SUSTAINABLE ECONOMIC DEVELOPMENT:

INITIATIVES, PROGRAMS, AND STRATEGIES FOR CITIES AND REGIONS

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PREFACE

Urban Sustainability Associates (USA) is a nonprofit network of national practitioners committed to advancing innovation in the application of sustainability strategies to urban centers.

USA's mission is to support urban regions in implementing large-scale urban sustainability solutions. Our vision is that radically improved environmental performance of urban regions can drive inclusive prosperity. More information about USA and its services is available at www.urbansustainabilityassociates.com

Urban Sustainability Associates works on sustainability solutions in six primary content areas:

- Sustainability Planning
- Energy Efficient Building Retrofits
- Sustainable Transportation
- Sustainable Economic Development
- Community Energy Planning
- Green Infrastructure

This document shares the USA framework for implementing Sustainable Economic Development strategies for urban regions. James Nixon, its author, is chairman of Sustainable Systems, Inc., a USA partner, and coauthor of the "Double Bottom Line Handbook." He was a lead consultant in the creation of *Mission Verde*, San Antonio's Sustainability Plan and Southwest Florida's Climate Prosperity Strategy.

Future USA publications will cover other aspects of USA work, including large-scale building retrofits; sustainable transportation; transit- and cargo-oriented development; and green infrastructure.

USA Network Members

Center for Neighborhood Technology

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Reconnect America

O-H Community Partners

Colorado University Initiative for Sustainable Development

I. EXECUTIVE SUMMARY

This paper provides cities and regions with a comprehensive approach to economic development that puts sustainability front and center. It offers:

- A framework addressing what sustainable economic development is, why it matters, and how it is similar to and different from traditional economic development.
- A set of sustainable economic development initiatives and programs for cities/regions, with descriptions of each initiative and program, along with possible delivery partners.
- An approach to the development of sustainable economic development strategies for cities/regions that incorporates the initiatives and programs.

The moral and environmental arguments for seriously dealing with climate change and environmental disruption are important, but not what this paper is about. Rather, this paper focuses on the great economic opportunities that are inherent in the economic transformation required by climate change and environmental disruption.

The paper addresses two audiences: those pursuing economic development who are interested in integrating sustainability with economic development best practices, and those working for sustainability who are seeking to engage with economic development.

The paper begins with:

- A brief discussion of the sustainability revolution.
- A description of the positive economic impact of California's nation-leading sustainability initiatives.
- The presentation of a set of market observations underlying sustainable economic development.
- A formulation of how sustainability integrates with city/regional economic development best practices and a characterization of the audiences for such a formulation.

The heart of the paper presents eight distinct Sustainable Economy Initiatives:

1. **Cleantech Business Cluster:** Encouragement of a cluster of businesses offering green products and services, such as energy, water, and/or resource efficiency; renewable energy; alternative transportation; and pollution/waste prevention and recycling.
2. **Green Business:** Improvement of the environmental and financial performance of existing firms.
3. **Sustainable Real Estate Development:** Promotion of walkable, mixed-use, mixed-income, transit-oriented real estate development – both infill and new communities.
4. **Green Investment:** Initiation of green investment vehicles to invest in green and clean tech businesses and sustainable real estate developments.
5. **Green Jobs:** Launch or strengthening of a system for green job development with green skills training training, career pathways, and green entrepreneurship to provide the workforce needed by green and clean tech businesses.

6. **Green and Cleantech Business Attraction and Retention:** Promotion of the city/region as an optimal place for green and clean tech businesses to start-up, locate, expand, and grow over the long term.

7. **Green Underserved Communities:** Connection of green and clean tech businesses and sustainable real estate developments led by people of color, women, and underserved communities with the appropriate business acceleration services and engagement of low- and moderate-income employees and residents in saving money through ecological efficiency.

8. **Sustainability Community Engagement:** Engagement of city/regional residents in understanding sustainability, participating in the process of building a sustainable economy, and making green purchasing decisions.

The presentation of each Sustainable Economy Initiative includes:

- A formulation of the objective for the Initiative.
- A discussion of the economic development "territory" covered by the Initiative.
- Two or more Green Programs that have been successful in accomplishing the objective for the Initiative. (A total of 26 Programs are described.)
- Strategic allies that have expertise in implementing each Green Program.

The paper concludes with a discussion of how cities/regions can choose from the Sustainable Economy Initiatives and the Green Programs to create their own Sustainable Economic Development Strategies.

II. THE SUSTAINABILITY REVOLUTION

A sustainability revolution is taking place—from an old economy that is high carbon, high pollution, waste intensive, and ecologically disruptive, to a new economy that is low carbon, low pollution, energy/resource efficient, and ecologically supportive. Businesses, cities, and regions that lead this revolution will prosper, because the new economy will outperform the old one. Businesses, cities, and regions that lag are in danger of being left behind.

Our time is somewhat analogous to 100 years ago when the automobile industry emerged and everything changed—the way cities and regions grew, the way transportation took place, which industries succeeded and which failed. In the 1920s, Detroit came to be the world headquarters of the global automobile industry and the wealthiest city in the country with the fastest growing population of any city in the world.

This time is also somewhat analogous to the information technology revolution 20 years ago when a complex of related technologies—the personal computer, the cell phone, and the Internet—emerged and everything changed again, with Silicon Valley/the San Francisco Bay Area becoming the world's leading economic region.

Sustainable Enterprise: This time it is the green industries—conservation, resource efficiency, renewable energy generation, pollution prevention, and waste minimization and recycling—that are the engine of transformation, and all businesses are coming to use their products and services.

The phenomena of global warming, peak oil, and environmental dislocation—combined with the incentive and regulatory priorities in the European Union, Japan, and the new U.S. administration of President Obama—provide inevitability to this transformation, making it the key to a successful 21st Century economy.

A new way of doing business is emerging out of this transformation—sustainable enterprise—and before long the way all businesses operate will completely change. As sustainable (green) enterprises emerge and interact with each other as suppliers and customers, and as they all become greener, a sustainable economy is developing. The new clean environmental technologies are at the heart of this economic transformation. While some businesses are specializing in producing and distributing them, all businesses are coming to use them.

Urban Response: Cities are on point for this transformation. More than half of humanity now lives in cities and that half annually produces 85% of the world's Gross Domestic Product, consumes more than 75% of the Earth's resources, and generates approximately 75% of the Earth's waste. If current trends continue, 61% of all people will live in urban areas by 2030, and the rural population will be smaller than it was in 1995. Fortunately, cities are responding to the economic challenges and opportunities offered by the sustainability revolution.

According to the Mayor's Climate Protection Center, 944 mayors from the 50 states, the District of Columbia and Puerto Rico, representing a total population of over 83 million U.S. citizens have signed the U.S. Conference of Mayors Climate Protection Agreement (as of June 2009).

Under this Agreement, participating cities commit to "strive to meet or beat the Kyoto Protocol targets in their own communities (7% reduction of greenhouse gas emissions from 1990 levels by 2012), through actions ranging from anti-sprawl land-use policies to urban forest restoration projects to public information campaigns."

The most recent (2007) edition of *Climate Protection Strategies and Best Practices*, published by the Mayor's Climate Protection Center, presents the climate protection initiatives of 52 different cities. Increasingly, cities are moving from individual initiatives to more comprehensive plans. For example, Chicago's Climate Action Plan (www.chicagoclimateaction.org), announced in the fall of 2008, addresses:

- Energy Efficient Buildings.
- Clean Renewable Energy Sources.
- Improved Transportation Options.
- Reduced Waste and Industrial Pollution.
- Adaptation (to the Effects of Climate Change).

San Antonio's *Mission Verde*: In January 2009, San Antonio undertook what can be seen as a second generation of sustainability plans when it launched *Mission Verde* focused on the economic opportunities inherent in the transition away from a carbon-intensive economy to a sustainable economy.

> **"Mission Verde…is more than an environmental policy; it is an economic one. This economic approach runs deep. It is expressed in the writings of the best-selling author and columnist Thomas Friedman and the noted economist Jeremy Rifkin, who both see this change as nothing less than the beginning of the Third Industrial Revolution and the future of the U.S. economy. It will be one of the most dramatic economic changes in world history. With Mission Verde, San Antonio has a plan to…compete successfully in a 21st Century global economy."**
> (www.nupolis.com/docs/Mission%20Verde%20Final.pdf)

Mission Verde is pursuing the creation of a sustainable economy in San Antonio through 10 initiatives:

1. A 21st Century energy infrastructure based on distributed energy generation.
2. A Multi-Tech Venture Capital Fund.
3. A Green Jobs Program.
4. An Economic Development Strategy to foster a sustainable economy.
5. A high-performance building code for new residential and commercial construction.
6. A Green Retrofit Program.
7. An integrated multi-modal transportation system.
8. Mixed-use, mixed income, walkable, transit-oriented real estate development.
9. A Green One-Stop Center.
10. Sustainability and resource efficiency across all City departments/facilities.

The sustainability perspective provides a vantage point from which the 944 cities that have signed the Mayor's Climate Protection Agreement and, ultimately, any city/region, can look at sustainability as, not only an outstanding economic opportunity, but as an essential determinant of economic prosperity.

III. THE CALIFORNIA EXAMPLE

The example of California provides striking evidence that the sustainability revolution is, in fact, picking up speed in a way that is highly beneficial economically.

The California Green Innovation Index provides a dashboard that depicts the impact of "three decades of ambitious state environmental and energy policies, putting California on a path to energy independence and one of the lowest per capita carbon footprints in the nation, all the while growing one of the most vigorous economies in the world." (*www.next10.org/environment/greenInnovation09.html*)

According to the 2009 Index:

- California's increased energy efficiency over the last 35 years has saved consumers over $56 billion, creating 1.5 million fulltime jobs and $45 billion in payroll.
- The 2009 Index shows that green jobs are increasing more rapidly than other jobs, with total jobs increasing by 1% statewide, while green jobs have increased by 10% since 2005.
- California's energy productivity – Gross Domestic Product (GDP) per unit of energy – is 68% greater than the rest of the nation.
- In 2006, energy consumption per capita in California was 18% lower than 1970 levels, while energy consumption per capita for the rest of the country remained at 1970 levels.
- California's economy is less than half as carbon intensive as the rest of the U.S. While GDP per capita in California increased by 28% in the 16 years following 1990, gross emissions per capita are 10% lower than 1990, thereby demonstrating that it is possible to increase economic prosperity while also reducing greenhouse gas emissions.

IV. MARKET OBSERVATIONS

A set of seven market observations can assist cities/regions in understanding the sustainability revolution, as it manifests in California and elsewhere, and to formulate the sustainable economic development strategies they need to embrace the economic opportunities offered by building a sustainable economy.

Observation 1: The goals of improved environmental performance and energy independence (climate mitigation; climate adaptation; resource/energy efficiency; and alternative energy development) are driving the development of new products, services, companies, and markets that will outperform their non-green counterparts over the long run.

Observation 2: Many of the specific climate mitigation strategies (such as clean renewable distributed energy and large-scale building retrofits) have natural economic development potential for stimulating new businesses and jobs.

Observation 3: Environmental gains must generate tangible economic benefits to be successful. Sustainability solutions that combine improved environmental performance and economic benefits are the key to successful climate-change mitigation/adaptation strategies. If the benefits of reduced greenhouse gas (GHG) production are externalized, distant, and delayed, the motivation to make voluntary large scale reductions will eventually dissipate. Goals for reducing GHG emissions need to be translated into self-reinforcing market dynamics.

Observation 4: Leadership on climate change and regional/global economic competitiveness can reinforce each other rather than cancel each other out. Environmental performance can drive economic prosperity that can be equitable for different groups and places.

Observation 5: As energy and natural resource efficiency become increasingly important competitive advantages in regional and global economies, urban sustainability strategies can be integrated with economic development and community development strategies that leverage the competitive advantage of urban density.

Observation 6: Economic benefits can be realized in two basic ways. (1) Increased participation in the emerging sustainable economy can generate new enterprises, new jobs, and new wealth. (2) The hidden advantages of "urban form" can create significant reductions in the cost of living and the cost of doing business through the integration of community design, energy efficient buildings, and mobility systems.

Observation 7: A sustainable economic development strategy can use many of the same best practices as other kinds of economic development strategies—it is just focused on different kinds of technologies, products, processes, companies, markets, and career pathways.

V. SUSTAINABLE ECONOMIC DEVELOPMENT

The seven market observations can be summarized into one proposition:
For cities/regions to prosper and be successful in the 21st Century, their economic development strategies must engage with the economic opportunities offered by the sustainability revolution.

How this can be accomplished is the message of this paper, which is addressed to the audiences of:

- Regional, state, county, and city public officials.
- Economic development agencies.
- Environmental, energy, waste management, and other sustainability agencies.
- Redevelopment authorities.
- Business civic organizations, chambers of commerce, and other business support associations.
- Community and neighborhood development organizations.
- Environmental and sustainability action organizations.
- The economic development and sustainability dimensions of educational institutions.
- Technology development agencies.
- Economic development and sustainability consultants.

The generally recognized best practices for city/regional economic development include:

- Identifying the business clusters in the city/region that are already strong and the nascent business clusters for which there are the preconditions for becoming strong, particularly those business clusters that are effective job producers and wealth producers.
- Assisting existing businesses, particularly those in the identified business clusters, to thrive, while growing new businesses in those clusters.
- Strengthening businesses that produce products and services for export out of the city/region to a national and global market, in balance with city/region and neighborhood serving businesses.
- Attracting businesses, particularly those in the identified clusters, to move to the city/region.
- Encouraging real estate development that locates housing that is affordable near where the businesses are located.
- Promoting the revitalization of low- and moderate-income neighborhoods and communities.

- Fostering robust economic, social, and environmental infrastructures in the city/region that provide the financial, workforce development, educational, and resource systems that businesses need.

- Branding and marketing the region, highlighting its business clusters and its economic, social, cultural, physical, and natural advantages to attract businesses to locate and grow in the region.

A Sustainable Economic Development strategy uses all of these best practices in a modified fashion to encourage:

- Businesses that specialize in environmental products and services (the cleantech business cluster) to start-up, locate, and grow in the region.

- All businesses in a region to become greener and, at the same time, more economically productive.

- Sustainable real estate development to take place—development that is mixed use, mixed income, walkable, energy and resource efficient, and transit oriented.

- The regional financial, workforce, and educational infrastructure to understand sustainable enterprises, in order to encourage investment in the sustainable economy and to prepare people to participate effectively as workers, consumers, and investors.

- The regional physical infrastructure to provide energy, water, materials, buildings, and mobility in a way that is both ecologically and economically efficient.

- The region to be recognized as a place that is in the forefront of the sustainability revolution, becoming an economically, socially, and environmentally better place to live, work, and locate a business.

Separately, each of these best practices can make a significant contribution to the emergence of sustainable economic development in a city/region, but taken together, they can show the way to building a sustainable economy that provides strategic economic advantage in the global economy.

VI. SUSTAINABLE ECONOMY INITIATIVES

Based on this perspective, a city/region can assemble a Sustainable Economic Development Strategy that is composed of a set of Sustainable Economy Initiatives, each of which includes one or more specific Green Programs. These Sustainable Economy Initiatives and Green Programs draw on economic development best practices and environmental best practices to create an integration of sustainability and economic development.

Presentation of the Sustainable Economy Initiatives: Each of the eight Sustainable Economy Initiatives presented below includes:

- A formulation of the objective for the Initiative.
- A discussion of the economic development context covered by the Initiative.
- Two or more Green Programs that have been successful elsewhere in accomplishing the objective of the Initiative.
- Strategic allies that have expertise in implementing the Green Programs.

After a presentation of the Sustainable Economy Initiatives, this paper concludes with a discussion of how a city/region can utilize the Sustainable Economy Initiatives and Green Programs to create a Sustainable Economic Development Strategy uniquely appropriate for that city/region.

Based on their unique situation and their sustainability values and goals, the government, business, and community leadership of a city/region can choose from among these Sustainable Economy Initiatives and Green Programs, as well as suggest other Initiatives and Programs, to formulate a Sustainable Economic Development Strategy uniquely appropriate for their city/region.

1. Cleantech Cluster Initiative

Encouragement of the emergence and/or growth of a Cleantech Business Cluster

Context

A Cleantech Cluster Initiative uses the approach of business cluster development to encourage the emergence of and/or the strengthening of a cleantech business cluster in a city/region.

Business Clusters: According to Harvard Professor Michael Porter, business clusters are "geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field that are present in a region." Clusters arise because they:

- Increase the productivity of the companies in the cluster.
- Drive innovation in the field.
- Stimulate new businesses in the field.

Silicon Valley in California is the best known example of a business cluster. In the mid 1990s, a number of successful computer-related companies emerged in Silicon Valley, which led entrepreneurs interested in starting up new high-tech companies to do so in Silicon Valley. This led to many venture capital firms relocating to or expanding their offices in Silicon Valley, thereby encouraging more entrepreneurs to locate their startups there.

The cluster effect in the business and capital markets also led to a cluster effect in the labor market, because programmers, engineers, and other technologists realized that they would find greater job opportunities by moving to Silicon Valley. At the same time, Stanford University business and technology graduates tended to stay in Silicon Valley, finding work or starting a business, often utilizing the technology transfer of intellectual property developed at Stanford.

High-tech companies and startups around the country knew they could find capital and workforce with the proper skill sets in Silicon Valley, which provided incentives for them to move there, in turn leading to more high-tech workers locating there. At the same time, business (legal, accounting, marketing, PR, etc) and financial services firms have been attracted to Silicon Valley by the markets created by high-tech businesses located there.

The process for defining, describing, and encouraging business clusters is not standardized and different economic development practitioners have developed their own methodologies. However, most cluster analysis uses evaluation of regional employment patterns, usually based on the NAICS North American Industrial Classification System.

Economic development best practice suggests that regions should identify a few clusters and develop a comprehensive approach to encouraging the clusters to thrive in the region. It is important to select clusters in industries that are likely to grow nationally and globally and that already have a base of activities and support in the region.

The discussion that follows focuses on the Cleantech Cluster, but the same approach can be used for the green businesses in any business cluster, i.e. any industry sector made up of businesses that have or are prepared to "go green" in their operations, though they may not produce a cleantech product or service.

Cleantech Cluster: The term "cleantech," often used interchangeably with "greentech," has emerged as an umbrella term encompassing a diverse business cluster with a range of environmental products, services, and processes, all intended to:

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

The emergence of cleantech is a response to the challenges of climate change and ecological disruption that resulted from the way older industrial technologies operated. However, in a very large and growing number of cases the new clean technologies are turning out to be highly cost effective with a return on investment (ROI) coming within relatively short time periods.

While the boundaries of the Cleantech Cluster are not precise, the Cleantech Group, organizers of the Cleantech Network and the Cleantech Forums, has suggested that clean tech includes eleven industry sub-segments (presented here in a somewhat augmented form:

- **Energy Generation:** wind, solar, hydro/marine, biofuels, geothermal, and other forms of energy generation.
- **Energy Storage:** fuel cells, advanced batteries, and hybrid systems.
- **Energy Infrastructure:** management, transmission, and "smart grids."
- **Energy Efficiency:** lighting, buildings envelope, insulation, glass, and other forms of energy efficiency.
- **Transportation:** vehicles, logistics, structures, and fuels.
- **Water and Wastewater:** water treatment, water conservation, and wastewater treatment.
- **Air and Environment:** cleanup/safety, emissions control, monitoring/compliance, and trading and offsets.
- **Materials:** nano, bio, chemical, and other forms of new, more efficient materials.
- **Manufacturing and Industrial:** life cycle design, advanced packaging, monitoring and control, smart production, and industrial ecology.
- **Agriculture:** natural pesticides, land management, sustainable forestry, and aquaculture.
- **Recycling and Waste:** recycling and waste treatment.

The Obama Administration has indicated clearly that it will invest substantial sums of money in clean tech as one strategy that addresses climate change and dependence on foreign oil, as well as the recession and green job creation. The funding for clean tech in the recently passed Stimulus Package bares this out. There are also strong indications that a national carbon cap-and-trade system may be implemented. These new financial incentives and regulatory constraints will provide significant new impetus for clean tech, which is already receiving the third highest amount of new venture capital investment, after high tech and bio tech.

Seven Keys Elements Involved in Cleantech Cluster Development: There are seven keys involved in a Cleantech Cluster in a city/region. They include:

1. Entrepreneurs and managers that are starting up and growing businesses in the cleantech sector.
2. Sources of equity and debt finance prepared to make investments in cleantech businesses.
3. Workforce with the appropriate skill sets to meet the employment needs of cleantech businesses.
4. Business services (legal, accounting, marketing, strategy, management assistance etc.) with domain expertise at the level of operations to which cleantech businesses aspire.
5. Suppliers and customers for the businesses in the Cleantech Cluster.

6. Universities and educational and research institutions that are educating entrepreneurs and managers who want to startup businesses and/or work in the cleantech businesses, as well as whose research activities are developing new intellectual property that can be the focus of new cleantech business development through technology transfer.

7. Networks that link the various aspects of the Cleantech Cluster together.

While some regions will come to be known for being home to specific aspects of the cleantech industries, all regions need to make effective use of them. They will come to be key differentiators for regional prosperity that is sustainable.

Business Incubation and Acceleration: Since the Cleantech Cluster is still in the relatively early stages of development, very many cleantech businesses are in the start-up or early stages of development.

Unless it is led by a serial entrepreneur, a typical start-up or early-stage company is led by an entrepreneur whose expertise is in a particular technology, product, or service, but not in all of the other dimensions of running a business—such as management, operations, finance, human resources, legal, government relations, marketing, sales, and customer service. A business acceleration program is designed to assist the entrepreneur of a start-up or early-stage company with all of these other business dimensions.

A business incubator is a facility where related but non-competitive companies co-locate in executive suites with common meeting rooms, services, and other facilities. Typically, business incubators function with a real estate based business model, deriving their primary income from the rental of space to companies moving through the incubation process.

Business incubators typically include a business acceleration program in association with the business incubator. However, a business acceleration program does not need to be associated with a business incubator and can serve businesses that are not co-located.

The National Business Incubation Association (www.nbia.org) is the leading organization advancing business incubation. It provides information, education, advocacy, and networking resources to help bring excellence to the process of assisting early-stage companies worldwide.

The association is composed primarily of incubator developers and managers, but technology commercialization specialists, educators and business assistance professionals are also represented. Its mission is to provide training and a clearinghouse for information on incubator management and development issues and on tools for assisting start-up and fledgling firms.

A large number of environmental business incubators have developed in the last decade. For example, the Environmental Business Cluster is a non-profit clean energy and environmental technology commercialization center in San Jose, California, assisting emerging clean energy and environmental technology companies in reaching the market. The Environmental Business Cluster provides business assistance programs and aids in the formation of technology partnerships and industry networks. During its 15 years of experience, the Environmental Business Cluster has helped more than 150 businesses commercialize and market their products.

Cleantech Transfer and IP Commercialization: Universities are playing an essential role in the development of clean technologies. For example, the Lawrence Berkeley Labs at the University of California, Berkeley, have developed a worldwide reputation producing energy efficiency and other forms of cleantech research. Its stature was recognized by President Obama when he chose Steven Chu, the President of Lawrence Berkeley Labs, to be his Secretary of Energy.

Through technology transfer and intellectual property commercialization, university research can come to be utilized by cleantech companies to produce new cleantech products and services.

Typically, university research needs to go through a process of technology transfer (tech transfer) to become a product or a service that can be commercialized. According to the Association of University Technology Managers:

"Technology transfer is a term used to describe a formal transfer of rights to use and commercialize new discoveries and innovations resulting from scientific research to another party. Universities typically transfer technology through protecting (using patents and copyrights), then licensing new innovations. The major steps in this process include the disclosure of innovations, patenting the innovation concurrent with publication of scientific research and licensing the rights to innovations to industry for commercial development."

Universities with significant research activities usually have their own tech transfer and intellectual property (IP) commercialization programs to promote licensing agreements and joint ventures. Recently, a variety of technology transfer intermediaries have also emerged, working with research institutions, governments, and corporations. Technology transfer is complex and may involve scientists, economists, engineers, lawyers, and marketing specialists. Increasingly, university tech transfer programs and tech transfer intermediaries are focusing on cleantech.

The process for exploiting research commercially varies widely. It may involve licensing agreements or joint ventures and partnerships. Licensing compensation may take the form of licensing fees or ownership shares in a company or a combination of forms of compensation.

Green Programs

Cleantech Cluster Study: If one does not exist already for the city/region, a Cleantech Cluster Study is typically the first step in launching a Cleantech Cluster Initiative. A Cleantech Cluster Study identifies:

- The cleantech businesses already located in the city/region, categorizing them according to their industry sub-segment, number of employees, geographic location in the region, stage of development, and investment received.
- The entrepreneurial (particularly serial entrepreneurs) specialized talent pool and workforce that the cleantech cluster can draw on.
- Level of activity in related business clusters, such as bio-tech and high-tech.
- The city/region's support mechanisms, including cleantech networks, related trade associations, and specialized business services providers.

- University and research institution engagement with clean tech, including technology transfer and IP commercialization potentialities.
- Angel, venture, and debt financial infrastructure and current levels of investment.
- Local, state, and federal policy, regulatory, and incentive environment.
- Natural advantages (days of sun, amount of wind, etc.) and disadvantages.
- General assessment of the local/regional economic trends, challenges, and opportunities.

A Cleantech Cluster Study forms the basis for the other aspects of a Cleantech Cluster Initiative. Strategic Development Solutions (www.sdsgroup.com) and Sustainable Systems, Inc. (www.ctcluster.com/main/SSIInc.htm) are completing a Cleantech Cluster Study in the San Antonio, Austin, and Houston region in Texas in association with building a Multi-Tech Venture Fund headquartered in San Antonio.

Cleantech Network: If a Cleantech Network doesn't already exist in a city/region, then it is important to establish one. Typically, a Cleantech Network will include:

- Entrepreneurs, management, and workforce of cleantech companies.
- Investors, including banks, venture funds, angel networks, and finance intermediaries.
- Energy and water utilities.
- Business services providers serving the cleantech sector, including: legal firms, accountants, management and business strategy consulting firms, public relations and marketing firms, and others.
- Academic institutions, including research institutes, green MBA programs, and tech transfer programs (see below).
- Government agencies interested in encouraging cleantech businesses in their jurisdictions, including economic development, business development, and workforce development agencies.

A typical mission statement for a Cleantech Network could be to facilitate the start-up and expansion of cleantech companies in the city/region to capitalize on the rapid expansion of the cleantech market in research and development, manufacturing, distribution, sales, services, and maintenance.

Activities of a Cleantech Network could include: networking meetings, a website with email updates and an electronic newsletter, public forums, conferences, entrepreneurial assistance, market development, and coordination of group buying power. One important function of a Cleantech Network is to provide suggestions for how the city, the county, the colleges and universities, and others can be of assistance in growing the clean tech cluster.

The Cleantech Group, among other things, coordinates a national Cleantech Network (www.cleantech.com).

Coordination of a Cleantech Network can either be provided by an existing organization or public agency, or a new organization can be formed to provide coordination. Organization of a Cleantech Network can flow out of the completion of a Cleantech Cluster Study.

Green Business Acceleration Program: As developed by the Communications Technology Cluster (CTC) Business Center in Oakland, California, a Green Business Acceleration Program assists businesses to "grow faster and smarter," where faster is measured by significant increases in income and profitability and smarter is measured by significant increases in environmental and social performance.

The CTC Business Acceleration Program involves consultations with participating businesses, led by business acceleration practitioners. The consultations begin with an assessment that addresses 10 key dimensions of successful business performance, including:

- Vision, mission, objectives, value proposition, and company culture.
- Business model.
- Sustainability orientation and environmental performance.
- Markets, marketing, and sales strategy.
- Operations, delivery systems, quality control.
- Management team, Board of Directors, and Advisory Board.
- Workforce and human resources, including recruitment, hiring, training, performance, and advancement of employees.
- Technology/IT.
- Community engagement.
- Finances, financial management, capitalization, and exit strategies.

Based on the assessment audit, the business acceleration consultation then focuses on developing a business acceleration strategy that the company will undertake to accomplish business objectives, support strengths, provide solutions to weaknesses, and address needs in relation to both financial and environmental performance.

Typically, the business acceleration strategy includes hiring appropriate business and environmental service providers who have already succeeded at the level of operations to which the business aspires. The business acceleration strategy also usually includes development and implementation of a capital acquisition plan, with potential sources of capital identified.

Often, a business acceleration strategy will include establishment of an executive advisory board for the company, made up of business leaders with general business and industry specific expertise.

A business Acceleration Program can be customized to fit within an incubator or to operate on its own, and it can focus on the Cleantech Cluster as a whole, sub-sectors of Cleantech Cluster, or one or more sectors of Green Business. The business model for a Business Acceleration Program's revenues is based on fees for services from client companies, combined with success fees for companies' acquisition of debt or equity capital.

Cleantech Transfer and IP Commercialization Program: It is important for a Clean Tech Cluster Initiative to identify and engage with the different research and tech transfer programs in a city/region's universities, particularly those addressing tech transfer in the cleantech area. A Cleantech Network should include representation from university tech transfer programs if they address clean tech.

If the city/regions universities do not specifically focus on clean tech, then the Cleantech Cluster Initiative should encourage the universities to do this and the Association of University Technology Managers and the Cleantech Group are both resources to assist the universities in doing this.

Relation to Other Initiatives: In addition to what has been outlined in this section, a Cleantech Cluster Initiative can be enhanced by implementation of the Green Business, Green Investment, Green Jobs, and Cleantech and Green Business Attraction.

2. Green Business Initiative

Improvement of the environmental and financial performance of existing firms

Context

The purpose of a Green Business Initiative is to establish a system for assisting all businesses in a city/region to "go green" by improving their environmental performance in ways that also improve their financial performance over the long run. Cleantech businesses provide the green products and services. Other businesses use those products and services to go green.

Businesses Going Green: Recognizing the economic opportunities inherent in going green, many leading larger corporations are taking significant actions. For example:

- According to its Sustainability Progress Report, Wal-Mart has committed to an environmental responsibility program, aiming to cut greenhouse gas emissions by 20 percent by 2012, while targeting 100% renewable energy, zero waste, and the sale of sustainable products. Wal-Mart has invested $500 million in sustainability, increased building and fleet efficiency by 15%, built a set of experimental green stores, and is requiring its suppliers to go green through its Sustainable Value Networks.

- In its 2007 report, GE indicated that its Ecomagination initiative now has 60 products generating $70 billion in revenue, with overall corporate greenhouse gases reduced by 8% from 2004 levels.

- In its case study on DuPont, the Climate Group reports that DuPont saved $3 billion while reducing greenhouse gas emissions by 72% over a decade. DuPont is aggressively developing sustainable products for buildings and construction, transportation, agriculture and nutrition, and communication. DuPont reports on its social and environmental progress using the Global Reporting Initiative reporting format and is independently monitored by Environmental Resource Management.

- In its Sustainability Report, Interface, Inc., the world's largest manufacturer of commercial and residential modular carpet and broadloom, shows that it has grown $200 million (to over $1 billion) without increasing resource consumption, and the company has avoided $250 million in waste management bills.

- ☼ According to the State of Green Business 2009, 30% of the corporations in the S&P 500 now produce a non-financial report that addresses environmental issues.

- ☼ The 2008 study, Going Green by Hudson Gain Corporation, found that 214 of the 1,200 largest corporations in the United States had some version of a Chief Sustainability Officer and a sustainability program oriented around achieving a "triple bottom line" of "profit, people, and planet." These sustainability programs address how the corporations function, independent of whether they produce a specific product or service to benefit the environment.

Other major U.S. corporations with comprehensive sustainability programs include: Dell, Johnson Controls, Hewlett Packard, Johnson and Johnson, Coca Cola, H.J. Heinz, Google, Random House, Nike, Starbucks, TimeWarner, UPS, Whole Foods, Xerox, Target, Walgreens, and many others.

Sustainability Reporting: During the last decade, a variety of different approaches to sustainability reporting have emerged to assist corporations to attain and report on environmental progress. The International Standards Organization and the Global Reporting Initiative are the two most widely used systems.

The International Standards Organization ISO 14000 standards *(www.iso.org/iso/iso_catalogue/management_standards/iso_9000_iso_14000.htm)* seek to identify what an organization does to:

- ☼ Minimize harmful effects on the environment caused by its activities.

- ☼ Achieve continual improvement of its environmental performance.

The ISO 14000 standards specify requirements and guidelines for establishing environmental management systems, including labeling, performance evaluation, life cycle analysis, communication, and auditing.

The Global Reporting Initiative (GRI) has developed the most widely used sustainability reporting framework, setting out the principles and indicators that organizations can use to determine both what to report and how to report in measuring their economic, environmental, and social performance. *(www.globalreporting.org/Home)*

Sustainability reports, based on the GRI Sustainability Reporting Guidelines, address "materiality" (economic, social, and environmental impact); stakeholder inclusiveness; sustainability context; and "completeness" (scope, boundary, and time covered); and also include sector supplements and national annexes. The Guidelines can be used to benchmark organizational performance with respect to laws, norms, codes, performance standards, and voluntary initiatives; demonstrate organizational commitment to sustainable development; and compare organizational performance over time.

Typically large corporations have a department with senior staff to address environmental issues, implement sustainability initiatives, and report on progress. However, smaller businesses have difficulty finding the resources to hire a single environmental officer, let alone a whole department. Environmental performance is more hit or miss with small and mid-size companies.

Because of this situation, a city/region will need different approaches for providing assistance to its larger corporations and for assisting its small and mid-size companies.

Green Programs

Green Business Certification Program: To help small and mid-size companies in the San Francisco Bay Area to go green, the Association of Bay Area Governments established the Bay Area Green Business Program (*www.greenbiz.ca.gov/ShopGreen.html*). This program assists small- and medium-sized businesses in implementing high standards of environmental performance. The Bay Area Green Business Program is a partnership of government agencies and utilities that help local businesses take environmental actions through an easy-to-use framework and check list for improving environmental performance.

According to the Bay Area Green Business Program, certified green businesses bring their operations into compliance with all environmental regulations and then go beyond compliance to implement additional measures to address:

- Water conservation.
- Solid waste reduction and recycling.
- Energy conservation.
- Pollution Prevention.

Certified Green Businesses are recognized as environmental leaders and report that being certified:

- Strengthens their financial bottom lines through operating efficiencies and increased patronage.
- Improves employee morale and the health of the workplace.
- Establishes a marketing edge over the competition.

Over 1,000 businesses and public agencies have been certified since 1997. Certified green businesses receive a Green Biz logo to display, are listed in a printed and on-line directory, and receive press and other forms of recognition.

Newly certified green businesses receive their certification at quarterly events hosted by different certified green businesses. These quarterly events also include presentations by green thought leaders and by the companies hosting the events. Typically, these events receive good coverage in the local media.

The Program is implemented by Green Business Coordinators in 9 participating counties. The Green Business Coordinators assist businesses to make sure they are in compliance with all applicable environmental regulations and help them to complete the Green Business Certification Checklist. Unique checklists are developed for different industry sectors.

These county programs are funded by their partners, including local and regional government agencies, utilities, special districts, and nonprofit organizations that promote environmental compliance, pollution prevention and resource conservation, with some funding also coming from government and foundation grants.

The city of Los Angeles received a grant from the Los Angeles Department of Water and Power to start a green-business certification program modeled on the Bay Area Program.

Start-up of a Green Business Certification Program will involve:

- Identification of a lead agency.
- Acquisition of start-up and operational funding.
- Determination of the initial industry sectors.
- Establishment of a relationship with all of the relevant environmental regulatory organizations.
- Fine tuning of the questionnaire for the chosen industry sectors in relation to the specific city/region.
- Hiring of the coordinator.
- Launch of the Green Business Certification Program.

Green Business Forum: Larger corporations that go green typically create the position of Chief Sustainability Officer, Chief Green Officer, or Chief Environmental Officer at the vice president level to oversee a department that addresses the company's compliance with environmental regulations and overall pro-active environmental performance.

As described above, the International Standards Organization ISO 14000 standards and the Global Reporting Initiative (GRI) have become the most widely used sustainability reporting frameworks applied by a Chief Environmental/Green/Sustainability Officer to report on the sustainability/environmental performance of the business.

Constitution of a Green Business Forum in a city/region can significantly assist the Chief Environmental/Green/Sustainability officers of the major corporations in the city/region with their assigned responsibilities to improve the sustainability and environmental bottom line for their respective entities.

The intent of a Green Business Forum is to conduct a best-practices exchange and support optimization of businesses' improvement strategies by addressing mutual opportunities and barriers. The Green Business Forum can hold forums on corporate sustainability, environmentally preferable purchasing programs, resource efficiency, and other green topics featuring thought leaders, best practices, and leading national and city/regional examples. A Green Business Forum can also weigh in on public policy as it relates to the environment.

A Green Business Forum can also be a context for the major businesses in a city/region to utilize the "industrial ecology" perspective to explore how businesses can use one another's waste streams as sources of energy and/or feed stock.

Launch of a Green Business Forum would be preceded by identification of the large corporations in the area with green/sustainability programs and a needs assessment to determine the perceived needs of those corporations, as well as specific programatic and structural ideas that they have for the organization of a Green Business Forum in the city/region.

The Business Council on Climate Change (BC3) is one example of a Green Business Forum. *(www.bc3sfbay.org/welcome)*. BC3 is a partnership of San Francisco Bay Area businesses committed to reducing their green house gas emissions. BC3 companies of all sizes commit to five principles of climate leadership—internal implementation; community leadership; advocacy and dialogue; collective action; and transparency and disclosure.

BC3 members collaborate to share ideas and case studies, identify tools, participate in educational forums, and establish best practices. There are over 90 members including: Cisco Systems, Pacific Gas & Electric, The Gap, Blue Shield of California, CH2M Hill, and Webcor Builders.

In its *Mission Verde* sustainability plan, the City of San Antonio established a Community Green Leaders Task Force to accomplish the function of a Green Business Forum.

Another example of Green Business Forums are the Sustainable Business Forums in West Michigan and Southeast Michigan. These forums bring together corporate sustainability leaders in these regions to share best practices and develop standards for implementation of internal sustainability initiatives. The West Michigan Sustainable Business Forum (*www.wmsbf.org*) has developed a detailed implementation guide and self-scoring system that is used by Forum members.

A Green Business Forum should be able to be coordinated by a part-time staff person, with the requisite knowledge and skills. It is possible that one or more of the corporate foundations in the city/region would recognize the virtues of a Green Business Forum and provide funding.

Regional Resource Metabolism Assessment: Regional resource metabolism and urban metabolism are analytical sciences based upon industrial metabolism, which originated during the early-1970s (Robert Ayres at Carnegie Mellon University) and has since been used as an economic development tool for regions such as Germany's Rhine River Basin and Australia's Southeast Queensland.

A Regional Resource Metabolism Assessment analyzes the resource flows entering and leaving a region in order to:

- Identify which industries add the greatest economic value for the least environmental cost.
- Target the missing sectors that fill the gaps in a city/region's resource economy.
- Reduce imports and increase the value-added exports.
- Close local/regional resource loops by turning wastes into resources.
- Drive economic development strategy that builds both jobs and environmental performance.

All of a region's stakeholders—whether they are an executive of a large business, the owner of a small business, an elected official, an economic development specialist, an environmental or community activist, or an investor—need to understand a city/region's Resource Metabolism, in order to:

- Grow the sectors that add greatest value.
- Stop investing in sectors that cost too much.
- Increase everyone's efficiency in using common resources to create human value.

A Regional Resource Metabolism Assessment provides a reality-based map of a city/region's economy. Resource Metabolism maps assess actual resource flows through a region to provide a new perspective on efficiency of resource use, and to identify economic strategies compatible with quality of life goals. It is called a "reality based" approach to economic development since it is based on the physical reality—the flows of energy, resources, water and "wastes"—that underlie all economic life.

A Regional Resource Metabolism Assessment can be the prelude to establishing a Regional Resource Exchange, a system for enabling businesses in a region to list their "wastes" and their "feed stock" needs and to pursue matches, so that, to the greatest degree possible, there is no waste and all of businesses' wastes become feedstock for other businesses.

Natural Logic, Inc. *(www.bc3sfbay.org/welcome)* has pioneered the use of Regional Resource Metabolism Assessments in the U.S.

Sustainable Supply Chain Program: As an aspect of its Climate Prosperity Strategy, the state of Delaware is launching a Global Green Supply Chain Service as a research, outreach, and technical assistance initiative for Delaware businesses. In Delaware, this Service will assist businesses in understanding the green markets and green supply chains for their current products and how they can develop new products to tap into these supply chains. For manufacturing businesses, this Service will partner with the Delaware Manufacturing Extension Partnership.

All of the Green Programs in the Cleantech Cluster Initiative section can also be used to encourage green businesses in other business clusters.

3. Sustainable Real Estate Development Initiative

Promotion of walkable, mixed-use, mixed-income, energy efficient, transit-oriented real estate developments—both infill and new communities—that feature cleantech and green businesses

Context

The way cities/regions are laid out is fundamental to their sustainability. Two main dimensions of past practices have generated inefficient and unsustainable land use patterns:

- ☼ Zoning that isolates job locations, shopping and services, and housing from each other.
- ☼ Low-density land uses designed for access by the automobile.

A complex of problems results from this approach to land use: traffic congestion and long commutes; decline in air quality; inefficient energy consumption and greater reliance on foreign oil; loss of open space and habitat; economic resources that are inequitably distributed; and decline in residents' sense of community.

Urban sustainability requires a transition to land use practices designed to encourage efficient use of infrastructure, more closely integrated neighborhoods with a sense of community, and the preservation of natural systems.

Smart Growth and New Urbanism have emerged as use-integrated alternatives to the use-differentiation of automobile-oriented land use patterns. Smart Growth encourages higher density, transit-oriented, in-fill development and New Urbanism seeks mixed-use, walkable, human scale neighborhoods.

Smart Growth and New Urbanism are coming together to generate an economically, socially, and environmentally friendly conception of sustainable neighborhood development. The U.S. Environmental Protection Agency (EPA) has established 10 guidelines for this type of sustainable real estate development:

1. Mix land uses.
2. Take advantage of compact building design.
3. Create housing opportunities and choices for a range of household types, family size and incomes.
4. Create walkable neighborhoods.
5. Foster distinctive, attractive communities with a strong sense of place.
6. Preserve open space, farmland, natural beauty, and critical environmental areas.
7. Reinvest in and strengthen existing communities and achieve more balanced regional development.
8. Provide a variety of transportation choices.
9. Make development decisions predictable, fair and cost-effective.
10. Encourage citizen and stakeholder participation in development decisions.

In addition to these guidelines, it is important that sustainable real estate developments are energy efficient, use renewable sources of energy, and encourage cleantech and green businesses.

Sustainable real estate development has tended to do well financially. For example, in *Doing Well by Doing Good: The Benefits of Green Development*, the Rocky Mountain Institute argues that:

"Well-executed green development projects…perform extremely well financially. In fact, even though many of the leading-edge developers … have strong environmental backgrounds and ideals, the financial rewards of green development are now bringing mainstream developers into the fold at an increasing pace. It is possible—indeed it is the norm—to do well financially by doing the right thing environmentally. For example, project costs can be reduced, buyers or renters will spend less to operate green buildings, and developers can differentiate themselves from the crowd —getting a big marketing boost."

Benefits of green development can be "reduced capital costs, reduced operating costs, health and productivity benefits, higher perceived value and quality, staying ahead of regulations, and the satisfaction of doing the right thing."

Thousands of projects have been built with this orientation and now the U.S. Green Building Council is using a set of sustainability principles to develop an application of the Leadership in Energy and Environmental Design (LEED) certification for neighborhoods *(www.usgbc.org/DisplayPage.aspx?CMSPageID=148)*.

Sustainable Real Estate Development provides a foundation for Sustainable Economic Development. Mixed-use developments provide the spaces within which cleantech and green businesses can operate. The energy and cost efficiencies of green new construction and retrofits of existing buildings can be important sources of savings for green businesses and markets for cleantech businesses. Mixed-use, human-scale, walkable neighborhoods are more attractive to the entrepreneurial talent and workforce needed by cleantech and green businesses.

Green Programs

Modification of the Planning Code and Zoning: It may be the case that a city needs to modify its Planning Code and Zoning to encourage mixed-use Traditional Neighborhood Development; Transit Oriented Development; In-Fill Development; Commercial Retrofits; and Form-Based Development.

Adoption of a "SmartCode" is one approach to doing this. According to SmartCode Central (www.smartcodecentral.org/), a SmartCode "folds zoning, subdivision regulations, urban design, public works standards and basic architectural controls into one compact document. It is also a unified ordinance, spanning scales from the region to the community to the building."

A SmartCode supports walkable and mixed-use neighborhoods, transportation options, conservation of open lands, local character, housing diversity, and vibrant downtowns. A SmartCode discourages sprawl development, automobile dependency, loss of open lands, monotonous subdivisions, deserted downtowns, and unsafe streets and parks. A SmartCode is one of the family of "form-based codes" addressing primarily the physical form of building and community rather than primarily use and density.

Urban Land Institute (ULI) Sustainable Development Panel: ULI, a not-for-profit (*www.uli.org*), with more than 40,000 members worldwide representing the entire spectrum of land use and real estate development disciplines, has been very successful in stimulating various kinds of development in different regions.

ULI has been brought in to 500 different locations, in 47 states, 12 countries, and 4 continents, utilizing a comprehensive, pragmatic approach to solving a variety of land use challenges.

Typically, a ULI engagement is initiated by the regional ULI chapter. Public and/or private entities can be the client. After a conversation to frame the assignment, ULI assembles an interdisciplinary panel of volunteers who spend up to a week on-site exploring the situation, interviewing stakeholders, and making recommendations. Panels approach the assignment from all perspectives, including market potential, land use and design, financing and development strategies, and organizing and implementation.

When ULI undertakes a Sustainable Development Panel–one of the various types of ULI panels–the panel of ULI sustainable development experts spends a week in the city/region. To help achieve optimal sustainable development in the city/region, the ULI Sustainable Development Panel provides:

- An extensive sustainable development resource book.
- Comprehensive verbal and written recommendations, including development strategy, planning and zoning modifications, and recommendations on opportunity sites.
- Opportunities to engage ULI staff and members in follow-up efforts.

Once the city/region has received the ULI recommendations it can work with ULI, the regional and national development communities, community stakeholder groups, and public jurisdictions to assimilate and implement the ULI recommendations in ways that communicate to local and national developers the virtues of undertaking sustainable real estate developments.

Scan of Sustainable Development Opportunities: It is often helpful to have a sustainable development consultant undertake a scan of a city/region's specific sustainable development opportunities, both new communities and, particularly, potential infill developments in order to identify optimal development strategies and generate developer engagement.

If the development industry in a city/region is not aggressively pursuing sustainable development, such a scan can be very useful in catalyzing developer interest and engagement. If the interest is not there from the regional development industry, then a sustainable development consultant can bring in national developers to pursue development at the opportunity sites that are identified. Sustainable Systems has conducted a variety of such scans in various regions.

4. Green Investment Initiative

Initiation and coordination of green investment vehicles to invest in cleantech and green businesses and sustainable real estate developments

Context

The availability of green investment capital is essential for the growth of early and later stage cleantech ventures and for the pre-construction and construction phases of sustainable real estate developments. For those cities/regions which need additional green investment resources, a Green Investment Initiative can be of assistance through the creation of a green venture fund, a green real estate fund, special purpose bonding capacity, and/or a green investment network.

Cleantech Investment: According to the State of Green Business 2009, venture capital investment in clean tech rose to a record $7.6 billion, double the previous year—in a year when overall venture capital investment declined by 8%. More than 40% of this total (over $3.8 billion) went into solar, particularly thin-film, solar thermal, and solar services. Bio-fuels received more than $1 billion. Energy efficiency and smart grid investments obtained more than $700 million, followed by wind at over $390 million, energy storage at over $360 million, and transportation at better than $300 million. The other clean tech sub-sectors dropped off significantly from there.

However this cleantech venture investment is largely concentrated in Silicon Valley, the San Francisco Bay Area, and the Boston/New York City corridor. For example, according to the California Green Innovation Index 2009, $3.3 billion in cleantech venture investment was made in California in 2008.

Double Bottom Line Funds: In regions as diverse as New England, the Mid-Atlantic states, Southern California, the San Francisco Bay Area, Puget Sound, and Northwest Louisiana, business, civic, government, and community economic development organizations are contracting with Fund Building Teams to launch Double Bottom Line (DBL) Funds that employ a variety of market-based strategies to encourage business and economic development, community revitalization, and smart growth in low- and moderate-income (LMI) neighborhoods.

DBL Funds are special purpose private equity funds that can be either venture funds or real estate funds. DBL Funds pursue:

1. Market-rates of financial return for investors (the First Bottom Line).

2. Substantial economic, social, and environmental returns for local and regional stakeholders (the Second Bottom Line).

To a significant degree catalyzed by Economic Innovation International, Strategic Development Solutions, and Sustainable Systems, (DBL Fund Building Team) a whole field of DBL private equity investing has grown up in the last decade to invest in DBL real estate and business deals.

According to the Double Bottom Line Handbook (www.sdsgroup.com/dbl-handbook.html), since 1998 more than $20 billion has been invested in regional, mega-regional, and national DBL Funds. These DBL Funds are succeeding, producing market rates of financial return for institutional investors while creating jobs, community revitalization, and environmental progress for community stakeholders.

As these DBL asset classes have emerged, fund managers have begun to specialize in DBL Funds. At the same time, institutional investors have received both the First and Second Bottom Line returns that have led them to become repeat investors, looking with favor on new DBL Funds.

According to the Double Bottom Line Handbook, DBL Funds have somewhat more presence in the heartland than Cleantech Venture Funds, but they are still largely concentrated on the West and East Coasts.

The DBL Fund Building Team is utilizing the approach that has been successful in building other types of DBL Funds to build specifically green venture and real estate funds in different regions. For example, San Antonio's Mission Verde Sustainability Plan includes the launch of a Multi-Tech Venture Fund to invest in clean tech, along with bio-tech and high-tech ventures.

Green Bond Financing: A bond is a formal certificate of debt issued in writing in return for a loan. Bonds are issued by both government entities and private entities. The issuer sells the bond to investors who, in essence, loan the money to the issuer in return for a bond which assures its repayment. Individuals, financial institutions, bond brokers and others purchase these bonds, and are known as "lenders," "investors" or more simply, "bondholders."

The bondholder provides the loan for a defined period of time, and must receive repayment by the maturity date. Through this period, the bondholder also receives interest payments on the loan, and the rate is usually at a fixed rate, or coupon. The price of a bond changes during its lifetime. Bonds are backed by the credit of the issuer, and in the case of government, its taxing power. Generally, the riskier the bond, the higher rate of return a bondholder will receive.

According to Forbes' Investopedia, there is a new entry into the arena of green investing—green fixed-income investing, aka green bonds. Fixed-income investing for the environmentally aware is a relatively new concept compared to other types of financial instruments. Green bonds are issued to generate money that supports environmentally friendly business ventures.

The use of bonds to fund environmentally friendly projects may give either taxable or tax-exempt income to investors while also generating support for environmentally friendly projects.

Green bonds in the United States got a major boost from the Green Bonds amendment to the America Jobs Creation Act of 2004. It provides funding, in the form of $2 billion worth of AAA-rated bonds issued by the United States Treasury, to finance environmentally friendly development. The first major project financed by green bonds was a retail complex in upstate New York called Destiny USA which received $238 million in funding when Green Bonds were sold to the public in February of 2007.

On a smaller scale, individual states are also taking action. For example, in April of 2007, the Public Service Commission of West Virginia oversaw the offering of a $459.3 million bond sale in what it called the "nation's first environmental control bond issue." The proceeds of the sale were earmarked to purchase environmental control equipment to reduce power plant emissions responsible for smog and acid rain.

Green Programs

Green Investment Fund Program: Green Funds can be seen as a sub-set of the DBL Fund asset classes. From this perspective, initiating a Green Fund (venture or real estate private equity investment) that is headquartered in a city/region is possible, provided that three conditions are met:

1. There is adequate green business and/or real estate deal flow that meets the investment criteria of the green venture or real estate fund.

2. National and regional institutional investors are prepared to make investments in the fund(s).

3. An appropriate fund manager, with a top quartile track record, can be found to manage the fund.

In some regions, such as the San Francisco Bay Area, initiation of one DBL Fund has led to additional funds being established, resulting in a regional "family of funds."

Increasingly, institutional investors are requiring that the deal flow catchment area be mega-regional. However, if a Green Fund is headquartered in a city/region and one of the special purposes of the fund can be to encourage sustainable economic development in the city/region, then the fund manager for the fund will make a significant effort to invest in deals from that city/region and experience has shown that this leads to a significant percentage of the fund being invested in the city/region.

These types of Green Funds are not passive investors. Rather, they work with the deal-flow infrastructure in a city/region to develop and nurture a pipeline of deals.

If a Green Fund has bank investors who are seeking Community Reinvestment Act (CRA) credit for their investments in the Green Fund, then the Fund will need to make investments in low- and moderate-income neighborhoods that are within the bank's market service area. This has been the case with most DBL funds currently in existence and has led to some outstanding in-fill, mixed-use real estate investments and venture investments in urban locations.

Usually the lead investor in a venture investment is joined by a group of co-investors. If a city/region does not have a strong group of green venture investors, building a new Green Venture Fund in a city/region will typically result in venture co-investment by funds located elsewhere, leading to an increase in venture investment beyond the capitalization level of new Green Venture Fund.

In a building a Green Fund, typically, the DBL Fund and Building Team completes a feasibility study and market assessment to determine if the three conditions of deal flow, investor interest, and fund manager availability are met and to produce the term sheet and business model for the fund. The DBL Fund Building Team is compensated by participating in the management fee and "carried interest" of the fund.

In the approach to building DBL Funds that is emerging during the last couple of years, the DBL Fund Building Team continues working with the Fund throughout its life, assisting with deal-flow generation and deal nurturing while assisting the Fund to accomplish the special purpose for which it was organized.

Green Bond Mechanism: A Green Bond Mechanism can take either the form of a tax-exempt bond or a taxable bond. Green Bonds can be used for many purposes, including to finance retrofit programs for residential, commercial, industrial, and public buildings and to construct facilities for green and clean tech businesses.

"Municipal bonds" are issued by state and local governments and include both tax-exempt and taxable bonds. With taxable bonds, bondholders pay taxes on the income received from bonds. However, with tax-exempt municipal bonds, bondholders are not required to pay tax, and therefore will accept a lower interest rate from the issuer, anywhere from 1.5% to 4% below conventional financing.

Whether the bonds are taxable or not is determined by the type of project that is going to be funded. Projects that are deemed as helping "the public good" generally qualify as tax-exempt, while projects that benefit a private party (partially or completely) have the interest earned on the bonds taxed.

There are two types of tax-exempt municipal bonds:

1. **General Obligation Bonds.** These bonds are backed by the ability of the municipality to repay its debt obligation by taxation or revenues. General obligation bonds are voter-approved.

2. **Revenue Bonds.** Revenue bonds are backed by the revenue from a specific project such as toll roads, bridges or hospitals, and are generally issued by state or local authorities, or their instrumentalities, or not-for-profits created to accomplish public purpose goals and to issue these bonds.

According to the approach of the DBL Fund Building Team, building a Green Bond Mechanism is a two-phase process. The focus of the first phase is to design the bond mechanism given goals for the bond and current industry standards. In the second phase, the Green Bond Mechanism proposed at the end of first phase is created.

Activities in Phase I:

1. Determine the financing needs for the program for which the bonding mechanism is being created.

2. Survey best practices of current tax-exempt or taxable bonds for similar purposes.

3. Research the current tax-exempt and taxable bond markets, both the domestic and global markets.

4. Evaluate bond practices and constituencies in the city/region.

5. Review current rules and regulations in the city/region/state which may affect issuance.
6. Determine the need for appropriate credit enhancement.
7. Determine the legal, financial and regulatory structure for the bond.
8. If a tax-exempt bond is being pursued, ensure that the issuer is able to issue tax-exempt bonds because of the "publicness" and "public good" of the bonds.
9. Design the appropriate credit enhancement, as needed.
10. If constitutional or regulatory barriers are uncovered, develop a successful strategy based on previous experience.
11. Research bond counsel and investment bankers.

In Phase II, the bond mechanism is built to accomplish the desired investment purpose. Activities in Phase II usually take approximately six months. At the conclusion of Phase II, the city/region will have the bonding capability it needs in order to carry out the goals of the city/region.

Mission Verde in San Antonio includes plans for a Green Bond Mechanism to finance region-wide building retrofits.

Green Finance Network: A Green Finance Network is a regional investment network made up of banks, venture funds, real estate funds, angel investors, bank and insurance intermediaries, pension funds and other investors who are interested in investing in the green venture or real estate deals.

A Green Finance Network can be established as an aspect of a Green Investment Initiative that also includes the establishment of a Green Venture Fund, a Green Real Estate Fund, and a Green Bond Mechanism, or it can be established as a stand-alone program that can assist in organizing the investment resources in a city/region and potentially bring in investment resources from outside of the region.

A Green Finance Network will meet 2 to 3 times a year with the mayor, city manager, head of economic development and/or other city/regional officials to talk about different aspects of the Sustainable Economic Development Strategy. At the same time, 3 or 4 green venture or real estate deals are presented, seeking investment from one or more of the investor participants in the network.

All of the deals are pre-screened, the presenters are given a specific slide format to follow, and their presentations are rehearsed. Decisions on whether to invest are made by each investment participant, based on the underwriting criteria of that investor.

A Green Finance Network can be coordinated by a public agency or a not-for-profit intermediary. The different investor members communicate their investment underwriting criteria to the coordinator so that it is possible for the coordinator to make referrals between meetings of the Network.

5. Green Jobs Initiative

Launch or strengthening of a system for green job development with career pathways and green entrepreneurship to provide the workforce needed by cleantech and green businesses

Context

According to the *New York Times*, a green collar economy is "an economy with millions of workers installing solar panels, weatherizing homes, brewing biofuels, building hybrid cars and erecting wind turbines. Labor unions view these new jobs as replacements for positions lost to overseas manufacturing and outsourcing. Urban groups view training in green jobs as a route out of poverty. And environmentalists say they are crucial to combating climate change."

Green Jobs: A green job can be seen as any job that supports any form of sustainability. However, a narrower and perhaps more useful approach identifies "green skills" as the distinguishing factor. In this sense, the concept of green jobs refers to:

- Jobs in cleantech industries.
- Construction jobs in green new construction and retrofits.
- The environmental/sustainability related jobs in businesses that are going green.
- The environmental/sustainability related jobs in public agencies.

The creation of green jobs addresses many of the key problems currently facing the U.S. —unemployment, the recession, the environmental crisis and climate change, and dependence on foreign oil. Recognizing this, the Obama Administration has made a strong commitment to green jobs creation, named a green jobs champion—U.S. Representative Hilda Solis—as Secretary of Labor, and included significant funding for green jobs in the stimulus package.

Examples of Green Jobs Programs: To create one of the first green jobs programs in the country, the City of Oakland allocated $250,000 to an experienced job training organization, the Cypress Mandela Training Center, and to Laney Community College to fund the Oakland Green Jobs Corps through January 2010. The Oakland program provides low- and moderate-income residents with training for jobs such as solar panel installation, energy-efficiency construction and retrofits, and work related to biofuels, such as car and truck maintenance, production and fuel stations.

The Los Angeles Green Careers Training Initiative, another model already in existence, was developed by the Los Angeles Apollo Alliance in conjunction with the City of Los Angeles Green Retrofits Program. The Green Careers Training Initiative seeks to create green career ladders in construction, the public sector, public and private power companies, and emerging energy industries by (1) connecting low-income inner-city residents to union apprenticeship and community college training programs that prepare them for living wage jobs; and (2) providing upgrade training to existing workers within those industries.

The University of Illinois at Chicago Center for Urban Economic Development, the Center on Wisconsin Strategy, and Green for All have produced a Workforce and Economic Development Strategy for the Chicago Climate Action Plan (CCAP), seeking to ensure that an appropriately-skilled workforce exists in Chicago to carry out the work of CCAP. This Strategy has two central goals:

1. Connect green-collar job opportunities from CCAP to populations and communities in need, and ensure that entry-level jobs are linked to career paths to self-sufficiency; and

2. Support the growth of green businesses developing and producing goods and services that further CCAP goals, and add to Chicago's economic base.

The plan estimates that investments in CCAP implementation could generate up to 5,000 direct jobs in areas like:

- Energy auditors and efficiency measure installation workers.
- Landscape design, installation and maintenance.
- Recycling and reuse.
- Renewable energy installation.

Development of the Chicago green jobs strategy will include: assessment; strategy development; hiring a City of Chicago coordinator; funding, implementing, and evaluating pilot programs; and developing additional strategies and implementation plans.

Green MBA and Entrepreneurship: Top universities, such as Stanford, Yale, University of California Berkeley, and Columbia, are incorporating sustainability in their Master of Business Administration (MBA) programs and research, and using this orientation as a strategic advantage in attracting professors, students, and corporate partners.

The Aspen Institute is positioning itself as a center for encouraging this evolution. Aspen Institute publishes:

- Beyond Grey Pinstripes, which ranks the top 100 MBA programs in the country that incorporate social and environmental stewardship into their curriculum and research.
- A Closer Look at Applied Sustainability Centers, which presents best practices for sustainability centers at higher education institutions.

Through its Teaching Innovation Program, the Aspen Institute provides a forum for the exchange of innovative ideas about MBA curriculum and provides networks of business school faculty and business practitioners with resources for teaching, research, and curriculum development in relation to corporate social and environmental stewardship.

Green Programs

Green Jobs Program: According to the Council of Adult and Experiential Learning (CAEL), implementation of a city/regional Green Jobs Program begins with constitution of a Green Jobs Leadership Group. The Green Jobs Leadership Group should involve the workforce system coordinated by the regional Workforce Investment Board, the Community College System, relevant public agencies, the utilities, and other green industry leaders. The Green Jobs Leadership Group can be coordinated by one of the city/region workforce groups or by an outside national workforce intermediary.

The role of the Green Jobs Leadership Group is to adopt a green jobs strategy and then use that strategy to design and implement a green jobs pilot and, subsequently, a full green jobs program.

A green jobs strategy involves:

- Prioritizing a few industry sub-sectors, such as commercial and residential green retrofits, solar installers, and green new construction.
- Defining the job requirements and the career ladders for these sub-sectors.
- Completing research on education/training resources and capacities in the city/region.
- Outlining a pilot Green Jobs Program that includes provision for recruitment of candidates, job readiness and skill training, placement, and post-placement support.
- Benchmarking the proposed Green Jobs Program with other green workforce development initiatives.
- Undertaking fund raising, locating sources of public and foundation funding, submitting applications, and obtaining funding.
- Implementing the pilot Green Jobs Program.

Once the pilot is successful, the same strategy can be used to bring on other industry sub-sectors related to green and cleantech businesses in the city/region.

The Green Jobs Leadership Group should monitor progress and make mid-course corrections. Based on the success of the pilot and the lessons learned, the Green Jobs Program will be able to expand the number of potential workers and businesses served in the initially targeted industry sub-sectors as well as to diversify into other industry sub-sectors.

A Green Jobs Program can emerge from a city/region's workforce investment system, but often it makes sense to bring in a workforce intermediary with experience in developing comprehensive industry sector workforce development systems.

In the case of the Mission Verde Sustainability Plan in San Antonio, the City contracted with the Council on Experiential and Applied Learning (CAEL), a national workforce intermediary with a wide range of workforce development experience, to coordinate the assessment and design phases of the Green Jobs Program creation process (www.cael.org).

Sustainable Business Education Program: If the universities and colleges in a region do not have sustainable business education programs to address entrepreneurship and management training in relation to sustainable enterprises—cleantech and green businesses—it is important to the success of a Sustainable Economic Development Strategy to develop and implement such programs. Sustainable business education trains entrepreneurs who may then succeed at starting up cleantech businesses. Sustainable business education is also important to educate the managers in green businesses with responsibility for environmental programs.

A Sustainable Business Education Program can be undertaken at the university level, the college level, and/or the community college level. In some areas, small business development centers also provide this type of education.

There are many models to choose from and clear best practices are beginning to emerge. As discussed above, a city/regional Green Business Forum can provide guidance in relation to the management training needs of green businesses in the city/region and a Cleantech Network can assist in structuring an entrepreneurship program for cleantech entrepreneurs. The Aspen Institute offers resources to assist in this process. In addition, Sustainable Systems has been involved in entrepreneurship education and can provide assistance.

6. Cleantech and Green Business Attraction and Retention Initiative

Promotion of the city/region as an optimal place for cleantech and green businesses and sustainable real estate developments to locate, expand, and grow over the long term

Context

A city/region's Cleantech and Green Business Attraction and Retention Initiative has to be grounded in an understanding and presentation of the favorable characteristics of the city/region in relation to:

- Workforce quality and workforce training and placement infrastructure.
- Affordability of housing and proximity to employment sites.
- Pre-K through university education.
- Quality of city/regional services, including public safety, fire services, waste management.
- City/regional physical infrastructure, including pedestrian environment, streets, sewers, and tree canopy.
- Multi-modal transportation infrastructure.
- Price and quality of service for energy and water utilities.
- Degree to which the city, county, and state are business-friendly.
- Opportunity sites for business location and expansion and real estate development.
- Local, regional, and state tax structure.
- Government financial and other types of incentive programs.
- Sources of public and private finance.
- City/region year round weather.
- Regional culture, including recreational, cultural, and entertainment venues.

In addition, any effective business attraction program should have as its foundation a strong program for growing currently existing resident businesses. Therefore, all of the Sustainable Economy Initiatives and Green Programs outlined in the earlier sections of this paper can contribute to a Green Business Attraction and Retention Initiative.

In particular, it is essential to identify the different business clusters that are already strong in the city/region and those that the city/region wishes to strengthen in order to determine the type of businesses toward which to direct an attraction and retention effort.

It is, of course, also important to be clear on a lead agency and clear lines of communication and efficient collaboration with cooperating agencies. It is also most effective to obtain regional collaboration in the promotion of the region, rather than having competition among the cities within a region.

Silicon Valley, the East Bay Green Corridor Partnership, Portland, and Seattle all have developed different versions of a Cleantech and Green Business Attraction and Retention Initiative.

Green Programs

Green Branding and Marketing Campaign: Building on the foundation that already exists in the promotion of a city/region on the basis of the factors discussed above, a city/region has the opportunity to go on to develop and implement a Green Branding and Marketing Campaign. This will brand and market the region as an emerging sustainable economy with a coherent Sustainable Economic Development Strategy, seeking to attract cleantech and green business and sustainable real estate developments to the region.

It is useful for the lead agency in a Green Branding and Marketing Campaign to work closely with collaborating agencies and city/regional stakeholders, as well as professional branding and marketing consultants, to develop a brand, a message, and an approach that works.

Frequently, public relations, media, and event-based marketing are more cost effective than the expenditure of advertising dollars. Successful implementation of a Sustainable Economic Development Strategy should yield dozens of media-worthy stories embedded through-out region's sustainable economy initiatives.

By pursuing coverage of the different individual sustainability stories framed in the sustainable economy context from news services, Internet blogs, television, radio, and the print media, the region can re-brand itself as an emerging regional sustainable economy.

Event-based marketing can also be an important aspect of a sustainable economy marketing campaign. The lead and collaborating agencies can build on their lists of relevant sustainability organizations, industry associations, and government agencies to identify all of the relevant conferences and trade shows. Then they can work with the region's speaking resources to arrange for talks and presentations, addressing specific aspects of the region's sustainability story. In addition, the region can develop its own Building the Sustainable Economy conference, as discussed below.

Cleantech and Green Business Recruitment: Once cleantech and green businesses and sustainable real estate developers have indicated interest in the region, the city/region's Economic Development Department(s) will need to engage a "full court press" approach to business recruitment, using a clear system for following up on every lead and every indication of interest, so that all interested businesses and real estate developers receive the appropriate responses. Once businesses have decided on the region, it is very useful to be able to turn them over to a Business Assistance Center.

Green Business Assistance Center: Cities that do not have them should consider establishing a Business Assistance Center. Cities as diverse as Chicago, San Jose, and Oakland are having success augmenting their Business Attraction Programs, by initiating Business Assistance Centers that are visible and easily accessible one-stop shops for businesses to get the assistance they need to operate successfully in a city/region.

A city with a sustainable economic development program could take this national best-practice one step further by launching a Green Business Assistance Center. Such a Center could:

- Welcome all new businesses to the city and provide them with information on how to locate, finance, and run a business in the city, as well as providing referrals to the network of business support organizations.
- Provide information on the region's Sustainable Economic Development Strategy and the component Sustainable Economy Initiatives and Green Programs, including all of the forms of assistance that the city/region offers cleantech and green businesses and sustainable real estate developments in the region, as well as connecting businesses with the appropriate green workforce and other resources.
- If businesses are not green already, communicate the virtues and support available for going green.
- Guide new and existing businesses through the necessary city/region processes including making appointments with staff in other departments and providing detailed information about city requirements and processes.
- Advocate and facilitate inter-departmental solutions for businesses that encounter difficulties with the policies or processes of the city/region.

7. Greening of Underserved Communities Initiative

Connection of cleantech and green businesses and sustainable real estate developments led by people of color, women, and underserved communities with the appropriate business acceleration services and engagement of low- and moderate-income employees and residents in saving money through ecological efficiency

Context

It is essential that a Sustainable Economic Development Strategy benefit underserved communities and low- and moderate-income neighborhoods.

The equity argument for this has been articulated well by the organization founded by Van Jones, Green for All. "Low-income communities and communities of color have borne the brunt of the failures of the old economy…" It is important to "remedy that and make sure disadvantaged communities get equal access to the opportunities inherent in the new green one."

However, while the equity rationale for the greening of underserved communities is important, there is also an economic imperative. In his forthcoming paper, *Making the Case for Regional Action*, Robert Weissbourd of RW Ventures states that:

> "The concentration of poverty, often in the inner city, is one of the side effects of sprawl, and entails huge social costs and missed economic opportunities. The social costs associated with the concentration of poverty (such as crime) …result in high government costs, higher taxes, and a greater burden on businesses, ultimately hindering the economic growth of the region. From a public spending perspective, it is more efficient to maintain and invest in existing infrastructure rather than building new roads, sewers, and power lines. At the same time, research (particularly the research of Manuel Pastor reported in *Regions That Work*) has shown that regions are more efficient and economically successful if they use all of their assets, leaving no places or people behind."

Green Funds with a CRA requirement to invest in low- and moderate-income neighborhoods and Green Jobs Programs address the need to include underserved communities fully in strategies to encourage the emergence of a sustainable economy in a region. However, there are other programs that can also be included in an Underserved Communities Green Initiative. For example, Green for All has launched a Green Collar Cities Program with Newark, Philadelphia, Seattle, and Atlanta. (www.greenforall.org/resources/green-collar-jobs-in-america2019s-cities)

Green Programs

Green Capital Connections Program: A Green Capital Connections Program can be undertaken by a government agency or community development organization, beginning with the establishment of a Capital Connections Network. Such a Network should connect different categories of participants, including:

- Growth-oriented cleantech and green businesses and sustainable real estate developments led by or joint ventured by entrepreneurs/developers of color, women, or other underserved communities. These businesses and developments should be candidates for equity and/or debt investments.
- Investors interested in making equity or debt investments in growth-oriented green/clean tech companies/developments led by entrepreneurs/developers of color, women, or other underserved communities.
- Business services providers that serve this market.
- Educational institutions serving entrepreneurs/developers of color, women, or other underserved communities.
- Staff of government agencies interested in encouraging development of growth-oriented businesses in their jurisdictions.

The Capital Connections Program ought to involve at least four types of events to mobilize the Capital Connections Network:

1. Capital Connections Networking Receptions featuring presentations by statewide and regional leaders, and providing an opportunity for the participants in the Capital Connections Network to interact.

2. Capital Connections Forums/deal presentations attended by investors, entrepreneurs/developers of color, women, and underserved communities, business services providers, and representatives of educational institutions and government agencies.

3. Business Acceleration Workshops to teach key management, sales and marketing, and business strategy, perhaps organized by a Business Acceleration Program as discussed above.

4. An annual Capital Connections Conference, presenting business keynotes, high quality business and financial resources, and deal presentations by entrepreneurs/developers representing ethnic, women, and underserved communities. The attendees at a Capital Connections Conference would include entrepreneurs/developers, investors, business service providers, business education teachers and students, and representatives of government agencies as attendees.

The success metrics for a Capital Connections Program are:

- Entrepreneurs/developers of color, women, and other underserved communities receive investments.
- Investors make investments.
- Business service providers get clients.
- Educational institutions provide entrepreneurial assistance for graduates and placement opportunities for graduates, as well as obtaining potential new students.
- Government and political leaders obtain stronger companies.

Equity Express Program: The Center for Neighborhood Technology has developed a program called Equity Express, which has been successfully piloted in Oakland, California. Equity Express is a six-session workshop series giving participants the information and support they need to live in a way that is more ecologically efficient, thereby lowering their household expenses and reducing their carbon footprint.

While Equity Express may not be a traditional type of economic development program, it is a way to assist in bringing the benefits of resource efficiency to underserved communities. Financial education traditionally offers information on the basic elements of financial management such as budgeting, checking accounts, and credit history. Equity Express aims to deepen the financial education experience by encouraging participants to address the financial and ecological impacts of their spending and saving decisions in relation to five key areas:

1. Energy.
2. Water.
3. Transportation.
4. Food.
5. Telecommunication and Information Technology.

Physical decisions are involved in applying the principles of conservation and resource efficiency to each of these areas—which appliances to buy, whether to own a car and, if so, which car to drive, which television set and which computer to buy. But there are also behavioral decisions that impact spending and resource use every day. In the extreme case, it does not help much to install insulation and an energy-efficient air conditioner or central heating system if the doors and windows in a house are left open.

While Equity Express addresses the physical decisions of ecological efficiency, its primary focus is on the behavioral decisions involved in saving resources and money in relation to the five areas it focuses on. Curriculum has been developed that is used in a workshop format to assist people to learn how to pay attention to their decisions and save money and resources in relation to energy, water, transportation, food, and telecommunications and IT. The primary demographic target for Equity Express is low- and moderate-income employees and households; however middle-income households, facing the pressures of a contracting economy, can also benefit.

Since the best strategies for saving resources and money are dependent on geography to a significant degree, an Equity Express curriculum needs to be adapted to the geography of the location where the program is taking place (www.cnt.org/ted/sustainable-prosperity/).

Equity Express can be launched in a city/region by:

- Fine-tuning the Equity Express curriculum to fit the city/region.
- Completing a pilot workshop, co-led by a CNT staff person and a city/regional leader.
- Presenting a train-the-trainer workshop.
- Providing an on-going series of Equity Express workshops.

A wide range of organizations might consider offering an Equity Express Program, including:

- Housing organizations addressing homeownership training and foreclosure counseling.
- Businesses for their employees.
- Churches for their congregations.
- Job training agencies for their trainees.
- Government agencies for clients and/or staff.
- Organizations presenting financial education workshops and sponsoring Individual Development Accounts.

8. Sustainability Community Engagement Initiative

Engagement of city/regional residents in understanding sustainability, participating in the process of building a sustainable economy, and making green purchasing decisions

Context

A well-conceived Sustainable Economic Development Strategy, including the component Sustainable Economy Initiatives and Green Programs is important, but it will not be well implemented unless it is understood and embraced by businesses, government officials, employees, community groups, and residents. Building a culture of sustainability is critical to the integration of sustainability into a city/region's businesses, not-for-profits, government agencies, and neighborhoods.

Through a Sustainability Community Engagement Initiative, the city/region can define itself as a sustainable city and residents, businesses, community organizations, and government agencies can create a city-wide culture of sustainability that reduces costs, obtains financial benefits, and contributes to a prosperous economy, while contributing to the environmental and social health of the region, the country, and the world.

Green Programs

Green One-Stop Center: A Green One-Stop Center can play a very important role in a Sustainability Community Engagement Initiative. A Green One-Stop Center can be a physical place with an associated organization that:

- Becomes the public place to go to obtain information about the city/region's Sustainable Economic Development Strategy and the Sustainable Economy Initiatives and Green Programs that compose it.
- In particular, provides information on cleantech and green business and sustainable real estate development resources as well as the Green Finance and Green Jobs Initiatives.
- Houses and coordinates an Equity Express program to assist participants to save energy, water, resources, and money.
- Collaborates with educational institutions to establish a Sustainability Education Program.
- Joins the city/region to house and coordinate an annual Building the Sustainable Economy conference and exposition.
- Pursues funding from foundation and government sources to support its activities.

A Green One-Stop Center should, most likely, be established as a public private partnership between the city/region and either a pre-existing or a new not-for-profit corporation.

Sustainability Education Program: Most cities/regions have a variety of education programs addressing different aspects of sustainability (energy conservation/efficiency, water conservation/efficiency, and green building resources and practices, etc.). However there is usually no general, coordinated sustainability education effort.

A Sustainability Education Program could be created by a Sustainability Education Task Force coordinated by the Green One-Stop Center and made up of representatives from appropriate stakeholder groups. A Sustainability Education Program could advise on the formulation of curriculum and teaching resources, selection and training of teachers, and identification of educational venues appropriate for teaching about sustainability and building a sustainable economy at the various educational levels—elementary, middle, and high schools, college, university, and on-going community education.

Sustainable Economy Dashboard: A Sustainable Economy Dashboard is designed to report on key city/region performance indicators—e.g. number of cleantech and green businesses and their economic performance, carbon footprint, amount of energy saved, amount of energy generated from renewable energy sources, energy productivity, water saved, water productivity, number of green jobs created, number of retrofits completed. Such a scorecard can be very effective in providing on-going and, in some cases, real-time feedback in relation to the impact of a Sustainable Economic Development Strategy. Such a tool could be deployed on desktops, on the web or even on bulletin boards and billboards.

A dashboard can serve as a comprehensive on-line hub, linking all sustainability Sustainable Economy Initiatives and Green Programs, and could help all participants know what's working, what's needed, and how they can contribute. This kind of "status map" has supported innovation and effectiveness in a wide range of organizations.

The first step in creating a dashboard is to convene a stakeholder workshop to decide on a core set of key performance indicators (KPI) that are relevant for the business, community, and public sectors.

The second step is to identify data resources needed to generate those KPIs, and to obtain organizational commitment to provide that data through a reliable and implementable data acquisition and analysis system.

The final step is to design and deploy the Sustainable Economy Dashboard (supplemented by other communication strategies) to deliver and communicate KPIs—ideally in real time—to both track and drive improved performance.

Sustainability Communication Program: Active, frequent communications are essential to building a culture of sustainability in a city/region. Communications can take many forms, from a website and an annual report to special events and management dashboards.

A Sustainability Website that includes the Sustainable Economic Development Strategy, the Sustainable Economy Initiatives, and the Green Programs, along with updates, opportunities to interact, and ways to participate, is one basic aspect of a Sustainability Communication Program. A public site can be supplemented with a password protected aspect of the site for the lead agency(s) to use as an internal collaborative workspace to guide on-going planning and implementation activities associated with the Sustainable Economic Development Strategy.

An annual Sustainability Report is useful as a way to benchmark annual progress in relation to the different Initiatives and Programs, including the actions that have been taken, the results of those actions, and new actions that are contemplated for the succeeding year. This process could be integrated with an annual Building a Sustainable Economy conference and exposition.

Building a Sustainable Economy Conference and Exposition: Annual conferences can be very useful mobilizations to bring all the different parts of a network together for inspiration, information sharing, assessment of the past, and preparation for the future.

An annual Building a Sustainable Economy conference and exposition—organized by the Green One-Stop Center, an appropriate group of stakeholders, and an event management consultant—could bring together businesses, community groups, residents, and government officials to learn, network, and sample green products and services.

The purpose of the conference and exposition, organized according to the different Initiatives making up the Sustainable Economic Development Strategy, would be to bring together regional, national, and global sustainability leaders to:

- Discuss regional, national, and global trends, challenges, and opportunities.
- Assess progress in implementing the Sustainable Economic Development Strategy over the past year and receive a report on how the city/region has done over the past year in relation to the key sustainability performance indicators.
- Generate responses to the assessments of the past year's progress and the new trends, challenges, and opportunities that have been identified.
- Brainstorm new ideas.
- Suggest mid-course corrections for the Sustainable Economic Development Strategy.
- Provide the opportunity for cleantech and green businesses, sustainable developments, public agencies, and community organizations to exhibit their products, services, and programs.

An annual Building a Sustainable Economy conference provides an opportunity to re-market sustainability to the city/region each year, as well as re-marketing the city/region as a sustainable region and a good place for sustainable businesses, cleantech businesses, and green developers to locate and grow.

Sustainable Systems has coordinated three international Building a Sustainable Economy conferences and Modern Media, the event-based marketing company that Sustainable Systems partners with, has organized dozens of substantial events, including ECO:nomics–Creating Environmental Capital, the *Wall Street Journal*'s first green conference, a forum for CEOs and entrepreneurs driving growth at the intersection of business and the environment.

VII. MAKING SUSTAINABLE ECONOMIC DEVELOPMENT STRATEGIES

The transition to a carbon-constrained world will drive profound changes in every city/region. The question is whether the transition will be dominated by a potentially chaotic response to emergencies or a more orderly process of careful design, implementation, and evaluation. The premises behind the creation of a Sustainable Economic Development Strategy are that a more orderly response to this inevitable transformation can and should be managed and that this will lead to economic benefits.

The Sustainable Economy Initiatives and Green Programs described above provide a menu of options for a city/region to choose from in undertaking a Sustainable Economic Development Strategy.

In moving to an integrated Sustainable Economic Development Strategy it is important to recognize that the Sustainable Economy Initiatives and Green Programs have important relationships with each other and need to interact with one another in order to begin to build a sustainable economy in a city/region.

For example, green businesses are markets for the products and services of cleantech businesses. Cleantech and green businesses and sustainable real estate developments can access equity and debt capital through a Green Investment Initiative and access workforce offered by a Green Jobs Initiative.

Cleantech businesses can take advantage of tech transfer and IP commercialization as well as sustainability entrepreneurship and management education. By engaging city/regional leadership, as well as broad community participation, a Sustainability Community Engagement Initiative will benefit all of the other Strategic Initiatives.

Assessment: The first step in the strategy-development process needs to be an assessment of the city/region's economy, highlighting its sustainability assets and liabilities. One of the most important roles that a Sustainable Economic Development Strategy can perform is to provide a simple, coherent framework for examining the city/region's different sustainability assets and liabilities as aspects of a coherent economic, social, and environmental system.

Ultimately a Sustainable Economic Development Strategy needs to propose ways to build on the assets, address the liabilities, and measure results. An analysis of a city/region's economy and sustainability assets and liabilities involves:

1. **Business Assessment**
    - Cleantech Cluster in the city/region.
    - Green businesses located in the city/region.
    - Sustainable development in the city/region.

2. **Economic Assessment**
   - Cluster analysis of industry sectors.
   - Investment infrastructure, including: angel groups, venture funds, banks, insurance companies, and pension funds.
   - Pattern of high, medium, moderate, and low income neighborhoods.
   - Gross domestic product.
   - Calculation of greenhouse gas emissions to establish carbon footprint.
   - Economic productivity – ratio of energy consumed to gross domestic product.

3. **Physical Infrastructure Assessment**
   - Energy utility, including sources of energy, energy conservation, and energy-efficiency programs.
   - Water utility, including sources of water and water conservation and efficiency programs.
   - Highways and streets, including single occupancy vehicle miles traveled.
   - Sewers.
   - Public transit system.
   - Open space and parks.
   - Tree canopy.

4. **Social Infrastructure Assessment**
   - Residential population, workforce population, green workforce population.
   - Educational system – pre-K through university, including: business development, entrepreneurship, tech transfer, and sustainability programs.
   - Workforce development system.
   - Environmental and cultural amenities.
   - Environmental, green, sustainability, business, and community development stakeholder groups.

5. **City/Regional Government Assessment**
   - Current economic development strategy.
   - Resources currently devoted to business and economic development in city/regional departments, including: economic development, city planning, zoning department, and others.
   - Programs for addressing jobs, housing, and wealth creation in these neighborhoods.
   - City codes and regulations for businesses, buildings, and land use.
   - Current city/region sustainability/green policy.

Process for Creating a Sustainable Economic Development Strategy: The process for creation of a Sustainable Economic Development Strategy begins with the establishment of the responsible parties. Typically this includes one or more lead agencies or organizations located in the city/region and a lead strategy consultant and a strategy consultation team.

The lead agency and the lead consultant then undertake a preliminary assessment to:

- Identify the city/region's stakeholders who will participate in the process.
- Formulate the city/region's situation and primary goals and objectives for the process.

On this basis, the Lead Agency contracts with the Lead Consultant to produce a Sustainable Economic Development Strategy Report and Recommendations. The purpose of this Report is to:

- Undertake an initial set of meetings with stakeholders to constitute a Stakeholder Team for the Strategy.
- Complete an initial scan of the city/region's economy, sustainability assets and liabilities, challenges, and opportunities.
- Recommend the Sustainable Economy Initiatives and Green Programs to be included in the Strategy (drawing from those in this paper as well as from suggestions from stakeholders).
- Suggest the other strategic allies to be included in a Strategy Consultation Team.
- Propose the key performance indicators, success metrics, modes of monitoring and evaluation.
- Propose a process, timeline, business model, and budget for formulation and implementation of the Strategy.

Then, the Report and Recommendations are presented to the decision-making body(s), discussed, modified, and adopted. At that point an agreement is established with the Strategy Consultation Team.

Guided by that agreement, the Strategy Consultation Team works together with the Stakeholder Team—coordinated by the Lead Consultant in collaboration with the Lead Agency—to undertake implementation of the full Sustainable Economic Development Strategy.

Strategy Business Model: In this process, it is important to pay close attention to the business model that is built into the Sustainable Economic Development Strategy. The Strategy should not just result in costs for local/regional government agencies.

It is perfectly legitimate to use a portion of increases in business license fees, property taxes, sales taxes, property transfer taxes, and income taxes (in cities/regions where any of these are assessed) directly or indirectly attributable to the Strategy as a way to pay for its expenses. However, it is also important for the Strategy to look for all of the potential sources of income and support to supplement government expenditures. Each of the Sustainable Economy Initiatives that are chosen to be incorporated in the Strategy should include an aggressive pursuit of ways to contribute income and support. For example:

- Businesses can sponsor the Strategy as a whole, as well as different Initiatives and Programs.
- Businesses can pay modest fees for services, particularly when they are tied to savings and increases in income.
- Successful financings and business transactions can yield small success fees. Carbon credits and offsets can be accumulated and sold.

- Public/private partnerships can be created that incorporate sources of private support.
- Public agencies, private organizations, and public/private partnerships can all pursue the many sources of new federal funding emerging in the Obama Administration for the type of Programs incorporated in the Strategy.
- Grants can be solicited from philanthropic and corporate foundations.

Multi-City/Regional Collaborative: If this approach to developing a Sustainable Economic Development Strategy finds favor with federal agencies and/or philanthropic and corporate foundations, it would be very useful and cost-effective to establish a multi-regional learning network of three or more cities/regions that are undertaking Sustainable Economic Development Strategies.

It would be very helpful for some general funding to be allocated to assist in:

- Establishing the strategic alliance of organizations that are potential participants in Strategic Consultation Teams.
- Constituting a national infrastructure of cross-regional, web-enabled products and services (such strategy planning systems, systems for monitoring and displaying as dashboards, and systems for comparative bench-marking).
- Creating a learning network of cities/regions to learn from one another, mutually support one another, and, potentially, do business with one another.

This could reduce the costs to the individual cities/regions and accelerate mutual learning and implementation.

Conclusion: Cities/regions need to undertake Sustainable Economic Development Strategies for defensive reasons, to avoid being left behind as the Sustainability Revolution picks up speed. However the positive reasons for launching a Sustainable Economic Development Strategy are more important. Such a Strategy can guide the residents of the city/region in evolving a culture of stewardship, innovation, and action that can lead to prosperity, satisfaction, and inspiration. A regional culture of innovation and action in relation to sustainability is increasingly becoming one of the criteria that businesses use to determine their locations.

A Sustainable Economic Development Strategy provides guideposts on the way to the full realization of the promise of the sustainability revolution. As such, it can help create a place that the residents will be proud to hand on to their children and their children's children.