INTERNATIONAL
ECONOMIC DEVELOPMENT
COUNCIL

A Letter from the President

On behalf of the International Economic Development Council (IEDC), the world's largest membership organization serving the economic development profession, I am pleased to release the Climate Prosperity Handbook, a unique and innovative publication that aims to help communities seize the economic benefits of proactively pursuing sustainable development and climate action strategies. The Handbook came together over the past year through dozens of remarkable supporters in the economic development field and allied professions. We are indebted to them for their gracious support and their respective contributions.

While the challenges our country and communities currently face are undoubtedly vast, this handbook presents a confident case for optimism. A critical shift is taking place in the economic development profession. No longer are sustainability and economic development seen at odds; rather, they now can take part in a symbiotic relationship to be harnessed for healthier communities and stronger economies. Just as information technology and biotechnology have been the brass rings of economic development in recent years, so sustainability is now and will be in the 21st century economy. IEDC's Board of Directors has made sustainability a strategic priority, committing the organization to being on the forefront of this issue and helping the economic development profession navigate this rapidly changing environment.

This handbook is only the beginning of IEDC's work on linking sustainability with economic development. We invite you to our Annual Conference in Reno, Nevada, this October, entitled Renewable Communities: Leveraging your Competitive Assets, which will explore the opportunities of the emerging green economy. We will be presenting our work on the Climate Prosperity Handbook, and stakeholders from the Climate Prosperity Project will be presenting on the innovative climate prosperity strategies they are implementing in their own communities. Further, our program offers multiple sessions that address sustainability and renewability, including:

- Emerging from the Ashes: Leveraging Clean Tech for Recovery
- Doing More with Less: Building Green to Slash Energy Expenses and Enhance Competitiveness
- Combating Unemployment: The Potential of Green Jobs

Attendees also will hear how Colorado landed $700 million in investment from a Danish wind power company. In addition, energy entrepreneur Michael Hess, Chief Executive Officer of Mariah Power, will be a featured keynote speaker, as will Dr. Stephen Wells, President of the Desert Research Institute, a global thought leader in environmental technologies. Finally, there will be multiple additional opportunities for attendees to network with each other and with climate prosperity experts to discuss strategies for benefiting from the greening economy. For complete details, please visit our website www.iedconline.org.

During the development of this handbook, the Climate Prosperity Project, Inc. was launched as a formal nonprofit organization to promote the concept in regions across America, and I am delighted to now be serving on the board of the organization. You can learn more about the Climate Prosperity Project, Inc. via the web at: www.climateprosperityproject.org.

IEDC is excited about the ever-growing opportunities ahead of us in the realm of energy, sustainability and climate change. We hope you will join us in Reno to explore this issue in depth.

Sincerely,

Jeffrey A. Finkle
President and CEO

The Climate Prosperity Handbook

Green Savings

Green Opportunities

Green Talent

INTERNATIONAL
ECONOMIC DEVELOPMENT
COUNCIL

July 2009

International Economic Development Council

IEDC is the world's largest membership organization serving the economic development profession, with over 4,600 members, and a network of over 25,000 economic development professionals and allies. From public to private, rural to urban, and local to international, our members represent the entire range of economic development experience. The issue of sustainability has been designated a strategic priority by the IEDC Board of Directors. Further, sustainability and policy responses to climate change are growing issues for our members. Through a range of services, including: conferences, training courses, webinars, publications, research and technical assistance efforts, we are striving to be on the cutting edge of understanding the opportunities and challenges stemming from climate change and economic transformation. For more information about IEDC visit www.iedconline.org.

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Climate Prosperity Handbook

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The Climate Prosperity Handbook

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The opinions, findings and conclusions reported in this handbook are those of the authors and of IEDC and do not necessarily reflect those of the listed handbook sponsors and partners.

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The handbook, authored by Shari Garmise, Phil Singerman, and Elizabeth Thorstensen, is indebted to the many supporters of the project, including: Marc Weiss and all those who have been dedicated to the Climate Prosperity Project; as well as the IEDC Board of Directors and Sustainability Sub Committee. We would also like to thank Louise Anderson, Eddie Bates, Mary Lou Benecke, Anne Berlin, Eric Coffman, JoAnn Crary, Scott Dempwolf, Jeff Finkle, Dick Fleming, Swati Ghosh, Chris Girdwood, Jill Hall, Cass Harris, Doug Henton, Talib Hudson, David McFeely, Michael Northrop, Collin O'Mara, Bill Michalerya, Julia Parzen, Gian Porro, Carrie Ridgeway, Bill Rief, Jackie Roberts, Robin Roberts Krieger, David Rodgers, Dana Rothstein, Eric Schneider, Michael Schneider, Mike Schwenk, Janet Smith, Marty Walsh, Sharon Ward; and in addition, the many local-level practitioners who generously gave their time and insights to add invaluable on-the-ground perspectives to the continuing evolution of sustainable economic development.

IEDC is reducing its carbon footprint! This handbook has not been printed in hard copy and is only available in digital format. If you would like to print this document, we encourage you to reduce your environmental impact by using the double-sided page option that is available on most printers.

Rockefeller Brothers Fund
Philanthropy for an Interdependent World

July 2009

In the Fall of 2007 meeting, the Rockefeller Brother Fund committed itself to testing the proposition that responding to climate change represents not only an environmental imperative but, in fact, an extraordinary economic development opportunity. Dialogue among a wide range of public, private, and nonprofit leaders led to the important concept of "climate prosperity", focused on creating regional economic outcomes—green savings, green opportunity, and green talent—while reducing greenhouse gas emissions.

One of the first steps taken to explore the concept was commissioning this *Climate Prosperity Handbook* prepared by the International Economic Development Council as a guide for local economic development professionals.

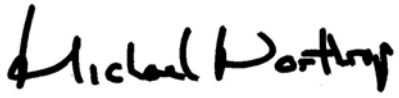
The Rockefeller Brothers Fund was pleased to provide the initial funding to IEDC to produce this handbook. Thanks go to Jeff Finkle, Shari Garmise, Phil Singerman, and Elizabeth Thorstensen at IEDC for their work making this handbook a reality. We are also pleased that other sponsors and partners have joined to support its development.

During the development of this handbook, the Climate Prosperity Project, Inc. was launched as a formal nonprofit organization to promote the concept in regions across America. An initial set of pilot regions are now testing these ideas in their communities through public-private alliances.

You can learn more about the Climate Prosperity Project, Inc. at the Web site: www.climateprosperityproject.org

If we are to address our environmental, energy, and economic challenges in ways that create jobs and opportunity while promoting cleaner places to live, we need to become more efficient in the use of all of our resources and adopt innovative energy strategies. As global and national policies attempt to deal in effective ways with the challenge of climate change, our communities can develop strategies today that advance both their economic and environmental well being. This handbook provides practical guidance on how to move forward during this time of change.

Best regards,



Michael Northrop, Program Director
Sustainable Development
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INTRODUCTION: CLIMATE PROSPERITY

With the advent of historic economic, environmental and social shifts taking place across the globe, comes a growing recognition for the inextricable benefits from the integration of sustainability initiatives and economic development. As noted throughout this handbook – we stand at a momentous crossroads, one much larger and more complex than when the work for this project began many months ago. In the months since this project began, a global credit crisis has taken place, drastically changing the economic landscape that we had become accustomed to. New leadership in the White House is paving a new pathway with regards to national policy on energy and climate change. Further, mounting growth and demand from international markets is making a clear case that all nations have to play a proactive role in addressing sustainability. The confluence of these events and numerous other shifts currently taking place make a clear and paramount case that merging economic development strategies with sustainability and climate action policy not only presents unprecedented opportunity, but that those communities that fail to take advantage of this time will likely fall behind.

The unprecedented growth of the U.S. and world economy has progressed hand-in-hand with a voracious appetite for energy, creating great volatility in the world fossil fuel market and exacerbating the threat of climate change. The U.S. demand for electricity alone is expected to grow by 39 percent between 2005 and 2030[1] and global energy consumption is expected to grow by 60 percent by 2020[2]. Tackling climate change challenges us to decouple economic development from carbon emissions and wasteful use of resources.

As we hurdle ever closer towards the collective effects of our use of energy, land and resources; localities are taking the lead in cultivating cutting edge solutions to confront the challenges of climate change while simultaneously looking to bolster their economies. No longer are local level leaders waiting for the international or even national-level policymakers to respond. They now recognize that the challenges of climate change must be met in their own backyards, led, not necessarily by world-stage leaders but by local stakeholders. It is now widely agreed upon that action must take place on the local level, and cities are proving to be the living laboratories for incubating the preeminent solutions to addressing climate change. Led by Seattle Mayor, Greg Nickels, the U.S. Mayors Climate Protection Agreement came online in 2005 and is now backed by over 950 mayors (as of June 2009). In signing the agreement, the mayors agreed to meet the goal of the Kyoto Protocol for reducing greenhouse gas emission in their respective cities.

There are also promising strides being made at the state level. In early 2007, eight northeastern states, collectively representing almost 50 million people, enacted the Regional Greenhouse Gas Initiative (RGGI). RGGI is a state-level emissions cap-and-trade program between the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York and Vermont. Not to be out done by the east, The Western Climate Initiative was also initiated in 2007. The initiative includes 7 U.S. states (Arizona, California, Montana, New Mexico, Oregon, Utah and Washington) and four Canadian Provinces. The initiative proposes the launch of a cap-and-trade system planned to come online as soon as 2012.

Further, several individual states are leading the sustainability movement with their own plans. California, a leader in setting carbon reduction goals, has recently deepened its commitment by enacting broad measures that reward cities and counties who implement development laws that are thought to thwart the onset of urban sprawl – a carbon culprit. Several states are now mandating that utilities provide a certain percentage of power from renewable sources, and the commonwealth of Pennsylvania recently enacted a $650 million energy fund to support growth in the renewables sector. As cities and states continue to incubate carbon action policy and establish best practices while working out the kinks, there will likely be an upward movement to create more and better national-level carbon action policies that can spur the economy.

In addition to local and regional government response, there has been a large upsurge in the call to climate action by global business leadership. We now see numerous large corporations forging relationships with each other with commitments around the purpose of creating a business-led response to climate change. Consortia such as Business for Innovative Climate and Energy Policy (BICEP) and United States Climate Action Partnership (USCAP), function under the notion that a proactive business response to climate change will create more economic opportunities than risks for the U.S. economy.

Although carbon abatement seems like a daunting task, in fact opportunity is knocking. While historically, sustainable environmental practices were assumed to hinder economic growth, mounting data shows undeniably that implementing strategies to reduce greenhouse gases is, in fact, one of the most promising routes to enhanced economic development. Climate prosperity strategies go beyond the basics to show a deeper picture of consequences and opportunity costs via the lens of a total systems approach. Climate prosperity takes a three pronged approach of **1) Green Savings**—cutting resource costs; **2) Green Opportunities**—enabling businesses and jobs to grow and thrive; **3) Green Talent**—developing globally competitive entrepreneurial and workforce skills, and attracting and retaining talented people.

> *Climate Prosperity Strategies maximize state and local responsibility, innovation, and action, well synchronized with the grassroots empowerment approach. Climate Prosperity also emphasizes personal responsibility and accountability. Climate Prosperity blends individual, family, and entrepreneurial self-interest with voluntary collaboration.*[3]

While unprecedented opportunities will come from the switch to a lower-carbon economy, there will, without hesitation, be transition pains and significant investments required to make it happen. Energy intensive industries and the communities that they are home to, will undoubtedly feel the pinch as they adapt to a changing energy environment. Moreover, investments will be needed to upgrade our infrastructure and buildings to handle widening sources of energy among other changes. This is not to diminish the validity of the importance of the transition, but rather to drive home the point that it will require a critical lens to evaluate the costs and benefits of specific changes and how they might impact communities, industries and economic sectors. While one approach may create economic dividends for one community, it could be financially detrimental to another. As such, those in the economic development realm should be well informed on the changes in the global energy market, changing federal and global policy environments, transforming industries and by extension, wary of broad brush, silver bullet strategies.

The purpose of this handbook is to reveal the potential of sustainable economic development and provide a map that communities can use to implement these efforts. The following section explains why greening the economy has taken center stage on political and economic agendas. The second, third and fourth sections outline the overall climate prosperity model and chart the measurable economic benefits of reducing carbon emissions. The fifth section outlines the U.S. Federal framework. The last section shows how communities can move climate prosperity strategies forward in their own backyards.

I. THE NEED FOR THE GREENING OF THE ECONOMY

In order to fully understand the opportunities that climate prosperity presents to local, regional and national levels, it is imperative to first outline the trends and pressures that are driving the greening of the economy. These include: the changing energy marketplace; businesses leading the charge, changing technologies; changing stakeholder demands; and policy drivers.

A. Changing Energy Marketplace

In 2006, the U.S. imported about 60 percent of its crude oil demand[4]. Dependence on one energy source makes the entire U.S. economy highly vulnerable to any disruption in supply from natural, economic or political causes. According to the U.S. Department of Energy (DOE), "Developing domestic energy sources with known and stable costs would significantly improve U.S. energy stability and security."[5]

The U.S. dependence on imported fossil fuels has had a detrimental impact on the long-term health of our economy on three dimensions: the trade deficit, energy prices and supplies, and industry location patterns. First, oil imports comprise one third, or the largest individual share, of our merchandise deficit.[6] According to the Council on Competitiveness the trade deficit costs U.S. jobs, as approximately 27,000 U.S. jobs are lost for every $1 billion of the U.S. trade deficit. By that calculation, the increased purchase of oil imports between 2005 and 2006 (@$42 billion) probably resulted in a loss of about 1.1 million U.S. jobs over that time period. Thus, bringing energy back to the U.S. means bringing jobs home.

Equally important, oil prices have become more volatile, and the consequent unstable prices and supplies are reverberating across many sectors of the economy. Consumers and businesses are feeling the bite and an overall trend of increasing oil prices over the past decade are dampening U.S. GDP growth. According to the Congressional Budget Office (CBO)[7], increased oil prices reduced GDP growth by about 1 percent in 2006, and lowered household savings rates as consumers spent more on energy. The CBO predicts that increases in energy prices over the next 10 years will reduce U.S. living standards as people spend more of their money on energy and less on other goods and services.

Energy Fact

"In 2006 18.3 percent of the world's electricity was produced using renewable sources. But by 2030 this will rise to 23.3 percent, as technology gets cheaper and fossil fuels remain pricey, according to the annual report from the International Energy Agency. Energy produced by hydro and wind power will double by 2030 accounting for most of the growth."

Source: Economist, November 13, 2008

Finally, volatile energy prices are changing the location and competitiveness factors of businesses, and thus of communities. For some, we are seeing businesses return to the U.S. to be closer to consumer markets and or resources that serve as inputs to product development. Other corporations are relocating overseas for the same reason.

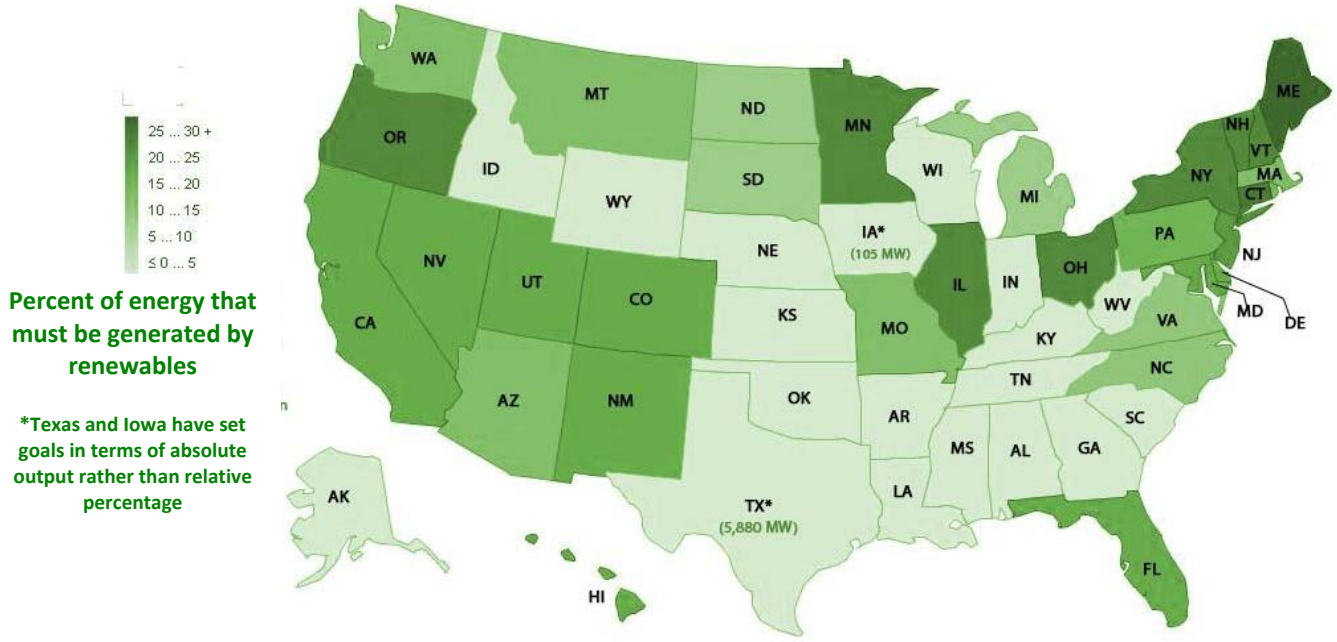
[The need for a portfolio approach]

What is needed to stabilize and sustain the energy marketplace is a portfolio approach. Meaning, a diversity of energy sources including both renewables and cleaner non renewables, and the technology and economic development tools that are needed to bring them into a comprehensive and complementary system. A portfolio strategy has already helped numerous countries to ward off the risks that come from oil dependence. Notably, Denmark, during the oil crises of the early 1970's found itself in an uncomfortable situation from being almost completely foreign oil dependent. In response to this scare, they began to invest in and develop wind energy. Today, wind power generates 20 percent of Denmark's electricity.

The first wind farms in the U.S. were built in the early 1980's in California and developed with incentives from tax credits. While technology has rapidly advanced and the wind turbines of today have 30 to 50 times the capacity of earlier versions, economic incentives are still needed for helping us to reach a more balanced portfolio strategy.

More than half of the states in the U.S. now have renewable portfolio standards (RPS) which require that electric utilities supply a certain amount of energy from renewable sources. Some states' RPS policies are more aggressive than others. Texas, for example, will require 2,000 megawatts of renewable power generation by 2009, which is expected to result in a savings of 3.3 million tons of carbon dioxide emission annually.[8] To further validate such aggressive state measures, federal policies such as production tax credits also need to be a part of the mix of tools. The map below demonstrates the extent of RPS across the United States.

Figure 1: Renewable Portfolio Standards



Data Source: www.epa.gov/combdhpp/state-policy/renewable_fs.html

B. Economic Development Recrafted

Whereas the global acceptance of climate change has arguably been the clinching factor pushing sustainable economic development onto the world agenda, this need to green the economy has also been fueled by political, economic, social and security concerns. In other words, there is a series of factors that cumulatively are recrafting the economic development environment and the conditions that make communities competitive. These are the changing business landscape, the trajectory of technology and innovation, changing stakeholder demands, and dynamic state and local policy leadership. Let's take a look at each in turn.

[Businesses Leading the Charge]

Globally competitive businesses remain so by staying ahead of the rest of the world's learning curve. Today, that means incorporating energy and environmental concerns into their business practices. According to the Council on Competitiveness, businesses are moving in this direction in response to four drivers:

- Competitiveness. For example, companies who produce computer chips now compete on energy performance per watt as well as speed.[9]
- Risk management including operational, financial and reputational risks. For example. Coca-Cola partnered with the World Wildlife Fund on water conservation globally.[10]
- Stakeholder interest and responding to the need for greater transparency of environmental practices. For example, the green grid consortia emerged to tackle consumer concerns regarding the high power usage of data centers.[11]
- Overall savings that come from managing energy better and the profits from creating products for a growing market. For example, DuPont, who has been a global leader in this area, receives about 17 percent of its total revenue from sustainable product sales.[12]

When we look at the leading global companies, they are not only implementing more sustainable practices in their own firms, they are actively demanding that others implement them as well. DuPont and Alcoa, for example, are lobbying Congress for a carbon cap-and-trade system, while Wal-Mart is channeling green policies down through its supply chains. FedEx Express, the world's largest express transportation company, teamed up with Environmental Defense to develop a cleaner, more fuel-efficient delivery truck with its supply chain. Further, major corporations including Starbucks, Sun Microsystems, Levi Strauss, Nike and Timberland formed the Business for Innovative Climate and Energy Policy (BICEP) project with the intention of working with other businesses and congress to push more aggressive climate and energy legislation. As these leading companies receive positive publicity and business value from their endeavors, competing firms within the same industry will be forced to act, providing a domino effect.[13]

[Changing Technologies]

When oil prices topped $50 a gallon, renewable energy, which could not traditionally compete with fossil fuels on cost, emerged as competitors in the energy market.[14] The shift in oil prices combined with the growing global demand for greater energy conservation and alternative energy sources is acting as a pull for greater investment in new technologies in these areas. This is revealed in changing research and development (R&D) patterns and the growth of alternative energy.

Clean tech is the target of increasing R&D investment by governments and corporations. In 2007, industry invested $9.8 billion and government invested $7.1 billion, which totaled $16.9 billion for clean tech R&D.[15] Asian governments are the heaviest investors.[16] In fact, in the U.S., we have witnessed an 85 percent decline in real terms of the DOE's budget authority for renewable, fossil, and nuclear energy between 1978 and 2005.[17] As investment increases, so does patent activity. In 2006-2007, biofuels had 2,800 patents registered which was more than wind (282) and solar (555) combined.[18] We should expect to see this grow as demand for renewable energy and energy efficiency increase.

Businesses are responding to a demand on the part of business, government and consumers for cleaner, more energy efficient products and services. For example, more hybrid cars are on the market and plans are to increase their production. According to PriceWaterhouse Cooper (2008), we are seeing a clear growth of alternative energy with a 125 percent increase of the installation of solar energy systems, a 45 percent increase in wind turbine installations and a 32 percent rise in bioethanol production in 2007, and these investment trends are predicted to continue through at least 2010. We would expect these trends to accelerate if the federal government more actively intervenes in carbon reduction.[19] Even more notable is the growth of clean tech revenues. Between 2006 and 2007, revenue growth for alternative energy was up 40 percent, from $55 to $77.3 billion.[20]

Critically, new technologies are more than goods, they also include processes. "New business models that reward suppliers and end users in the power and transport sectors for consuming less energy will be as important as new technologies."[21] For example, green buildings are not just defined by what they are made of but how they are made. For a green building to succeed it must be planned, designed, constructed and monitored in new ways; all systems must be aligned for maximum impact. Product and process innovations are self-reinforcing. "Green products enable and are enabled by the process."[22] Thus, as demand for greener building products increases, then so should the demand for high performance buildings which can maximize the potential of the more energy efficient products. Similarly, as the demand for green buildings increases, then so should the need for greener products and materials, which make up the final product.[23]

[Changing Stakeholder Demand]

Demand for environmentally friendlier products is on the rise from businesses, consumers and government. The demand, however, does not represent a simple cry for lower prices (although that is part of it as consumers have recognized that higher energy prices are here to stay). The need is also for better health, a higher quality of life, and a growing recognition that our ethical obligations expand to what we owe the next generation.

Some visible evidence of this trend has been via the attempts at green reform by Wal-Mart, a once loathed corporation by man in green-conscious circles. Main stay green product suppliers who once refused to sell their products to the retail giant, have now lifted those bans because they see Wal-Mart as going in a new, greener direction, despite remaining criticisms that belay the largest retailer in the world.[24] Green consumers, who were once relegated to finding specialized green products at specialty retailers such as Whole Foods, are increasingly finding an outlet for their green product spending at retailers such as Wal-Mart.

[Policy Drivers]

Some cities, states, regions and countries have been engaged in innovative policy formation to encourage the movement of firms, consumers and markets to incorporate greener practices. They are doing this in response to tighter municipal budgets, a need to address climate change, and to build their economies and create a competitive advantage for their jurisdictions. Until the 2008 elections, the Federal government had been limited in its role and ability to lead in this area, largely due to the design of budget appropriations for key departments that could be taking a lead role. "The US government has not been a leader in stimulating cleantech growth…It has been a laggard. We're at risk of giving away the greatest strategic industry of the 21st century."[25] As will be demonstrated later in this document, the New Administration has made climate change and energy policy key priorities.

While the Federal government has been idling, cities and regions have been stepping into the leadership role. In fact, one of the key factors differentiating communities will be policy innovations. Government is back in the equation for economic success. The policies emerging to stimulate the renewable energy and energy efficiency activities can be divided into four categories: voluntary, regulatory, incentives, and leadership.

Voluntary Options

Voluntary options such as the Leadership in Energy and Environmental Design (LEED) standard for high performance green buildings or voluntary green building codes established by cities are emerging to define and standardize sustainable practice and provide information on how to achieve it. LEED is arguably driving the expansion of green building practices.

Government Regulatory Policies

Governmental regulatory policies are emerging to create demand for, and better enable, renewable energy. We have seen the growth of state renewable portfolio standards in over half the U.S. which require that utility companies produce a certain percentage of electricity from renewable sources. Hawaii has the most ambitious at 70 percent by 2030.[26] We have also seen 39 states require electric utilities to connect renewable energy to the transmission

grid through interconnection and metering rules.[27]The states with RPS' have also made the most headway in building wind turbines.[28] Critically, the evidence is clear that environmental regulation has not lead to job loss. A World Watch Institute study found that the actual job loss due to environmental regulations has been extremely limited and, per investment dollar, renewable energy technologies will far surpass the job levels of fossil fuels.[29]

Incentives

State and localities are also using market-driven incentives to encourage change. There are 45 states as well a myriad of cities with varying types of credits, loans, and abatements to stimulate renewable energy and greater energy efficiency. Regional carbon cap-and-trade systems have already begun and more are on the horizon. In addition, the change in administrations and the advent of the American Recovery and Reinvestment Act has brought momentous incentives and investment to drive change in the renewable and energy efficiency sectors. The Federal Framework Chapter (p.35) of this handbook provides a detailed outline of the stimulus and federal structure of support.

Public Leadership

State and local governments also serve as sustainability role models, taking the lead in adopting greener practices. Seattle, Austin and Cranford, NJ (to name just a few) have policies that require new public buildings attain LEED standard. Washington, DC has taken this one step farther by requiring the private sector to attain LEED standards. Not only does this send a message to the market, these activities also help to build skills and expertise and reduce costs to enable this sector to grow and expand within the private sector.

One of the driving forces compelling public action to stem climate change is our growing understanding that the future of economic development and community competitiveness is inseparable from a sustainable future. In the next section, we outline the economic benefits of implementing strategies that reduce carbon emissions, reuse resources and better manage energy.

THE DYNAMIC BENEFITS OF CLIMATE PROSPERITY STRATEGIES

The following three sections will demonstrate that we can indeed move to a higher level of economic prosperity by lowering carbon emissions and renewing resources. At its most basic, the global economy is expanding, the demand for energy is growing, and the ability of the world to meet that demand from fossil fuels is becoming increasingly more difficult, more expensive and more unreliable. Thus, climate prosperity strategies are not just environmental solutions; they are meeting the demands of the market.

There is, however, no silver bullet to easily meet the world's growing energy appetite while providing greater protection to the environment. As a study by the McKinsey Global Institute points out that no single action in the energy sector will reduce emissions the needed amount, a range of actions across the energy sector will need to occur, including: energy conservation, greater energy efficiency, more renewable energy options, and decarbonizing fossil fuels (e.g. carbon sequestration for coal).[30] Moreover, these changing market realities will require upfront investments such as upgrading our energy grid system, increasing research and development in alternative energies to reduce their costs, and assisting dirtier industries and firms adapt to this new economic environment. As we shall see in the following sections, investing in climate prosperity in all of these areas, and by extension lowering greenhouse gas emissions, not only stimulates the economy but does so across a range of sectors, which can widely spread the benefits across and within regions. While there will be initial costs to make this transition, the information to follow makes clear that the economic benefits will far outweigh them.

A review of the literature reveals several areas of clear economic gain that will result from investment in climate prosperity. These are: cost savings enabling investments elsewhere; quality job creation; investment and innovation throughout the economy leading to the emergence of new firms and whole new industries, and an improved quality of life. In what follows, we will summarize the research out there to show where and how those gains can be made through **Green Savings/ Green Opportunities/ and Green Talent.**

II. GREEN SAVINGS: LOW HANGING FRUIT

To reduce carbon emissions and move toward a more sustainable economy, the low-hanging fruit is greater energy efficiency, conservation and using less carbon-intensive energy sources in existing products.[31] More efficient policies on the part of government and businesses will lead consumers to lower energy costs, which will provide more disposable income enabling them to invest in or purchase other things. According to the McKinsey Global Institute, implementing energy efficiency activities will abate a significant proportion of carbon emissions and provide positive economic returns through energy costs saving. McKinsey smashes several assumptions about what it would cost to make this happen. Critically, they note:

- that 80 percent of the abatement potential actually does not rely on new technology development but can be done with what we have now;
- that there are significant low-cost abatement opportunities in the industrialized world; and
- that industry and power, which many believe will bear the brunt of abatement costs, in fact, represent only about half of the abatement potential.[32]

California Savings

Despite some of the highest energy costs in the country, California spent half as much on energy as Texas because of its energy conservation strategies, resulting in $25 billion dollars in the pockets of CA businesses and consumers.
Source: California Green Innovation Index, Next 10, 2009, page 64

In sum, energy efficiency presents a reasonable first step to reduce carbon emissions while adding to economic growth. And the wider literature provides additional support for this.

Research demonstrates that through renewable energy generation and energy efficiency technologies, state and local governments have been able to save billions of dollars annually.[33] Between the years of 1979 and 1986, for example, annual energy costs in the United States decreased by approximately $150 billion (compared to approximated values at 1973 levels) due to the implementation of energy efficient technologies in response to the oil crises of 1973.[34]

There are generally two ways to foster these savings: through process and/or product changes. A process change may incur no direct cost but requires a behavioral change such as using windows instead of air-conditioning for ventilation and encouraging the use of mass transit instead of individual car use. Product changes include the purchase of new materials and equipment that are more efficient than current systems or materials. This may have seemingly larger up-front costs than less efficient products but provide long-term savings over time such as decreased energy bills. Employing newer, more efficient heating or air conditioning, fixing leaky pipes, and installing solar panels are all examples of equipment changes. Wal-Mart has installed smaller generating units inside their trucks to reduce the cost of fuel waste when drivers rest overnight. This single step accumulates to a savings of over $25 million annually.[35] There are mounting examples of prosperity gains from the energy conservation efforts of communities, businesses and individuals.

A. Business Savings: enhances competitiveness

Private companies are now taking a leadership role in energy conservation in three ways: 1) increasing energy productivity internal to the firm; 2) adjusting products and services to reflect customer expectations; and 3) building sustainability into their business models and competitive advantage.[36] In many cases, these are low risk, high return investments. Let's take a look at some examples. IBM has saved $729 million from 1990 to 2002 through energy conservation measures which resulted in saving 12.8 billion kWh and avoiding approximately 7.8 million tons of carbon dioxide.[37] IBM also created a new business unit that provides business consulting services to help businesses green their operations.[38] Environmental Defense Fund's inaugural group of Climate Corps Fellows helped 7 host companies (Yahoo! Inc., Cisco, Intuit, NVIDIA, Salesforce.com, Crescent Real Estate and KKR) find additional efficiencies in lighting, computer equipment and heating and cooling systems to save $35 million in net costs over five years and reduce greenhouse gas emissions per year by 57,000 metric tons – equivalent to taking more than 7,000 SUVs off the road.

With businesses, simple steps can often lead to bigger things. By simply recognizing their wasted energy processes and curbing their use, Honda saves approximately $750,000 a year at their Lincoln, AL Line 2 Paint Department alone. This savings attitude has permeated many other Honda plants, and currently Honda sponsors multiple energy efficiency programs aimed at reducing energy costs. These costs are given back to consumers on the price of Honda's environmentally friendly cars.[39] Moving beyond cost savings, Honda's commitment to alternative energy sources is moving it in whole new business directions—it's moving directly into the energy sector with its recent establishment of a solar subsidiary focused on developing solar cells that can power homes and cars.[40]

And we must not forget that there are global business opportunities inherent in abatement. North America represents 18 percent of the market for energy efficiency but China represents 21 percent and the Middle East 10 percent.[41]

While larger companies are increasingly able and willing to make the transition to more sustainable business practices, smaller firms still need help making the transition. Small and medium sized businesses are often trapped in the day-to-day survival of running their operations and it may be more difficult for them to do longer term strategic planning or make the initial investments in regard to plugging into the potential of a regional green economy. Local governments, in such cases, are finding ways to help small businesses make this transition. The City of San Jose, CA, for example, has been making considerable efforts to reach out to local and regional businesses of this type. Specifically they have utilized BusinessOwnerSpace.com, the San Jose – Silicon Valley one stop for businesses and entrepreneurs. BusinessOwnerSpace.com serves to establish an integrated source of information and services for entrepreneurs to start, grow and sustain a business in Silicon Valley.

B. Consumer Savings: acts as net wage increase

Consumer savings can come in a variety of ways; greening homes, changing commute patterns, and encouraging recycling among others. Recognizing the economic and environmental value of consumer conservation, states and cities have started to provide incentives to people to encourage greater energy efficiency. Oregon created the Oregon Residential Energy Tax Credit (RETC) which awards tax credits to residents for purchasing qualified appliances and renewable energy technologies. Necessary appliances such as washers, dryers, and water heaters are all on the list of authorized items, and are all eligible for up to $1,000 per year in tax credits for each purchase, making some appliances essentially free.[42] An analysis of this program found that RETC, coupled with a similar tax credit for businesses (BETC) has resulted in the equivalent of a net wage increase in Oregon of over $18.6 million, which has increased the tax revenue for the state by over $10 million. This new increase in income achieved through savings enhances overall economy purchasing power, thereby *inducing* further consumption- and investment- driven stimulus.[43]

A study of Portland, with its growth boundaries and focus on density and mass transit, reveals similar results. Cortright found that Portlanders travel less by car than other similar sized cities. On average Portlanders travel only about 4 miles less per day, but for a metro area of approximately 2 million, this results in a total savings of $2.6 billion a year that can be spent on other things.[44] Moreover, money spent on energy and transportation for the most part leaves the local economy. However, the dividend from energy efficiency is more likely to be spent locally, thus adding more value to the strength of the local economy and the maintenance of local jobs.[45]

Looking at the impact of greater energy efficiency nationally, the Union of Concerned Scientists estimates that if all automakers progressed to a fleet capable on average of 35mpg by 2018, it would save consumers $37 billion and cut national oil use by 1.6 million barrels.[46] Similarly, a Brookings study noted that transit efficiencies, usually in the form of transit systems, lowers transportation costs and transit time for citizens, which enables them to purchase other items as well as reducing fuel costs for public employees.[47]

For lower income individuals, energy prices in particular can bite into paychecks and make the difference in whether or not they can pay all their monthly bills. Not surprisingly, we are seeing governments trying to find ways to better manage energy costs of housing for lower income individuals. For example, the City of Houston partnered with CenterPoint Energy, the primary energy supplier to Pleasantville, to weatherize and insulate homes free of charge to low-income individuals, saving them 10-13 percent on energy bills every month.[48] As another example, Portland's Multifamily Assistance Program (MAP), which provides loans to green multifamily buildings and apartment complexes, enabled the improvement of 44,000 apartment units, lowered utility costs for 100,000 residents, and now conserve 75,000 mWh of electric power every year.[49]

C. Community Savings: economic stimulus

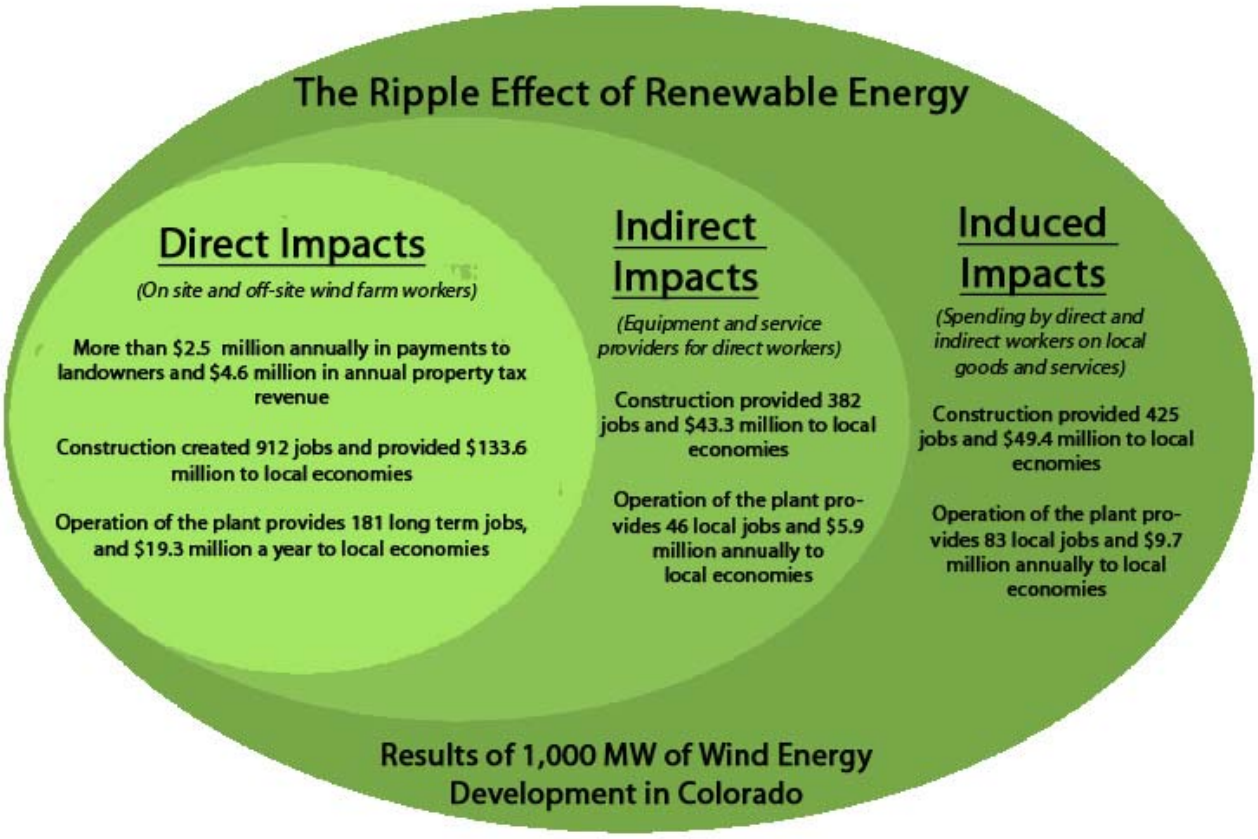
To better manage their tightening budgets and spiraling energy costs, states and cities are also implementing their own efforts to conserve energy. These actions are not only having a positive impact on public bottom lines, but also serve as a model and incentive to the private sector to increase their activities in these directions as well.

For example, the public sector is, according to one journalist, "leading the charge in alt-fuel usage.[50] Ann Arbor Michigan for example, saved over $6 million in energy and fuel costs with their Green Fleets Program, which consists of purchasing more efficient vehicles for city employees.[51] Over half the fleet uses biodiesel and natural gas. Moreover, the city received a government grant to install an E-85 pump, which provides a fuel blend comprised of 85 percent ethanol and 15 percent gas.[52]

According to research, denser development, where people can shop, work, or play nearby home, reduces driving time by 20-40 percent, with resulting fiscal gains through reductions in infrastructure spending, such as those incurred by building new roads and extending water and sewer lines.[53] A Brookings study, which aggregated the results of multiple studies on smart growth, estimated that smart growth policies can reduce state and local capital spending on infrastructure by 10 to 20 percent. Moreover, the study emphasized that beyond the capital expenditure, higher density developments cost less for operations, maintenance and service delivery because overall there is less to maintain such as the need for fewer fire stations, and shorter water and sewer pipes.[54] Another study estimated that urban infill developments would result in about 35 percent decline in driving and carbon emissions and reduced infrastructure spending about 11 percent nationally.[55]

In addition to cost savings, the growth of renewable energy is having a positive impact on our tax base. For example, wind facilities contributed $6 billion in local property taxes (many states reduce or eliminate these taxes on wind energy projects), $15 million to state income taxes during construction and $1.5 million annually once in operation in addition to job creation and environmental benefits.[56]

Figure 2: Ripple Effect of Renewable Energy



Source: S. Reategui and S. Tegen, "Economic Development Impacts of Colorado's First 100 Megawatts of Wind Energy"

The development of renewable energy can further benefit local communities by acting as a powerful economic stimulus. A National Renewable Energy Laboratory (NREL) study of the effects of the construction of 1000 MW of wind power in Colorado found that $34.9 million (2008 dollars) in annual local economic activities was generated as a result of hiring local workers.[57] Additionally, this type of development can serve as a significant source of recurring income through land lease payments. These payments made to land owners who have leased their land to wind farm developers, start typically at 2.5 – 3.5 percent of the total revenue generated by the wind farm landowner payments, but they often escalate and can be as much as 6 percent of annual revenue in the later years of production. In addition this varies depending on when the project was installed and the respective property values of the region. In Colorado, these payments provide $2.5 million in extra income to farmers and ranchers.[58] The reason for this substantial economic growth is the "ripple effect" of green energy, demonstrated by Figure 2.

III. GREEN OPPORTUNITIES: RESTRUCTURING THE ECONOMIC LANDSCAPE

The opportunities available from greening the economy are vast. Investments in renewable energy and energy efficiency technologies such as capturing waste heat, developing a plug-in hybrid car and emerging thin-film solar nanotechnologies will lead to new products, services, niche markets, and whole new industries. As demand for low-carbon solutions grows, this will lead to the emergence of new value chains that disrupt existing industries and create new ones, such as industries based on large scale use of biomass to fuel power plants.[59] As a result, we are witnessing investment opportunities increasing globally, the creation of new businesses, and the emergence of entrepreneurial leaders in these industries. We are also seeing the emergence of new markets for traditional industries.

Mapping Companies Poised to Grow

A valuable resource for locating RE and EE firms is the Environmental Defense Fund's: Mapping the Green Economy. This interactive tool is replete with case studies that illustrate the economic potential of these businesses.

The EDF mapping tool can be found at
http://www.lesscarbonmorejobs.org

A. Investment and R&D

In the past few years, we have seen alternative energy move from being a niche market to become a mainstream investment target. Between 2004 and 2007, venture capital investment in clean tech jumped from 1.9 percent of total venture investment to 7.4 percent in 2007.[60] It is now the third largest category for venture investment in the U.S.[61] That growth accelerated dramatically in 2006 and 2007 as Figure 4 demonstrates. In 2007, clean tech investment totaled $2.2 billion in investment, representing a 45 percent increase from 2006. Major beneficiaries include biofuels in 2006 and solar in 2007. We are seeing similar increases in investment into energy efficiency technologies which have grown 78 percent between 2006 and 2007, totaling $1.8 billion last year. Studies have found that an average of about 2,700 jobs are created for every $100 million venture invested.[62] If electricity generation from renewables in the U.S. increased from its current rate of approximately 6 percent to 20 percent by 2020, national job creation is predicted to reach 355,000.[63]

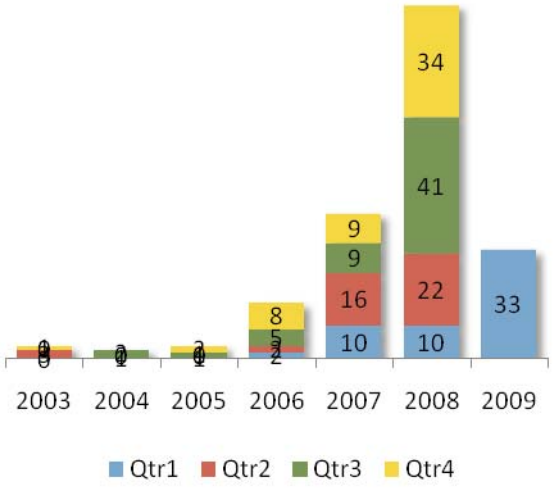
We can view similar patterns in greenfield investment projects in the U.S. Figure 3 below demonstrates the growth of renewable energy project investments in the U.S. between 2003 and the first quarter of 2009.

Looking at global investment trends in clean tech we see a similar growth pattern. In 2007, $148.4 billion were raised in 2007, up 60 percent from 2006.[64] Looking specifically at public markets, $23.4 billion was raised in 2007 compared to $10.5 billion in 2006.[65]

Figure 3: Renewable Energy Project Trends Analysis

Between 2003 and 2009, fDi Markets recorded a total of 212 Renewable Energy investment projects in the United States which created a total of 4906 jobs.

Year	No of Projects	Percentage Growth
2003	4	
2004	3	-25.0%
2005	4	33.3%
2006	17	325.0%
2007	44	158.8%
2008	107	143.2%
2009	33	n/a
Total	**212**	
Average	**30**	

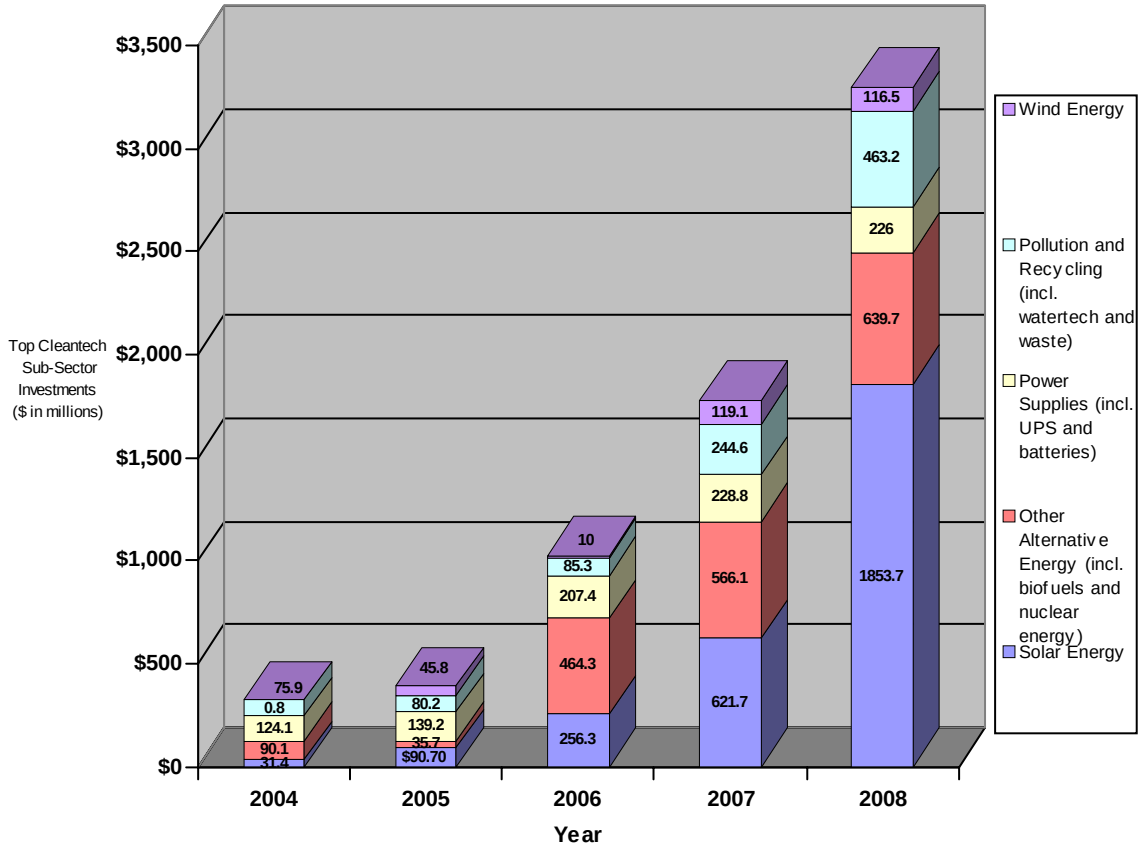


Source: FDI Intelligence from Financial Times Ltd

In response to these investment patterns and promising stock performance of public companies in these clusters, we have seen the emergence of stock market indices tied to sustainable energy. These include:

- NASDAQ Clean Edge US (CLEN) launched in 2006, which tracks performance of technology producers, installers and others;
- The KLD Global Climate 100 Index (GC 100) which tracks companies with the greatest promise for tackling climate change impacts;
- The Merrill Lynch Energy Efficiency Index (EEI) that follows companies expected to gain from increased energy efficiency[66]; and
- The Cleantech Capital Indices (CTIUS), comprised of 45 public companies, which has outpaced the S&P, NASDAQ and Dow Jones indices over the past two years[67]

Figure 4: Solar is Prime Mover of Cleantech Growth



Source: MoneyTree(tm) Report from PricewaterhouseCoopers/National Venture Capital Association based on data provided by Thomson Reuters.

B. Entrepreneurship and Innovation

Some of the best known 20th century entrepreneurs, many who drove the IT revolution, are leading the renewable energy investment charge[68]. As experienced entrepreneurs enter the field, it also makes it easier for a company to both attract investment and survive in a competitive market place[69]. Some examples of well known entrepreneurs entering the renewable energy market are:

- Paul Allen, Microsoft, investing in Biodiesel
- John Doerr, Kleiner Perkins Caufield & Byers, investing in green technology innovations
- T. Boone Pickens, Oil to Natural Gas to Wind
- Bill Gates, Microsoft, investing in Biofuels
- Vinod Khosla, co-founder of Sun MicroSystems, Cellulosic Ethanol
- Richard Branson, Virgin Airlines, U.S. Ethanol production
- Elon Musk, Pay Pal, Electric Vehicles
- Jesse Fink, founder of Priceline.com, investing in clean technology

In California, where the regulatory, investment and innovation environment have arguably been the strongest in the country, we can see contours of these new industries clearly emerging. Between 1990 and 2006, the number of clean tech companies grew 84 percent, from 1,000 to 1,800, predominantly in the energy generation and energy efficiency areas[70]. In 2006, 36 percent of the venture capital investment in the U.S. went to California-based firms.

As another example, Massachusetts has seen the creation of over 119 companies dealing with renewable energy in the past five years. To support entrepreneurship, the State of Massachusetts started the Massachusetts Renewable Energy Trust in 1998 capable of offering loans of up to $500,000 for companies researching new renewable energy and energy efficiency products. The Trust is funded through annual revenue of $62 million recovered through a surcharge on utility bills. One success story is Evergreen Solar, a plant in Marlboro, MA funded partially through the Massachusetts Renewable Energy Trust. The company employs over 300 workers, many of whom are manufacturers, with the rest in science, administration, and finance, and has an overall budget well above $100 million[71].

As another example, Ohio has also seen a boom in venture capital investment in clean technology and is ranked 6th in the U.S. for green patent registrations. The venture capital investment in Ohio is focused in the thin-film solar industry, but the state also holds strengths in hybrid systems, advanced batteries, and fuel cell technology.[72]

Further, Florida now has a burgeoning cluster of renewable energy firms and has initiated the Florida Energy Systems Consortium to unite the state's leading universities to research renewable energy technologies. The consortium plans to focus on bringing the new technologies to the market and incubating a workforce of graduates with expertise in the field. The state has already committed $50 million in support of this initiative.[73]

The diversity of these initiatives is representative of the fact that entrepreneurship and innovation is available to all states, not just a few, within these emerging fields. Figure 5 demonstrates how many companies involved in renewable energy and energy efficiency are already present in many economies.

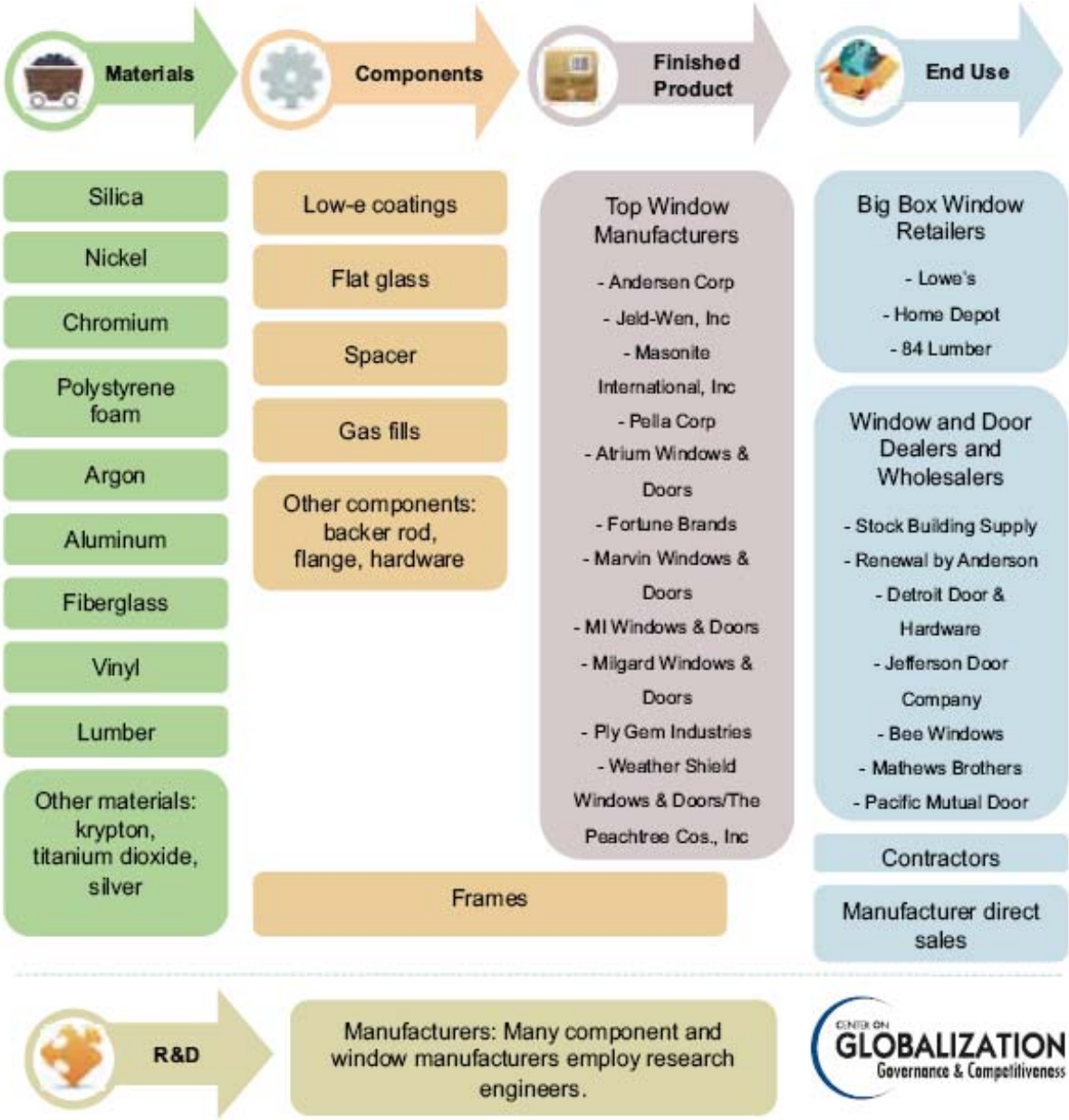
C. New and Transforming Industries

Increasing investment, research and innovation in renewable energy and energy efficiency are stimulating the emergence of new companies, which will encourage industries to retool and ultimately will generate whole new industry clusters. Renewable energy and energy efficiency industries are not solely confined to energy generation, rather renewable and energy efficient techniques have the capability of influencing and evolving the products and processes of all industries. Finally, some industries will not need to re-tool but simply find new customers for existing products. Figure 5 shows the supply chain needed for a high performance, energy efficient window which combines components from traditional manufacturers such as those making industrial gases with newer components such as low-e coatings.

Many jobs impacted by strategies to address climate change are the same jobs where people already work such as manufacturing, construction, and transportation. It is estimated about 14 million existing jobs nationwide will benefit from green investments.[74] For example, a study of 155 metropolitan areas by Good Jobs First found that metropolitan areas that

had adopted smart growth policies actually witnessed more construction than those who did not.[75] Over a ten year period, smart growth metros witnessed $100,000 more construction activity per capita than those without such policies. This increased activity was attributed to rehabilitation efforts. The study also looked particularly at Oregon, the growth boundary pioneers and found that over a 15 year period, construction jobs and the dollar value of construction work increased 120 percent compared to a U.S. average over the same period of 26 percent.

Figure 5: Simplified High-Performance Window Value Chain



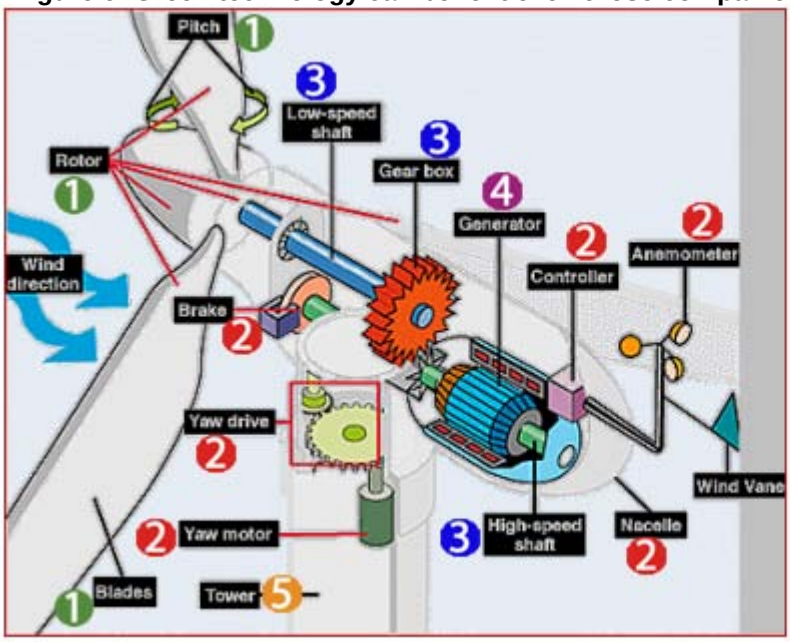
Source: CGGC, based on company annual reports, individual interviews, and company websites.

Companies need not have a "green" focus for renewable energy development to act as an economic boon. The Renewable Energy Policy Project has identified over 10,000 companies employing over 700,000 workers which could participate in manufacturing PV solar panels, and over 16,000 companies employing over 1 million workers which could manufacture the parts required for wind turbines.[76] See Figure 6 for a view of the number of component parts already in production that would be supported by renewable energy development.

This handbook will provide snapshots on the immediate opportunities presented by green buildings, recycling, water, transportation and manufacturing. It should be noted that while these industries represent a strong impact across the board to many communities, the opportunities are not limited to these industries.

According to the Smart Communities Network, there are about 5 million commercial buildings, and almost 76 million residential buildings currently in the U.S. Cumulatively, these buildings account for one-third of U.S. consumed energy.[77] They also project that by the year 2010, another 38 million buildings will have been constructed. Even if these numbers are considered in light of the current recession, there undoubtedly remains a need to construct and retrofit buildings in a green manner.

Figure 6: Green technology can benefit even those companies without a green focus



Component

1. Rotor
2. Nacelle & Controls
3. Gearbox & Drive Train
4. Generator & Power Electronics
5. Tower

	Number of U.S. Companies capable of producing these components
1	11,954
2	11,595
3	1,476
4	1,089
5	3,780

Source: Renewable Energy Policy Project

[Green Buildings]

Driving the growth of green buildings is a growing environmental awareness; increased attention towards the bottom-line of building costs (energy savings); increasing costs of non-renewable resources, a mushrooming of local incentives implemented to spur the growth of the green building industry, and an increasing awareness by businesses that greener workplaces attract talent. The most obvious and most cited benefit of green buildings lies in lower occupancy operating costs. Thus, especially for publically-owned buildings, green buildings are increasingly viewed as a budgetary savings mechanism, and by extension a savings to tax payers. "A study on the costs and financial benefits of green buildings initial investment of 2 percent in green building design, on average, results in life cycle savings of 20 percent of the total construction costs – more than ten times the initial investment."[78]

The Development Center for Appropriate Technology is a non profit organization that serves to remove barriers from sustainable building and development. Their website provides text of alternative building codes from successful examples of cities and states that have adopted them.

Source: http://www.dcat.net/resources/index.php

The green building industry includes a deep supply chain of producers, suppliers/distributors, consumers, and facilitators. The potential for growth in this arena is vast. Representative jobs within the supply chain can include, but are not limited to: electricians, heating/ventilation/air conditioning installers, construction equipment operators, roofers, insulation workers, carpenters, industrial truck drivers, construction managers, building inspectors, etc.[79] Green building techniques, for the most part, do not require different skill sets, as largely evidenced by green construction projects being bid on by green *and* non green construction firms. In a forecasting study conducted by the U.S. Conference of Mayors, their estimates show that 81,000 jobs would be created in the retrofitting of buildings to make them more energy efficient over the next three decades. The jobs would range from manufacturers of green building products to the installation of the products themselves. [80]

On a policy-level, the chief obstacle standing in the way of the green building industry are the building codes that pre-date green building techniques, and make illegal many green building elements and techniques, i.e. waterless urinals.

[Recycling]

The recycling industry holds vast potential that has just begun to be tapped. The National Recycling Economic Information study commissioned by the EPA showed that there are over 56,000 recycling and reuse businesses in the U.S., producing a total annual payroll of about $37 billion.[81] Thus, the recycling sector is now shown to be a strong driver of job creation.

All arrows point to the success of the recycling industry as lying in the hands of state and local policy in regulating and encouraging the recycling and reuse of materials. The industry itself is unique in that it comes together via the participation of the government at both local and regional levels (regulators and facilitators); direct business involvement (i.e. processors) as well as indirect (i.e. support industries such as trucking); and the general public – those that direct products away from landfills and into recycling centers. Recycling can fall into a maze of materials including: reusables, textiles, plant trimmings, putrescibles, ceramics, chemicals, paper, metals, glass, polymers, wood, and soils. As such, not only does the industry support

jobs and obvious tax revenues, but the benefits extend beyond into robust indirect benefits. The recycling industry produces profits that are gained from recovering products that otherwise would have ceased to circulate through the monetary cycle. When such products are recycled they can keep earning a financial return, whereas when they are dismissed into landfills their value is lost. Further, savings are gained on disposal fees, especially for industrial businesses. Recycling may also create unanticipated economic opportunities, in the way of retaining, expanding and attracting firms to an area that would benefit from the use of specific recycled products. This could even serve in driving the growth of particular industry clusters.

For example, South Carolina has over the past 17 years achieved a diverse interconnectivity between local governments and firms in support of the recycling industry. In 2006 The South Carolina Department of Commerce produced a report in conjunction with the College of Charleston which found that the recycling industry in South Carolina has generated over 37,000 direct and indirect jobs, and produced nearly $70 million in state tax revenue. The report also noted that recycling industry jobs pay above the state average in wages/ salary.[82]

[Water]

Unlike oil, there is no replacement for water. As the water supply becomes increasingly vulnerable and constrained, there are resulting implications for its cost, supply and quality. Rethinking and retooling how we manage water and water infrastructure in terms of efficiency, innovation and conservation will save money, promote opportunities, and improve economic productivity and competitiveness, as well as environmental quality.

Addressing water quality issues is critical if sustainability initiatives are to be successfully wed with economic development. As with other forms of infrastructure, investing in water acts as a basic economic stimulus strengthening local and regional economies both in the short and long run. According to an evaluation by the American Society of Civil Engineers, the U.S. will need to spend over $1 trillion to repair its infrastructure, and it gave the worst infrastructure evaluation to the water sector. Further, Goldman Sachs projects that the global water consumption rate will continue to double every twenty years, which is largely thought to be an unsustainable rate of consumption.

While agriculture is by far the biggest user of water worldwide, water is in increasing demand by business, and businesses are beginning to get on board in rethinking how they go about using water. Other affected industries include food and beverage, hospitality, sports and recreation and more. “According to a survey by the Marsh Centre for Risk Insights, 40 percent of Fortune 1000 companies said the impact of a water shortage on their business would be “severe” or “catastrophic” – but only 17 percent said they were prepared for such a crisis”.[83] For multinational corporations who oftentimes have multiple factories throughout the developing world where water supply tends to be more strained, water efficiency and conservation is a must. Conserving water isn’t just a responsible measure for businesses to take, as being more efficient about their usage and waste also reinforces their bottom line.

[Transportation]

According to the Northeast Sustainable Energy Association, transportation uses two-thirds of all the oil in the US, and accounts for 60-90 percent of the urban air pollution.[84] Opportunities to innovate and grow in the area of transportation are three fold: change economic incentives to encourage the utilization of more efficient forms of transportation; encourage the development of more efficient transportation vehicles and systems and the subsequent infrastructure to support them; and utilize alternative fuels to power various modes of transportation.

One such example of encouraging efficiency through economic incentives is via congestion pricing. This method, undertaken in the central business district of London has been widely praised. Since its inception in 2003, London has observed a 30 percent average drop in congestion, a 37 percent average increase in traffic speed, a 12 percent drop in particulate matter and nitrogen oxides, and a 20 percent decrease in fossil fuel consumption and CO2 emissions.[85] Further, the fees raised via the congestion pricing enabled London to invest in better public transit infrastructure, namely the city's extensive bus system, which by extension experienced a dramatic increase in ridership.

"Cleaning up" old and inefficient engines in both private and public vehicles represent further opportunities in this sector. Many cities are now turning to "greening" their bus fleets, and states such as New Jersey are lowering the retirement age for school buses to encourage the adoption of newer, more efficient engines. Also, New York City is in the process of changing its fleet of 13,000 yellow taxicabs over to hybrids by 2012.[86]

Further, renewable fuels such as ethanol and biodiesel are on the rise, and it is estimated that the expected growth in this sector could create upwards of 1.5 million jobs by 2030 and another 1.4 million jobs in connected ancillary services such as legal, engineering and research fields.[87] The City of Gatlinburg, TN has made large strides in greening its municipal fleet of over 20 vehicles to run on B20 biodiesel. B20 biodiesel is made from a mixture of vegetable-based oil and petroleum-based diesel and helps to prolong engine lifespan as well as lowers polluting emissions.[88]

Finally, the race is on globally to fashion more fuel efficient vehicles. Investment and research and development in biodiesel cars, hybrid cars, electric cars, new types of fuel cells, and others are occurring globally. This creates new opportunities as well as new challenges for regions marked by automotive clusters as well as new regions looking to enter the game.

[Manufacturing]

Many communities are uncertain as to their potential place in the low carbon, green, economy. As sustainability efforts become more wide spread, opportunities are expected to exponentially filter through to every level of the economy, thus making prospects within a multitude of different industries and supply chains increasingly available to various communities. From software engineers to finance specialists to construction workers – the low-carbon philosophy will penetrate every aspect of the economy – beyond high level innovations, direct to the local level. Everything will need to adapt, from infrastructure to how we lay our electricity.

Places throughout the Midwest and rustbelt are beginning to navigate the waters of how to transition their shrinking manufacturing economies into viable and sustainable economies that tap the opportunities presented by the green economy. Newton, IA is one such example. After the departure of the Whirlpool factory was announced, formerly the community's largest employer, local economic developers worked to attract TPI, a wind turbine blade manufacturer, to absorb some of the employee base left by Whirlpool. The city successfully brought both Whirlpool and TPI to the table together to discuss the skill sets of the local workforce to identify what gaps there might be, and thus what training would need to be offered to bring the local workforce into the new TPI plant. Training was then supported via the local community college.

Other communities are also trying to stay one step ahead of the transition by introducing new markets to traditional manufacturers and working with them to build relationships to encourage innovation and new products and processes. One such example of this trend is the presence of the firm Pilkington, which bought out a century old main stay of the glass making industry in Toledo, OH. Pilkington's business in its traditional sector, the automotive industry, has been down 30 percent in the past few years in North America, while their recently added solar division has been growing at an encouraging 40 percent annually. The region is hoping to play off this trend by taking a regional approach to further spur the growth of the renewables industry in Toledo. The University of Toledo has begun to play an integral role by employing 15 faculty members to specialize in researching and innovating in the area of solar power. The university is licensing the technologies being developed by its faculty and as a result is encouraging those researches to start new firms. One such company, Xunlight, is developing thin and flexible solar cells. As of November 2008, the firm had 65 employees and is expecting to grow up to 150 employees by the middle of 2009.[89]

Diversification still remains a strong consideration and communities are leery of placing all of their eggs in one basket. Many of the component makers that are one or two levels down on the supply chain (i.e. wiring suppliers) often supply their products to multiple industries, both renewables entering the market along with more traditional manufacturing products as well. For example, a small wind project would use steel, fiberglass, and concrete – none of which are considered "green products" in and of themselves, but are still nonetheless critical components.

Notably, according to FDI Intelligence of the Financial Times, of all the renewable energy greenfield investment projects that occurred between 2003 and the first quarter of 2009, about 40 percent were invested in manufacturing. Collocating and investing in these types of industries is giving many communities the security they are looking for.

Green Supply Chains

Corporations are also starting to benefit from greening their business practices and supply chains. For example, in 2000, GM was able to lower its disposal costs by $12 million by establishing a reusable container program with its suppliers.[90] Further, regions are beginning to critically examine the components of various renewable supply chains and then match them with the strengths of their respective regions. When a fit is identified, local economic developers can aid in helping to foster and build relationships between the players in their region. This isn't necessarily a systematic process, but is rather driven by firm to firm.

While large manufacturers and original equipment manufacturers (OEMs) have been increasingly able to transition into green products, small and medium-sized enterprises (SMEs) lack the time and resources to easily transition. The economic restructuring that is stemming

from sustainability demands a level of upfront investment as well as business acumen and marketing expertise that many good SME's often do not have and cannot afford individually. As such, economic development intermediaries will need to play a critical role in helping SMEs to leverage not only their own manufacturing strength, but the strength and support of a regional cluster or supply chain network, and the resources of traditional economic development and workforce development partners. Appendix 1 offers a diagrammatic model of how the transition could take place.

D. Smart Grid Infrastructure: a key component to the low-carbon economy

The infrastructure that serves the power supply of the U.S. lies presently at an impasse. As demand for energy continues to rise, the North American grid is being stretched to its limit. While it is becoming increasingly desirable to bring renewables into the mix, the current grid will be strapped to handle them without further infrastructure and support taking place. If all of the costs are brought into the equation, it becomes clear that inefficiencies in the system are the main culprit. The core of this issue is that energy needs to be supplied, managed, and consumed more efficiently. As U.S. infrastructure continues to become outdated and under capacity, smart grids are seen as a technological solution that could take some of the strain off of the current grid and aid it in functioning more effectively and efficiently. This would not only act as a stimulus in terms of investment and job growth, but it would also break down barriers and open up doors to new innovations across the board.

Smart grid encompasses hundreds of different applications and centers around the concept of integrating all aspects of the grid, including suppliers and users so that the system can function more holistically via self monitoring and, by extension, make adjustments in power supply when necessary. Smart grid allows for two-way communication between suppliers and consumers that enables instant adjustments that can balance supply and demand. It can also help with rapidly pinpointing and resolving outages, thus aiding in a safer and more secure grid.

> *For a smarter grid to benefit society, it must reduce utilities' capital and/or operating expenses today – or reduce costs in the future. It is estimated that Smart Grid enhancements will ease congestion and increase utilization (of full capacity), sending 50 percent to 300 percent more electricity through existing energy corridors.*[91]

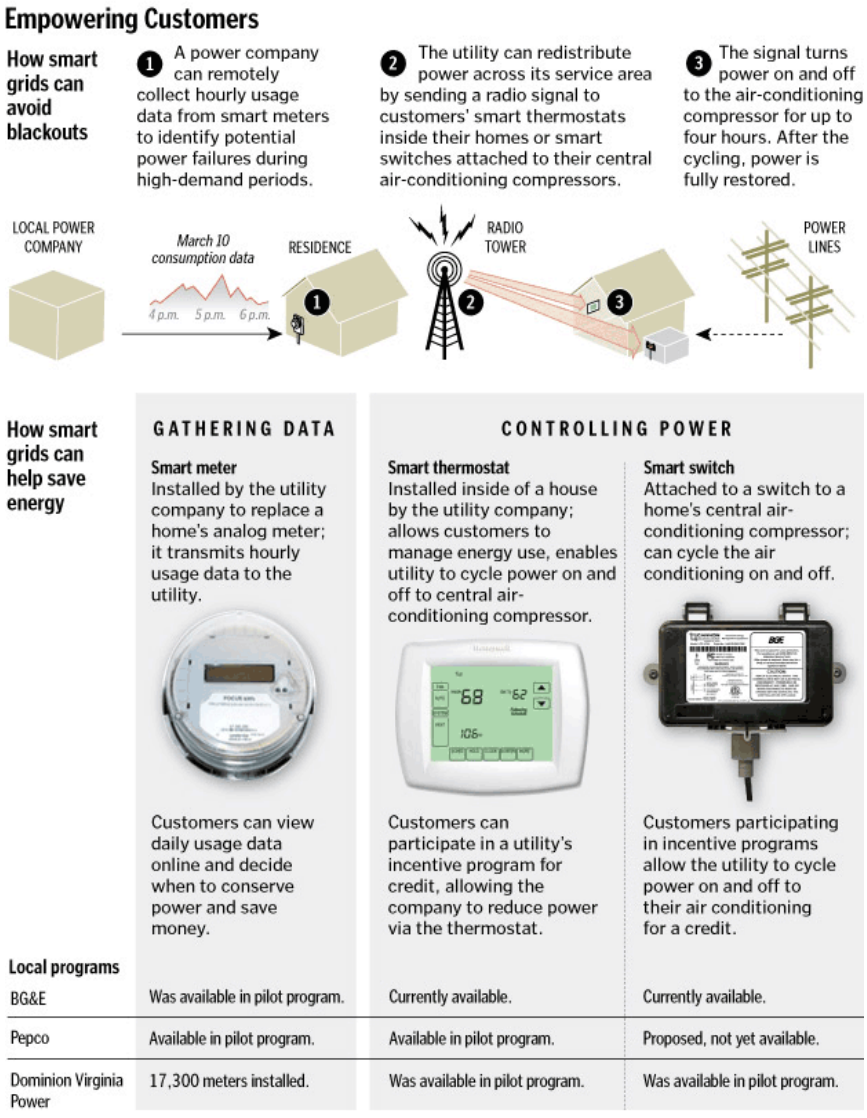
Further, smart grids also hold the ability to decentralize power distribution. This type of distribution allows for shorter distances from supplier to consumer, which results in a more efficient transmission (see Figure 7). Additionally, smart grids can help in lowering greenhouse gas emissions by sensitizing customers to their consumption levels, and by shifting the utility loads to more off peak periods, which are typically served by more efficient facilities. A smarter, more efficient grid may also decrease some of the need in hard infrastructure that is presently thought to be required in order to update the grid for business as usual. It should be noted that effective smart grid implementation requires: market signals to encourage changes in consumer behavior; state regulations to set the expectations of the efficiency of energy delivery; and pilot projects to test different options for how to approach smart grids.

One particular project of note is the grid friendly controller pilot project done by Pacific Northwest National Laboratory. The controllers are installed in major appliances such as

refrigerators, air conditioners, water heaters, etc. The device monitors the amount of power going through the larger grid and momentarily turns off these appliances to compensate for power grid overloads. Because this only goes into effect for a matter of seconds to a few minutes, pilot studies have showed that any negative effects or interruptions on consumers are negligible.

The primary challenges to adopting smart grids will be the initial investments that will come from wide ranging coordination efforts, along with the costs of new hard and soft infrastructure. The Electric Power Research Institute (EPRI) was recently selected by the National Institute of Standards and Technology (NIST), to facilitate the development of a smart grid interoperability roadmap for the electricity sector. The roadmap will provide a critical step in balancing interoperability standards for the smart grid. The document is intended to ensure that different vendors' products will work together effectively, and that consensus standards should drive down the cost of components and systems, reduce the risk of early obsolescence and spur innovation. The roadmap is expected to be available by summer (2009), and will inventory existing standards, identify gaps, and list priorities for reconciling differences among current standards or developing entirely new ones.

Figure 7: Benefits of the Smart Grid



Source: Cristina Rivero, Washington Post

IV. GREEN TALENT: JOBS AND SKILLS

The literature is clear that investment in activities that combat climate change can be a job creation mechanism. Those benefits play out in several ways: the creation of new jobs in energy and related industries, the retention and strengthening of jobs in traditional industries that have been reinvigorated by becoming more sustainable, and a tendency for those jobs to be quality jobs meaning they tend to be higher paying and more secure (less vulnerable to outsourcing). It's also important to note that the range of industries touched, create an array of opportunities from low to high skilled, enabling broad-based prosperity—many will be touched by these opportunities.

But what *is* the "green economy"?

Much concern and energy has been placed on defining exactly what the green economy is *and is not*. These concerns are valid as green revolution takes off and everyone jumps on board, some with legitimate green claims, others far from it. On behalf of Next 10, a nonprofit organization based in California, Pew Charitable Trusts, and Collaborative Economics, an economics consulting group, developed the Green Establishments Database. This methodology focuses on green business establishments and represents the core green economic activity. These are businesses that provide products and services that do the following:

- Provide alternatives to carbon-based energy sources
- Conserve the use of energy and all natural resources
- Reduce pollution (including GHG emissions) and repurpose waste.

The Green Business Establishments database is categorized by 15 segments which are based roughly on the technology segments defined by the Cleantech Group.

- Energy efficiency
- Energy generation
- Transportation
- Energy storage
- Air and environment
- Recycling and waste
- Water and wastewater
- Agriculture
- Research and advocacy
- Business services
- Finance and investment
- Advances materials
- Green building
- Manufacturing and industrial
- Energy infrastructure

Source: California Green Innovation Index, Next 10, 2008 and 2009. Clean Energy Economy, Pew Charitable Trusts, 2009.

A. Quality Job Creation

The renewable energy and energy efficiency industries are gaining momentum throughout the United States. They are creating jobs across skill ranges from the manufacturing and installation of renewable energy and energy efficiency equipment to accountants, clerical workers, and sales in companies designed to use and sell emerging renewable energy and energy efficiency technologies. A study by Bezdak et al found:

> *Renewable energy and energy efficiency technologies are driving significant economic growth in the United States. In 2006, these industries generated 8.5 million new jobs, nearly $970 billion in revenue, more than $100 billion in industry profits, and more than $150 billion in increased federal, state, and local government tax revenues.*[92]

The Table below shows the job creation impacts measured in just one state in one year. They are significant.

Table 1: Colorado Renewable Energy and Energy Efficiency Industries, 2007

Industry	Revenues (millions)	Industry Jobs	Total Jobs
Renewable Energy	$1,082	4,415	10,075
Energy Efficiency	$9,129	35,470	81,210
Total	$10,211	39,885	91,285

Source: American Solar Energy Society, www.ases.org/greenjobs

[Renewable energy creates more jobs than fossil fuel]

Equally important, projection models suggest that renewable energy industries can create more jobs than their fossil fuel counterpart per amount of energy installed, produced and per dollar invested.[93] Moreover, there has been a clear trend of job decline in the fossil fuel sector, which has not been due to environmental regulations.[94] Furthermore, the jobs created in renewable energy are in different sectors and occupations than those in fossil fuel industries. Solar and wind stimulate manufacturing, construction and installation jobs while fossil fuel provides jobs in operations and maintenance, fuel production and extraction and processing. Biomass creates fuel production and processing jobs in agriculture. Solar and wind also will create operation and maintenance jobs but its unclear at this time whether they will generate more or less than fossil fuels. The concentration of manufacturing job creation opportunities in solar and wind gives it a greater potential for growth, because it may be able to tap into export markets, while jobs in operation and maintenance cannot.[95]

The table below presents economic impact models using different energy investment scenarios in the U.S. It compares three scenarios based on the U.S. implementing a 20 percent RPS by 2020 and two versions of fossil fuel as usual scenarios. The table reveals that in all cases, the scenarios including renewable standards generate double or more jobs than a fossil fuel as usual scenario.

Table 2: Energy and Jobs

Scenarios	Average employment associated with each scenario (jobs)		
	Construction, Manufacturing, Installation	O&M and Fuel Processing	Total Employment
Scenario 1: 20 percent Renewable Portfolio Standard (RPS) by 2020 (85 percent biomass, 14 percent wind energy, 1 percent solar PV)	52,533	111,136	163,669
Scenario 2: 20 percent Renewable Portfolio Standard (RPS) by 2020 (60 percent biomass, 37 percent wind energy, 3 percent solar PV)	85,008	91,436	176,444
Scenario 3: 20 percent Renewable Portfolio Standard (RPS) by 2020 (40 percent biomass, 55 percent wind energy, 5 percent solar PV)	111,879	76,139	188,018
Scenario 4: Fossil Fuels as Usual to 2020 (50 percent coal and 50 percent natural gas)	22,711	63,657	86,369
Scenario 5: 20 percent Gas Intensive by 2020 (100 percent natural gas)	22,023	61,964	83,987

Table: Comparison of the estimated employment created by meeting the equivalent of 20 percent of current U.S. electricity demand via an expansion of fossil- or renewables-based electricity generation.
Source: Daniel M. Kammen, Kamal Kapadia, and Matthias Fripp (2004) *Putting Renewables to Work: How Many Jobs Can the Clean Energy Industry Generate?* RAEL Report, University of California, Berkeley.

Moving from national studies to state and local levels, we see that more targeted studies of specific state and local economies demonstrate the economic promise of renewable energy and energy efficiency industries. For example:

- In 2006, the growth of renewable energy and energy efficiency industries created 1,260 jobs in Oregon, while state energy costs decreased by approximately $48 million.[96]
- Environmental industry employment in Syracuse, NY is growing faster than any other industry in the state.[97]
- Nearly 500,000 jobs were created within Ohio alone directly or indirectly resulting from the renewable energy and energy efficiency industry. Researchers believe the Midwest manufacturing states, such as Ohio, are well positioned to enter manufacturing industries related to renewable energy and energy efficiency supply chains because they have the labor force and the facilities.[98]
- Research in Massachusetts determined that 10,000 new jobs were created in the State and growth will continue in this area.[99]

The job creation potential of renewable energy and energy efficiency is centered around the significant potential for market growth in the U.S., which represents one of the largest potential single markets. With the mushrooming of state renewable portfolio strategies, the weakness of the dollar and rising energy costs, we have seen a proliferation of foreign investment in the U.S. to produce wind energy[100], supported by the production tax credit.[101]

In addition to direct jobs in energy generation and operations, investment in renewable energy also stimulates indirect job creation in areas such as market research, training, project

facilitation, consulting, financing, policy advice, and other technical assistance to corporations and citizens employing renewable technologies.[102] The growth of the renewable and energy efficiencies sectors will depend to a large part on the concurrent growth of other sectors such as more sustainable transportation, green buildings, information technologies and more.[103]

Any discussion of the job picture in the world of renewable energy and energy efficiency is incomplete without a discussion of the current employment situation. The high price of energy is also a consequence of a shortage of people and equipment working in the field. This is compounded by the fact that the average age of over half of the power, oil and gas workforce is 50 and they are 10 years or less from retiring. It is unclear if there is enough of a pipeline, especially in the science and engineering positions, to fill those jobs as people retire.[104]

B. Quality Skills: Opportunities to build and strengthen indigenous skill base

Renewable energy and energy efficiency industries will create high-paying jobs within the fields of science, manufacturing, and skilled labor.[105] There are roughly five million employees working for environmental companies, and they include workers of all skill levels including highly skilled technical and professional occupations.[106] Overall, green investments, as the citation below highlights, provide a higher return in high skilled jobs.

> *Environmental investments generate, proportionately, 3–4 times as many jobs in professional, scientific, and technical services as the state averages. Jobs in this sector include the high-skilled, high-wage, technical, and professional jobs that all states seek to attract and retain.*[107]

Therefore, unsurprisingly, we are seeing a lot of states and communities investing not only in ways to support these new industries, but finding ways to develop the workforce to meet skill needs. The literature indicates that 28 states have begun to implement training programs to increase employment eligibility of skilled workers within the renewable energy and energy efficiency industry, and in most cases through partnerships with local colleges and universities. For example, Washington State instituted the Center of Excellence for Energy Technology with the assistance of three local universities in 2004. As another example, a consortium of solar energy companies collocated in a One-Stop Job Center in the City of San Jose, because around 60 percent of the solar jobs were for panel installation, and they could access a trained workforce.

Unions can benefit from this development. In California, for example, the Million Solar Roofs law requires that solar roofs are to be installed using labor union affiliated employees.

The renewable energy and energy efficiency economies also hold tremendous opportunities for job training, especially for low-income and disadvantaged workers. Oakland, California has created a Green Academy Workforce to train low-income individuals to clean and renovate their own neighborhoods. Oakland also has instituted the Green Energy Pathways Program which is designed to recruit, educate, train and ultimately place students in green energy jobs in the public and private sectors.

C. Quality of Life/ Place: attract and retain talent

Increasingly, companies believe that greening the workplace and the community is essential to attracting a talented workforce. In their classic text on local economic development, Edward Blakely and Ted Bradshaw state that businesses look to quality of life and livability as key location driving factors that local governments should build upon and promote to the business community.[108] As quality of life has become an essential business location factor, smart growth and green buildings are part of a critical mass of tools required to integrate sustainability initiatives with economic development. Having a more sustainable built environment is a critical component of quality of place and increasingly of communities' competitive advantage. Two key areas for investing in this area are smart growth and green buildings.

[Smart Growth]

Smart growth is based on mixing land uses, using land and infrastructure efficiently, creating walkable neighborhoods that are attractive and distinctive, providing transportation and housing choices, and encouraging community and stakeholder collaboration in development decisions. Key elements that smart growth provides such as available infrastructure, proximity to employment, and access to transit are among factors that make communities attractive to developers, businesses and residents. Portland, OR, for example, known for its green policies, saw a growth of 50 percent in its college-educated population between the ages of 25-34 in the 1990s, which was five times more than the U.S. average[109]. Also, a year-long study by Richard Florida and Carnegie Mellon University, entitled *Quality of Place & the New Economy: Positioning Pittsburgh to Compete* evaluated the relevance of quality of life factors, outside of job availability in attracting talent to regions. The study disputes regularly accepted notions that jobs alone are the most important factor in attracting talent and confirmed that quality of place is a paramount driver.[110]

Smart Growth initiatives such as transit oriented development (TOD) can have deeply positive impacts on local economic development, including talent attraction and retention. TODs are higher density developments encompassing transit stations. TODs promote easy pedestrian access within mixed use areas that integrate residential, commercial, retail, recreation and institutional uses. In Washington, DC for example, the NoMa development has been revitalizing what was a high crime, abandoned industrial and warehouse area and evolving into a booming mixed use neighborhood. The development has resulted in the creation of thousands of new jobs and residential units, and more than $1 billion of investment.

Moreover, failing to invest in smart growth can hold negative consequences for a local, state or regional economy. In 2003, for example, the Brookings Institution found that Pennsylvania's land development practices, which had the effect of decentralizing growth and weakening the state's established communities, contributed to the state's loss of young people and its subsequent job and wage stagnation.[111]

[Green Buildings]

Green buildings are also becoming part-in-parcel of the smart growth/ quality of life movement in further supporting the attraction of a talented workforce. Psychic income can be generated by occupying a desirable building, such as a LEED certified building, which could result in such added benefits as increased business and workforce attraction. A study of high performance green buildings in Northeast Ohio found that one of the reasons many corporations were choosing to construct green buildings was the perception that greener workplaces helped them attract and retain talent.[112]

Moreover, the evidence suggests that greener environments (e.g. improved indoor air quality, better lighting) are also healthier environments, which can improve the productivity and satisfaction of workers and the academic achievement of students.[113] Green buildings have even been shown to hold positive correlations in customer traffic of retail buildings. For example, the Heschong Mahone two-year study of day lighting's impact on retail sales "holds robust statistical evidence that day lighting presented positive impacts for sales volumes as experienced by one major retailer across 73 locations in the state of California."[114] Unfortunately, traditional financial analysis methods often do not capture these benefits. It is imperative that all life-cycle factors be added to the equation to reflect the true cost and benefits of green buildings.

V. FEDERAL FRAMEWORK

The results of the 2008 Presidential and Congressional elections ushered in a new era of federal support for a national climate prosperity strategy that will provide a significant opportunity for local communities to further advance the green economy agenda. Bi-partisan congressional support for a more balanced energy policy has grown over the past four years, in part driven by international crises in the oil-rich Middle East. The gasoline price spiked over $4.00/gallon in the spring of 2008 refocused public attention on the issues of energy affordability. The leadership of local governments, educational institutions, and regional organizations of states has provided another compelling example of the power of local "laboratories of democracy." The Obama Administration's support for science-based policy ensures attention to issues of climate change, and the financial crisis provides an economic incentive and political opportunity for investments to build a new green economy. Driving this emerging political consensus is the recognition that U.S. dependence on carbon-based sources of energy is economically and environmentally unsustainable.

A. Driving forces for federal policy promoting climate prosperity strategy

The "scientific debate" over climate change has been settled: i.e. green house gas emissions, caused by human industrial activity, most notably carbon dioxide (CO2), have trapped the sun's heat, causing a rise in the earth's temperature, resulting in significant, adverse and potential irreversible effects on the climate.

In its 2007 Nobel Peace Prize Award to the U.N.'s Intergovernmental Panel on Climate Change, the Nobel Committee stated: "Whereas in the 1980's global warming seemed to be merely an interesting hypothesis, the 1990's produced firmer evidence in its support. In the last few years, the connections become even clearer and the consequences still more apparent."

The companion Peace Prize to Al Gore noted "the Norwegian Nobel Committee is seeking to contribute to a sharper focus on the processes and decisions that appear to be necessary to protect the world's future climate, and thereby to reduce the threat to the security of mankind. Action is necessary now, before climate change moves beyond man's control."

International political pressure and economic competition is forcing a national U.S. response.
The U.N. Framework Convention on Climate Change's Kyoto Protocol, intended to stabilize greenhouse gas concentrations, has attracted 183 signatories, the United States being the major nonparticipant. The upcoming December 2009 meeting in Copenhagen has created a deadline for the U.S. to change its position.

The European Union's Emissions Trading Scheme, adopted in response to Kyoto, caps CO2 emissions for over 10,000 power generators and factories, representing more than 50 percent of the region's CO2. After a three year trial period of the "cap and trade" system, a formal compliance period began in January 2008, initially resulting in the price of carbon emissions allowances stabilizing at 25 Euros/metric ton, an incentive level deemed sufficient

to reduce use of carbon based fuels. Although the world-wide economic crisis has caused a retrenchment of the EU's goals, European firms are gaining a first-mover advantage in developing innovative technologies; in addition, U.S. firms will likely face a "carbon tariff" on exports if the U.S. does not adopt a similar system.

Leading corporations have endorsed the approach of "cap and trade" to reducing emissions. The U.S. Climate Action Partnership, representing 26 Fortune 500 companies and 5 environmental firms have actively promoted federal legislation in a January 2007 Call for Action and in a January 2009 Blueprint for Legislative Action. Members of the Partnership include General Electric, the Environmental Defense Fund, Ford Motor Company, and the Pew Center of Global Climate Change.

B. Obama Administration Policy

During his Presidential campaign, Barack Obama was a clear proponent of action to address climate change: "Climate change is real. It is something we have to deal with now, not 10 years from now, not 20 years from now." His platform included:

- Greenhouse gas emission reductions through a cap and trade system, auctioning all allowances, with a 2050 goal of emissions 80 percent below 1990 levels
- Fuel Efficiency by increasing CAFE standards ("Corporate Average Fuel Efficiency") for vehicles by 4 percent per year
- Alternative Energy by requiring that 25 percent of U.S. electricity come from sustainable energy sources by 2025 and investing $150 Billion of cap and trade revenue over 10 years for clean energy research and development and creating 5 million new jobs, and
- Climate Treaties by re-engaging in the Kyoto Protocol process.

During the transition, the President-elect reaffirmed his commitment to climate change. Only two weeks after the November election in a "surprise taped statement," he confirmed, in one of his first policy pronouncements that he planned to continue his support of aggressive targets for fighting climate change.

The President's policy position will be supported by his nominees to head federal energy and environmental agencies: all are experienced administrators and accomplished scientists who have been public advocates of climate change policy:

- Assistant to the President for Energy and Climate Change – Carol Browner, EPA Administrator during the Clinton Administration, pushed for tough air pollution standards
- Director of the White House Office of Science and Technology – John Holdren, a Harvard physicist and former President of the Association for the Advancement of Science, has publicly stated that climate change is "well beyond dangerous and is careening toward completely unmanageable."
- Chair of the White House Council on Environmental Quality – Nancy Sutley was a deputy mayor of Los Angeles for energy and environment and an EPA official during the Clinton Administration

- Energy Secretary - Steven Chu, a Nobel Prize winning physicist and head of the Lawrence Berkeley National Laboratory, is a firm believer in the need to limit carbon emissions
- Assistant Secretary for Energy Efficiency and Renewable Energy – Cathy Zoi, founding CEO of Al Gore's Alliance for Climate Protection
- Labor Secretary – Hilda Solis, a member of Congress from California, introduced the Green Jobs Act, which was included in the 2007 energy bill.
- EPA Administrator - Lisa P. Jackson, the former head of the New Jersey EPA, introduced a plan to reduce carbon emissions 20 percent by 2020 and 80 percent by 2050
- Director of the National Oceanic and Atmospheric Administration – Jane Lubchenco, a professor of marine biology at Oregon State University, has been an outspoken critic of NOAA, saying they do not do enough to prevent overfishing.
- Chairman of the Federal Energy Regulatory Commission – Jon Wellinghoff, primary author of Nevada Renewable Portfolio Standard

The President's continuing commitment was further demonstrated in his FY10 Budget Document, "A New Era of Responsibility – Renewing America's Promise," which stated as goals:

- Develop Economy-Wide Emission Reduction Program
    - 14 percent Below 2005 greenhouse gas level by 2020
    - 83 percent Below 2005 greenhouse gas level by 2050

- Implement Cap and Trade System
    - 100 percent Auction
    - Invest $150 Billion over 10 years, starting FY12
    - Balance of funds returned to the people, especially vulnerable families, communities, and businesses to help in transition

C. Congressional Leadership Supports Green Technology Policy

Congressional leadership, particularly in the House, supports climate change policy. Because of the historic shift of party allegiances, resulting (until the last two cycles) in the reduction of conservative members in the Democratic caucus, leadership positions in the House have become dominated by long serving liberal members from urban areas, particularly from the coastal States, most notably California.

- Speaker of the House – Nancy Pelosi (D-CA)
- House Majority Leader – Steny Hoyer (D-MD)
- Chairman, House Energy and Commerce Committee – Henry Waxman (D-CA)
- Chairman, House Energy and Environment Subcommittee – Ed Markey (D-MA)
- Chairman, House Ways and Means – Charlie Rangel (D-NY)

The Senate leadership generally reflects a more balanced geographic distribution, but Chairs of key Committees have also become active on energy issues:

- Chair, Environment and Public Works Committee – Barbara Boxer (D-CA)
- Chair, Transportation and Infrastructure Subcommittee – Max Baucus (D-MT)
- Chair, Energy and Natural Resources – Jeff Bingaman (D-NM)

The salience of climate change legislation is perhaps best reflected in the competition among Congressional members for leadership on this issue. This competition was dramatically demonstrated by the ouster, in a tightly contested caucus vote, of Rep. John Dingell (D-MI), the House's longest serving member and Chair of the Energy Committee, by Rep. Waxman. Dingell had introduced his own climate change bill; Waxman promised to move more quickly.

In early February Sen. Boxer unveiled a set of legislative principles to guide action on emission controls; Sen. Bingaman has announced his interest, and Sen. Kerry, Chair of the Foreign Relations Committee, has held hearings which featured Al Gore.

In May, 2009, the American Clean Energy and Security Act, originally introduced by Rep. Waxman and Rep. Markey, passed the House Energy and Commerce Committee. A floor vote is expected in June, 2009. Rep. Peterson (D-MN), Chair of the House Agriculture Committee, has marked up legislation that gives jurisdiction over a new carbon market to the Commodity Futures Trading Commission.

Members whose communities could be adversely impacted by these trends feel compelled to respond with their own proposals. At the end of March, a bi-partisan group of eight Senators, including Democrats from manufacturing intensive mid-western States, introduced legislation (S.661) to help manufacturing firms use less energy, reduce carbon emissions, and produce new technologies to lower our reliance on fossil fuels.

Not only is there competition among members of Congress, there is competition between the Congress and the Administration. The Obama Administration has made it clear that it believes that climate change requires Congressional legislation, but that in the absence of such action, the Administration is prepared to take action within its existing authority. Accordingly, EPA Administrator Jackson has begun the review of Bush Administration policies, and will use the Clean Air Act to regulate green house gas emissions. Specific action items

include issuing a waiver for the state of California to move ahead with stricter motor vehicle emissions standards, and establishing a federal greenhouse gas registry.

D. American Recovery and Reinvestment Act of 2009

The Administration, faced by the most severe economic crisis since the Great Depression, has focused its attention on restoring confidence in the economy. The American Recovery and Reinvestment Act of 2009 (ARRA 2009), introduced in the House in January, and signed by the President on February 17th, reflects the Administration's strong support of energy conservation and efficiency investments. Grants, loans and tax incentives for energy conservation and efficiency represented the largest set of new energy initiatives in the bill, and despite the debates and changes in the legislation during the course of its passage, these elements remained intact.

Investment in green technology is seen as a short term recovery mechanism – green jobs – and a long term reinvestment vehicle in the greening of the American economy. In a report prepared by the President's economic advisors in January, "The Job Impact of he American Recovery and Reinvestment Plan," the Administration calculated that of a total of 3,675,000 jobs affected by a proposed $775 billion package of expenditures and tax cuts, 459,000 (or 12 percent) would result from the Energy "component" (dollar amount unspecified).

In a plan summary released on January 23, 2009 – "The American Recovery and Reinvestment Plan – By the Numbers," the Administration's energy goals included doubling renewable energy capacity within 3 years, capable of powering 6 million home; weatherizing 2 million homes and 75 percent of federal buildings; laying 3000 miles of electric transmission lines; installing 40 million smart meters; and leveraging $100 billion in private investment through a new Clean Energy Finance Initiative.

In the final version of ARRA 2009, signed by the President on February 17, 2009, appropriated $797 billion, of which the Department of Energy receives over $45 billion of for energy programs. Much of this funding is for existing programs authorized under such legislation as the Energy Policy and Conservation Act, the Energy Independence and Security Act of 2007, and the Energy Policy Act of 2005. ARRA 2009 funds many of these programs that were previously authorized, but never funded, in addition to increasing the budgets of other existing programs to unprecedented levels.

$16.8 Billion is targeted for Energy Efficiency and Renewable Energy grants and programs:

Weatherization Assistance	$ 5.0 Billion
State Efficiency and Conservation Block Grants	$ 3.2 Billion
State Energy Program	$ 3.1 Billion
Research, Development, Demonstrations and Deployment	$ 2.5 Billion
Advanced Battery Manufacturing Grants	$ 2.0 Billion
Alternative Fueled Vehicles Pilot	$ 0.3 Billion
Transportation Electrification	$ 0.4 Billion
Energy Appliance Programs	$ 0.3 Billion

Additional funding was provided to other DOE offices:

Electricity Delivery and Energy Reliability Smart Grid, including Worker Training	$ 4.5 Billion
Fossil Energy R&D	$ 3.4 Billion
Science	$ 1.6 Billion
ARPA-e	$ 0.4 Billion
Innovative Technology Loan Guarantee	$ 6.0 Billion
Borrowing Authority – Transmissions Lines	$ 6.5 Billion

Funding to support energy research, efficiency and conservation are included in the Recovery Act for other agencies as well:

National Institute of Standards and Technology	$ 100 Million
National Oceanic and Atmospheric Administration	$ 170 Million
National Aeronautics and Space Administration	$ 400 Million
Defense Environmental Clean-Up	$ 5.1 Billion
Department of Defense Energy Research	$ 300 Million
General Services Administration	
Energy Efficiency in Federal Buildings	$ 4.5 Billion
Energy Efficient Federal Vehicles	$ 0.3 Billion

Housing and Urban Development	
Public Housing - Competitive grants to leverage private sector investments for renovations including energy conservation retrofits	$ 1.0 Billion
Assisted Housing – Grants and loans for energy retrofit and green investments in assisted housing	$ 250 Million
Labor	
Competitive grants for worker training including careers in energy efficiency and renewable energy	$ 500 Million
Defense	
Military Construction – Energy	$ 100 Million
Conservation and Alternative Energy	$ 120 Million
Energy Conservation Investment Operations and Maintenance –repair and modernization of facilities including investments in energy efficiency of DoD	$3.7 Billion

In addition to the significant grant and loan programs, there are more than a dozen tax credits and incentive programs that support conservation, efficiency, and alternative energy, including:

- Renewable Energy and Conservation Incentives
  - Extension of renewable energy production tax credit
  - Election to claim the investment tax credit in lieu of the production tax credit
  - Grants for renewable energy projects in lieu of the investment tax credits (New Treasury program)
  - Energy tax credit for small wind energy properties – dollar cap on 30 percent credit eliminated
  - Alternative/renewable energy tax credit – dollar cap on 30 percent credit eliminated
  - Tax credit for energy non business conservation improvements increased from 10 percent to 30 percent and dollar cap eliminated
- Bonds
  - Clean Renewable Energy Bonds – total amount expanded to $2.4 Billion
  - Qualified Energy Conservation Bonds – total amount expanded to $2.4 Billion to include loans and grants to home owners and businesses for green community programs

- Manufacturing Facilities
  - Income tax credit of 30 percent to encourage the development of domestic manufacturing base to support renewable energy production, conservation and efficiency - $2.3 Billion

The implementation of the Recovery Act provides resources for communities to develop climate prosperity strategies. In mid-March the Department of Energy announced allocations of nearly $3.2 billion in formula grants for State Energy Grants. The purpose of these grants is to enable states to save energy, increase the generation of renewable energy, and reduce green house gas emissions. A major goal is to reduce per capita energy consumption of 25 percent by 2012 below the 1990 levels.

In late March the Department announced plans to award $3.2 billion in energy efficiency and conservation projects in U.S. cities, counties, states, territories, and Native American tribes. The Energy Efficiency and Conservation Block Grant program provides formula grants for projects that reduce total energy use and fossil fuel emissions, and improve energy efficiency nationwide. The funding will support energy audits and energy efficiency retrofits in residential and commercial buildings, the development and implementation of advanced building codes and inspections, and the creation of financial incentive programs for energy efficiency improvements. Other activities eligible for use of grant funds include transportation programs that conserve energy, projects to reduce and capture greenhouse gas emissions, renewable energy installations on government buildings, energy efficient traffic signals and street lights, deployment of Combined Heat and Power and district heating and cooling systems, and others.

Cities and counties will receive nearly $1.9 billion under the Energy Efficiency and Conservation Block Grant Program, and states and territories will receive nearly $770 million. States will receive and administer funds for those counties and cities that are not large enough to qualify for direct DOE funding. More than $54 million will flow directly to Tribal governments. Up to $456 million of this funding is planned to be made available under a separate competitive solicitation for local energy efficiency projects.

E. Cap and Trade Mechanisms

[Note: This section was written before the *Waxman-Markey - American* Clean *Energy* and *Security Act of* 2009 -was drafted and approved on May 21, 2009 by the House Committee on Energy and Commerce.]

The stimulus bill will allow a down payment on programs, technologies and market place incentives to stimulate energy conservation, efficiency, and the development of renewable energy. However, the long term driver of climate prosperity will be the impact of climate change and the response to green house gas emissions. The method currently approved by the international community and by leading environmental groups and large corporations is a cap and trade system. "Cap and trade" focuses on achieving a specific level of CO2 reduction and allowing the cost of compliance to be managed through a tradable permit program; by contrast, a carbon tax sets a limit to the cost of compliance and achieves a level of emissions commensurate with that premium. For an excellent discussion of these issues, see CRS Report for Congress, “Climate Change: Design Approaches for a Greenhouse Gas Reduction Program (Updated November 24, 2008)”.

The federal framework for climate prosperity will be influenced by existing local green house gas coalitions. In the absence of federal action, States – and Canadian Provinces and Mexican states – have joined together to promote regulatory mechanisms. The Western Climate Initiative includes 7 states and 4 provinces; the Midwest Greenhouse Gas Accord

includes seven states and provinces. The most developed is the Regional Greenhouse Gas Initiative (RGGI), a cooperative of 10 Northeastern and Mid-Atlantic States, discussed previously in this document.

Through March, 2009, RGGI conducted three auctions of emissions allowances; the latest, and largest, on March 18th, saw 50 qualified entities bid and 42 purchase 31.5 million 2009 vintage allowances, which sold at $3.51; combined with a parallel auction of 2.1 million 2012 vintage allowances, at $3.05, yielded $117 million for the participating states. This price is lower than that estimated to be necessary to stimulate emitters to convert to newer technologies, a function of variables such as a cap higher than actual usage; however, the demand for the allowances did reflect the acceptance of "investors," primarily energy generators, of the need to participate in the auction system, if only for defensive financial reasons.

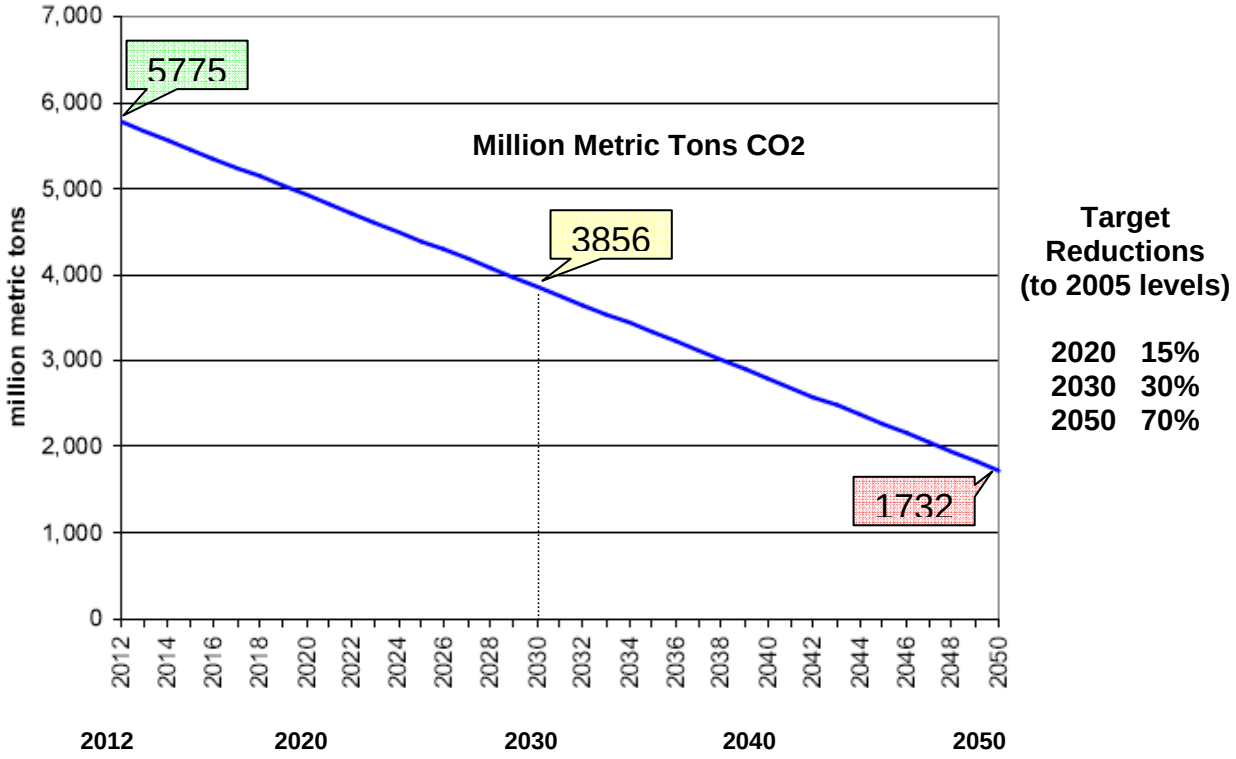
A federal cap and trade regime will have to take into account the leadership of these regional efforts, and recognize the value of the allowances purchased. Just as the cap and trade system in the European Union imposes international pressure on the U.S., regional efforts create a domestic impetus to national action.

The most well-developed and formally considered federal legislative proposal for cap and trade was presented in the Climate Security Act of 2007 (S.2191), known as the Lieberman-Warner Bill, debated by the Senate in the spring of 2008. There are – and will be – many other proposals, but understanding Lieberman-Warner provides a baseline for comparison. For economic development professionals, the two major issues are the differential impact on industries and communities of the increased cost of carbon based energy, and the use of the revenue generated by the auction of emissions allowances.

The major features of the legislation are (1) the level of limits on GHG emissions, (2) the facilities that are covered by the cap, (3) the organizational and administrative mechanisms for regulating the regime, and (4) the distribution of the allowances; each of these is described further below.

(1) The cap is set at 5.775 billion metric tons of CO2 in 2012, declines by 30 percent by 2030 and by 70 percent by 2050, significantly below current levels. As the cap becomes tighter, the pressure on covered facilities to comply will become greater, and the value of the allowances will increase.

Figure 8: Emissions Reduction Plan: Lieberman-Warner Climate Security Act



(2) Covered facilities include energy generators using large amounts of coal, natural gas facilities, petroleum producers and importers, chemical importers, and manufacturers that emit hydro-chloral-carbons. Although these facilities are estimated to number in the single digit thousands, they – or their products (e.g., transportation fuel) – generate the majority of GHG.

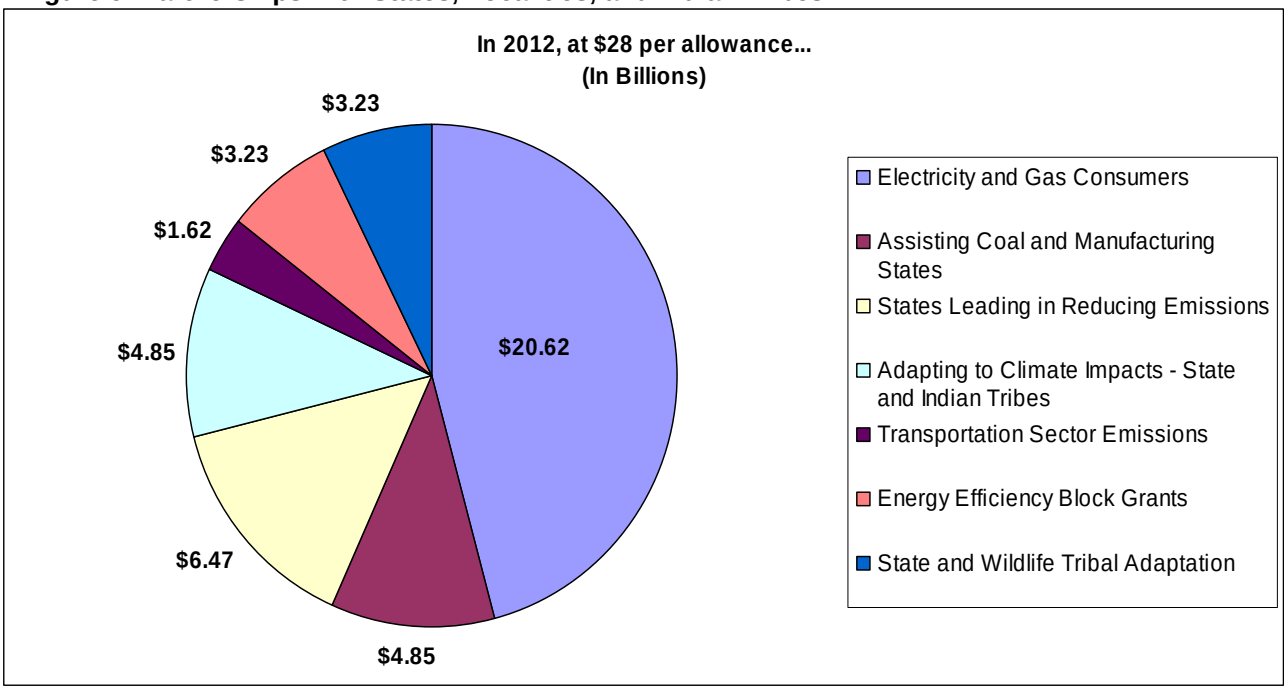
(3) Lieberman-Warner proposes a regulatory structure that attempts to provide a market-like mechanism for the purchase and trading of allowances. EPA is given primary administrative responsibility; an inter-agency Carbon Markets Working Group provides recommendations on the market mechanisms; an SEC/FRB type Carbon Market Efficiency Board of citizens with 14 year terms assures that the system functions properly; and a Climate Change Technology Board promotes new technologies.

(4) The distribution of allowances provides a flexible mechanism for mitigation of compliance costs and transition to lower carbon usage. The major distinction is between "allocations" of allowances (i.e., permits to emit greenhouse gases) to covered facilities in accordance with a formula, which can be used or sold ("traded"), and "auctions," where a unit of government sells allowances and uses the proceeds for programs, as in the RGGI program. (During the Presidential campaign Senator McCain proposed to allocate all allowances, Senator Obama proposed to auction them and use the proceeds for "green tech" investments.). Other mechanisms include purchasing "offsets," e.g., planting trees that reduce CO2 emissions, "banking" (saving) current allowances for future use, and "borrowing" against future allocations.

The value of allowances and the revenue flowing back to public bodies can be considerable. The Administration's FY10 Budget proposes to use such revenue to invest $15 million/year

over a 10 year period, and use the remaining funds to mitigate the impact on low income populations. The Congressional Budget Office, estimating the price of the 5.775 Billion allowances in 2012 at $28 each, calculated that the Lieberman-Warner bill would generate $161.1 Billion in funding, including $35.3 Billion in revenue to the federal government. The legislation very specifically assigned each and every allowance to a program (including allocation to covered facilities) or agency or local unit of government. Nearly 28 percent of the allowances were designated for seven programs under "Partnerships with States, Localities, and Indian Tribes" (see figure below) for example, providing $3.23 Billion for Energy Efficiency Block Grants, $1.62 Billion for mass transit, and $4.85 Billion worth of allowances to States dependent upon coal and manufacturing, to distribute or auction at their discretion.

Figure 9: Partnerships with States, Localities, and Indian Tribes



The U.S. Climate Action Partnership, a driving force behind the Lieberman-Warner legislation, has proposed a new set of detailed principles in its January 2009 "Blueprint" to guide legislation action in the 111th Congress. Among the range of ideas put forward is a greater reliance on "offsets" and a series of "complementary measures" including research and development, carbon capture and storage, transportation industry and building systems efficiencies. Allowances would be provided for a broad array of purposes analogous to those in the Lieberman-Warner legislation; in the early years largely allocated, in later years auctioned.

Since the November 2008 election, national priorities have been dramatically reoriented, and despite Administration and Congressional commitment to climate change legislation, it is unlikely that a robust program will be enacted in the next year. However, advocates believe that the Clean Air Act contains sufficient authorities to initiate such a program, and given the reputation that secondary market mechanisms have recently earned, and the complexity of the proposed regulatory regime (including verification), modest steps to implement a cap and trade system may be taken administratively. A possible short-term outcome is the gradual

establishment of the system, but with a generous cap, resulting in a limited economic impact until the recession is alleviated – a system with "training wheels."

Even if robust green house gas emissions control is not likely to be a legislative result of the 111th Congress, climate prosperity strategy will influence other upcoming legislation:

- Revisions to the "Energy Independence and Security Act of 2007"
- Reauthorization of the Transportation Bill
- Revisions to the "Food, Conservation and Energy Act of 2008"
- Reauthorization of the "Public Works and Economic Development Act"

Climate Prosperity Strategies In Your Community

VI. Getting Started Guide

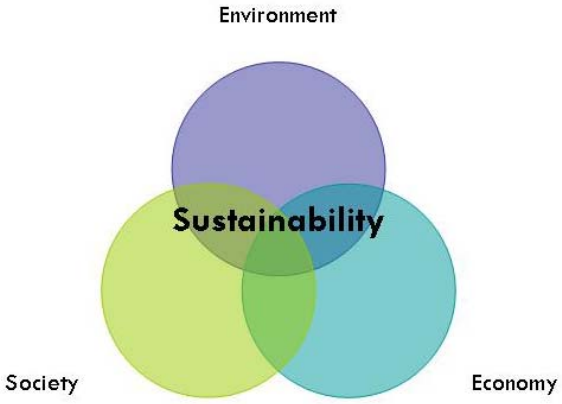
GETTING STARTED GUIDE
CONTENTS

1.0 Strategies for Prosperity: the path to sustainability

Sustainability is not something that is achieved, but rather is a pathway – constantly in flux and in need of reassessment.

Climate prosperity strategies provide cities and regions the opportunity to increase local economic growth, employment creation and development initiatives within the context of sustainable development. Cities such as Chicago and San Jose have sustainability strategies on the books, and several cities, both large and small have already forged ahead with climate action strategies. Eight pilot projects are currently taking place across the country under the umbrella of the Climate Prosperity Project and will serve as vital laboratories for better understanding how to best go about doing climate action strategies on the city, regional and state levels. Silicon Valley's strategy, "Climate Prosperity: A Greenprint for Silicon Valley," is an excellent resource for other communities to draw on.

A successful climate prosperity strategy will encompass the three-legged stool of sustainability – economy, environment, and society. Engaging in climate prosperity strategies can: catalyze smarter and more sustainable economic development; energize communities and residents to engage in a more sustainable collective path; and help to protect and conserve critical environmental resources and stem the threats from climate change.



[Are economic developers integrating sustainability into their activities?]

During the spring of 2009, IEDC conducted a sustainability survey of its membership to identify broad trends and challenges facing the economic development community in the transition towards sustainability. Representatives from over 140 communities from throughout the United States and Canada responded to the survey.

The survey results show that sustainability initiatives are indeed beginning to become integrated as elements of the economic developer's toolbox. Survey respondents were asked what economic development sustainability initiatives their communities already have in place (or are in the process of implementing). Out of 19 broad initiative options, the most common responses were those that are already fairly standard to the economic development field, including: green infrastructure (e.g., bicycle lanes, wildlife corridors, greenways); encourage/incentivize mixed-use development; promote infill/adaptive reuse; promote redevelopment of brownfields; and promote increased public transit service. Notably, many newer initiatives, such as municipal energy efficiency efforts (e.g., traffic signals, sewage pumps, fleet upgrades); encouraging/ incentivizing transit-oriented development, clean tech attraction, and green construction requirements (e.g., LEED standards) were spreading. Thirty to 40 percent of respondents noted that their communities were involved in at least one of

these sustainability initiatives. The least common initiatives were the newest and emerging areas of sustainability planning, such as smart grids and metering; business retention and expansion around green supply chains; clean tech attraction; and green affordable housing.

Many respondents remarked that there are deep and significant challenges standing in the way. Chief among these were access to funding, lack of political support, lack of a champion, and limited organizational capacity. These findings drive home the critical need for education in this area. Further, many respondents noted that they need tools and direction in how to engage in sustainability and climate prosperity strategies. This guidebook is intended to serve that purpose.

[Who and What is this Guide For?]

This getting started guide is intended to provide economic development professionals, community leaders, planners, organizers and advocates with strategies that communities can use to start engaging in climate prosperity and greenhouse gas reduction strategies. Understandably, communities and community leaders reading this document will be at different stages of the process, depending on the political, economic and social climate of the community. As such, different steps already may have been accomplished. However, all of the steps in the document are considered to be best practices and lessons that communities can plug into at various stages of planning and strategizing. While this is *one* framework for guiding a city/region through the climate action strategic process, each community's strategy will be unique—tailored to meet the specific economic, environmental, political, technological and social assets and aspirations of each place.

As an additional resource, the compendium of cases that follows this document provides a range of independent strategies that could serve as components of a wider strategy.

2.0 Build the Foundation

"To be thrown upon one's own resources, is to be cast into the very lap of fortune; for our faculties then undergo a development and display an energy of which they were previously unsusceptible"

-Benjamin Franklin

Before a climate prosperity plan can be developed and translated into actionable goals and policies, a foundation of institutional, organizational and community capacity must be built first. The order of the following steps is dependent on a community's present position in the process of creating a climate prosperity strategy.

Steps to building the foundation:

- **Identify a Champion**
- **Identify the Lead Organization**
- **Assess Your Community**
- **Mind Shift to Sustainability Planning**
- **Build on What You Have**
- **Establish Lead Organization as Climate Prosperity Hub for Community**
- **Identify Diverse and Dynamic Stakeholders**
- **Educate Stakeholders and Leaders**
- **Dedicate Staff to the Process**
- **Build a Dedicated and Focused Task Force**
- **Seek Diverse Financing Streams for the Process and Plan**
- **Develop a Strong and Unifying Vision**

[Identify a Champion]

Successful strategies require a network of dynamic leaders, stakeholders, and resources. Therefore, identifying a champion who can lead the climate prosperity strategic process is critical. The champion can act as the catalyst for galvanizing wide-ranging support for the project, as well as aligning the resources needed to get the project off the ground. This person is often a political leader such as a mayor, county commissioner, or governor. In the absence of a true champion, the lead organization can take on many of the roles in terms of galvanizing support and creating momentum for the strategy. In San Jose, CA, Mayor Chuck Reed spearheaded the process. However, businesses executives, university presidents or other community leaders can also assume this role.

[Identify the Lead Organization]

Developing a climate prosperity strategy requires a dedicated and in-depth process – one that demands a committed organization with the capacity to lead all stakeholders through the development of the strategy. The following questions can help identify the lead organization:

- Does the organization have the knowledge base to address the integration of economic, social, and environmental challenges?
- Does the organization have the capacity to lead a multi-stakeholder climate prosperity planning process?
- Does the organization have the political capital to be a neutral convener?

The lead organization can be public, private or community-based. In Metropolitan St Louis, the St. Louis Regional Chamber & Growth Association has assumed the lead role. In some cases, it may be necessary to create a public-private partnership to steward and oversee the process.

[Assess Your Community Through a Green Lens]

In order to create a strategic roadmap for a prosperous future that will benefit the economy, the environment, and people alike, it is critical to first assess the current conditions of the community and what resources it holds both broadly and through a green lens. This includes looking at economic, environmental, and social conditions – as well as how these systems interact.

Table 3: Tools/Measures for Identifying and Analyzing Local Resources and Assets

Economic Conditions
SWOT (strengths, weaknesses, opportunities, threats)
Labor force (location quotient, shift share, skill sets and their applicability to greener industries, green jobs analysis*)
Economic base analysis
Cluster analysis, including subsets of green industries and energy-intensive industries**
Green supply chain analysis
Environmental Conditions
Quantity and quality inventory of current and projected local natural capital assets (e.g., parks, water bodies, forests, etc)
Greenhouse gas inventory (e.g., public buildings, transit fleet, local traffic patterns, etc.)
Evaluate local renewable energy resources
Current status and outlook of local environmental health
How green the building stock is (commercial, residential, industrial)
Social/ Institutional Conditions
Local policy framework (e.g., building codes, state incentives and regulations, state Renewable Portfolio Standards)
Demographics (age, degree attainment, income, etc.)
Voter participation
Community involvement
Local institutions (e.g., educational, workforce, financial etc.) and cultural/social organizations (e.g., foundations, arts, faith-based, etc.) asset inventory***
Individual skills asset inventory
Transit use and access

* *The Minnesota Green Jobs Task Force conducted a market analysis to identify business opportunities and needs created by key environmental policies previously adopted in Minnesota. The document provides a useful framework in assessing current and potential job growth in identified green sectors. www.mngreenjobs.com*

** *For a mapping of existing companies poised to grow from investments in climate solutions – and emerging clusters, see lesscarbonmorejobs.org*

****For an excellent guide to asset mapping, see the Council on Competitiveness' Asset Mapping Roadmap: A Guide to Assessing Regional Development Resources. www.compete.org*

All of the data collection needs listed in Table 3 are fairly standard to economic development strategic planning, with the exception of the greenhouse gas inventory. The analyses of these data sets remain fundamentally the same as in traditional economic development strategic planning, but they also must be assessed through a greener lens. For example, it is important to identify energy-intensive firms and sectors as well as those that can plug into emerging greener supply chains to understand a community's assets within a changing economic framework. Moreover, economic developers and communities need a shift in mindset about potential interactions, synergies, and challenges occurring among the social, economic, and environmental conditions.

[Mind Shift from Strategic Planning to Sustainability Strategies]

To shift the mindset of the strategic planning process to one that incorporates the complex interactions that sustainability strategies demand, communities must begin with a mind mapping exercise to "green" standard analyses in order to mine them for sustainability opportunities.

"Greening" of the SWOT Analysis

For an example, the SWOT analysis approach is outlined below. The goal of a SWOT analysis remains the same – to map local strengths and weaknesses (internal), opportunities and threats (external). However, the mind occurs in asking questions that focus on the intersections of economic, environmental and social forces.

Strengths: the community can promote or build-up
Weaknesses: the community acknowledges or fixes
Opportunities: the community can prepare for
Threats: the community mitigates, if possible

Strengths (Internal, Positive):

- What key local assets could be tapped and developed to support local sustainability initiatives?
- What sustainability programs and policies are already in place that can serve as a base to build upon?
- What businesses and labor are already functioning in green or environmentally related industries?
- What organizational assets are already in place that could support sustainability initiatives?
- What research and green training opportunities are available in local colleges and universities?

Weaknesses (Internal, Negative):

- What's holding the community/city/region back from moving forward on a comprehensive sustainability approach to development (e.g., building codes, regulatory environment, lack of leadership)?
- What social, economic and environmental assets in the community are lacking or in need of development?
- What firms, sectors and workers have already been challenged by recent energy market volatility?

Opportunities (External, Positive):

- What regional, state, and national environmental and economic trends could the community tap into and capitalize on?
- What demographic and workforce assets can be utilized to strengthen the local economy's green job base?
- What economic sectors are transforming that local clusters may potentially to tap into?
- What new resources (funding, R&D) can be tapped into?

Threats (External, Negative):

- Are there environmental trends that are expected to negatively affect the community (e.g., air pollution, water quality and water availability)?
- What global economic trends (e.g., recession, globalization) could reshape the local economic structure?
- What firms and sectors may be challenged by a rapidly changing energy market and changing regulatory structures that will require greenhouse gas reduction and greater energy efficiency standards?
- How might changing consumer spending patterns and increasing demands for greener, more energy-efficient products impact local businesses?

Sample SWOT Analysis

The following (Table 4) provides an example of a SWOT analysis conducted by a community that is making the shift to sustainability planning. Threaded throughout the analysis is a special focus on different aspects of sustainability stemming from various types of stakeholders.

Table 4: Climate Prosperity-focused SWOT Analysis Example

Strengths	Weaknesses
Educated, diverse and young population Links to institutions doing green R&D Public/private partnerships & new approaches in use Utilities engaging people and companies in going green Some existing firms in renewable and energy efficiency Existing small business mentoring and training	Downsizing of manufacturing base Lack of linkages: between training agencies and employers, matching supply and demand Growing gap between "Haves and Have Nots" Aging infrastructure Suburban growth: into rural/ agricultural/ environmentally important lands Lack of common vision/goals for sustainable development Older, energy inefficient building stock
Opportunities	**Threats**
Young, educated population could spur entrepreneurial growth in green jobs Increased partnership activity: refocus/expand role of existing educational facilities, build stronger links with business community Chamber an advocate of clean economic sectors: technology-based, health, tourism Manufacturing skills base lends itself to clean tech sectors Neighborhoods w/ strong physical (grid system) and social connections	Global economic downturn Competitions for new employers - industries/businesses, with other communities "Status Quo Thinking" from the state level on sustainability Water resources threatened from pollution and overextended from growth Rising costs of energy – effects on local firms and residents Aging manufacturing workforce

[Build Upon What You Have]

Equally importantly, communities need to take inventory of current programs, policies and initiatives already in place that they can build off, such as local housing associations with voluntary green building frameworks, utility companies with energy efficiency programs, community colleges with green construction training modules, and state incentives to promote alternative energy.

Many communities, having never approached economic development from a sustainability perspective before, may be tempted to enter the process believing that the wheel will have to be reinvented. However, many communities are rich with assets that often lie under the radar of local leaders. As such, conducting an assets inventory is a critical step in the pathway to sustainability. This includes plans, programs, current industries and people – all of which need to be mined for relevant elements that can be plugged into the roadmap for creating a climate prosperity strategy. This is not to say that new paths should not be pursued; rather, existing paths should not be ignored if they hold promise. Communities should pose the following questions when assessing existing assets:

- What are the existing economic development and environmental goals and visions?
- Which programs are already in existence (e.g., green development standards, technical assistance to entrepreneurs in green sectors, green fleet transition plan)?
- Which of these programs have been successful? Why or why not?
- Which programs are potentially scalable and/or adaptable to targeted goals?
- Which programs present low barriers and high cost-effectiveness?
- What other plans and strategies have already been developed that need to be considered?
- What state and federal-level incentives are in place to spur growth in sustainability-based economic development?
- Where are there potential allies and partnerships to be formed?
- How many firms with environmentally linked activities already operate in the community?
- How many firms that are poised to grow in the low carbon economy already operate in the community?
- How many of their suppliers are located in the community?
- What local colleges and universities have relevant training and R&D activities?
- What portion of the labor force is engaged in environmentally linked sectors and what skill sets do they have?
- What are the opportunities for matching local technological and industrial strengths with specific environmental initiatives? What types of public-sector assistance will support job growth in these areas?[115]

[Establish Lead Organization as Climate Prosperity Hub for Community]

Part of driving momentum for the climate prosperity strategy process is to establish the reputation of one organization as the go-to place for all activities related to climate prosperity. This positioning should begin before the planning process and extend beyond the strategy's completion. A variety of initiatives can be taken to establish the lead organization as a "sustainability hub," such as hosting seminars to educate stakeholders on different aspects of sustainability. For example, the St. Louis Regional Chamber and Growth Association (the lead organization for the Climate Prosperity initiative in metropolitan St. Louis) will be holding a seminar on energy audits for business savings. As another example, Sacramento, CA, developed a clean-tech "green pages" to both document and support its growing clean tech sector. Organizations can also connect with the business community and the public through information-sharing on sustainability via newsletters, blogs, and websites. The lead organization will need to ask itself: What is the organization already doing well that can translate into strengthening its sustainability capacity?

Further, the lead organization should have deep knowledge of different sustainability initiatives and resources throughout the community so that it can serve as an intermediary and link between people and institutions. Having a single sustainability hub for the community provides clarity to businesses about where and how decisions are being made, and helps them understand how they might be impacted. Further, it can attract stakeholders to come together over divisive issues and forge networks and dynamic partnerships that are critical to the success of the future strategy.

[Identify Diverse and Dynamic Stakeholders Who Bring Key Resources to the Table]

For a successful climate action strategy, communities will need to involve a wide variety of stakeholders, many of whom may not have worked together previously, such as business representatives and environmentalists. Engaging with and educating these stakeholders to identify critical common interests, such as building opportunities and combating climate change, creates common ground that is essential for a successful climate action strategy. Engaging diverse stakeholders also:

- Fosters stronger and more diverse outcomes (more actors involved)
- Fosters social, institutional, and economic stability by giving people an investment in local outcomes
- Fosters more ardent involvement in sustainable development and, by extension, people's own social, economic, and political futures
- Provides information on the strengths, weaknesses and economic opportunities of the local economy
- Generates interest and support for economic activities
- Brings increased resources to implement the strategy
- Legitimizes the strategy
- Builds capacity, skills and knowledge

To assemble this group, assess the different stakeholders by weighing varied interests against a set of criteria. The criteria should determine what interests are relevant and why, as well as gauge the relative importance of stakeholders' interests, objectives, and conflicts. Stakeholder interests should be assessed in terms of:

- The intersection of the stakeholders' interests and that of the strategy as a whole
- The quantity and types of resources they can mobilize
- The issues that the stakeholder could impact or resolve[116]

Keep in mind that a climate prosperity strategy requires engaging stakeholders who are not typical participants in economic development strategic planning processes. Stakeholders who can be key in helping to accomplish specific goals should be sought and included.

Equally, it is important to invest sufficient time with leadership and stakeholders at the beginning stages to gain their input and buy-in to the process. This may appear to slow down the process in the beginning, but the time is a worthwhile investment that will have the benefit of stronger outcomes in the long run. Their early participation generates a more dynamic response to local needs by increasing vertical and horizontal coordination of policies and programs and encouraging policy innovation. Further, getting stakeholders' in-depth participation is key to building economic priorities that are based on specific endogenous resources. Those who are engaged early on also can help spread the word about the strategy, acting as champions for it among their community contacts and networks.

[Educate Stakeholders and Leaders]

Many of the communities that have been successful in developing sustainability and/or climate action strategies have had very strong and engaged leadership. In these cities, the leadership understands what the vision is and what it takes to get there. These leaders understand how climate action policy and economic development align and see value in making it a priority. Because these leaders are educated on the subject, they make an effort to establish the networks and the frameworks necessary for the community to avidly pursue a meaningful strategy. However, some communities are more dispersed and cannot rely on one or even a few central leaders, and as such a network of key leaders from throughout the region will need to be engaged. Many leaders are familiar with the climate action movement, but will need to learn how it can be linked to economic development to create concrete benefits to the community.

Community education is also critical in order to get the buy-in of residents. Simple things, such as newsletters, blogs and workshops can deepen sustainability awareness within a community. For example, the Town of Taber, in Alberta, Canada, hosts a one-day "ecofair" for the community. The family-oriented event teaches about sustainable practices and technology, including displays on energy - efficient housing, water conservation, micro-generation and more. A highlight of the 2009 fair was the University of Calgary Solar-Powered Car.

In considering what kind of education is needed, some questions to ask include:

- Is the current political environment favorable to embracing a sustainability agenda?
- Is there a pervasive anti-environmental culture in the community?
- Are politicians leading the charge, or do they need to be educated on the benefits of taking climate action?

- How will climate actions impact area businesses? What are the costs and benefits?

[Dedicate Staff to the Process]

The lead organization ideally should have dedicated staff to the process – depending on the size of the community, this might be more than one person, or a combination of staff that are full- and part-time on the project. If there is more than one staff person dedicated to the project, one of those people should be identified as the lead.

The City of Normal, IL, has developed "Green Teams" that consist of a broad cross-section of town employees representing different departments and areas of expertise. The 2008-2009 Green Team goals are broken down into five broad categories, each containing numerous objectives. For example, under the energy efficiency goal, one of the five objectives is to establish baseline energy information by constructing a database to centralize historical energy consumption at all public facilities. Each objective has an identified team leader and supporting staff tasked with carrying out the objective. Another strategy that can help with staffing continuity is to partner with another organization. The City of Chicago did this when developing the Chicago Climate Action Plan. By collaborating with Global Philanthropy Partnership (GPP), the city gained strategic and technical expertise, along with access to business and professional partners.[117]

[Build a Dedicated and Focused Task Force]

The task force should be composed of a relatively small group of diverse stakeholders from different sectors of the community, including civic, private and non-profit leaders. The task force members should be those that are committed to the mission as well as the time the process will take. The purpose of this group is to examine issues and make recommendations to the lead organization. This group can also focus on interpreting trends and addressing unmet needs of the community. Activities that may be appropriate for this group include:

- Reviewing research and results that come out of the community assessment phase
- Participating in the scenario planning process to identify plausible futures (see p. 63)
- Reviewing draft reports
- Endorsing goals and strategies
- Reviewing and evaluating projects and programs
- Identifying planning resources

It is imperative to empower the task force and other related working groups with information as a follow-up to convening events such as workshops and meetings. When facilitating the visioning process for the City of Newark, N.J., the Apollo Alliance set up a web page that summarized meeting notes, complete with any graphic illustrations that were made, speaker contact information, and research that was specific to Newark. [118]

[Seek Diverse Financing Streams for the Process and Strategy]

Funding can be one of the primary challenges to engaging in a climate prosperity strategy on the community level. Communities that have had success in financing strategies and planning processes have engaged with a variety of funding sources, as municipal budgets are often too limited to accommodate the depth and scale that this type of planning and implementation requires. Part and parcel of successfully developing diverse funding streams is to engage in a collaborative process that can organically and continually present more resources to the strategy. Almost all communities that have engaged in a climate action strategy have reached out to local, regional and/or national foundations. These organizations, especially local ones, have critical links to the civic and business communities which are invaluable to the success of any climate action strategy. They can help to enhance business partnerships and strategies that strengthen long-term economic development. Further, involving such organizations fosters social, institutional, and economic stability by giving the community an investment in local outcomes.

[Develop a Strong Unifying Vision]

The following three options represent approaches to strategic visioning that can be used singularly or in combination with each other. Option 3, scenario planning, should be thought of as an additional tool that can support any type of visioning process, whether top-down (driven by leadership) or bottom-up (driven by public input from local stakeholders).

Option 1: A Leadership-Driven Vision

As mayors, county commissioners, and governors become more educated in sustainability, they often take the lead role in developing far-reaching sustainability visions and goals for their communities. Broad goals are then delegated to community leaders for implementation and marketed to the community. Examples of cities that have mayoral-driven sustainability strategies and plans are Chicago, New York City, Salt Lake City, San Jose, and Seattle.

Option 2: A Traditional Strategic Planning Approach

A traditional strategic planning approach that involves stakeholders and input from the community can be used to complement a leadership-driven vision, or can be utilized in communities that are lacking strong leadership on sustainability and climate-related policy issues. The process can involve a bottom-up participatory process or a process with select stakeholders, such as the process laid out in this guidebook. Participants engage in guided dialogues to identify the core strengths, weaknesses, opportunities and threats of the community. Based on this dialogue, the group can work together to identify the core goals of the community. Goals are then elaborated upon to include achievable objectives.

Tip: Nominal group exercises provide a structured problem-solving or idea-generating process in which individuals are brought together in a non-threatening environment to express and discuss their ideas. The process can help to clarify, prioritize, reach consensus, and make decisions on proposed actions.

One example of this process is from Newark, N.J., where the Apollo Alliance helped to facilitate a year-long planning process, Newark's Green Future Summit, to move from the vision of a green economy to the reality of a green economic strategy.[119] Newark's Green Future Summit helped refine goals and strategies and created critical personal connections

among city, community, business, citizen, and labor leaders.[120] In addition, an artist was brought into the process to describe the proceedings in colorful displays of pictures, symbols and language. These dynamic illustrations helped to capture the findings of the summit at different points throughout the year (see Diagram 10).

Diagram 10: What Does Green Economic Development Mean for Newark, NJ?

Source: Apollo Alliance. Imagining Newark's Green Future. January 2009.
Graphic Facilitation: Brandy Agerbeck, Loosetooth.com

Option 3: Scenario Planning

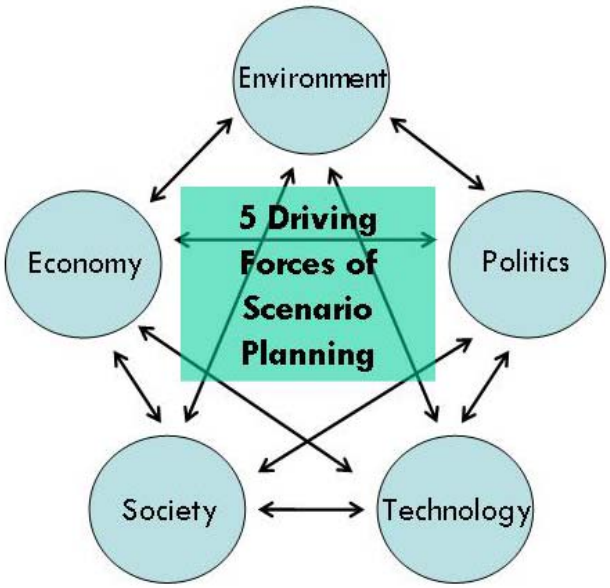
While most economic development professionals are fluent in the art of strategic planning, scenario planning represents an offshoot that can help leaders think through highly complex and dynamic situations. In strategic planning, a community looks at its current situation and compares it to what it would like to be in a certain amount of time.[121] Scenario planning takes this one step further by offering a dynamic systems approach to identifying multiple futures based on internal and external, known and unknown social, technological, environmental, economic, and political forces. **Please see the following section for a detailed summary of scenario planning as a powerful climate prosperity planning tool.**

3.0 Scenario Planning: a visioning tool for climate prosperity planning

"Scenarios are stories about the future. They are not attempts to predict the future; rather, they aim to sketch the boundaries of the plausible." -World Economic Forum

Scenario thinking began as a military tool, but gained wider recognition as a business tool utilized by large corporations in reaction to a world with growing uncertainty. Scenario planning represents a critical approach for a climate prosperity strategy because it provides for truly dynamic plans and strategies that are living documents, always adaptable to changing forces. As with strategic planning, scenario planning involves a realistic appraisal of available resources, constraints, and opportunities; the development of achievable goals; and the formulation of action plans to reach those goals. However, the roadmap for getting there allows for expanded thinking by challenging assumptions and established patterns that might prevent a city or region from embracing changes that are necessary to growth. Scenario planning is ideal for addressing complex issues and challenges with multiple forces: internal and external, horizontal and vertical, and foreseen and unforeseen.

Diagram 11: A Systems Approach



The outcomes of the scenario planning process can be used to help practitioners and stakeholders draw out a common vision. Scenario planning can be utilized in different forms, along different timescales, with different types of participant groups. It can be a very involved and lengthy process, inclusive of public participation and broad stakeholder input. Alternately, it could be a one- to two-day workshop, specifically for leadership and key stakeholders.

The process itself emphasizes group learning, an excellent mechanism for educating stakeholders and a critical step to building a climate prosperity strategy. Further, the process aids in breaking down institutional silos that often separate key stakeholders by providing a common nomenclature for discussing possible futures. Because climate prosperity strategies represent a new approach that requires new ideas and realms of possibility, scenario planning lends itself to helping communities think through the complexities of interacting forces. The dynamism of the scenario planning process is that it doesn't end when everyone is in agreement, but rather carries through as a living tool to help communities transition through time.[122]

In order to be successful, scenario planning requires:

- A dedication to the completion of the process
- Openness to exploring new ways of doing things
- Enough time to dedicate to the integrity of the process (urgency should not threaten the process)
- An understanding that scenario planning is dynamic, always open to questioning assumptions and reframing questions based on trial and error

What scenario planning is *not*:

- Predictions of the future or even a most likely future
- A static direction on which a community should set its gaze

Understanding Scenario Planning

Q. What Kind of Timeframe Should the Scenarios Explore?
A. While short-term goals will be critical to the success of a climate action plan, generally timeframes that are greater than 10 years are most suitable for slow-changing and wide-ranging issues, such as environmental and social issues

Q. Who Should Be Involved in the Scenario Planning Exercise?
A. The scenario planning exercise can be a completely public process or can be kept to select stakeholders (e.g. the task force – see chapter 2.0)

Q. Why Is Scenario Planning Important to Climate Prosperity Planning?
A. The scenario planning exercise educates community stakeholders on the climate prosperity strategy by engaging them to imagine how assumptions and uncertainties interact to create different futures. Further, it primes stakeholders to start thinking in terms of interactive systems, rather than traditional transactions-based economic development.

Steps to Scenario Planning

Scenario planning is a multi-step, dynamic process. The first step involves orienting the stakeholders to the issues and challenges at hand. The stakeholders should work together to collectively identify the challenges facing the community and to define what the core questions should be.

Once the context has been identified in step 1, step 2 takes stakeholders through an exercise to leave the confinement of day-to-day "survival thinking" to engage in a dialogue about the future. In this step, stakeholders identify the external forces that are currently impacting the community or that may impact the community in the future in predictable and unpredictable ways.

Step 3 leads stakeholders to evaluate the internal dynamics of the community by identifying what local assets are most vulnerable to external forces, and how internal forces and external forces may interact with local circumstances.

The last step combines all of the recognized forces from steps 2 and 3 to identify emerging themes that could create a scenario framework of plausible futures. Plausible futures can then be written as storylines about the community which begin in the present and describe different ways the community could evolve through a series of planned and unplanned events. The storylines aren't met to be predictions, but rather tools to spark the community's self-awareness by thinking through what could happen and what actions the community can take to influence present and future forces. Diagram 12 illustrates the basic steps involved in engaging in a scenario planning process.

Diagram 12: Steps to Scenario Planning

Step 1: Define the Context

→ Where is the community on the path to sustainability?

→ What is the principal concern?

Step 2: Identify the External Forces

→ What external forces (social, political, environmental, economic, and technological) are assumed to take place?

→ What are the primary external uncertainties?

Step 3: Evaluate Internal Dynamics

→ How might local assets interact with external forces?

→ What local assets are most sensitive to internal and external forces?

Step 4: Identify Spectrum of Plausible Futures

→ Where do external forces and internal dynamics meet?

→ What storylines outline the array of possible futures?

Step 1: Define the Context

This step calls on stakeholders to come to a consensus on a definition of sustainability and how the community will adapt to an increasingly sustainability-driven world. A SWOT exercise is a useful tool for identifying the strengths, weaknesses, opportunities and threats that will help the stakeholders frame how sustainability is playing out in their community (see Table 4).

→Where is the community on the path to sustainability?

- What sustainability-oriented goals, visions, programs and policies are already in place (e.g., LEED certification, recycling programs, etc)?
- What is the political environment surrounding the issue of sustainability within the community, region, state, nation?
- What are the most important issues related to attaining long-term sustainability for your community?
- Where does the business community stand on these issues?
- What do you believe is pre-determined for the next *X* number of years?
- If you looked back from 25 years in the future, what would the community's failure or success be?
- To what degree do stakeholders understand the changing energy economy?
- How is the community understanding and adapting to current sustainability trends and challenges (e.g., energy consumption patterns)?

→What is the principal concern?

- What will the state of the community be in 20 years? Is the community headed down a road to sustainability?
- What steps can the community take to protect and develop its assets?
- Has the community started to embrace sustainability practices?
- Have businesses started to embrace sustainability practices?

Step 2: Identify the External Forces

Step 2 is designed to identify and explore the external forces that can shape future outcomes of the community. This is where the five driving forces of scenario planning (Diagram 11) begin to come into play. Community leaders and stakeholders should identify what the potential political, economic, social, technological, and environmental factors are that could affect their community. The forces can be categorized into *assumptions* (forces that are expected) and *uncertainties* (forces that are less certain and more volatile).

→ What external forces (social, political, environmental, economic, and technological) are assumed to take place?

- What sustainability-oriented national and regional policy initiatives are likely to take place (e.g., the carbon cap-and-trade policy proposed by the Obama administration)?
- What financial incentives will the state provide to spur growth in green products?
- Where is the private sector directing investment?
- What demographic trends are anticipated?
- What workforce trends are anticipated?
- What environmental trends are anticipated (e.g., pollution levels to increase with population growth)?
- How will technology play a role in monitoring sustainability measures?

→ What are the primary external uncertainties?

- Will local expectations regarding sustainability improve as education on the subject matter improves?
- When will the global credit crunch taper off?
- When and where will natural disasters occur due to climate change?
- How will climate change affect regional and state water quality and supply?
- As other countries develop, what will be the global demand for green products?
- As other countries develop, how will their policies influence global natural resource and agricultural supplies?
- How prepared are our businesses, workers and economic sectors?

Step 3: Evaluate Internal Dynamics

Step 3 is the final step before scenarios can start to be developed. It gives stakeholders an opportunity to identify what local assets are most vulnerable to internal and external forces and how those assets and forces may interact.

→ How might local assets interact with external forces?

- What strengths of the local employment base are congruent or incongruent with the skill demands coming from shifts in technology related to green jobs?
- How might local land use patterns shift to meet the demands of an increasingly carbon-conscious world?
- What local entrepreneurs and economic sectors will be able to take advantage of opportunities emerging in changing markets?

→ What local assets are most sensitive to internal and external forces?

- Will current water supplies be able to serve an increasing population?
- Will investments in public transit transform land use patterns?
- How will climate patterns change potentially impact local social and economic structures?
- How will the community's relationship with the region affect its ecosystems and natural resources?
- How will the community take advantage of any local or regional demographic shifts?
- How will the community's history in particular industrial sectors transform into future opportunities within green supply chains?
- How will local businesses adapt to changing demands for greener products and processes from individual and business customers?

Step 4: Identify Spectrum of Plausible Futures

This step combines all previous steps to start brainstorming a scenario framework of plausible futures. Stakeholders should identify what themes are beginning to emerge from steps 2 and 3 and where external forces and internal dynamics are likely to intersect. A useful starting point is to identify the most pressing uncertainties from step 2. From there, stakeholders can identify where and how those uncertainties might interact with local dynamics. For example, a coastal community may identify their most pressing uncertainty as sea level change. The uncertainty of sea level change can then be used to ask which aspects of the community would be most vulnerable to small, medium and large changes in sea level. If the tourism industry is identified as vulnerable, the community may want to explore measures to protect the industry, or expand its economic base in other industries.

Stakeholders should use this exercise to brainstorm storylines about the community that begin in the present and carry through to a future point through various internal and external events. The stakeholders can then begin to envision what the community would be like under the various scenarios, and ask how different actions could lead to desirable or undesirable possible futures. The answers to these questions will be the primary elements to creating community-wide goals and priorities. It is important to note that this is not where the scenario planning process ends. Rather, it is essential to embrace a trial-and-error process in which stakeholders feel free to continually retool the process to capture the most desirable and appropriate picture of the community. It should be noted that this is not a strictly linear process, and it is expected that leaders and stakeholders participating in the process will be keen to work through the process repeatedly to flush out the best visions for their respective community.

→What storylines outline the array of possible futures?

- Where do internal and external social, economic, environmental, political, and technological trends consistently align to tell a story?
- What storylines represent aggressive political leadership?
- Which storylines require little support by the government?
- Which storylines require broad-based community support versus little community input?
- Which storylines are based on cataclysmic events?
- Which storylines require local institutions to implement wide-ranging reforms?
- What storylines require businesses to implement wide-ranging reforms?

→ Where do external forces and internal dynamics meet?

- Is the local manufacturing base poised to meet the demands of an anticipated national policy push for energy efficiency?
- How would an unforeseen disaster affect the most critical assets of the community?

4.0 Translate Visions into Strategies

"No action, no change. Limited action, limited change. Lots of action, change occurs."

-Catherine Pulsifer

[Define Goals and Objectives]

Once a visioning process has taken place (see p. 61), specific goals, objectives and strategies can be defined and drafted that describe what kind of community you hope to develop.

- Goals provide points of reference for making decisions and developing the strategies, subsequent projects, and programs to achieve them.
- Goals should provide direction and guide the development of relevant strategies and economic development projects and programs.
- Goals also serve to educate and inspire participants in the implementation process.
- Goals communicate the intent of the climate prosperity strategy effort.[123]

San Jose's Green Vision provides an excellent example of what climate prosperity goals can look like. The goals of the vision are intended to cut the carbon footprint of the city by more than fifty percent. They include:

1) Create 25,000 clean tech jobs as the world center of clean tech innovation.
2) Reduce per capita energy use by 50 percent.
3) Receive 100 percent of electrical power from clean renewable sources.
4) Build or retrofit 50 million square feet of green buildings.
5) Divert 100 percent of the waste from the city's landfills and convert waste to energy.
6) Recycle or beneficially reuse 100 percent of the city's wastewater (100 million gallons per day).
7) Adopt a General Plan with measurable standards for sustainable development.
8) Ensure that 100 percent of public fleet vehicles run on alternative fuels.
9) Plant 100,000 new trees and replace 100 percent of the city's street lights with smart, zero emission lighting.
10) Create 100 miles of interconnected trails.[124]

Objectives represent the specific tools by which a goal will be reached. For example, Silicon Valley's Climate Prosperity Greenprint defines a goal of building a clean tech and green industry base. Their objectives include:

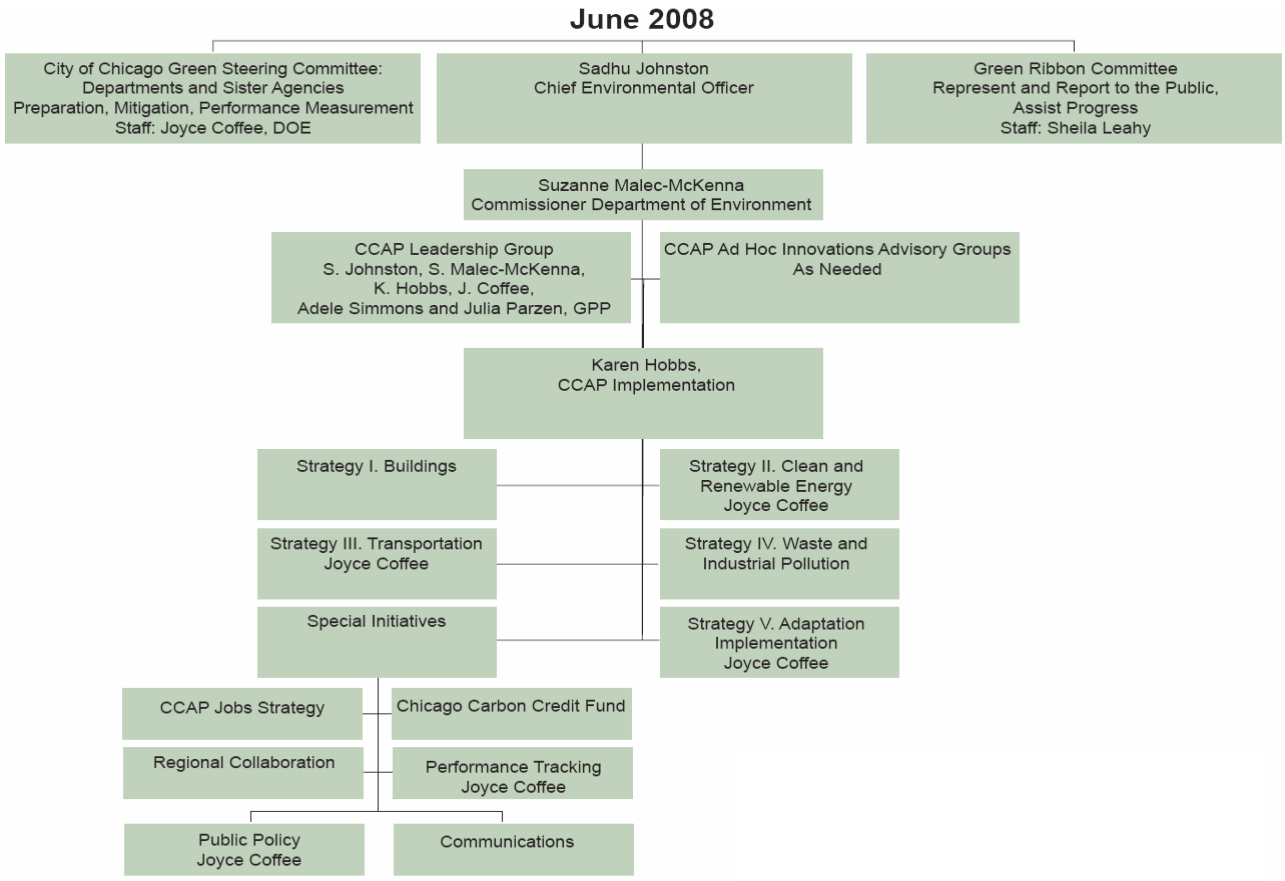
- Provide access to financing to enable businesses to expand and purchase greener products.
- Ensure that workforce training programs are aligned with the needs of these industries, as well as utilities and public agencies.
- Promote a regulatory climate that encourages innovation as well as green practices.
- Market the Valley's products in this area and attract the appropriate workforce.

[Develop an Action Plan]

Action plans define the steps to implement the chosen goals and objectives. They describe the components of the proposed projects and how those projects support the strategy, objectives, and goals of the overall climate prosperity plan. Action plans lay out:

- The tasks involved and their sequence.
- Realistic timetables for the completion of different activities.
- The expected impacts or results of the action.
- Who or what organization is responsible for each task.
- Funding requirements, including identification of sources.
- The monitoring process and benchmarks.[125]

Diagram 13: Chicago Climate Action Initiative Organizational Chart



Source: Parzen, Julia and The City of Chicago. Lessons Learned: Creating the Chicago Climate Action Plan. 2009

Climate prosperity strategies should play close attention to cross-departmental and cross-institutional relationships. In order for the strategy to be successful, it will require breaking down the usual boundaries and silos. Depending on the community's size and the organizational structures of the public and private sectors, a clear set of responsibilities for each of the goals should be tasked to specific teams. More dynamic goals demand the formation of teams that cross multiple boundaries.

For example, to complete an ambitious green jobs goal, a cross-departmental team should include staff from economic development, workforce, and environment services at a minimum. Lead actors or agencies who are responsible for the completion of the team's ultimate goal should be identified and assigned from the beginning. Further, the team members should report progress back to their respective departments on a regular basis. Each team should also have access to leaders who are high up within the community government and can advocate on behalf of the team for policy changes and resources. Diagram 13 outlines the organizational chart for the City of Chicago's Climate Action Initiative, which shows that the implementation piece is broken down by broad goals and that leaders had been identified for most of the goals.

As with many planning and strategic processes, skepticism may pervade. Creating sustainability strategies is a new venture to most communities, and it will undoubtedly be met by skepticism. Stakeholders may not fully understand how ambitious goals will create momentum for the larger strategy. Engaging in small, actionable items early in the process allows for barriers and key lessons to be identified for moving forward.

[Measure and Track Success]

Measuring sustainability is vastly complex. Because the environment, the economy, and society are all constantly changing, it is impossible to garner a truly accurate view of sustainability on a regional level. However, certain measurements can be adapted to attempt to understand it.

When choosing indicators, it is important that they are:

- Replicable for consistency
- Sensitive to the situation being observed
- Reliable (objective or verifiable)
- Relevant to the project objectives
- Cost-effective, i.e., worth the time and money spent collecting them
- Timely[126]

They also should include economic and environmental goals, especially greenhouse gas reduction and ways to measure emerging green companies and sectors. As Newark, NJ went through its year-long process to imagine a green future, the project's task force identified green benchmarks against which they would check all goals and strategies. They include:

- Create safe, healthy, high-quality jobs that provide pathways out of poverty and opportunities for career advancement.
- Make use of Newark's existing assets, strengths, and opportunities.
- Produce a healthier and more livable Newark.

- Engage the community, especially youth and business, around a collective vision for the future.
- Reduce greenhouse gas emissions that contribute to global warming.
- Emphasize recycling, waste reduction, and reuse.[127]

Measurements can be categorized by the three paradigms of sustainability: economy, environment, and society.

General economic measurements can include:

- Cost of services and infrastructure (e.g., recreation, schools, water and sewer laterals, public facilities, roads, utilities, and operational costs)
- (Green) jobs per person
- (Green) jobs per dwelling unit
- Income per person and quality of jobs
- Employers per acre
- College attainment levels
- Patents, including those related to clean tech or green industries
- Venture capital
- Self-employment
- Clean tech or green start-ups
- Small businesses/women- and minority-owned businesses

General environmental measurements can include:

- Per capita greenhouse gas emissions
- Community's overall greenhouse gas emissions
- Per capita vehicle miles traveled
- Net wetland loss
- Per capita water use
- Per capita storm water runoff
- Per capita acreage of impervious surfaces
- Connectivity of open space and natural lands

General social measurements can include:

- Park space inventory and proximity to residents
- Bicycle and pedestrian networks
- Travel times to other communities and employment centers
- Transit service coverage and density
- Bus service to employment centers
- Number of feet to vital retail amenities such as grocery stores, pharmacies, and postal offices
- Voter participation rates
- Community service involvement
- Economic integration
- Internet accessibility

Evaluation does not end with identifying results. Leaders must use the information to adjust projects or strategies, hold implementing organizations accountable for results, and advance overall goals.[128]

[Build Momentum through Marketing the Message]

Successful climate prosperity strategies require that all sectors of the community understand the strategy and can play a role in supporting it. As such, the overall vision and message of the strategy needs to be marketed to different segments of the community. Lead organizations should focus on branding an effective message that tells a story. The size and culture of the community will affect this message. For example, if the community is a place where "everybody knows your name," then word-of-mouth might be better than local media.

The overall message should communicate:

1) Credible data – how is the city currently doing economically, environmentally, and socially?

2) How will the strategy provide long-term value and benefit to regional stakeholders?

3) What's special about the strategy that will make the community a standout in sustainability?

For larger communities, it can be beneficial to assemble a communications task force or committee. The City of Chicago had a communications committee which assisted with messaging the Climate Action Plan as well as outreach planning. The committee helped the city focus messaging on quality of life benefits and cost savings of action. It crafted various programs to spur the business community and the public at large to take action. It also reached out to dozens of community organizations to enlist them as outreach partners.[129] For smaller communities, communication strategies should be integrated into the larger strategy and assigned a responsible party.

5.0 Moving Forward

"Make no little plans. They have no magic to stir men's blood and probably will not themselves be realized."

-Daniel Burnham

While understanding and attempting to implement sustainability is quite difficult, numerous communities are doing it successfully, which is clear evidence of the evolution of this movement. The compendium at the end of this report provides examples of communities large and small that have started down this road. Further, the completion of bold, large-scale plans and strategies such as those in Chicago, New York City San Jose, and Greensburg, KA, just to name a few, are paving the pathway for other communities across the country to develop their own unique and innovative solutions. Clearly, a holistic approach is necessary to complement the complexities of our regions and communities. Assessing communities based on their economic, environmental, and social aspects provides for the most comprehensive lens of analysis.

For local economic development practitioners, the national focus on energy and climate change will become one of the most significant public policy trends for the next decades. The interest in global warming has grown exponentially over the past decade, supported by the emerged scientific consensus, stimulated by foreign examples and led by state and local governments. Hundreds of corporations and communities have adopted climate protection policies, strategies and plans.

The economic development implications of this movement have only recently become apparent to the economic development community. The true cost of energy, i.e., the environmental and economic consequences of green house gas emissions, regulated at the national level, will now be a major cost of production, altering the competitive position of industrial sectors and regions. The new federal investments in energy conservation and efficiency will provide opportunities for communities to position themselves in this new energy economy.

Because of the ubiquitous nature of energy usage, participation in the new energy economy will be open to a broader range of communities. Unlike the biotech sector, in which only a few regions were favored by sustained federal R&D funding, concentrations of venture capital firms, or the legacy locations of pharmaceutical companies, all communities can benefit from Green Savings, and large numbers from Green Opportunities (e.g., weatherization companies) and Green Talent (e.g., the greening of existing manufacturing jobs).

Utilizing climate protection strategies to drive economic development, and focusing economic development programs on sustainability, will require economic development practitioners to become knowledgeable about the new science of climate change, and to more aggressively engage with the federal agencies and Congress.

[Links to Related Plans and Strategies]

Catalyzing Economic Growth & Environmental Quality in the City of Toronto
http://www.toronto.ca/business_publications/pdf/green_economic_development_22may2007.pdf

City of Chicago Climate Action Plan
http://www.chicagoclimateaction.org/

City of Vancouver, CA – Greenest City Quick Start Recommendations
http://vancouver.ca/greenestcity/PDF/greenestcity-quickstart.pdf

Climate Prosperity: A Greenprint for Silicon Valley
http://www.jointventure.org/programs-initiatives/climateprosperity/Greenprint%20for%20Silicon%20Valley%202%204%2009%20embargoed%20to%202%2020%2009.pdf

Greensburg, KS Sustainable Comprehensive Plan
http://www.greensburgks.org/recovery-planning/Greensburg%20Comprehensive%20Master%20Plan%2001-16-08%20DRAFT.pdf

Greenworks Philadelphia
http://www.phila.gov/green/greenworks/PDFs/GreenworksPlan002.pdf

Imagining Newark's Green Future: A Year Building the Green Economy
http://apolloalliance.org/downloads/newarksgreenfuture.pdf

Portland Development Commission Sustainability Plan, 2008- 2009
http://www.pdc.us/pubs/inv_detail.asp?id=755&ty=57

VII. COMPENDIUM OF GREEN STRATEGIES

This section represents a snapshot of current and diverse climate action strategies taking place across the public and private sectors, in different sized communities across North America. Its purpose is to provide a menu of examples that communities can use to design their own approaches to sustainability. It is not meant to be exhaustive. The compendium is broken down into the following broad categories, with each category providing multiple examples of how these strategies are being implemented.

1.) Business

a. Green Business Models

Dunkin Donuts – LEED Store
A Dunkin Donuts franchise in St. Petersburg recently opened its doors with a LEED-certified building. Along with standard green building features, such as energy-efficient lighting and plumbing fixtures, the store also composts all food waste on site. Additionally, the store has implemented a new process for making donuts involving energy-efficient convection ovens. Dunkin Donuts plans to use the store as a prototype for future LEED-certified stores.

Ford Motor Company - River Rouge Plant
The Ford River Rouge Plan (the Rouge), located in Dearborn, MI, is one of the largest eco-industrial projects undertaken by an individual firm in the United States. Ford Motor Company took a variety of environmentally sensitive approaches to building the facility. It created the world's largest "green" roof for an industrial facility using plants to filter soil contaminants (phyto-remediation); used renewable energy sources; and planted trees and other vegetation to create natural habitats for wildlife and green space for humans. As a result, the plant has earned the Gold certification by the U.S. Green Building Council for the Rouge Visitor Center and a Silver award for other facilities at the plant. In addition, the company has received numerous awards and recognition for its innovative approach to redeveloping the property in Dearborn.

Ford Motor Company - Fumes to Fuels
Since 2000, Ford has successfully lowered its global energy use by 27 percent and lowered carbon dioxide emissions by 31 percent - a total amount of energy that could power approximately 220,000 homes in the United States. This has been achieved by using wind power for one plant and also through light conservation, but most of the reductions have come

through their fumes-to-fuel program. Piloted at its plant in Dearborn, the program provides energy by using fumes from its vehicle paint shop to fuel an internal combustion engine and transfers that power to the plant's electrical grid. While providing clean energy, the system also reduces C02 emissions. Ford recently installed this program in a plant in Oakville, Ontario, Canada. Within a year, Ford plans to install a larger system in the plant that will both enhance the system and reduce C02 emissions by 88 percent.[130]

McDonald's – Sustainable Fisheries Program

McDonald's is working throughout its global locations to reform the sourcing of its fishery stocks. The reform guidelines were developed in conjunction with Conservation International andkey fish suppliers, and are currently implemented collaboratively with the Sustainable Fisheries Partnership. Currently, a majority of McDonald's fishery sources are from Marine Stewardship Council-certified facilities.

SolarTech Consortium

The SolarTech Consortium is a photovoltaic industry consortium whose purpose is to accelerate and grow the industry by unifying Silicon Valley solar companies. The consortium has recognized several impediments to the widespread adoption of solar technology, most notable high equipment costs and an overly long cycle from installation to interconnection. Believing that lower costs will act as a catalyst for market growth, the SolarTech Consortium seeks to improve the solar industry in a number of areas.

The central focus of improvement is establishing universal standards for the installation and certification of solar technology. A lack of information about solar equipment exists among both consumers and installers, and the SolarTech consortium seeks to educate on the topic by preparing a "Solar Manual" handbook for consumers and "Best Practices" handbook for installers. Additionally, the consortium has plans to work with manufacturers to standardize ratings of solar panel performance, and to assist economic development organizations by instituting a solar curriculum for training workers. Finally, the SolarTech Consortium has developed an innovative financing plan which will reduce the upfront cost of solar equipment, a central barrier impeding consumers from embracing the technology. For more information, go to http://solartech.org/.

Waste Management's Single-Stream Recycling

Single-stream recycling enables users to place all recyclable materials in one single bin, rather than pre-sorting them. Waste Management now has 30 facilities throughout North America designed to accommodate single-stream recycling. Technologies within the facilities allow the sorting to occur fairly quickly and easily. The innovative implementation of single-stream recycling has made recycling more convenient for consumers and thus has resulted in an

increase in recycled materials of up to 30 percent in participating communities. Further, the returns for Waste Management are equal to those for standard recycling practices.[131]

b. Making Business Greener

Environmental Defense Fund's (EDF) Corporate Partnerships
EDF works with Fortune 500 companies on partnerships that deliver environmental results, benefit businesses and change industries. The partnerships are strategically designed to simultaneously provide business benefits, produce environmental results and pave the way for transformational industry change. EDF does not accept no payments from their corporate partners. To learn more, go to: http://www.edf.org/page.cfm?tagID=56

New York City – Environmental Economic Development Assistance Unit
The Environmental Economic Development Assistance Unit (EEDAU) seeks to foster the joint goals of economic development and environmental protection by offering compliance and technical assistance to New York City industrial and commercial establishments and promoting environmentally sound business practices. In addition to compliance assistance, it assists in green business development, helps find sources of funding for businesses, advises on the issue of regulatory reform, and maintains a pollution prevention program.

Sacramento, CA - Green Capital Alliance
The Green Capital Alliance, a consortium of organizations in the Sacramento area, aimsto make the clean technology sector a defining feature of America's economy and to establish the Sacramento region as a leader in sustainability. To do so, the Alliance performs R&D and workforce development; offers marketing services for green business and provides entrepreneur and startup support; evaluates regional sustainability; and advocates for favorable public policies. The organization has been highly active in branding Sacramento as a hotspot for clean energy through participation in conferences and media tours, and has hosted multiple regional events to reinforce this paradigm. A complete list of the Green Capital Alliance's activities can be found at http://www.greencapitalalliance.org/docs/2007GCAAccomplishments_Final.pdf.

Salt Lake City, UT – Environmentally & Economically Sustainable Business Program
The program, run by the city, provides technical assistance to local businesses to help them become both more environmentally and economically sustainable. The program also provides periodic networking meetings, where local owners can share ideas and innovations in greening their businesses.

World Wildlife Fund's (WWF) Transformational Partnerships
WWF works with leading companies to make deep operational changes. With this type of partnership a company will make an aspirational, measurable commitment to transform their impact on the environment in deep partnership with WWF. For more information, go to: http://www.worldwildlife.org/what/partners/corporate/index.html

2.) Energy Efficiency

Cambridge Energy Alliance
The Cambridge Energy Alliance (CEA) is a non-profit based in Cambridge, MA, whose mission is to reduce energy and water use in the city. CEA offers privately financed energy audits covering building energy efficiency and renewable energy upgrades to all who are interested. CEA has also formed alliances with both private and investment banks that are able to offer inexpensive financing for upgrading projects, such as loans which will match or exceed estimated energy savings.
For more information, go to: http://www.cambridgeenergyalliance.org/

Duluth, Minnesota – Revolving Loan Fund
Duluth, Minnesota, maintains a revolving fund to finance local energy-efficiency improvements. Fifty percent of savings from each project is available for future energy-efficiency improvements. The mechanism supports continuous efficiency improvements without having to compete for funding in the annual budget-setting process. Initially funded from the remains of a home energy loan program co-sponsored by the City of Duluth and Minnesota Power, both the revolving fund and Minnesota Power each receive a 50 percent share of cost savings from energy efficiency. For more information, go to: www.duluthmn.gov

Energy Trust of Oregon
Energy Trust of Oregon, Inc., began operation in March 2002, charged by the Oregon Public Utility Commission (OPUC) with investing in cost-effective energy conservation, helping to pay the above-market costs of renewable energy resources, and encouraging energy market transformation in Oregon. Energy Trust funds come from a 1999 energy restructuring law, which required Oregon's two largest investor-owned utilities to collect a three percent "public purposes charge" from their customers. The law also dedicated a separate portion of the public-purpose funding to energy conservation efforts in low-income housing energy assistance and K-12 schools.
For more information, go to: http://www.energytrust.org/

Environmental Protection Agency (EPA) Smart Wave℠
SmartWay℠ is an innovative brand that represents environmentally cleaner, more fuel efficient transportation options. In its simplest form, the SmartWay brand identifies products and services that reduce transportation-related emissions. However, the impact of the brand is much greater as the SmartWay brand signifies a partnership among government, business and consumers to protect our environment, reduce fuel consumption, and improve our air quality for future generations. For more information, go to: http://www.epa.gov/smartway/

Louisville, KY – Public-Private Sector Partnership for Energy Efficiency
To enlist the community in Louisville Metro Government's efforts to promote energy efficiency, Mayor Jerry Abramson reached out to Louisville's commercial real estate (CRE) sector. The CRE community, realizing the potential benefits, responded enthusiastically. Building on their interest, the Mayor launched the Louisville Public-Private Sector Partnership for Energy Efficiency early in 2008 as a key tool to help reduce greenhouse gas emissions. Significant accomplishments of the partnership to date include formation of the non-profit Louisville Energy Alliance (LEA) and the Louisville Kilowatt Crackdown.

LEA quickly developed the Louisville Kilowatt Crackdown as a mechanism to involve the CRE sector in energy efficiency. The Crackdown was designed to introduce building owners and operators to resources and tools available through ENERGY STAR and to the potential benefits of energy efficiency. Participant benefits include increased energy efficiency; reduced or controlled operating costs; reduced greenhouse gas emissions; demonstrated commitment to sustainability; and community recognition through promotion of participants by Metro Government and the LEA. The major community benefit is a reduction in greenhouse gas emissions generated by commercial buildings, which represent a significant portion of Louisville's emissions. Some 244 buildings from all sectors of the community are participating in the 2009 inaugural Louisville Kilowatt Crackdown. Participants benchmarked their buildings' 2008 energy use in ENERGY STAR's Portfolio Manager online software tool, and are continuing to enter/monitor their monthly usage while making improvements during 2009.

Oregon - Business Energy Tax Credit (BETC)
The BETC provides tax credits to transportation, industrial, commercial and residential projects that are energy-efficient and use non-polluting, renewable energy sources. These tax credits are taken against state income taxes and other taxes. In 2007, the law was extended to 2016 and increased the number of credits available. There is currently a $10 million credit cap (50 percent of the eligible costs up to $20 million) allocated for five years at 10 percent. The credits are aimed at direct costs concerning business energy-efficiency projects such as equipment, engineering and design fees, materials, supplies, installation and other costs.
For more information, go to: http://www.oregon.gov/ENERGY/CONS/BUS/BETC.shtml

Pennsylvania – Small Business Energy Efficiency Grant Program
The Small Business Energy Efficiency Grant Program is operated by the State of Pennsylvania's Department of Environmental Protection and offers small businesses (those with 100 or fewer employees) reimbursements for the adoption of energy-efficient equipment or processes. Twenty-five percent of the cost, up to a maximum of $25,000, can be reimbursed.
Nearly any type of energy-saving practice is eligible, and the state offers the examples of efficient HVAC systems, lighting, commercial refrigeration, process improvements, windows, and insulation. However, the project must save the business at least $1,000 in energy costs annually and result in either a 20 percent annual energy cost savings or a 20 percent reduction in energy consumption.
For more information, go to:
http://www.depweb.state.pa.us/energindependent/cwp/view.asp?a=3&q=543714

Redlands, California – Performance Contracting
The City of Redlands used "performance contracting" to upgrade the HVAC, lighting systems, sensors, and irrigation devices of 12 buildings and parks, which allowed the city to save a substantial amount of money on these retrofits. The performance contracting model minimizes financial risk by using the energy savings caused by capital improvements to pay for the cost. The contracts are often structured as a lease, but the lease payments cannot exceed the financial savings from the project. The benefits from this sort of project can be substantial, as Redlands has halved its energy usage in a two-year period – all at no upfront cost to the city.

Santa Monica, CA – Reduced-Emission Fuels for Public Fleet
Since 2001, 75 percent of Santa Monica's public works vehicle fleet has been running on reduced-emission fuels. Also, 43 percent of the city's bus service, the Big Blue Bus transit fleet, runs on Liquefied Natural Gas (LNG), a cleaner-burning fuel than diesel.

3.) Green Buildings

Austin, TX - Austin Energy Green Building
Austin is the home of "Austin Energy Green Building," the nation's oldest "green construction" certification program. Started in 1991 as a set of basic guidelines, the program has evolved into an organization which thoroughly vets construction proposals and provides comprehensive education to the community regarding green construction practices.

The program offers separate certifications for residential, commercial, and multi-family construction projects. It offers assistance to homeowners and construction professionals at all stages of the building process, helping them to develop realistic plans and goals, reviewing proposed specifications, and helping locate financial incentives.

One of the greatest triumphs of this program was the construction of the City of Austin Emergency Medical Services building. With the help of the Austin Energy Green Building program, this facility was the first in Texas to earn a LEED Gold rating, and employs environmentally sustainable features such as a rainwater collection cistern, passive cooling instead of air conditioning, and generous shaded porches in order to reduce heat gain during Austin's long warm season. For more information, go to:
http://www.austinenergy.com/energy%20efficiency/programs/Green%20Building/index.htm

Burns Harbor, IN – First Community to Receive National Green Standard
Burns Harbor recently became the first community in the U.S. to receive certification under the National Green Standard by the National Association of Homebuilders. Offering an alternative to the more business-oriented LEED certification, the National Green Standard defines green building for single and multifamily homes, residential remodeling projects and site development projects, while still allowing for the flexibility required for regionally appropriate best green practices.

The planned 60-acre neighborhood will include a combination of 265 single-family, semi-detached and multifamily homes, and is designed to reduce urban sprawl. With a focus on physical design that would spur a tight-knight urban community, the community includes such social and environmentally sustainable features as higher density development, multiple access points, pedestrian-oriented streets, lower parking ratios and proximity to mass transit options. Additionally, construction efforts have been designed to protect environmentally sensitive areas, preserve existing vegetation and use low-impact development storm water management techniques.

Sixty homes have been completed thus far that feature elements such as recycled building materials, high-efficiency HVAC systems, energy-efficient appliances and water-saving measures.

Arlington County, VA - Green Building Incentives for the Private Sector
Arlington County has a green building incentive program that rewards developers for constructing LEED-certified buildings by giving them permission for increased density on new developments. The program was updated and expanded in 2003 to include many different types of developments and a full range of LEED certifications. The program helps produce green buildings while also promoting higher density and attracting increased business. For more information, visit the county website: http://www.arlingtonva.us/.

Chicago, IL - Green Roofs
Chicago is a U.S. leader is promoting the construction of green roofs. Green roofs can lower building temperatures and allow more efficient heating and ventilation use. For businesses such as health food stores, green roofs can also be a source of income by allowing these businesses to grow produce on their roof and sell it in their stores. The City of Chicago currently has a green roof grant program to promote more of these projects. Currently, green roofs in Chicago constitute 2.5 million square feet, including an impressive green roof at Millennium Park which attracts many tourists and has spurred development in the surrounding area.

National Governors Association and Wal-Mart - Greening State Capitols
The National Governors Association and Wal-Mart Stores Inc., partnered to create a program to assess selected state capitol buildings between 2008 and 2009 for energy efficiency needs and offer recommendations for upgrades. Twenty state capitols have been chosen and experts from Wal-mart will audit lighting, heating, ventilation, air conditioning equipment, refrigeration, and building structures, including insulation and windows. Experts will then recommend ways to save energy that will provide a return on investment within five years. The North Dakota state capitol worked with this program and found that $150,000 annually could be saved through energy efficiency measures.

Urban Redevelopment Authority of Pittsburgh - Green Design Incentives
The Pittsburgh Urban Redevelopment Authority (URA) offers reduced interest rates on Urban Development Fund, Technology Zone/ Enterprise Zone, and Pittsburgh Business Growth Fund loans for projects that achieve certification under the United States Green Building Council's (USGBC) LEED program. The interest rate reduction increases with the level of certification achieved and varies from 2.5 percent below the Enterprise Zone rate for Platinum-certified projects to a 1 percent reduction for Silver certification.
For more information, go to: www.ura.org.

4.) Green Jobs

Michigan – No Worker Left Behind & Green Energy Corps
In response to Michigan's unemployment rate escalating to 11.6 percent (the highest in the nation), the state Department of Energy, Labor & Economic Growth created the "No Worker Left Behind" program, which is designed to retrain unemployed workers. The program offers up to two years' tuition at any Michigan community college, university or other approved training program for workers who pursue training in emerging industries, such as "green-collar" industries. No Worker Left Behind has successfully retrained over 60,000 workers thus far.

Tied into this program is Michigan's Green Energy Corps, which will create a significant number of green-collar jobs. Announced in early 2009, the program intends to employ at least 10,000 workers to weatherize public buildings, install renewable energy technology, and develop renewable fuels.

Louisiana Bio-diesel
Louisiana recently decided to foster the development of biofuels by enacting legislation (HB 1270) that establishes linkages throughout Louisiana at all levels of biofuel production. Louisiana is making the production of feed stock, the development of refinery technology, and the purchase of end-user items such as hybrid vehicles more affordable. Through this process, Louisiana hopes to create jobs in these industries in many different sectors, from agriculture to scientific research. Louisiana is enacting this legislation by authorizing research and offering demonstration grants.

Oakland, CA: Green Jobs, Green Tech, Green Cluster
Oakland, CA, has worked with the State of California to fund and promote a movement toward green industry in Oakland. Working with local universities, economic development organizations and emerging green companies in the region, Oakland hopes to further the use and development of emerging clean/green technology. Oakland has developed the Green Academy Workforce which trains low-income residents to clean and renovate their own neighborhoods. Also, by receiving a $250,000 grant from the federal government, Oakland has created the Oakland Green Jobs Corps, which provides training and guidance for prepare young adults to eventually enter into green collar jobs. For more information, go to: www.oaklandnet.com.

Chicago, IL - Greencorps Chicago
Greencorps Chicago is a community landscaping and job training program whose mission is to improve the quality of life throughout Chicago by providing horticultural instruction, materials and employment. The program is administered by the Chicago Department of Environment in conjunction with WRD Environmental (an ecological consulting firm).

Greencorps Chicago offers two categories of services to the community, community greening and job training. The community greening aspect includes free distribution of plant and vegetable seeds, basic landscaping and community garden assistance, and the awarding of various accolades to local residents and organizations for outstanding contributions to the environment.

The initiative also offers a paid, nine-month job training program for approximately 50 people a year, which focuses on landscaping and horticulture, environmental health and safety, electronics recycling, and weatherization. This program has been especially effective in involving those who have recently left the penal system and are seeking reintegration into society.

Greencorps Chicago is funded by an annual grant of $2.5 million from the city of Chicago and it also receives financial support and advanced training from the environmental services firm OAI. For more information, go to the City of Chicago Department of Environment: www.cityofchicago.org/environment/.

5.) Recycling

Dallas, TX - Green and Efficient Purchasing
The city of Dallas requires the city itself and its consultants and contractors to purchase and use recycled materials and other environmentally preferred products whenever feasible.[132]

Utah - Recycling Market Development Zones
Brought online in 1996, the program seeks to implement recycling as an economic development tool. Counties within the state may apply for status as recycling zones by offering incentives to recycling companies such as financing, expedited permitting, infrastructure assistance, competitive utility rates, zoning assistance, etc. Eligible recycling businesses that locate in a zone can qualify for a 5 percent state tax credit on machinery and equipment; 20 percent state tax credit (up to $2,000) on eligible operating expenses; and technical assistance from state recycling-economic development professionals, in addition to the aforementioned local incentives. According to the Governor's Office of Economic Development, the rate of return on this program is 2.7 percent with an estimated cumulative payroll of $39.2 million since 1997.
For more information, go to: http://incometax.utah.gov/credits_recyclingmarket.php

6.) Renewable Energy

Albuquerque, NM – City Renewable Energy Initiative
In 2005, the mayor of Albuquerque signed a resolution containing policies to implement the City Renewable Energy Initiative. The program provides tax incentives and credits of up to $1 million for solar energy manufacturers or solar research and development. Funds for incentives and credits come from Albuquerque's CIP Decade Plan and Energy Conservation grants. This program helps increase the city's competitiveness by attracting and retaining jobs in solar energy. For more information, go to: http://www.cabq.gov

Ann Arbor, MI – Solar American City
Ann Arbor, MI, a designated Solar American City, received a $200,000 grant from the Department of Energy to help it develop a solar program. While in the process of developing a comprehensive solar program, the city promotes solar energy and energy efficiency through a revolving energy fund of $100,000 to help local facilities invest in energy efficiency. The city hopes to educate the public on solar energy and energy efficiency and to increase the business for energy manufacturers and contractors. For more information, go to: http://www.a2gov.org.

California - Green Wave Initiative
This program, initiated by the California Treasurer in 2004, uses a portion of the state's two largest pension funds to invest in the environmental technology sector. The program looks to invest $1.5 billion into clean tech and environmentally responsible companies. This investment could help create over 10,000 jobs in green technology and over 100,000 jobs through the multiplier effect. This is a good example of where the state provides major capital investment in emerging green industries.

Columbia, MO – Innovative Approaches to Utilities
In 2004, Columbia passed a vote to enact a renewable energy standard for the city. The "Renewable Energy Standard" measure was approved to require that the city's utility obtain two percent of its power from renewable energy sources, such as wind and solar power, by 2007; the percent ramps up to 15 percent by 2022.[133]

Jackson County Development Council, North Carolina – Green Industrial Park
The Jackson County Development Council (JCDC) created a green industrial park that houses the world's largest wood energy pellet production facility. This facility has created 51 jobs in the plant, 8 jobs at the warehouse, and 300 one-year construction jobs. It has also helped sustain 150 jobs at timber companies that supply the raw materials.

Jacksonville, Florida – JEA (Electric, Water, Sewer)
JEA, Florida's 2nd largest community-owned utility, generates green energy by burning methane gas from one of the city's sewage treatment plants and from several local landfills. The methane gas, generated by the bacteria that decomposes waste, generates enough energy to power 4,500 homes a day (over 15 megawatts). JEA has plans to use biomass to produce renewable energy as well, and seeks to generate 7.5 percent of its power from renewable resources by 2015.

State of Florida – Energy Diversity Package
The 2008-09 budget for the state of Florida has allocated nearly $79 million for energy-related projects to increase research and development and stimulate commercialization of alternative and renewable energy sources throughout the state. The financial package will support R&D at five Florida universities in innovative technology and strategy; a solar field at Florida Gulf Coast University; matching grants for demonstration, commercialization and R&D relating to bio energy; and a renewable energy and energy-efficient technologies grant for R&D and technology demonstration.

State of Michigan – Centers of Energy Excellence Program (2008)
In 2008, the governor of Michigan signed the Centers of Energy Excellence Program into legislation to bring companies, academic institutions, and the state together to create jobs in alternative and advanced energy. The program will be administered through the Michigan Economic Development Corporation, now the Michigan Department of Energy, Labor and Economic Growth, and will search for advanced energy companies in the state to match with universities, national labs and training centers to accelerate next-generation research, workforce development and commercialization. The Michigan Strategic Fund (MSF) has been authorized to allocate $45 million to establish and operate the program, and grants will be made to for-profit companies working with innovative energy technology.

7.) Research & Development

University of Tennessee Research Foundation and Dupont Danisco – Cellulosic Ethanol Pilot Facility
The University of Tennessee Research Foundation (UT) partnered with Dupont Danisco Cellulosic Ethanol LLC to construct a pilot-scale biorefinery and research and development facility for cellulosic ethanol in Vonore, TN. The partnership works well, as UT has expertise in cellulosic feedstock production and co-product research. The university also works with Tennessee farmers to help develop a cellulosic energy crop supply chain for biorefineries that utilizes switch grass.

In 2007, the governor set aside $40.7 million for the construction of the pilot biorefinery, which will raise the profile of the Tennessee Biofuels Initiative and help Tennessee become a leader in cellulosic ethanol.

The University of Iowa Biomass Fuel Project
The University of Iowa Power Plant, working with the Quaker Oats Company, has created a new energy source which has saved the university hundreds of thousands of dollars in fuel costs. Quaker Oats worked with the university to use unprocessed oat hulls in the power plant's circulating fluidized bed boiler. This in turn has become a long-term, viable source of energy for the University of Iowa.

8.) Smart Growth

Salt Lake City, UT - Envision Utah
A good example of thinking about how to evolve an existing region into a sustainable region is through the "Envision Utah" effort. Envision Utah was initiated by *The Coalition ForUtah's Future*, a local civic group. Their process emulates that of scenario planning, a way to think about the future of a place through envisioning different possible scenarios of growth. The process provided a series of public workshops to encourage consensus building and community visioning for a new regional plan for the Salt Lake region. For more information, go to: www.envisionutah.org

Hillsborough County Economic Development Department, Tourism Division – Ecotourism
Hillsborough County in Florida has produced an ecotourism guide entitled The South Shore: What a Difference a Bay Makes!. This guide is meant to both promote local businesses but also educate the publics on the area's ecological wonders, county and state parks, and other natural highlights. Though an alliance with the South Shore Alliance, the Hillsborough County Economic Development Department Tourism Development Program and Tampa Bay & Co., they have produced the first tourism guide focused on ecotourism in the county. A survey in 2007 reported that 10 percent of the South Shore's visitors were interested in outdoor activities. For more information, go to:
www.hillsboroughcounty.org

Lancaster, CA – Fees and Charges for Infrastructure Development
Lancaster, CA has instituted development impact fees for infrastructure based on the distance of new developments from the identified central part of the city.[134]

New Jersey- Sustainable Communities' Implementation Grant Program
The Municipal Land Use Center at the College of New Jersey operates the Sustainable Communities' Implementation Grant Program, which offers a $15,000 matching grant program to NJ municipalities which demonstrate a commitment to creating sustainable community programs. Programs which involve Brownfield projects, wastewater conservation, sustainability education, municipal greening, sustainable agriculture, or simply any general community sustainability plan are eligible for the grant. A mandatory match of $7,500 is required by the applicants, and there is $75,000 in total funding to be distributed.

New York – Brownfield Cleanup Program (BCP)
In 2003, New York State followed the lead of many other states in initiating a Brownfield Cleanup Program (BCP). This program looks to enhance the private-sector cleanups of Brownfields and reduce the amount of open space being developed. The projects are overseen by the New York State Department of Environmental Conversation and when a site has been cleaned, the applicant receives a Certificate of Completion which gives them liability protections and allows them to apply for tax credits to offset costs for cleanup. Since 2003, 169 sites have been approved under this program

Portland, OR – Green Streets Program
Portland has implemented a Green Streets Program which makes onsite storm water control a permanent parts of Portland's cityscape while also possibly helping accelerate the local

economy. This program advocates a policy which requires curb extensions, bioswales and storm water planter systems to all be a part of city-funded infrastructure projects that lieu in the public right-of-way. These elements are required by the city's storm water management manual. Projects that do not fall under these elements will pay 1 percent of their construction costs to go into a "percent for green" fund. The city has currently identified 500 opportunities for the green street program and two city efforts have won awards from the American Society of Landscape Architects for their green streets projects. For more information, go to: www.portlandonline.com

Silver Spring, MD – Transit-Oriented Development
Silver Spring, a historic inner-suburb of Washington, DC has used transit-oriented development to bring new life to its once-ailing downtown. In conjunction with a partnership between Montgomery County and a developer, numerous local and state incentives were used to drive the revitalization. As a result, Silver Spring has become a magnet for economic activity, linking new businesses and jobs with a growing residential market. Residents have walking access to a cluster of shops, offices, parks, and the train station, which connects Silver Spring to Washington, DC and other regional destinations.[135]

TIF Financing – Wood River Illinois
Wood River, IL limits the use of tax-increment financing (TIF) for greenfield developments. If a developer wants tax increment financing for their development and the land is vacant, they must produce a development that strictly conforms to the City's strategic plan and demonstrate how it will be the catalyst for better quality development and redevelopment in the city. The current TIF policy ensures and helps development in Wood River meets the communities goal for orderly, paced development. For more information, go to: www.woodriver.org

Efficient Growth for Growing Suburbs (EGGS) in Southeastern Pennsylvania
Recognizing the challenges that the growing suburbs of the region face, the Efficient Growth for Growing Suburbs Program (EGGS Program) provides grants to these suburbs to improve growth management and community design and to optimize the efficiency of their existing and planned transportation network, through better linking land use and transportation planning.

Funding for EGGS is provided by Penn DOT and administered by Delaware Valley Regional Planning Commission (DVRPC). The EGGS Program is only available for eligible communities in Bucks, Chester, Delaware and Montgomery counties. Two categories of municipalities were eligible to apply:

1. Municipalities identified as "growing Suburbs" on the 2030 Planning Areas map of the DVRPC long-range plan Destination 2030 (84 communities).
2. Municipalities identified as "Rural Areas" on the 2030 Planning Areas map that have at least 100 acres of "Future Growth Area" designated on the 2030 Land Use Plan map (28 communities).

For multi-municipal applications, municipalities contiguous to the municipalities meeting the criteria above are eligible as partners. Multi-municipal applications were encouraged.
For more information, go to: http://www.dvrpc.org/planning/community/EGGS.htm

9.) Strategic Approaches

Berkeley, CA- Berkeley FIRST & Solar Smart Energy
Berkeley FIRST is a solar financing program which is designed to reduce the prohibitively high upfront cost of adopting renewable energy technology. It allows property owners to borrow money from the City's Sustainable Energy Financing District to install solar PV panels (up to a cost of $37,500), and to repay the cost over 20 years through an additional annual property tax.

The program is currently in the pilot stage, with 50 volunteers in the process of installing solar panels on their residences. Two installations have already been completed- a 5.6 kW installation, which will produce 66 percent of the household electrical load with an anticipated 84 percent utility bill reduction, and a 2 kW installation, which will generate about 50 percent of the electrical load.

The Berkeley FIRST program works in conjunction with the DOE Solar America Cities sponsored "Berkeley Solar Smart Energy" initiative. The Solar Cities America program grants cities up to $200,000 as well as technical assistance from DoE laboratories and energy policy experts in order to accomplish the goals of the project. The Solar Smart Energy program is designed to improve home energy efficiency by creating "turn key" installation kits of solar powered water and air heating systems. The normal process of equipping a building for solar power is complex, and has several distinct steps, each of which requires a great amount of expertise. These kits greatly simplify the process by combining all components required for a solar installation into single, comprehensive package.
For more information, go to: http://www.ci.berkeley.ca.us/ContentDisplay.aspx?id=26580

Chicago, IL - Bike 2015 Plan
The city of Chicago has developed a set of proposed programs and policies with the goal of making bicycling a central method of transportation for its citizens by 2015. The plan seeks to increase bicycle usage, so that 5 percent of all trips less than five miles are by bicycle, and reduce bicycle injuries by 50 percent from current levels. To accomplish these goals, the plan calls for the construction of a bikeway network with bicycle friendly streets that connect all neighborhoods of the city, as well as convenient connections between biking and public transit. Additionally, there is a great emphasis on education to promote bike safety, as well as comprehensive crash analysis of bicycle accidents. For more information, go to: http://www.bike2015plan.org/

Greensburg, Kansas
After Greensburg, Kansas suffered nearly complete destruction at the hands of an F5 Tornado on May 4th, 2007, its citizens decided to rebuild Greensburg as the "greenest town" in America. A twelve week planning process involving the community and environmental experts resulted in a comprehensive plan for the reconstruction of the city, which would focus on environmental sustainability. Amongst many supporting actors involved, was the DoE's National Renewable Energy Laboratory (NREL), which provided technical assistance as well as training sessions.

Per the comprehensive plan, all city-owned buildings will be built to LEED Platinum standards, economic and regulatory incentives will be used to attract sustainable businesses, and an eco-

tourism industry will be developed as a source of revenue. While the town is still in the earliest stages of construction, it has already developed a Light Emitting Diode (LED) street lighting system, a retail store with advanced energy saving features, and several LEED Platinum buildings are nearing completion.

Equally important as the technological achievements in the reconstruction of this city is the culture which surrounds this project. A nonprofit organization known as Greensburg Greentown has launched with the mission to provide the education and resources necessary for Greensburg residents to rebuild the city using environmentally sustainable methods. Additionally, there has been widespread citizen collaboration through the blog "Chain of Eco-Homes", which is a "show and tell" of sustainable homes built by citizens.

The informational website of Greensburg Greentown can be found at http://www.greensburggreentown.org/.

Knoxville, TN – Solar America City
Knoxville has proposed an extensive plan in order to develop and emphasize solar energy in the city. Selected as one of the DOE Solar America Cities, Knoxville plans to install two highly visible solar arrays in the city, integrate solar energy into affordable housing, and conduct extensive training on the subject in order to grant the public a thorough understanding of the merits and technical aspects of solar technology.

While the program is still in its fledgling stages (it was only selected as a Solar America City in March of 2008), it has been lauded for its early accomplishments. The public outreach program thus far has been extensive, with several well attended workshops on the basics of solar technology, a partnership with a local college in order to develop a "green curriculum", and training sessions on thermal technologies for local building and code officials.

The program is funded by the DOE Solar Cities America program ($200,000 plus technical assistance), as well as by the Tennessee Valley Authority, which has pledged $50,000 per year.

Massachusetts Renewable Energy – Economic Development Council of Western MA
In Massachusetts, the number of jobs produced in Green Energy is expected to reach a growth rate of 20 percent per year and will eventually replace textiles as the state's tenth largest industry. In 2007, the state enacted the Green Communities Act of 2007. This multifaceted act encourages energy and building facilities, renewable energy, green communities, and also uses facets of the Regional Greenhouse Gas Initiative (RGGI). The act also contains market incentives and funds available to many different types of energy generation. There is also a "Fast track" permitting program for companies looking for new sites in the state.

Michigan Department of Energy, Labor and Economic Growth (DELEG)
In December of 2008, Michigan modified the name of its Department of Labor and Economic Growth to include 'Energy' as a means of streamlining state government and aligning all renewable energy and energy efficiency programs together. The new department will facilitate collaboration on energy initiatives between employees from the Departments of Agriculture, Environmental Quality, the Energy Office and the Public Service Commission. The DELEG is also tasked with the Green Jobs Workforce initiative, through which it will invest $6 million into bolstering Michigan's green economy.

Southwest Florida - Climate Prosperity Strategy
Using federal funds, the Southwest Florida Planning Council has developed a Comprehensive Economic Development Strategy (CEDS) which outlines a climate prosperity strategy for the region. Southwest Florida has been gaining unemployment due to declines in dominant regional industries. This strategic plan for climate prosperity assists Southwest Florida gain green industries that both create new jobs while improving the overall environmental quality of life. The strategy also hopes to educate residents about the importance of green industries and their economic benefits.

State of Pennsylvania – Alternative Energy Investment Act (2008):
Pennsylvania currently has created a $650 million energy package in tax incentives, loans, and ad grants to spur the development and use of clean energy technologies within the state. It is intended to save families and small businesses money on their energy bills by supporting investments in energy conservation and efficiency. The package also includes the ability for the state to make strategic investments to help spur billions of dollars in new, private economic development projects from alternative energy companies and early stage business that will create thousands of jobs in a rapidly growing industry. The governor believes that the bill will help the state leverage as much as $3.5 billion in private investment and create at least 13,000 new, good-paying jobs.

10.) Water Conservation

Alamogordo, NM – Innovative Water Conservation Measures
The City of Alamogordo, NM has instituted innovative approaches to conserving its water source. They do this through an extensive reclaimed water irrigation system that uses all city greenspaces, parks, ballfields, the zoo, the golf course, and the cemetery. The city has also implemented water saving measures for the Department of Public Safety / Fire Services Division by building a pump test facility and installing an in-ground tank to re-circulate fire truck testing water. The Department hired a consultant to conduct a computer analysis to view the hydrant flow capabilities in the city, which in the end, provided an accurate gallons-per-minute measurement of each hydrant's capability that has saved the city thousands of gallons per year.
For more information, go to: http://ci.alamogordo.nm.us/Home.htm.

Scottsdale, AZ – Innovative Water Conservation Measures
The City of Scottsdale, AZ has put much investment into conserving their water sources. In 1987, Scottsdale was the first city in the region to implement a water resources acquisition fee which helps fund the purchase of surface water supplies and every new development since 1987 has paid this fee. This fee has helped Scottsdale double their water supplies. The city also has a goal to replace any groundwater they have pumped with groundwater recharge. In 1999, Scottsdale built a state of the art water campus that treats wastewater specifically for irrigation purposes. Since in the winter, places such as golf courses need less irrigation, the plant is used to supply clean drinking water which is then recharged back into the ground to replenish the groundwater supply. In 2007, the water campus successfully charged 1,155,106 gallons of reclaimed water and CAP water back into the ground. To also promote water

conservation, the city offers a rebate program for citizens that install water efficient plumbing. For more information, go to: http://www.scottsdaleaz.gov/Topics/Recycling.asp.

The Everglades – Sugar and Grass

To help restore the Florida Everglades back to their original state, the governor of Florida has proposed a plan to buy 180,000 acres from U.S Sugar Corp at a cost of $1.34 billion to help restore and cleanse the water flow from Lake Okeechobee to the Everglades. Extreme growth in the region and increased agricultural usages have polluted and destroyed sections of the Everglades. This plan will result in U.S. sugar transferring their land with a right to lease much of it back for seven years. U.S sugar will keep their current mill, rail network and citrus processing plant and will have the right to lease the land back for $50 an acre as annual fee. U.S Sugar could also use the sugar it grows for ethanol production. The governor also has endorsed a proposal for an Ilinois-based company called Coskata to create a joint venture with U.S Sugar to build an ethanol plant by combining farm waste with municipal rubbish.[136]

San Antonio Water System - Welcome H_2OME

The San Antonio Water System is an organization governed by the City of San Antonio, TX which serves as a means of implementing great breadth of incentive based programs in order to encourage water conservation. The "Welcome H_2OME" initiative, focused on residential water conservation, offers financial rebates for "hot water on demand" systems, landscaping which will conserve water, and energy efficient washing machines, as well as entirely free, water efficient toilets. Additionally, free home audits of water usage are offered in order identify areas of potential savings. Rebates for commercial projects are substantial and offered as well – up to one half of the installed cost of water efficient systems can be subsidized by the program.

The program has been immensely successful. High efficiency toilets have been placed in every school in the San Antonio area, as well as in 60,000 apartments, 1,200 restaurants, and 3 hotels. This portion of the program alone has saved 175 billion gallons of water -the equivalent of $500 million. Additionally, the combination of these various incentives in addition to regulatory measures regarding water usage has reduced San Antonio's use of water by 25 percent since 1980.

For more information, please go to: http://www.saws.org/

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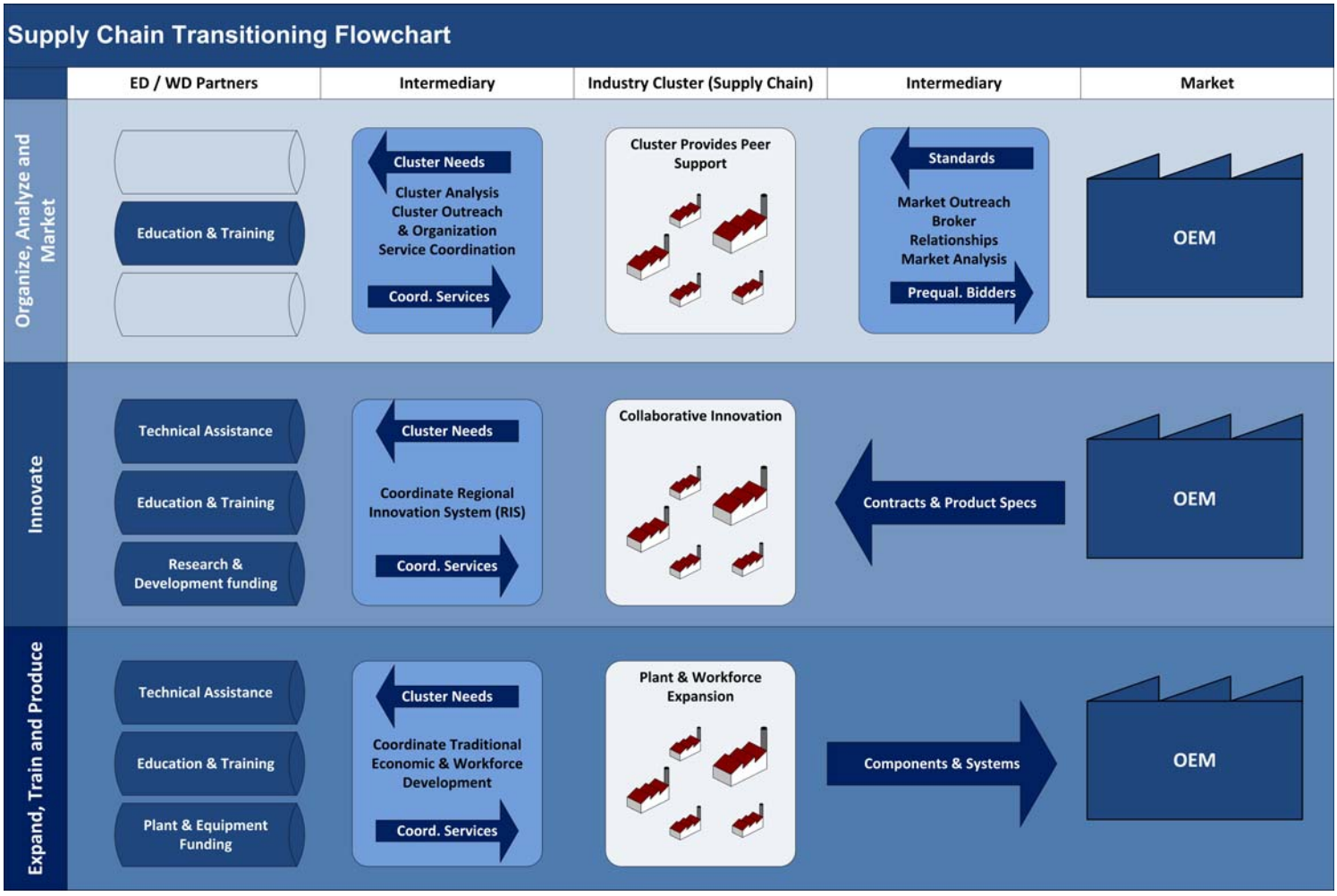
APPENDIX 1: TRANSITIONING SUPPLY CHAINS INTO GREEN MARKETS

There are three features to this model of transitioning supply chains to green markets that represent critical new approaches. The first is organizing a cluster of SME's with the intent of collectively or collaboratively pursuing new business in emerging industries. Most cluster strategies focus on building relationships in support of existing product lines. The second is outreach to OEM's on behalf of the cluster in order to help cluster firms establish new business relationships and secure new contracts in emerging industries. This also includes preparing SME's to become successful bidders with those OEM's. The third critical approach is the development of regional innovation systems that support collaborative innovation in the cluster.



Source: C. Scott Dempwolf

APPENDIX 2: COMPENDIUM OF GREEN JOBS

The following information was compiled by The Voinovich School of Leadership and Public Affairs at Ohio University, 2009. The list represents types of jobs that could fall under different "green" industries.

(Industries in no particular order, jobs in alphabetical order)

Clean Coal

- Electricians
- Engineers
- Laboratory technicians
- Logistics and distribution specialists
- Power Plant operators
- Researchers
- Tool and die manufacturers
- Transmission line operators

Building Retrofitting and Green Building

- Architects
- Building inspectors
- CADD specialists
- Carpenters
- Carpenter helpers
- Civil engineers
- Construction equipment operators
- Construction managers
- Electricians
- Green consultants
- Heating/AC installers
- Industrial truck drivers
- Insulation workers
- LEED certifiers
- Roofers

Mass Transit

- Bus drivers
- Civil engineers
- Dispatchers
- Electricians
- Engine assemblers
- First-line transportation supervisors
- Metal fabricators
- Production helpers
- Rail track layers
- Welders

Energy-Efficient Automobiles

- Automotive service technicians
- Computer software engineers
- Computer-controlled machine operators
- Electrical engineers
- Engine assemblers
- Engineering technicians
- Fleet technicians
- Metal fabricators
- Operations managers
- Production helpers
- Sales and marketing of vehicular diagnostic equipment
- Transportation equipment painters
- Vehicular laboratory technicians
- Vehicle and equipment maintenance operators
- Welders

Wind Power

- Bearings manufacturing
- Composites manufacturers
- Construction equipment operators
- Control systems manufacturing
- Electrical engineer
- Electrical equipment assemblers
- Environmental engineers
- Fabrication shop operators
- Fasteners Manufacturing
- First-line production supervisors
- Forge operators
- Foundry operators
- Gear Manufacturing

- Hydraulics
- Industrial production managers
- Industrial truck drivers
- Iron and steel workers
- Machine shop operators
- Machinists
- Metal coatings specialist
- Millwrights
- Power electronics manufacturing
- Sensors manufacturing
- Sheet metal workers
- Site assessment engineer
- Turbine/blade manufacturers
- Wind energy specialist

Solar Power

- Certified installers
- Construction equipment operators
- Construction managers
- Electrical engineers
- Electrical equipment assemblers
- Electricians
- Engineers
- Industrial machinery mechanics
- Installation helpers
- Laboratory technician
- Laborers
- Metal fabricators
- Researchers
- Silicon processing and manufacturing
- Welders

Biofuels & Biomass

- Agricultural and forestry supervisors
- Agricultural inspectors
- Agricultural workers
- ASTM Certification technicians
- Certifiers
- Chemical engineers
- Chemical equipment operators
- Chemical technicians
- Chemists
- Engineers
- Environmental permitting
- Farm product purchasers
- Industrial truck drivers
- Laboratory chemists
- Laboratory technician
- Logistics and Distribution specialists
- Mixing and blending machine operators
- Refinery technician
- Researchers
- Tree harvesters
- Saw mill operators

Fuel Cells

- Advanced battery development technician
- Corrosion technician
- Cryogenics technician
- Engineers
- Hydrogen storage technician
- Proton exchange fuel cell membrane technician
- Researchers
- Solid oxide fuel cell production technician

Nuclear Reprocessing

- Atomic Reactor Specialists
- Centrifuge technician
- Nuclear engineers
- Nuclear hazard waste specialist

Small Scale Hydro Power

- Quality Assurance technicians
- Turbine manufacturers
- Turbine installers
- Turbine technicians

Energy efficiency

- Efficient motor manufacturers
- Home and manufacturing energy audits
- Lighting contractors
- Manufacturing efficiency specialists

Small grid operators

- Distributed generation specialists
- Load forecasting

APPENDIX 3: LIST OF RELATED RESOURCES

Bringing Home the Green Economy: A User's Guide to the 2009 American Recovery and Reinvestment Act
Green For All and PolicyLink have prepared this User's Guide to assist local and state advocates, nonprofit organizations, public agencies, and policymakers in making the best use of recovery dollars.
http://www.workforce3one.org/view/4010909237272759881 (log in required)

California Green Innovation Index, Next 10, 2008 and 2009
The inaugural California Green Innovation Index produced by Next 10 provides a comprehensive look at the role of innovation in reducing greenhouse gas emissions while growing the economy. The Index measures progress toward green innovation— green in the sense that it generates both environmental and economic benefits.
http://www.nextten.org/pdf/GII/Next10_FullFindings_EN.pdf

Database of State Incentives for Renewables and Efficiency (DSIRE)
DSIRE is a comprehensive source of information on state, local, utility, and federal incentives that promote renewable energy and energy efficiency.
http://www.dsireusa.org/

Going Green: The Vital Role of Community Colleges in Building a Sustainable Future and Green Workforce
The National Council for Workforce Education and the Academy for Educational Development published a report which provides strategies for community colleges to address climate change, environmental stewardship, and green workforce development
http://www.aed.org/News/Releases/going_green.cfm

Green Jobs Guidebook: Employment Opportunities in the Green Economy
Published by the Environmental Defense Fund, the guidebook outlines the potential of California's existing and growing green jobs marketplace.
http://edf.org/documents/8489_Green%20Jobs%20Guidebook%20FINAL%20with%20cover.pdf

Green Jobs in Minnesota: Market Analysis
The Minnesota Green Jobs Task Force Conducted a Market Analysis to identify business opportunities and needs created by key environmental policies previously adopted in Minnesota. The document provides for a useful framework in assessing current and potential job growth in identified green sectors.
www.mngreenjobs.com

Energy Efficiency and Conservation Block Grant Program – Development of an Energy Efficiency and Conservation Strategy
The Energy Efficiency and Conservation Block Grants (EECBG) Program, funded for the first time by the American Recovery and Reinvestment Act (ARRA) of 2009, represents a Presidential priority to deploy the cheapest, cleanest, and most reliable energy technologies we have - energy efficiency and conservation - across the country. The Program, authorized in Title V, Subtitle E of the Energy Independence and Security Act (EISA) and signed into law on December 19, 2007, is modeled after the Community Development Block Grant program administered by the Department of Housing and Urban Development (HUD).

The following link outlines the development of an Energy Efficiency and Conservation Strategy as one of the eligible activities under the EECBG Program.
http://www.eecbg.energy.gov/solutioncenter/eligibleactivities/Activity_1.html

Imagining Newark's Future
Published by the Apollo Alliance, "Imagining Newark's Future" details how the Newark community chose a new narrative for economic development based on environmental sustainability and family-supporting green-collar jobs. The report can act as a guide to leaders in other cities who seek a cleaner and greener path to prosperity.
http://apolloalliance.org/downloads/newarksgreenfuture.pdf

People, Planet, & Profit: Catalyzing Economic Growth & Environmental Quality in the City of Toronto
This document, published by Toronto's department of Economic Development, Culture, and Tourism defines a green sector strategy that is both meaningful and actionable. It can serve as a valuable blueprint for other similarly motivated cities.
http://www.toronto.ca/business_publications/pdf/green_economic_development_22may2007.pdf

U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy
Prepared for The United States Conference of Mayors and the Mayors Climate Protection Center by Global Insight, the report examines the economic benefits of the 'Green Economy' - including a current count of Green Jobs in the U.S. economy as well as their distribution across metropolitan areas. The third section outlines areas of potential future growth. The fourth section forecasts potential growth under a set of specific scenarios.
http://www.usmayors.org/pressreleases/uploads/GreenJobsReport.pdf

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