



**San Bernardino County
Energy Efficiency Pilot Program
Final Report**

Prepared for:

**City of San Bernardino
and
Southern California Association of
Governments**

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DISCLAIMER

This is a project for the City of San Bernardino (City) with funding provided by the Southern California Association of Governments' (SCAG) Compass Blueprint Program. Compass Blueprint assists Southern California cities and other organizations in evaluating planning options and stimulating development consistent with the region's goals. Compass Blueprint tools support visioning efforts, infill analyses, economic and policy analyses, and marketing and communication programs.

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I. Executive Summary

The Regional Energy Efficiency Pilot program (REEP) as part of Sustainable San Bernardino was developed and launched in a fluid market where the economy and several enabling legislation, regulations and financing programs were in flux or being stalled. This turn of events is not unusual in this field and should not be seen as a barrier to the successful development of the program. Energy efficiency and alternative energy programs have long experienced this same constantly changing situation; inconsistent market signals are one of the key reasons why it has been difficult to engage building owners in improving the energy performance of their facilities.

There are a number of reasons why REEP remains timely and important for the City of San Bernardino and for the Southern California Association of Governments region, especially for priority market segments where REEP can serve a key role in helping the business dynamics of the City remain competitive. The efforts undertaken by the City in conjunction with major utilities, community partners, workforce development agencies and business groups provide a foundation for the City to test strategies and create tools to respond to the changing market.

Some key issues addressed included the following:

- There is growing recognition by commercial and residential building owners of the importance of energy efficiency. The key reasons include the need to minimize operating costs through lower utility bills, create process efficiencies that consume less energy and to ensure that properties remain competitive. The latter is a major shift in the market; the market increasingly recognizes the value of energy efficiency, lower operating expenses and being green.
- The market for green products and services will continue to grow rapidly domestically and internationally, even with the ebb and flow of regulation. Much of the momentum is coming from the bottom up, i.e. from companies that see the market potential/demand and individuals wanting to lower their costs and carbon footprint. Additional reasons include increasing national security through energy independence; improving the country's trade imbalance; keeping financial resources in the local economy, and—a high priority for San Bernardino—creating local jobs that provide long-term careers in the growing field of energy efficiency.
- The combination of rising utility costs and the increasing availability and declining cost of energy efficiency and alternative energy technologies (especially solar electric [photovoltaic] systems) increases the financial viability of investments in this arena.
- Many of California's building energy efficiency-related initiatives are not dependent on AB 32, the Climate Change Solutions Act. AB 32 requires California to lower its greenhouse gas emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80 percent below 1990

levels by 2050. While some of the regulations aiming to decrease building energy use may flow from AB 32 (buildings represent approximately 50 percent of all greenhouse gas emissions and more than 70 percent of the nation’s electricity use), many do not. An example is AB 1103, which requires owners of non-residential buildings in California to disclose the Energy Star performance rating of any building that they want to sell, lease or finance when the entire building is involved in the potential transaction.

- The Public Utilities Commission has established energy efficiency targets for both Southern California Edison and the Southern California Gas Company that must be met. These programs are unprecedented in scope.
- Federal energy efficiency tax incentives, and utility rebates and other incentives are available, though some of them have sunset dates or decrease over time.
- Creating local ownership of small businesses by entrepreneurs entering the field of energy efficiency or expanding existing businesses to create jobs in energy audits, retrofits and renewable energies.

Project Overview

REEP’s Purpose

In order to analyze how the REEP program should be finalized given the status of the market, it is valuable to first review the original purpose. The REEP program’s purpose, as defined in the Request for Proposal (RFP) that Beacon responded to, is as follows:

The overall purpose of this project is to develop a local pilot program for a regional plan to promote the growth of green technology businesses and sustainable practices in the Inland Empire, leading to economic development and job growth. SCAG seeks a team of consultants for the Green Valley Initiative (GVI) and the City of San Bernardino to compile community and land use information, and to develop and document an “Implementation Plan” for the Regional Energy Efficiency Program (REEP) in San Bernardino that can be replicated in other cities to promote resource efficiency and energy audits through affordable loans and AB 811 funding resources.

Furthermore, the RFP stated:

GVI designed the REEP program for the purpose of conducting energy resource audits on the City of San Bernardino’s commercial, retail, industrial buildings and single family home building structures, with a view towards future retrofits, weatherization and solar power installations on these buildings to increase their energy efficiency, and competitiveness in the global marketplace. These audits will include cost benefit

analyses of energy efficiency technologies such as insulation, power efficient lighting, weatherization, and physical retrofits and modifications, including installations of solar power on the rooftop of each building audited. Before these audits can be successfully completed, the City of San Bernardino must collect key information and conduct effective outreach.

Conclusion #1: While the RFP identified AB 811 (PACE) as one source of funding, and PACE programs are now on hold, the key is financing—or other financial incentives. REEP should be designed to be flexible and to succeed regardless of the status or availability of any specific regulation or incentive or financing program.

Keys to REEP’s Success as Identified in Beacon’s Proposal

In our statement of work, the Beacon Management Group (Beacon) team identified the following as keys to a successful program:

- *Leveraging existing knowledge and resources.*
- *Understanding the barriers to getting building owners to implement energy efficiency and renewable energy measures.*
- *Finding solutions to overcoming the barriers.*
- *Testing marketing strategies to determine those that will have the most success.*
- *Understanding the green jobs potential; the local institutions currently training workers or interested in doing so for this market; and the local energy efficiency and renewable energy industry providers.*
- *Establishing the City of San Bernardino as a model for the community.*

Conclusion #2: The knowledge gained through the development of the REEP will be valuable regardless of the market, especially if the REEP is designed to be flexible to changing conditions.

Evolving Market

The energy efficiency and alternative energy markets continue to evolve. Most importantly for San Bernardino, the joint City/County PACE program to provide energy efficiency and alternative energy loans to property owners that would be repaid through property taxes is on hold due to a number of constraints, and it is not clear if and when it will be reinstated.

The statewide utility energy retrofit program, Energy Upgrade California, however, remains in flux but is still expected to be launched at some point in the near future. The program offers

property owners subsidized audits and one-stop access to all related programs. It includes a statewide web portal; statewide branding; a one-stop financing clearinghouse; contractor training; and installation quality assurance.

Despite the uncertainty of times, California has a long history of adopting environmental regulations, and support for the environment in the state remains strong. This was evidenced by the defeat of California Proposition 23 in the November elections which would have essentially placed AB 32, California’s Climate Change Solutions Act, in permafrost.

In addition, San Bernardino community representatives have expressed both interest and support for REEP. The need exists, both to reduce utility bills and create local green jobs, particularly for key sectors such as low-income housing and the logistics industry.

Conclusion #3: The fundamental goals of promoting the growth of green technology business and sustainable practices in San Bernardino remain sound. It is likely that the State will continue over time to adopt new regulations and standards for energy efficiency and related programs. Local interest remains strong.

REEP Database

One of the key components of the project included the compilation of an inventory of commercial, residential, and industrial properties that would be viable for participation in energy audits, retrofits and upgrades. The REEP database is intended as a resource tool for the City to explore ways to market, outreach and inform property owners and managers of incentives, benefits and other information. The database can be used to identify target markets, and can be rerun as these evolve. For example, financial incentives and loan programs may be targeted towards specific markets; as these programs are developed, the database will enable the City to identify the appropriate matching building owners.

A number of potential residential and commercial submarkets and market variables have already been developed. The variables include building age, ownership, market segment, and construction type/installed equipment. These can easily be fine-tuned as the market evolves.

II. Scope of Work San Bernardino Energy Efficiency Pilot Project

Beacon Management Group, a 14-year old MBE-SBE management consulting services firm was selected through a competitive bid process to create the strategic plan and marketing strategy for an Energy Efficiency Pilot Project in San Bernardino County which has been partially funded by the Southern California Association of Governments—Compass Blueprint Program.

The purpose of this nine-month Energy Efficiency Pilot Project was to develop a collaborative model in conjunction with the City of San Bernardino, the Southern California Association of

Governments and the Green Valley Initiative centered on stimulating the local economy. The research, analysis and marketing conducted by Beacon Management Group and its team of consultants was geared towards promoting the importance of energy efficiency audits on commercial, industrial and residential buildings within the City of San Bernardino. Through this program, we were to help the City promote solar power installation, weatherization, water conservation and LEED certified retrofits among commercial, industrial and residential property owners.

Beacon’s Scope of Work involved completing the following six major Tasks and accompanying Deliverables:

Task 1: *Use available electronic data to create a database of Commercial & Industrial Buildings in San Bernardino*

- Construct a proprietary database of commercial and industrial properties from available public sources, including SCAG and the County. The database would be built as a GIS parcel base and would combine this information with the workforce data being compiled in Task 4 into a single table. The database would be available in a format that can be used to conduct location searches and queries about properties.

Task 2: *Advise REEP* Project Administrators in the development of an outreach and marketing plan, and support the execution of program outreach to targeted industrial and commercial businesses in the City of San Bernardino through meetings and informational workshops.*

- Assist with the planning logistics, outreach, and registration of meetings and workshops.
- Produce a summary report with list of key stakeholders and participants, synopsis of discussion from meetings and workshops; strategies for marketing REEP program goals and best practices on successful models.

Task 3: *Advise REEP* Project Administrators in the development of an outreach and marketing plan and support the execution of program outreach to targeted housing structures in the City of San Bernardino through meetings and informational workshops.*

- Construct a proprietary database of residential properties from available public sources, including SCAG and the County. The database would be built as a GIS parcel base and would combine this information with the workforce data being compiled in Task 4 into a single table. The database would be available in a format that can be used to conduct location searches and queries about properties.
- Assist with the planning logistics, outreach, and registration of meetings and workshops.
- Produce a summary report with list of key stakeholders and participants, synopsis of discussion from meetings and workshops; strategies for marketing REEP program goals and best practices on successful models.

Task 4: *Identify local resources for provisional training to individuals seeking to gain employment as auditors, retrofitters, solar installers etc.*

- Develop a listing of likely occupations by SOC Code.
- Summary findings of local and regional trainings and related courses offered by community colleges, private career colleges and community based organizations.

Task 5: *Advise REEP* Project Administrators in the development of a Project Implementation Plan that may be replicated throughout the Inland Empire region.*

- Develop a Project Implementation Plan with key performance indicators.

Task 6: *Complete an “Implementation Plan” detailing the process for conducting the needed research, implementing the proposed program, vendor coordination, and marketing of the program. Implementation plan must include a proposed financing and budget plan that addresses costs associated with performance of audits, program management, and marketing outreach.*

- Summary of base characteristics and property selection criteria, key themes, trends, issues of concerns and relevant findings in a visual and narrative format.
- Narrative describing key marketing messages, methods for outreach for targeted audiences, costs associated with the audits, and program management timelines and milestones.
- A digital photo record sampling of all properties surveyed, identifying those participating in the REEP program.
- A digital spreadsheet of properties surveyed grouped by neighborhood or commercial area.
- Maps showing the retrofitted areas and identifying structures as contributing, non-contributing, or vacant parcel.
- Designing a method for Energy Efficiency Outcomes for each participating property to be documented on an individual inventory sheet.

***NOTE:** *The “REEP Project Administrators” was replaced by a “Steering Committee” led by the City of San Bernardino Mayor’s Office, and consisting of representatives from the Green Valley Initiative, utility companies, workforce training institutions, community nonprofits and energy efficiency specialists.*

The Desired Outcomes of this project were the following:

- Serve as an economic development catalyst by creating local jobs in green technologies to address the staggering 14.2% to 20% unemployment figures in the City.
- Improve commerce by supporting products and services from local area businesses.
- Attract capital financing to the area from investors and companies wishing to invest in development of clean tech and the green collar economy.
- Enable achieving national and state agendas to promote greater energy independence, efficiency, and conservation along with reduction of greenhouse gas emissions.

- Enhance local quality of life for diverse stakeholders by building local awareness and showcasing success stories through execution of program goals.
- Foster collaboration among public/private interests, unions, educational and workforce training entities, and other community interests.
- Craft a scalable, replicable and sustainable model that can be showcased in the Inland Empire and the rest of the SCAG region.

III. Overview of Sustainable San Bernardino Campaign

In 2010, the City of San Bernardino received just under \$2 million from The Energy Efficiency and Conservation Block Grant (EECBG) Program, funded for the first time by the American Recovery and Reinvestment Act (Recovery Act) of 2009. The City decided to use part of these funds for launching three major community-based programs including: rebate and audit programs, the energy efficiency pilot program, and the development of the AB811 program.

- ***Rebate and Audit Program***

The City is proposing to work closely with the Gas Company and Southern California Edison on the whole-house retrofit program that was launched in 2010. The main purpose is to help homeowners and businesses by buying down some of the cost of the audit, and providing matching rebates. The program is also focused on the economic benefit, besides its environmental impact, as a strategy to attract people who are less environmentally concerned.

- ***Development of AB 811 program***

The City of San Bernardino and the County of San Bernardino were working together to establish an AB 811 funding pool through a Joint Powers Authority for energy audits and retrofits to all participating cities within San Bernardino County. The idea was to increase the demand for energy efficiency retrofits, thereby creating opportunity for energy efficiency jobs. Unfortunately, this program was halted in July 2010 by the Federal Housing Finance Agency because of concerns that PACE (Property Assisted Clean Energy) loans would have the senior lien position, i.e., would get paid before mortgages. The matter remains gridlocked in legal and legislative entanglements with no predictable resolution in sight at the federal level.

- ***Energy Efficiency Pilot Program***

With funding, tools, and rebate and audit programs available, it was time to start developing the strategy for reaching out to community stakeholders with the right message. Capitalizing on the Green County San Bernardino campaign and other efforts underway in the City of San Bernardino, including a Climate Action Plan, the pilot program provides an opportunity that can not only be used in the City San Bernardino, but can be launched throughout the County. In conjunction with these efforts, the City

had already started working on an AB811 (PACE) Joint Powers Authority (JPA) for the region, but efforts were forestalled due to setbacks in the federal PACE program.

A steering committee organized by Beacon Management Group and the Mayor’s Office for San Bernardino was designated to give direction to this new project. This committee consisted of participants from the San Bernardino community, including the Mayor’s Office, local utilities, education institutions, workforce agencies, labor organizations, business and community groups. With the project under way, the committee focused their efforts on identifying target markets, creating sectors for job creation, creating an incentive structure, and formulating a marketing strategy that would tie it all together.

IV. Energy Efficiency Market Analysis

The Regional Energy Efficiency Pilot program, under the Sustainable San Bernardino campaign, is designed to create a model local program for the City of San Bernardino that creates green jobs, lowers building energy costs, and reduces pollution and carbon emissions through the installation of energy efficiency and renewable energy measures in existing buildings from every sector of the local economy.

There are several key elements to the energy efficiency and renewable energy market in San Bernardino and California:

- The growing recognition of the importance of energy efficiency by the market, including owners, tenants, regulators and utilities
- The local economy and high unemployment rate
- State and Federal regulations and incentives
- Utility rebate and incentive programs

The project has been developed within a market that has evolved considerably since its inception. Most importantly, when the program began, the City of San Bernardino was particularly interested in linking the project to its planned City/County PACE (Property Assisted Clean Energy) retrofit financing program. This program, enabled by AB 811, is currently on hold due to regulatory and legal challenges.

The shifting market should not be a barrier to the successful completion of the program and its value going forward. Energy efficiency and alternative energy programs have long coexisted with an ever-changing market. In fact, inconsistent market signals, such as incentives that are anticipated, begin (often later than projected) and then are fully subscribed or sunset (or never start), are one of the key reasons why it has been difficult to engage building owners in improving their building’s energy performance.

The fundamental goals of promoting the growth of green technology businesses and the adoption of green building practices in San Bernardino remain sound and will grow more important over time. This is due to the market’s growing understanding of the importance of building performance; strong local interest; and California’s long history of creating increasingly sophisticated and stringent environmental programs.

The project will be valuable regardless of the market. It has been designed to be flexible to changing conditions and meet its goals regardless of the status or availability of any specific regulation, incentive or financing program.

It remains timely and important for San Bernardino, especially for priority market segments where it can serve a key role in helping both the City remain competitive and its citizens to minimize their utility bills. The program also has the potential of providing neighborhood beautification and pride in the rich traditions of the past as the City prepares for a 21st Century economy. In addition, having this program in place and validated will provide San Bernardino with the tool it needs to move aggressively into the market whenever warranted.

A forecast, authored by Beacon Economics and released in partnership with the University of California, Riverside’s School of Business Administration, notes that relative to California, the unemployment rate in Riverside and San Bernardino Counties is expected to fall faster. Substantial job growth may not be evident in the region until the latter half of 2011, and the unemployment rate in Riverside and San Bernardino Counties may remain above 8 percent even through 2015.

David W. Stewart, dean of UC Riverside’s School of Business Administration says that the future of the economy in Southern California’s inland regions lie in the industries that drove growth before the housing boom, including, domestic and export markets, distribution infrastructure, and potential for stable sustainable electricity rates.

Key U.S., California, and Riverside/San Bernardino findings from the forecast include:

- United States: The decline in consumer spending has followed an extended period of overspending; do not look for a jump in demand driven by consumer spending.
- California: Total non-farm employment will cross the 14 million milestone in 2011 but will not reach its pre-recession peak of 15.2 million jobs until mid 2015.
- Riverside/San Bernardino Counties: Home sales will continue to fall into 2011 but will then return to growth driven by increasing population and pent up demand.

A. National Trends

- There is growing recognition by both commercial and residential building owners of the importance of energy efficiency. The reasons include the need to minimize operating costs by reducing utility bills; increasing utility rates; and the growing recognition that properties need to be efficient to remain competitive. The latter is a major shift in the market: the market increasingly recognizes the value of energy efficiency, lower operating expenses and being green.
- The market for green products and services has grown rapidly and will continue to accelerate domestically and internationally, even with the ebb and flow of the local market. Much of the momentum is coming from the bottom up, for example, from companies that understand the market demand and individuals wanting to lower their costs and carbon footprint. Additional reasons include increasing national security and improving the country's balance of trade by reducing energy imports; keeping money in the local economy (rather than spending it on importing energy), and—a high priority for San Bernardino—creating jobs, especially jobs that can not be exported.
- The combination of rising utility costs and the increasing availability and declining cost of energy efficiency and alternative energy technologies (especially solar electric systems, i.e., photovoltaic) increases the financial viability of investments in this market.

B. State Programs

There are a number of significant California laws, regulations and programs affecting the building retrofit market. Key elements include:

- **AB 32** (adopted 2006), the *Global Warming Solutions Act*, requires California to lower its greenhouse gas emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. On November 2, 2010, Proposition 23, which would have suspended further implementation of AB 32 until the state's unemployment rate dropped to 5.5 percent or below for four consecutive quarters, which has happened just three times since 1980, was defeated 61 percent to 39 percent. This was a strong statement by the voters for their support for green jobs and reducing pollution.

Existing buildings play a crucial role in meeting the AB 32 goals because they represent approximately 40% of all greenhouse gas emissions and the vast majority of buildings that will exist in California in 2050 are already built. The state will not meet its carbon emission goals if existing buildings are not made more efficient.

- **AB 758** (2009), the *Comprehensive Energy Efficiency Program for Existing Residential and Nonresidential Buildings*, recognizes the importance of the existing building sector by requiring that the California Energy Commission (CEC) develop and implement a comprehensive program to achieve greater energy savings in the state’s existing residential and nonresidential building stock. AB 758 provides the CEC with the authority to adopt mandatory measures in support of the program. The program, currently under development, will include the following elements:
 - Workforce development
 - Public awareness campaign
 - Financing options
 - Rating systems
 - Labeling programs
 - Audits & commissioning investigations
 - Retrofits & retro-commissioning

- **AB 811** (2008), also known as **PACE** (Property Assessed Clean Energy), authorizes municipal governments to establish energy efficiency funding programs that provide eligible residential and commercial property owners with loans for energy efficiency and alternate energy systems that are repaid through property tax bills. Property owners benefit by avoiding upfront installation costs and by the elimination of concerns that they will sell the property before recovering the system investment from utility bill savings. The latter is because, under PACE, if a property is sold before a loan is fully repaid, the new property owner becomes responsible for paying the balance. This program was halted in July 2010 by the Federal Housing Finance Agency because of concerns that PACE loans would have the senior lien position, i.e., would get paid before mortgages. Since then, several legal challenges have been filed in response to that decision, and legislative options are being proposed to circumvent the matter.

- **AB 1103** (2007) requires that, beginning January 1, 2011, commercial property owners whose property is solely occupied by the owner or is more than 50,000 square feet in size, must disclose the building’s U.S. EPA ENERGY STAR® Portfolio Manager Statement of Energy Performance and the California Energy Performance Disclosure Report for the property when the entire property is sold, leased or financed. The threshold is lowered to all properties over 10,000 square feet January 1, 2012, and all properties starting July 1, 2012. Buildings that are not eligible to receive an ENERGY STAR performance score must disclose their energy use intensity level (KBtu/sf/yr = 1,000 British thermal units/square foot/year).

- **The California Public Utilities Commission**, which regulates the state’s investor owned utilities (IOU), has established specific residential and commercial building energy efficiency targets that each IOU is required to achieve. The two utilities that provide

service to San Bernardino, Southern California Edison and the Southern California Gas Company, are among those affected. These programs are unprecedented in scope.

- **Energy Upgrade California** (energyupgradecalifornia.org), a program of the Southern California Gas Company, Southern California Edison and other California utilities, offers qualified residential property owners subsidized audits and one-stop access to all energy efficiency and alternative energy programs. It includes a statewide web portal; statewide branding; a one-stop financing clearinghouse; contractor training; and installation quality assurance. The website can be linked to local programs such as REEP. It is being launched as this report is being finalized.

C. Federal Programs

ENERGY STAR Portfolio Manager is a U.S. Environmental Protection Agency program that all types of commercial and institutional buildings can use to track and benchmark energy use over time. Office buildings, K-12 schools, grocery stores, hotels, and hospitals can go a step further and benchmark their energy use relative to the national population of similar buildings. Buildings in these classifications receive a rating of 1 to 100. Portfolio Manager normalizes for weather and several other important building and operational characteristics, allowing comparisons to be made on a level playing field. Entering energy consumption and cost data into a Portfolio Manager account benchmarks a building's energy performance, assesses energy management goals over time, and identifies strategic opportunities for savings and recognition opportunities.

Buildings in the classifications with national benchmarking with a minimum score of 75, i.e., those that perform better than 75 percent of all buildings in their classification, are awarded an ENERGY STAR label. According to the ENERGY STAR website, buildings that earn an ENERGY STAR rating typically use about 40 percent less energy than average buildings, without compromising comfort or services (http://www.energystar.gov/index.cfm?c=assess_performance.benchmark).

ENERGY STAR also rates consumer products such as appliances and new homes, and provides additional related services.

Interestingly, there is federal legislation referred to as the REEP Act that engenders several of the goals of the project.

The Retrofit for Energy and Environmental Performance (REEP) Program Act

HR 1778 - The Retrofit for Energy and Environmental Performance (REEP) Program Act was introduced in Congress in May 2009. The Bill was referred to Committee and is still waiting action. The rationale and goals of this program are:

Rationale: Buildings are responsible for 40 percent of all energy consumption, 70 percent of all electricity consumption, and 50 percent of all carbon emissions in the United States. Buildings in the United States account for 10 percent of global carbon emissions. Energy efficiency in buildings can be maximized with existing technologies to reduce building energy consumption by 25 percent or more. Expanding the residential and commercial efficiency will create jobs directly in performing retrofits, reduce energy bills for consumers, and address global carbon emissions.

Program Goals: The purpose of the Retrofit for Energy and Environmental Performance (REEP) program is to facilitate the retrofitting of existing buildings across the United States to achieve cost-effective energy efficiency improvements of 20 percent and significant improvements in water use. The program will provide federal financial assistance to state and local agencies for direct cash incentives and for the management of this program. State and local agencies will have broad flexibility in the structure of program operations and choice of retrofit agencies or contractors.

Administration: The Department of Energy and the Environmental Protection Agency will develop and implement the REEP program. State Energy Offices will then implement the REEP Program in accordance with standards and requirements adopted by the Administrator for the residential program and the Secretary for the commercial program. States will be given maximum flexibility to implement the program through the agency with the greatest familiarity with overall building performance. States may also delegate performance of the REEP program, upon their request and subject to state law, to counties, municipalities, public agencies, and other divisions of local government, provided that the State retains accountability for the funds and maintains responsibility to meet federal standards and requirements. States and local government entities may in turn employ public or regulated investor-owned utilities, building auditors and inspectors, contractors, non-profit organizations, and other entities to perform actual audits and retrofit services.

Financial Incentives for Residential and Commerce Buildings: The goal of REEP is to support direct incentives for efficiency improvements in residential and commercial buildings, compared to the building's previous energy use. Both residential and commercial buildings are eligible to receive additional incentives for properties achieving at least 20% energy savings in the use of water.

For homes:

- \$1000 for a combination of prescriptive measures designed to reduce energy consumption by more than 10% (but not less than 10%), and \$2000 for prescriptive measures designed to reduce energy consumption by 20%;
- \$3000 for actual demonstrated savings of 20% utilizing the performance based structure, and \$150 per additional percentage point of energy savings achieved;
- Incentives may accumulate to a maximum incentive not to exceed 50% of retrofit costs.

For commercial buildings:

- a maximum of \$0.15 per square foot of retrofit area for energy use reductions from 20% to 30%;
- \$0.75 per square foot for energy use reductions from 30% to 40%;
- \$1.60 per square foot for energy use reductions from 40% to 50%; and
- \$2.50 per square foot for energy use reductions exceeding 50%.
- Incentives may accumulate to a maximum incentive not to exceed 50% of retrofit costs.

Standards: Both the residential and commercial REEP program requires RESNET certification of building energy and environment auditors, inspectors, and raters and Building Performance Institute (BPI) certification or licensing by states of building energy and environmental retrofit contractors. Standards will be developed for the determination of energy savings in the performance-based program. State Energy Offices will be required to apply standards for training, certification of contractors, certification of buildings, and post-retrofit inspection as developed by EPA and DOE for residential and commercial buildings, respectively. Regular audits of the program are required.

D. Financial Incentives

Substantial State and Federal energy efficiency **tax incentives, utility rebates and other financial incentives** are available. Some of them decrease over time or have sunset dates. The incentives are too numerous to list here. Energy Upgrade California, the utility-sponsored energy efficiency program, lists energy and water efficiency incentives for each Zip code (enter a Zip code at http://energyupgradecalifornia.com/counties/san_bernardino.html). Entering 92418, the San Bernardino city hall Zip code, results in 68 incentives in 7 incentive categories and 4 service categories.

Another database of California state and local incentives is available at:

<http://www.dsireusa.org/incentives/index.cfm?re=1&ee=1&spv=0&st=0&srp=1&state=CA>

Federal incentives can be found at:

<http://www.dsireusa.org/incentives/index.cfm?State=US&ee=1&re=1>

E. Other Programs

LEED-EBOM (LEED for Existing Buildings Operations and Maintenance) is a green building rating system developed by the US Green Building Council (USGBC) that is gaining wide acceptance among commercial building owners, as have the LEED systems for new buildings. LEED is a point-based system that includes both prerequisites and optional credits. Depending on the number of points earned, buildings are certified at one of four levels: Certified, Silver, Gold or Platinum. One of LEED-EBOM’s prerequisites requires that a building must have a minimum ENERGY STAR rating of 69 to qualify for certification. Details about LEED-EBOM are available at <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=221>. The USGBC-Inland Empire chapter (<http://www.usgbc-ie.org/>), which includes San Bernardino, has supported the development of REEP.

V. Energy Efficiency Workforce Analysis

The energy efficiency sector has great potential to become a positive economic driver in California and San Bernardino County at a time when the economy is in desperate need of job creation. Investments in energy efficiency programs has the potential for creating jobs for trained professionals performing energy audits, retrofitting homes and buildings, installing advanced HVAC systems, and managing energy resources.

Investing in energy efficiency initiatives such as the REEP Program can become a regional and state-wide economic development strategy and energy efficiency jobs can not be outsourced.

Beacon Management Group, as part of this pilot project, was tasked to conduct an analysis of potential job opportunities related to energy efficiency industries, identify possible occupations, and local training resources related to the REEP audit and retrofit effort.

- Energy Efficiency Industries
- Energy Efficiency Occupations
- San Bernardino Demographics and Labor Force
- Training and Educational Opportunities
- Other Drivers of Potential Related Employment Opportunities
- Preliminary Implications

A. Energy Efficiency Industries

Industries with the greatest concentration of energy efficiency occupational opportunities were delineated by studies conducted by the Centers of Excellence (COE) in conjunction with multiple utilities agencies, and industry associations in 2008. Related industries were identified

by NAICS industry codes as shown below. According to the COE reports, the energy efficiency sector does not constitute an independent industry itself since the main activities, rather than being new efforts; often consist of a shift from standard practice to a more energy-efficient approach to design, building construction, and building operation. The following three major types of industries were identified by the COE studies:

Public or Private Utilities or Agencies:	Building Design and Construction	Building or Facility Operations and Maintenance.
Compliance, regulation, program administration, resource management, and auditing	Project management, design, building, installation, auditing, and retrofitting.	Maintenance, operation, and systems controls.

Green related activities and occupations are therefore contained within existing industry and occupational categories.

- **Utilities and Energy Resource Management** includes employers in public & private utilities & agencies responsible for Consulting and Planning for Energy Conservation and Resource Management (NAICS definition: 221 - Utilities, 54135 – Environmental consulting, 924 Administration of Environmental Programs (Public Sector), 92613 Administration & Regulation of Electricity, Gas, and other Utilities (Public Sector) This would include those occupations that are engaged in assessment and planning for energy efficiency. This industry would largely account for those positions in the public sector as well as those consultants that are guiding energy efficiency planning.
- **Design and or Construction of Buildings** (NAICS definition: 23 – Construction (Residential, Commercial or Industrial), 5413 – Architecture, Engineering and Design Services). This includes those occupations that are focused on building and designing more energy efficient homes, buildings and facilities. From a sector perspective, we included employers who are focused on residential, commercial and industrial building development.
- **Facility/Building Operations and Maintenance** (NAICS definition: 8113 Commercial & Industrial Equipment Repair and Maintenance, 53131 Real Estate Property Managers & Large Employers with Large Facilities) This includes those employers that hire individuals who can repair and maintain the new energy efficiency systems that are used in new and retrofitted buildings and facilities. This would include those individuals who are operating and maintaining new HVAC systems.

1. Green Building and Energy Efficiency Sector

The following is a listing of industries by NAICS code that may be or could choose to participate in the Green Building and Energy Efficiency activities such as the REEP audit and retrofit program.

Table (1)
Green Building and Energy Efficiency Sector by NAICS Codes

Green Economy area/sector	Industry Sector (2-digit NAICS)	NAICS	Description	
Green Building and Energy Efficiency	22 – Utilities	2211	Electric Power Generation, Transmission & Distribution [Energy conservation planning & consulting.]	
		2212	Natural Gas Distribution	
	23 – Construction	236	Construction of Buildings	
		236115	New Single-Family Housing Construction (except Operative Builders)	
		236116	New Multifamily Housing Construction (except Operative Builders)	
		236117	New Housing Operative Builders	
		236118	Residential Remodelers	
		236210	Industrial Building Construction	
		236220	Commercial and Institutional Building Construction	
		238	Specialty Trade Contractors (incl. Electrical Contractors)	
		238210	Electrical Contractors and Other Wiring Installation Contractors	
		238220	Plumbing, Heating and Air-Conditioning Contractors	
		238350	Finish Carpentry Contractors	
		238990	All Other Specialty Trade Contractors	
		238990	Roofing Contractors	
		31-33 – Manufacturing	3334	Ventilation, Heating, Air-Conditioning, and Commercial Refrigeration Equipment Manufacturing
			333414	Heating Equipment (except Warm Air Furnaces) Manufacturing
	335110		Electric Lamp Bulb/Parts Mnf	
	335121		Residential Electric Lighting Fixture Mnf	
	335122		Commercial, Industrial, Institutional Lighting Fixture Mnf	
	335129		Other Lighting Equipment Mnf	
	335311		Power, Distribution, and Specialty Transformer Manufacturing	
	42 – Wholesalers	423720	Plumbing and Heating Equipment and Supplies (Hydronics)	
			Merchant Wholesalers	
	53 – Real Estate and Rental and Leasing	531311	Residential Property Managers	
		531312	Nonresidential Property Managers	
	54 – Bus. Prof.	541310	Architectural Services	
		541320	Landscape Architectural Services	
		541330	Engineering Services	
		541340	Drafting Services	
		541350	Building Inspection Services	
		541420	Industrial Design Services	
		541620	Environmental Consulting Services	
	92 – Public Administration	921	Cities and Counties	
		924	Administration of Environmental Programs	

Source COE Study 2008

2. Renewable Energy: Energy Generation, System Installation & Storage Sector

The following is a listing of industries by NAICS code that may be or could choose to participate in the Renewable Energy: Energy Generation, System Installation & Storage Sector activities related to the REEP audit and retrofit program.

Table 2 - Renewable Energy: Energy Generation, System Installation & Storage Sector by NAICS Codes

Green Economy area/sector	Industry Sector (2-digit NAICS)	NAICS	Description [notes]
Renewable Energy: Energy Generation, System Installation & Storage	22 – Utilities	221111	Hydroelectric Power Generation
		221119	Other Electric Power Generation
		221121	Electric Bulk Power Transmission and Control
		221122	Electric Power Distribution
		221330	Steam and Air-Conditioning Supply
	23 – Construction	237130	Power and Communication Line and Related Structures Construction
		238160	Roofing Contractors
		238210	Electrical Contractors and Other Wiring Installation Contractors
		238220	Plumbing, Heating, and Air-Conditioning Contractors
	31-33 – Manufacturing	325000	Chemical Manufacturing
		333295	Semiconductor Machinery Manufacturing [Machines to manufacture solar panels.]
		333611	Turbine and Turbine Generator Set Units
		334413	Semiconductor and Related Device Manufacturing [Solar panel and fuel cell manufacturing.]
		334512	Automatic Environmental Control Manufacturing
		335911	Storage Battery Manufacturing
	42 – Wholesalers	423720	Plumbing & Heating Equipment & Supplies (Hydraulics) Merchant Wholesalers [Solar panel sales.]
		54 – Bus. Prof.	541330
	541370		Survey and Mapping Services
	541380		Testing Laboratories
	541620		Environmental Consulting Services
	541690		Other Scientific and Technical Consulting Services
	541712		Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology)
	81 – Other Services		811219
		811310	Commercial and Industrial Machinery (except automotive and electronic) Repair and Maintenance

Source COE 2008

B. Energy Efficiency Occupations

The following table presents the Green Cluster sector. It includes a list of emerging Green occupations and related Green occupations which are located in the existing Occupational SOC code system. These groupings were identified in the COE 2008 study. The segment of the energy efficiency workforce that was studied is primarily at the technician level/mid-level occupations most closely aligned with community colleges education programs, as opposed to professional level occupations. This level of occupations would predominate in REEP Program retrofit activities. Although occupations like Resource Conservation/Energy Efficiency Manager could be found in just about any large business, the COE study focused on the industries with the greatest concentration of energy efficiency occupational opportunities. The following three industries fit these criteria: Building or Facility Operations and Maintenance; Building Design and Construction; and Public or Private Utilities or Agencies.

1. Renewable Energy: Energy Generation, System Installation & Storage Occupations

Table (3) Renewable Energy

Green Economy area/sector	Green Industry Clusters	Emerging Green Occupations	Occupations with SOC Code
Renewable Energy: Energy Generation, System Installation & Storage	Solar thermal & photovoltaic (PV) systems	Solar power & PV systems:	Engineers (including civil and electrical engineers*):
	Wind energy power	Solar systems engineers	17-2041 Chemical Engineers
	Hydro-electric power	Solar systems engineering technicians	17-2051 Civil Engineers
	Geothermal power	Solar manufacturing technicians	17-2071 Electrical Engineers
	Smart grid	Solar sales estimators	17-2072 Electronics Engineers
	Hydrogen power	Solar thermoelectric plant managers	17-2081 Environmental engineers
	Energy storage	Solar systems designers	17-2112 Industrial Engineers
	Energy transmission/distribution	Solar commercial installation engineers	17-2131 Materials engineers
	Energy services (ESCO)	Solar installation electricians	17-2141 Mechanical engineers
		Solar installation electrician foremen	Mapping technicians (17-3031.02)
		Solar thermal system installers	Technicians/Electrical technicians:
		Solar PV installers (Proposed SOC: 49-9022 Solar panel installers and repairers)	17-3023 Electrical & electronics engineering technicians
		Wind energy power:	17-3024 Electro-mechanical technicians
		Wind farm electrical systems designers	17-3025 Environmental engineering technicians

		Wind power plant project engineers	17-3027 Mechanical engineering technicians
		Wind turbine electrical engineers	17-3029 Engineering technicians, except drafters, all other
		Wind turbine mechanical engineers	Commercial and industrial designers (27-1021)
		Wind power manufacturing technicians	Assemblers:
		Wind turbine maintenance technicians	51-2022 Electrical and electronic equipment assemblers
		Wind field technicians	51-2023 Electromechanical equipment assemblers
		Wind turbine machinists	51-2031 Engine and other machine assemblers
		Next generation hydro power:	51-2091 Fiberglass laminators and fabricators
		Ocean wave power turbine technicians	51-2092 Team assemblers
		Geothermal power:	Machinists, operators and inspectors:
		Geothermal electrical engineers	51-4041 Machinists
		Geothermal operations engineers	51-8012 Power distributors
		Geothermal mechanical engineers	51-8013 Power plant operators
		Geothermal power plant structural engineers	51-8021 Stationary Engineers and Boiler Operators
		Geothermal plant efficiency operators	51-9061 Inspectors, testers, sorters and weighers
		Geothermal plant installation technicians	Electrical & electronics repairers, powerhouse substation and relay (49-2095)
		Geothermal heat pump machinists	Industrial machinery mechanics (hydroelectric machinery mechanics) (49-9041)
		Hydrogen	Managers:
		Hydrogen plant operator and operations managers	11-1021 General and operations managers
		Hydrogen fuel cell engineers	11-9041 Engineering managers
		All renewables:	Roofers (47-2181)
		Instrumentation/Controls/Electrical (ICE) systems technicians	Plumbers:
		Renewable energy technicians	47-2152 Plumbers, pipefitters, and steamfitters
		Other energy engineers (Proposed SOC 17-2179 Other energy engineers)	47-3015 Helpers-pipe layers, plumbers, pipefitters, and steamfitters
			Sheet metal workers (47-2211)
			Installers & Energy efficiency specialists:
			17-3012 Electrical drafters
			49-9012 Control and valve installers and repairers, except mechanical door
			49-9021 Heating, air conditioning, and refrigeration mechanics and installers
			49-9051 Electrical power-line installers and repairers
			Sales representatives:

			41-4011 Sales representatives, wholesale and manufacturing, technical and scientific products
			41-9031 Sales engineers
			41-9041 Telemarketers
			Accountants (KSA of tax incentives, rebates, etc):
			13-2011.01 Accountants
			Meter readers, utilities (43-5041)
			Hydrogeologists:
			19-2042 Geoscientists
			Maintenance workers:
			49-9042 Maintenance and repair workers, general
			49-9043 Maintenance workers, machinery
			49-9098 Helpers-installation, maintenance and repair workers

Source: COE

2. Green Building & Energy Efficiency Occupations

Table (4) Green Building & Energy Efficiency Occupations

Green Economy area/sector	Green Industry Clusters	Emerging Green Occupations	Occupations with SOC Code
Green Building & Energy Efficiency	Green product manufacturing:	Green product manufacturing:	Engineers:
	--Lighting	Other energy engineers (Proposed SOC 17-2179 Other energy engineers)	17-2051 Civil engineers (including structural design)
	-- Construction materials	Energy services:	17-2071 Electrical engineers (including lighting product & equipment engineers)
	-- “Smart” systems & equipment	Field energy consultants	17-2112 Industrial Engineers
	--Water systems	Energy conservation representatives	17-2131 Materials engineers
	-- HVAC/R equipment	Energy managers & analysts	17-2141 Mechanical engineers (including water systems designers & engineers, & HVAC/R engineers)
	Green construction materials wholesaling	Compliance analysts or Energy regulation specialists	17-2151 Mining & geological engineers
	Energy services (ESCO)	Residential energy field auditors (Proposed SOC 25-9022 Home energy auditors)	Technicians/Electrical technicians:
	Design & construction of new buildings	Commercial & industrial energy field auditors	17-3012 Electrical drafters
	Retrofitting & retro-commissioning of existing structures	Design & construction of new green buildings/ Retrofitting of existing buildings/Deconstruction:	17-3023 Electronics & electrical engineering technicians (including lighting product manufacturing technicians)
Deconstruction	Green building & retrofit	17-3024 Electro-mechanical technicians	

		architects	
	Green building operations & maintenance	Renewable energy consultants	17-3027 Mechanical engineering technicians (including HVAC/R product manufacturing technicians)
	Certifications (LEED)	Industrial green systems & retrofit designers	17-3029 Engineering technicians, except drafters, all other
	Green landscaping	Environmental construction engineers	Fabricators & welders:
		Green building & retro-fitting project managers	51-2041 Structural metal fabricators & fitters
		Green building operations & maintenance:	51-4121 Welders, cutters, solderers, & brazers
		Water purification systems service technicians	Interior designers (27-1025)
		Green building operators & engineers	Architects:
		Green building maintenance engineer	17-1011 Architects, except landscape & naval
		Building performance specialists:	17-1012 Landscape architects
		Weatherization specialists or technicians	17-3011 Architectural & civil drafters
		Weatherization operations managers	Maintenance & repair workers:
		Residential air sealing technicians	49-9042 Maintenance & repair workers, general
		Building controls system technicians	Construction supervisors:
		Resource conservation or Energy efficiency managers	11-9021 Construction managers (including Project manager for construction & design work)
		Green landscaping:	47-1011 First-line supervisors/managers of construction trades & extraction workers
		Green landscape architects	Cement masons & concrete finishers (47-2051)
			Carpenters:
			47-2031 Construction carpenters
			47-3012 Helpers-carpenters
			Roofing & skylight installers:
			47-2121 Glaziers
			47-2181 Roofers
			Insulation installers:
			47-2131 Insulation workers, floor, ceiling & wall
			Electricians:
			47-2111 Electricians
			47-3013 Helpers-electricians
			Plumbers & HVAC/R:
			47-2152 Plumbers, pipefitters, & steamfitters

			47-3015 Helpers-pipe layers, plumbers, pipefitters, & steamfitters
			49-9021 Heating & air conditioning & refrigeration mechanics & installers
			Sales representatives:
			41-4011 Sales representatives, wholesale & manufacturing, technical & scientific products
			41-9031 Sales engineers
			Cost estimators (13-1051)
			Energy efficiency specialists:
			17-3012 Electrical drafters
			Inspectors:
			47-4011 Construction & building inspectors

Source: COE

C. San Bernardino Demographics and Labor Force

In order to better understand job opportunities that may result from the REEP program, selected demographic and resident labor force data is presented for the County of San Bernardino.

Population County of San Bernardino

Table (5) Population

Population Summary	San Bernardino County
Population	
2019 Forecast	2,402,780
2014 Projection	2,195,954
2009 Estimate	2,001,589
Growth 2019-2014	9%
Growth 2014-2009	10%
2009 Median Age	32.8
2009 Average Age	35.1

Source: Synergos Technologies

1. Educational Attainment - County of San Bernardino

Table (6) Educational Attainment

Subject	Population	Margin of Error	Male	Margin of Error	Female	Margin of Error
Population 18 to 24 years	229,287	+/-1,013	121,063	+/-659	108,224	+/-731
Less than high school graduate	19.90%	+/-1.5	23.80%	+/-2.5	15.60%	+/-2.0
High school graduate (includes	33.60%	+/-1.7	35.90%	+/-2.7	31.10%	+/-2.7

equivalency)						
Some college or associate's degree	41.50%	+/-2.0	36.20%	+/-2.8	47.50%	+/-2.9
Bachelor's degree or higher	4.90%	+/-0.9	4.10%	+/-1.3	5.80%	+/-1.4
Population 25 years and over	1,195,256	+/-1,012	586,933	+/-734	608,323	+/-801
Less than 9th grade	10.00%	+/-0.6	9.90%	+/-0.8	10.00%	+/-0.7
9th to 12th grade, no diploma	12.10%	+/-0.5	13.20%	+/-0.8	11.10%	+/-0.6
High school graduate (includes equivalency)	26.40%	+/-0.8	26.50%	+/-1.0	26.40%	+/-0.9
Some college, no degree	25.10%	+/-0.7	24.70%	+/-1.1	25.60%	+/-1.0
Associate's degree	8.40%	+/-0.5	7.90%	+/-0.7	9.00%	+/-0.7
Bachelor's degree	11.80%	+/-0.5	11.30%	+/-0.6	12.40%	+/-0.8
Graduate or professional degree	6.00%	+/-0.4	6.50%	+/-0.5	5.60%	+/-0.5
Percent high school graduate or higher	77.90%	+/-0.7	76.90%	+/-1.0	78.90%	+/-0.9
Percent bachelor's degree or higher	17.90%	+/-0.7	17.80%	+/-0.7	18.00%	+/-0.9
Population 25 to 34 years	317,033	+/-1,210	162,691	+/-728	154,342	+/-910
High school graduate or higher	81.30%	+/-1.6	78.70%	+/-2.1	84.10%	+/-1.8
Bachelor's degree or higher	17.20%	+/-1.3	14.30%	+/-1.6	20.40%	+/-1.7
Population 35 to 44 years	278,103	+/-1,080	139,180	+/-795	138,923	+/-844
High school graduate or higher	76.30%	+/-1.6	74.00%	+/-2.4	78.50%	+/-2.1
Bachelor's degree or higher	17.70%	+/-1.4	15.90%	+/-1.8	19.60%	+/-2.1
Population 45 to 64 years	430,517	+/-816	212,128	+/-693	218,389	+/-501
High school graduate or higher	79.40%	+/-1.2	79.00%	+/-1.5	79.80%	+/-1.5
Bachelor's degree or higher	19.80%	+/-1.0	21.00%	+/-1.4	18.70%	+/-1.3
Population 65 years and over	169,603	+/-578	72,934	+/-267	96,669	+/-503
High school graduate or higher	70.60%	+/-2.2	72.00%	+/-2.9	69.50%	+/-2.5
Bachelor's degree or higher	14.30%	+/-1.5	19.70%	+/-2.3	10.30%	+/-1.6
POVERTY RATE FOR THE POPULATION 25 YEARS AND OVER FOR WHOM POVERTY STATUS IS DETERMINED BY EDUCATIONAL ATTAINMENT LEVEL						
Less than high school graduate	20.40%	+/-1.9	15.60%	+/-2.0	25.20%	+/-2.6
High school graduate (includes equivalency)	12.70%	+/-1.4	10.70%	+/-1.7	14.60%	+/-1.7
Some college or associate's degree	8.30%	+/-0.9	5.70%	+/-0.8	10.60%	+/-1.5
Bachelor's degree	4.90%	+/-1.2	4.80%	+/-1.6	4.90%	+/-1.6
Graduate or professional degree	4.60%	+/-1.3	5.00%	+/-1.8	4.30%	+/-1.8

Source: U.S. Census Bureau 2008

2. Employment (4th quarter 2009) County of San Bernardino

Table (7) Employment

Labor Force Category	SB County	% Total
Current Year Estimated Population Age 16+ by Employment Status	1,538,580	
Labor Force	932,067	61%
In Armed Forces	9,145	1%
Civilian, Employed	711,143	46%
Civilian, Unemployed	211,779	14%
Not in Labor Force	606,513	39%
Unemployment Rate (as of 4th qtr 2009)	23%	

Source: Synergos Technologies

3. Employment by Industry (4th quarter 2009) County of San Bernardino

Table (8) Employment by Industry

Employment by Industry	SB County	% Total
Current Year Estimated Employed Population Age 16+ by Industry	711,143	
Agriculture, forestry, fishing and hunting, mining and construction	58,742	8%
Manufacturing	90,523	13%
Wholesale & retail trade	119,874	17%
Transportation and warehousing, and utilities	51,003	7%
Information	16,365	2%
Finance, insurance, real estate and rental and leasing	40,697	6%
Professional, scientific, management, administrative, and waste management services	54,088	8%
Professional, scientific, and technical services	26,576	4%
Management of companies and enterprises	162	0%
Administrative and support and waste management services	27,350	4%
Educational, health and social services	151,252	21%
Arts, entertainment, recreation, accommodation and food services	51,319	7%
Other services (except public administration)	36,431	5%
Public Administration	40,849	6%

Source: Synergos Technologies

4. Employment by Occupations - County of San Bernardino

Table (9) Employment by Occupation

Employment by Occupation	SB County	% Total
Current Year Estimated Employed Civilian Population Age 16 and over by Occupation	711,143	%
Management, Professional, and Related occupations	206,705	29%
Management, Business, and Financial Operations Occupations	82,974	12%
Professional and Related Occupations	123,731	17%
Service Occupations	109,518	15%
Healthcare support occupations	13,858	2%
Protective service occupations	20,554	3%
Food preparation and serving related occupations	30,911	4%
Building and grounds cleaning and maintenance occupations	22,791	3%
Personal care and service occupations	21,404	3%
Sales and Office Occupations	194,808	27%
Sales and related occupations	80,071	11%
Office and administrative support occupations	114,737	16%
Farming, fishing, and forestry occupations	3,080	0%
Construction, Extraction, and Maintenance Occupations	78,986	11%
Production, Transportation, and Material Moving Occupations	118,046	17%

Source: Synergos Technologies

5. Employment and Unemployment (current CA EDD Data) County of San Bernardino

Table (10) Unemployment CA LMI Data

Area Name	March 2010 Data		Unemployment	
	Labor Force	Employment	Number	Rate
San Bernardino County	870,800	741,900	128,900	14.8%

Source: CA EDD LMI 2010

D. Training and Educational Opportunities

1. Community Colleges

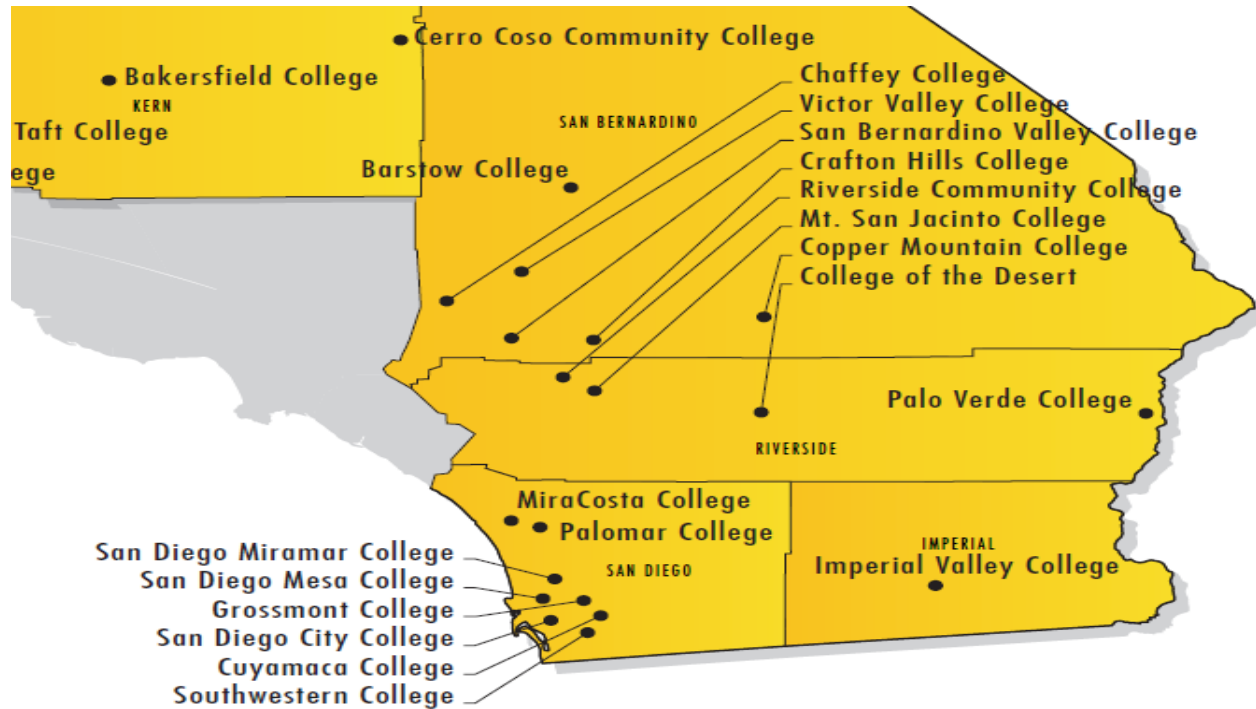
The following table presents community college courses located in the region related to the following Green groupings: energy efficiency, renewable energy, water efficiency, and those that may have some applicability. The data was developed by the California Community College Chancellors’ Office web page Green training and Education.

Table (11) Energy, Renewable, Water Efficiency related Community College Courses

	EWERE Grouping	Degree/Certificate/Courses, etc.
EE	: Energy Efficiency	Associate Degree
RE	: Renewable Energy	Certificate
WE	: Water Efficiency	Certificate/Degree
MHA	= May Have Application	Courses
		(Planned)
		n/c = Non-Credit Course
	Cerro Coso	
MHA	Natural resources, industrial technology	n/c
MHA	Engineering Technology	n/c
RE	Industrial Technology - Solar Tech	Associate Degree, Certificates
RE	Industrial Technology - Wind Tech	Associate Degree, Certificates
	Chaffey	
MHA	Drafting Technician: Architectural	Associate Degree
MHA	Earth sciences	n/c
	College of the Desert	
EE	Air Conditioning & Refrigeration	Associate Degree
MHA	Construction Mgmt (Emp. Oriented)	Associate Degree
MHA	Construction Mgmt (Transfer)	Associate Degree
MHA	Architectural Technology	Associate Degree
MHA	Architectural Technology (Transfer Oriented)	Associate Degree
EE	HVAC	n/c
MHA	Civil and Construction Mgmt Technology	n/c
MHA	Environmental Studies	n/c
RE	Alternative fuels technician	n/c
	Copper Mountain	
MHA	Environmental sciences	n/c
	Crafton Hills	
MHA	Environmental sciences	n/c
	Mt. San Antonio	
MHA	Architectural Technology Level I	Associate Degree
MHA	Air Conditioning & Refrigeration	Associate Degree
MHA	Architectural Technology	Certificate
WE	Water Technology	Certificate

MHA	Architectural Technology Level III	Courses
MHA	Architectural Technology Level II	Courses
MHA	Landscape Irrigation	Courses
MHA	Landscape & Park Maintenance	Courses
MHA	Landscape Design & Construction	Courses
MHA	Tree Care & Maintenance	Courses
EE	AC/Refrigeration	n/c
EE	Industrial electronics, agriculture power equipment	n/c
	Riverside City	
EE	Air Conditioning & Refrigeration	Associate Degree
MHA	Architecture	Associate Degree
MHA	Architectural Graphics	Courses
EE	Building, welding, automated systems engineering	n/c
MHA	Engineering Technology	n/c
	San Bernardino Valley	
EE	Air Conditioning & Refrigeration	Associate Degree
MHA	Architectural Technology	Associate Degree
WE	Water Supply Technology	Certificate
WE	Wastewater Treatment	Certificate
WE	Water Distribution	Certificate
WE	Water Treatment	Certificate
EE	Electrical Power Technology	Certificate/Degree
MHA	Computer-Aided Drafting Tech	Courses
MHA	Metal working & welding, automotive technician	n/c
	Victor Valley	
EE	Building and construction trades, horticulture	n/c
EE	Civil and Construction Mgmt Technology	n/c
EE	Construction Crafts Technology	n/c
MHA	Public Works	n/c

2. Map of Community Colleges Cited



3. Crosswalk Between Green Building and Energy Efficiency Occupations and Community Colleges Courses

Table (12) Crosswalk SOC to (Taxonomy of Programs) TOP Courses

Green Economy area/sector	Green Occupations with SOC code (from Green Jobs Framework table)	Related TOP Code	TOP Program Title
Green Building and Energy Efficiency	11-9021 Construction managers	050500	Business Administration
		050100	Business and Commerce, General
		050600	Business Management
	13-1051 Cost estimators	050100	Business and Commerce, General
		050500	Business Administration
		050600	Business Management
	17-1011 Architects, except landscape and naval	029900	Other Architecture and Environmental Design
	17-1012 Landscape architects	020110	Landscape Architecture (transfer)
	17-2051 Civil Engineers	092400	Engineering Technology, General
	17-2071 Electrical engineers	092400	Engineering Technology, General
	17-2112 Industrial engineers	099900	Other Engineering & Related Industrial Tech
	17-2131 Materials engineers	099900	Other Engineering & Related Industrial Tech
	17-2141 Mechanical engineers	092400	Engineering Technology, General
	17-2151 Mining & geological engineers, incl. mining safety engineer	099900	Other Engineering & Related Industrial Tech
	17-3011.01 Architectural & civil drafters	020100	Architecture and Architectural Technology
		095300	Drafting Technology
		095310	Architectural Drafting
		095320	Civil Drafting
	17-3012 Electrical drafters	095330	Electrical, Electronic, & Electro-Mechan. Drafting
	17-3023 Electrical & electronics engineering technicians	093400	Electronics and Electric Technology
	17-3024 Electro-mechanical technicians	094330	Vacuum Technology
		099900	Other Engineering & Related Industrial Tech
	17-3027 Mechanical engineering technicians	094500	Industrial Systems Technology and Maintenance
	17-3029 Engineering technicians, except drafters, all other	093480	Laser and Optical Technology
		094330	Vacuum Technology
		094610	Energy Systems Technology
095420		Plastics and Composites	
096100		Optics	
099900		Other Engineering & Related Industrial Tech	
27-1025 Interior designers	130200	Interior Design and Merchandising	
41-4011 Sales representatives, wholesale and manufacturing, technical and scientific products	050940	Sales and Salesmanship	

41-9031 Sales engineers	050940	Sales and Salesmanship
47-1011 First-line supervisors/managers of construction trades and extraction workers	093440	Electrical Systems and Power Transmission
	095210	Carpentry
	095220	Electrical
	095230	Plumbing, Pipefitting and Steamfitting
	095240	Glazing
	095260	Masonry, Tile, Cement, Lath and Plaster
	095270	Painting, Decorating, and Flooring
	095280	Drywall and Insulation
	095290	Roofing
	095700	Civil and Construction Management Technology
	095720	Construction Inspection
210210	Public Works	
47-2031 Construction carpenters	095210	Carpentry
47-2051 Cement masons and concrete finishers	095260	Masonry, Tile, Cement, Lath and Plaster
47-2111 Electricians	095220	Electrical
47-2121 Glaziers	095240	Glazing
47-2131 Insulation workers, floor, ceiling and wall	210210	Public Works
47-2152 Plumbers, pipefitters, and steamfitters	095230	Plumbing, Pipefitting and Steamfitting
47-2181 Roofers	095290	Roofing
47-3012 Helpers-carpenters	095210	Carpentry
47-3013 Helpers-electricians	095220	Electrical
47-3015 Helpers-pipelayers, plumbers, pipefitters,...	095230	Plumbing, Pipefitting and Steamfitting
47-4011 Construction and building inspectors	095720	Construction Inspection
49-9021 Heating, A/C, and refrig. mechanics & installers	094600	Environmental Control Technology
49-9042 Maintenance and repair workers, general		Civil and Construction Management
	095700	Technology
51-2041 Structural metal fabricators and fitters	095640	Sheet Metal and Structural Metal
51-4121 Welders, cutters, solderers, and brazers	095650	Welding Technology

Source: ONET "Greening the World of Work" Erich C. Dierdorff

4. Other Potential Training / Workforce Partner Entities

There are many opportunities to partner with employers, industry associations, workforce entities, and community organizations to meet the workforce needs of the energy efficiency sector. The table below highlights a few entities that could participate.

Table (13) Potential Training/Workforce Partners

Organization	Service Area (Type of Organization)	Potential Role Applicability
American Society of Heating, Refrigerating & Air Conditioning Engineers (ASHRAE) www.ashrae.org	Tri-County Chapter (Industry Association)	Access to Employers, Industry Standards, Job Descriptions
Building Commissioning Association, (BCA) www.bcxa.org	Southwest Chapter (Industry Association)	Access to Employers, Industry Standards, Job Descriptions, Industry Certification for Certified Commissioning Professional
California Building Performance Contractors Association (CBPCA) www.cbpc.org	Statewide	Access to Employers, Industry Standards, Job Descriptions, Building Performance Certifications and Training for HERS raters
	(Industry Association)	
California Commissioning Collaborative (CCC) www.cacx.org	Statewide	Access to Employers, Industry Standards, Job Descriptions
	(Industry Association)	
California Labor Federation AFL-CIO, Workforce and Economic Development Program www.wed-works.org	Statewide (Labor, Workforce & Economic Development Program)	Access to Labor Unions, Training Facilities through Union Locals
Environmental Training Centers, California Community Colleges www.EnvTraining.org	Statewide Economic & Workforce Development Program)	Technical Assistance, Curriculum Development, Training on energy auditing, regulatory compliance, and energy management/conservation
Green Valley Initiative www.greenvalleynow.org	Inland Empire Region (Non-Profit)	Access to Employers, Summits, Partnership Forums, Policy Changes, Regional Projects, and Research
Southern California Edison (SCE) www.sce.com	Southern California (Utility/ Employer)	Industry Standards, Job Descriptions, Access to Employees for Training, Training Centers, and Research
Southern California Gas Company www.socalgas.com	Southern California (Utility/ Employer)	Industry Standards, Job Descriptions, Access to Employees for Training, and Training
Building Industry Association (BIA) www.biassoc.org	Southern California (Industry Association)	Training, events and seminars, Access to Employers and Contractors
UC Davis, Energy Efficiency Center http://eec.ucdavis.edu/	Statewide (Research & Development, Education Institution)	Access to internships, fellowships and job postings and forums, workshops, guest
US Green Building Council (USGBC) www.usgbc-ncc.org	Inland Empire Chapter (Industry Association)	Access to Employers, Industry Standards, Job Descriptions, LEED Certification Training
Workforce Investment Boards www.cwib.ca.gov	Inland Empire	Access to Job Seekers, Training Funds, Employment Resources
	(Workforce Development)	

Source COE

E. Other Legislative Drivers of Potential Green Employment Opportunities

California’s Key Legislative and Policy Initiatives

AB 32: Assembly Bill 32 (AB32): The California Global Warming Solutions Act of 2006 mandates that California must reduce its green house emissions to 1990 levels by 2020. The bill sets a goal of approximately an 11% reduction from current emissions levels and nearly a 30% reduction from projected business-as-usual levels in 2020.

The California Air Resources Board’s (CARB) Draft Scoping Plan for AB 32: Implementation states that “California will need to greatly expand on energy efficiency efforts to meet our greenhouse gas emission reduction goals.” CARB’s Draft Scoping Plan identifies energy efficiency as the second largest component of the State’s overall emissions reduction program. (Source: CPUC Energy Efficiency Strategic Plan)

Energy Efficiency and California Block Grants (AB 2176): In 2008, AB 2176 was amended to require the California Energy Commission (CEC) to administer funds allocated to the state from the federal Energy Independence and Security Act of 2007 (Energy Act) for energy efficiency projects. The bill stipulates that 60% of Energy Act funds be used to provide grants to cities and counties with relatively small populations, and the remaining 40% to be used to provide grants to entities eligible under the federal act.

The Warren-Alquist State Energy Resources Conservation and Development Act (AB 2309): This 2008 law requires the California Public Utilities Commission (CPUC) to authorize the investor-owned utilities (IOUs) to provide energy efficiency audits for owner-occupied residential buildings built before January 1, 2006 upon owner request and make recommendations to the owner on cost-effective energy saving measures.

Energy Efficiency and Water Programs (AB 2404): This law, enacted in 2008, requires the CPUC to report to the Legislature the outcome of a pilot project that was established by the CPUC to determine whether water conservation projects are cost-effective means to saving energy, and make recommendations as to whether the utilities could achieve cost-effective energy efficiency improvements via water conservation projects.

California Public Utilities Commission Long Term Energy Efficiency Strategic Plan, (2008): Sets forth a roadmap for energy efficiency in California through the year 2020 and beyond. At the heart of the Plan are four bold strategies for achieving the aggressive goals outlined in the document. These goals are outlined below:

California’s Big Bold Energy Efficiency Strategies:

- All new residential construction in California will be zero net energy by 2020.
- All new commercial construction in California will be zero net energy by 2030.

- Heating, Ventilation and Air Conditioning (HVAC) will be transformed to ensure that its energy performance is optimal for California’s climate.
- All eligible low-income customers will be given the opportunity to participate in the low income energy efficiency (LIEE) program by 2020.

Energy Action Plan II (2005): Established “loading order” for energy use in state, making energy efficiency the top priority energy resource.

State Building Codes- Title 24: California’s Title 24 Building Energy Efficiency Standards regulates building sector policies (new and existing) in the areas of lighting and HVAC systems in commercial, government and residential buildings, as well as appliances used within those buildings. Title 24 which is updated every 3 years will continue to have a major impact on the growth of energy efficiency occupations, as the standards continue to become stricter and require higher levels of energy efficiency in the future.

California has adopted the first statewide green building code which will promote green building practices and energy efficient technologies. The provisions of the California Building Code will apply to every building in California. The new standards become guidelines starting July 2009 and a grace period will render the new code optional until 2010 so that industry and enforcement agencies have time to prepare for the new building standards.

Governor’s Green Building Executive Order S-20-04: (2004) Directed state agencies to make state-owned facilities 20% more energy efficient by 2015.

F. Issues, Observations, and Recommendations

1. There are several industries that fall within the Green Building and Energy Efficiency sector – Table (1) provides a listing of such industries by NAICS code shown up to 6-digit detail level that could participate in the REEP program.
2. There are several industries that fall within the Renewable Energy: Energy Generation, System Installation & Storage Sector– Table (2) can provide a preliminary listing to identify such firms that could participate in the REEP Program.
3. Table (3) shows emerging Green occupations related to the Renewable Energy: Energy Generation, System Installation & Storage sector. It also shows a list of related emerging occupations and generally where such occupations may be presently listed under the current SOC occupations classifications system. The data illuminates the type of potential jobs related to activities that may be available under the REEP Program.

4. Table (4) shows emerging Green occupations related to the Green Building & Energy Efficiency sector. It also shows a list of related emerging occupations and generally where such occupations may be presently listed under the current SOC occupations classifications system. Many of these occupations would be involved in the REEP Program.
3. The County of San Bernardino is projected to grow by about 10% over the next 5 years 2009-2014, with a median age of 32 (Table 5). Population growth and a younger age base are generally viewed as a positive economic indicator.
4. Close to 50% of the County of San Bernardino population over 25 years of age has less than a high school education (Table 6). This group therefore is a prime candidate for workforce training for jobs that could result from the REEP Program, particularly in the construction sector.
5. There are approximately 6,610 business establishments located in the City of San Bernardino. Depending on the type and characteristics of the building structure in which they are housed, each one of these buildings may be a potential candidate for participation in some form of energy conservation effort such that proposed by the REEP Program. The greater the number of business establishments participating in the REEP retrofit activities, the greater the number of jobs that could be created under this program.
6. There are at least 1,720 non-Single Family Dwelling commercial/industrial building structures located in the City of San Bernardino. Depending on the type and characteristics of these buildings, they may be a potential candidate for participation in some form of energy conservation effort such that proposed by the REEP Program. The greater the number of commercial/industrial properties participating in the REEP retrofit activities, the greater the number of jobs that could be created under this program.
7. The County of San Bernardino labor force totals 870,800 persons as of the 4th quarter 2009 (Table 10). As of March 2009, about 14.8% of the labor force is unemployed based on California LMI EDD data. The energy efficiency sector such as the proposed REEP Program could provide much needed employment opportunities to County residents. This unemployed sector could benefit greatly from job opportunities created by the

- REEP and related Green jobs that may result from other such initiatives.
8. Approximately 11% or 78,986 County of San Bernardino residents are employed in the construction and maintenance related occupations (as defined by US Census). A portion of these workers within these occupational groups lend themselves well to construction related jobs that would arise from the REEP Program.
 9. Table (11) outlines community college courses related to the energy, renewable, and water efficiency sectors offered by colleges located within the region. The community college system also offers extensive guidance and information with regard to Green related jobs training and education.
 10. Table (12) presents a crosswalk between Green occupations and California community college courses by TOP curriculum codes for the Green Building and Energy Efficiency sectors as defined by ONET.
 11. Table (13) provides a listing of organizations that may have a role with regard to Green jobs or the proposed REEP Program such as providing access to employers, providing industry standards information, jobs analysis, certifications, training, access to labor unions, technical assistance, partnerships, research, internships, jobs postings, and other related employment resources.
 12. Aside from the proposed REEP program, there is extensive California Legislation that is also driving the energy efficiency sector. These legislative mandates will create further opportunities for employment in industries and occupations similar to those identified for the REEP Program. The combined synergy will surely strengthen impetus for the REEP Program.
 13. Given the existing initiatives, extent of the building inventory, current legislative mandates, area community college courses and workforce related entities, and the supply and workforce characteristics, the Inland Empire is well positioned to build a pipeline of skilled workers and meet the regional workforce demands generated by the Green Building and Energy Efficiency movement.
 14. Workers who make homes and buildings more energy efficient perform valuable work in terms of the environment and can make a good living doing so. Their work helps homeowners and businesses save energy and money. Research shows that the money

saved is used to buy goods and services, which stimulates the regional economy and creates more jobs across all industry sectors.

VI. Database of Commercial/Industrial and Residential Properties

San Bernardino County has an array of buildings that are impacted differently when it comes to energy efficiency. Residential and commercial buildings vary in age and ownership status. They also vary in type of buildings as well as equipment installed. The current economy is holding back many from retrofitting or upgrading. We have, however, identified possible partners and programs to encourage efficiency.

Beacon in conjunction with Hogle-Ireland was tasked to develop a database for cataloguing the properties in San Bernardino County that could benefit from energy efficiency retrofits and/or could be prime targets for the program.

A. GIS and Database Development Methodology

The following is a summary of the methodology used to create the datasets for Energy Efficiency Pilot Program.

Purpose: To create an Access Database and Spatial Data Infrastructure (SDI) using ESRI Geographic Information Systems (GIS) to store, manage, and analyze energy efficiency audits on commercial, industrial, and residential properties within the City of San Bernardino.

A database would be developed to enable the data to be queried by specific fields and be searchable by geographic location. The deliverables would include a parcel specific GIS database with property information such as land use designations, site address, business information, and other region data such as household income and labor force data. Additionally, this GIS database would be incorporated into an Access database application with query and report functionality.

B. Organizing the Data

In order to create a functional database and corresponding maps, the first step was to organize the data provided by the City, County, SCAG, and our team research on labor force to identify the fields that would be utilized to associate to a specific, geographic location. The following table provides information on the original data we received and the fields we identified to compile the data into one parcel specific file.

Working through the public use records, a number of critical data discrepancies and challenges were discovered but were eventually overcome to ensure the integrity of the data.

SCAG Assessor’s Parcel (AP) and Existing Land Use data had mismatched APN numbers. We resolved the issue by taking the APN number in the SCAG Assessor’ Parcel file and applying it to SCAG’s 2008 Existing Land Use file. The Beacon consultants’ database team also observed that the county’s parcel shapefile had an APN number that was (9 digits), while the Assessor’s database had an APN number that was 13 digits. This highlighted the problem that some parcels had a one-to-many or many-to-many relationship with the Assessors database. Ideally, there the Assessor’s data should be joined to the parcel data with a unique ID that matches without any discrepancies in the records.

In addition, the file provided was incomplete and did not match the use codes in the “SCAG 2008 Existing Land Use” file or the “SCAG Assessor Parcel” file. The proper data dictionary was not available to read the numeric codes provided by SCAG in order to identify residential, commercial, and industrial land within the City. It was also unclear which file should be used to identify land designations in the SCAG data.

Another limitation was the Costar data provided which was not sufficient to complete the parcel level database specified in the Scope of Work. Information such as Company name, Business Owner, Manager Contact Information, NAICS/SIC Codes, Estimated Gross Sales, Employed or Work at Home, Estimated Household Income, Home Size, Major Resident Occupation, and contact phone number were not provided to us due to legal limitations.

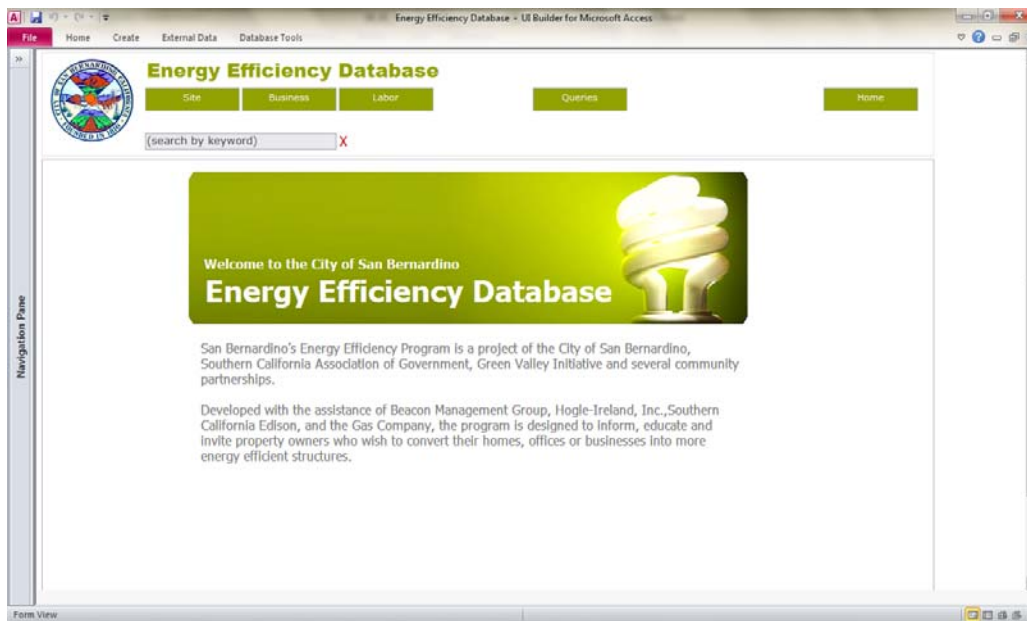
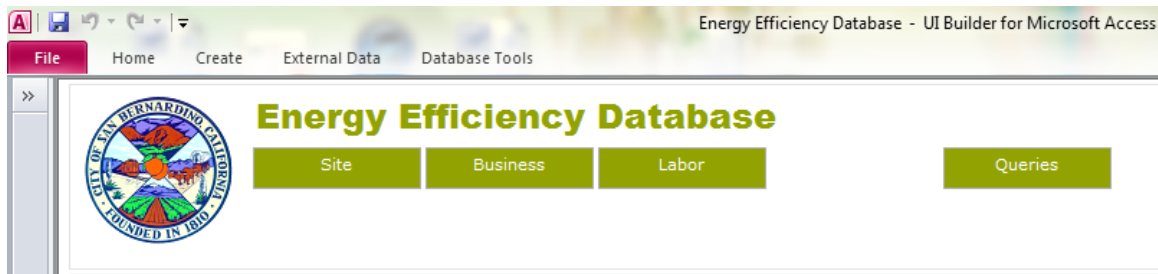
Original Data			
Year	Source, Data, and Spatial Join Field	Type	Record Count
2010	San Bernardino County Parcels by Assessor Parcel Number (APN)	Geometric Features	54,143
2010	San Bernardino City (County Assessor Data) Property Characteristics by Object ID, and Assessor Parcel Number (APN)	Table (dbf)	59,608
2010	San Bernardino City Business Information by Assessor Parcel Number (APN)	Table (dbf)	15,457
2009	Labor Force by Census Tract	Table (dbf)	35
2009	SCAG (Info USA, Costar Data) Business Information by Latitude and Longitude	Table (dbf)	6,596
2008	SCAG General Plan Parcels by Assessor Parcel Number (APN)	Geometric Features	54,169
2006	SCAG Household Income by Census Block Group	Table (dbf)	10,577
2000	U.S. Census Bureau Block Group	Geometric Features	215

2000	U.S. Census Bureau Tract	Geometric Features	58
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C. Deliverables

Access Database

A standalone database application was developed to enable non-GIS users to view the data and perform simple queries. The database allows a user to browse and query the data by Site Information, Business Information, or Labor Force Statistics.



Functionality

A navigation bar is provided that facilitates the navigation of three (3) specialized views. Each tab on the navigation bar loads a unique specialized view of the data. The user can perform simple criteria searches by inputting a discreet value for any of the fields in the active view. The database will return a set of records that meet that criterion. Once the record set has been

established the user can either export the entire selection set to Excel for additional analysis or navigate through the records and print out individual records as a summary report. Specialized queries are provided to assist the user in quickly identifying properties by: Construction Type, Heating Type, Roofing Type, and Air Conditioning Replacement Cost.

Criteria Queries

Construction Type Query by "Construction Type" only

Heating Type Query by "Heating Type" only

Roofing Type Query by "Roofing Type" only

Categorical Queries

AC Replacement Cost Create a list of properties with estimated AC Replacement Costs Calculated

Year Constructed Query by year constructed (Specify range)

Energy Efficiency Database - UI Builder for Microsoft Access

File Home Create External Data Database Tools

Energy Efficiency Database

Site Business Labor Queries Home

Lookup Tables

(search by keyword) X

Previous Record Next Record Print Record

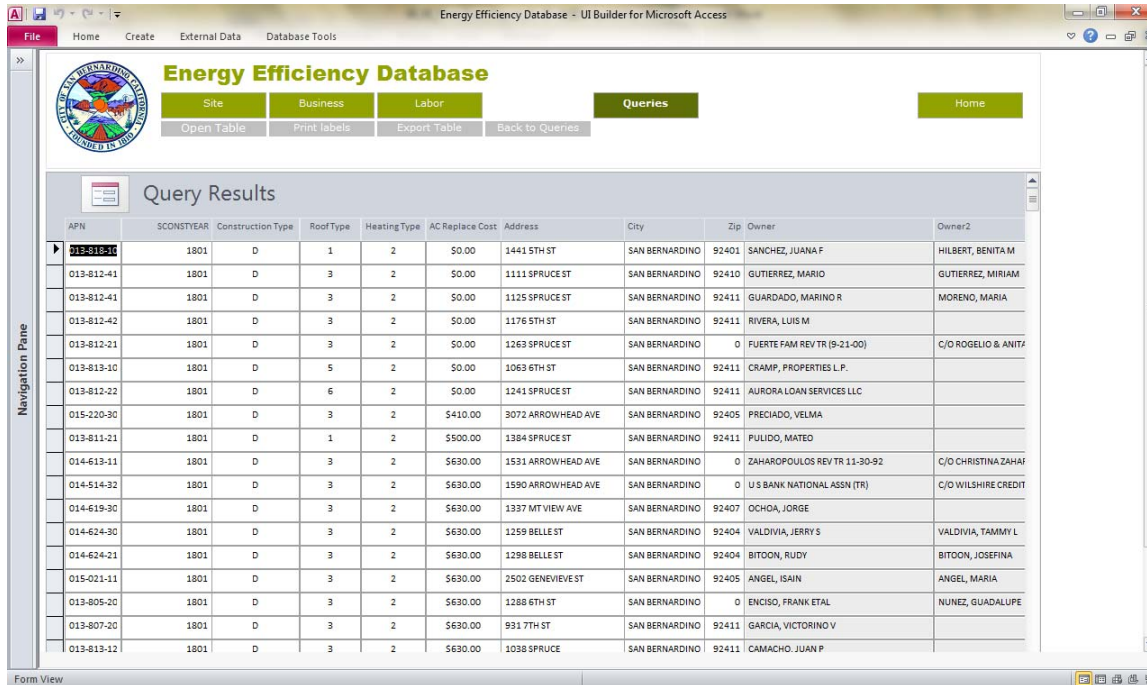
Site APN: 014-116-121 **Tract:** 005800 **Block Group:** 1 **Tax Rate:** 7062
Site Address: 156 W SIXTH ST **Lot Area (Sq. Ft.):** 7000
City: SAN BERNARDINO **Zip:** 92401 **Land Use Type:** 5

SB County Existing Use Code: 510 - SFR
SCAG Land Use Code (2008): 1120
City Land Use Code (2008): RH

Owner Information
SARKISYAN, ZARUI **Land Value:** \$20,000.00
156 W 6TH ST **Improved Value:** \$47,000.00
SAN BERNARDINO CA 92401 **Aquisition Date:** 6/22/2009
Last Ownership Change: 2010
How Title Held: SO

Construction Information
Construction Type: B **Total Rooms:** 6 **Roof Type:** 3
SFR Sq. Footage: 1152 **Family Rooms/Dens:** 0 **Water Source:** 9
Units: 0 **Bedrooms:** 4 **Electricity Source:** 9
Stories: 0 **Bathrooms:** 2 **Heating Type:** 1
Construction Date: 1912 **Landscaping:** 0

Form View



APN	SCONSYEAR	Construction Type	RoofType	Heating Type	AC Replace Cost	Address	City	Zip	Owner	Owner2
013-813-40	1801	D	1	2	50.00	1441 5TH ST	SAN BERNARDINO	92401	SANCHEZ, JUANA F	HILBERT, BENITA M
013-812-41	1801	D	3	2	50.00	1111 SPRUCE ST	SAN BERNARDINO	92410	GUTIERREZ, MARIO	GUTIERREZ, MIRIAM
013-812-41	1801	D	3	2	50.00	1125 SPRUCE ST	SAN BERNARDINO	92411	GUARDADO, MARINO R	MORENO, MARIA
013-812-42	1801	D	3	2	50.00	1176 5TH ST	SAN BERNARDINO	92411	RIVERA, LUIS M	
013-812-21	1801	D	3	2	50.00	1263 SPRUCE ST	SAN BERNARDINO	0	FUERTE FAM REV TR (9-21-00)	C/O ROGELIO & ANITA
013-813-10	1801	D	5	2	50.00	1063 6TH ST	SAN BERNARDINO	92411	CRAMP, PROPERTIES L.P.	
013-812-22	1801	D	6	2	50.00	1241 SPRUCE ST	SAN BERNARDINO	92411	AURORA LOAN SERVICES LLC	
015-220-30	1801	D	3	2	\$410.00	3072 ARROWHEAD AVE	SAN BERNARDINO	92405	PRECIADO, VELMA	
013-811-21	1801	D	1	2	5900.00	1384 SPRUCE ST	SAN BERNARDINO	92411	PULIDO, MATEO	
014-613-11	1801	D	3	2	\$630.00	1531 ARROWHEAD AVE	SAN BERNARDINO	0	ZAHARPOULOS REV TR 11-30-92	C/O CHRISTINA ZAHAF
014-514-32	1801	D	3	2	\$630.00	1590 ARROWHEAD AVE	SAN BERNARDINO	0	U S BANK NATIONAL ASSN (TR)	C/O WILSHIRE CREDIT
014-619-30	1801	D	3	2	\$630.00	1337 MT VIEW AVE	SAN BERNARDINO	92407	OCHOA, JORGE	
014-624-30	1801	D	3	2	\$630.00	1259 BELLE ST	SAN BERNARDINO	92404	VALDIVIA, JERRY S	VALDIVIA, TAMMY L
014-624-21	1801	D	3	2	\$630.00	1298 BELLE ST	SAN BERNARDINO	92404	BITOON, RUDY	BITOON, JOSEFINA
015-021-11	1801	D	3	2	\$630.00	2502 GENEVIEVE ST	SAN BERNARDINO	92405	ANGEL, ISAIN	ANGEL, MARIA
013-805-20	1801	D	3	2	\$630.00	1288 6TH ST	SAN BERNARDINO	0	ENCISO, FRANK ETAL	NUNEZ, GUADALUPE
013-807-20	1801	D	3	2	\$630.00	931 7TH ST	SAN BERNARDINO	92411	GARCIA, VICTORINO V	
013-813-12	1801	D	3	2	\$630.00	1038 SPRUCE	SAN BERNARDINO	92411	CAMACHO, JUAN P	

Note:

The database application is provided as a standalone installation package and requires no additional software to run. The standalone application is read-only.

GIS Datasets and Map Query Criteria

All the data was provided formatted and compiled into a comprehensive geodatabase called SBCity_PropertyData.mdb. **Appendix A (and Database on a CD)** has details of the GIS database and the map query criteria.

The maps depicting the following data are included in **Appendix B**.

D. Database Findings: Residential Properties

Variables

1. Building Age

- a. **Older housing** is likely less efficient, especially housing built before the California Title 24 Energy Performance Standards took effect in 1978.
- b. **Title 24** has been reissued every 3 years with tighter standards, so the older the building the less efficient it is, unless it has been upgraded.

2. Ownership

- a. **Owner-occupants** are the best target because owners are the most vested and have the most to gain.
- b. **Affordable housing** is another good target when conducted in partnership with

community-based organizations, such as those represented at the introductory meeting.

- c. **Rental properties** are challenging as the responsibility for utility bills is typically split between the owner (common area) and renters. Each apartments typically has individual electric and gas meters, though they do typically have water master meters. One possible focus is common areas, where energy use is typically limited to lighting. Larger property owners who own multiple buildings in the city may be more likely to participant as they're typically more sophisticated investors.
- d. **Condominium owners** might be interested in participating both for their individual units and their common areas. CC&Rs typically restrict what owners can do without Board of Directors approval.

3. Construction Type/Installed Equipment: The design and equipment of each residence may impact the opportunity and feasibility of installing energy efficiency measures.

- a. **Building type:** Different wall designs, i.e., wood and masonry, require different insulation strategies.
- b. **Roof type:** It is more difficult and therefore more expensive to install a solar electric (photovoltaic) system on a tile roof.
- c. **Space conditioning and water heating equipment:** electric heating is much less efficient than gas.

4. Current Economy

- a. **San Bernardino's current poor economy** means that property owners will be reluctant or unable to invest in their properties.
- b. **The unemployed** are likely spending more time at home and therefore are likely using their heating/air conditioning systems more than if employed. This may present an interest opportunity, in that some of the unemployed work in the construction industry.
- c. **Owned properties** that have been foreclosed or are threatened with foreclosure may not be good program targets.

5. Incentive Programs

- a. **Utility programs** place rebate limitations on buildings that already have installed energy efficiency measures. These buildings are only eligible for the whole building approach, and precluded from the prescriptive strategy.
- b. **PACE participants** must be property owners as the loans are repaid through property tax bills.

Additional Considerations

- 1. **Marketing Partners:** There may be creative ways to reach building owners beyond the heating & air conditioning contractors utilized by the utilities. These include: 1) roofing

contractors as re-roofing is the ideal time to insulate and switch to a cool (reflective) roof, and 2) window replacement contractors as they frequently advertise aggressively and are selling one of the more expensive energy efficiency options.

2. **Early Adopters:** It is important to identify and target early adopters who can serve as models for the various community segments.
3. **Program Distribution:** As with all programs, there are political considerations. It is important that all residents feel that they have an opportunity to participate in the program.

E. Database Findings: Commercial Properties

Variables: Many of the variables listed above are also relevant to the commercial sector, such as building age and ownership, though the specifics may differ.

1. **Building Age:** The issues are the same as for residential.
2. **Ownership**
 - a. **Owner-occupants**, as with residential, will have the largest incentive to participate.
 - b. **Large property owners and renters** are likely more sophisticated and have more to gain (including an advantageous position in the market) and may therefore be easier to reach.
 - c. **Single tenant buildings** are easier to market to compared to multi-tenant buildings, especially those with long leases of at least 5 to 10 years.
 - d. **Firms headquartered** in San Bernardino may be more willing to participate than firms with branch offices.
 - e. **Public agencies** beyond the city may be appropriate targets, such as the San Bernardino City Unified School District and San Bernardino Valley College, particularly because they own a large number of buildings and therefore have substantial energy budgets. As public agencies that don't pay property taxes, however, they are not eligible to participate in the PACE program.
3. **Market Sectors**
 - a. **Key market sectors** need to be identified through the database. Examples likely include logistics (i.e., warehouses), office and retail.
 - b. **Hotels/motels** are a likely target because of their 24-hour operations.
4. **Current Economy**
 - a. **Building owners** are reluctant to invest in their properties in this market for a number of reasons including falling rents and the difficulty of raising capital.

5. Additional Considerations

- a. **Stater Bros.** is a good target because of their visibility and large energy saving potential; however, they may not establish a model that is relevant to others.
- b. **Partnerships** are a key strategy for this market, i.e., the Chamber of Commerce, BOMA (Building Owners and Management Association) and similar groups.
- c. While there is a growing movement towards **green leases** (i.e., leases that provide owners and renters with a mutually beneficial incentive to implement energy efficiency/green measures), the movement is still in its infancy. A challenge is that most leases are triple net, i.e., tenants pay all the costs so owners have little incentive to upgrade. The counter argument is that buildings that are green are more successful in signing and retaining tenants.
- d. **U.S. EPA’s Energy Star Portfolio Manager** may be a useful data source. Approximately 40% of all office buildings in the U.S. used this tool to obtain a 1-100 point score. These numeric scores are a measure of efficiency against other buildings in each building classification. Both SCG and SCE will upload utility meter data directly to Portfolio Manager upon the request of a building owner.

VII. Marketing Strategy for Residential and Commercial Property Owners

A. Goals

The marketing goals of this program were to promote residential and commercial energy audits and retrofits through a comprehensive campaign focused on the establishment of strategic partnerships, public education, media placement and community outreach.

A number of challenges arose early on in the program, including the deferral or elimination of AB811 (PACE) program funding, delays with anticipated federal HOME STAR rebates, changes in the Energy Upgrade California program. These led to ongoing adaptations as to how the Sustainable San Bernardino campaign would synchronize with these and other factors; most significant among them being the slow pace of economic recovery, particularly for those living in the City.

San Bernardino continues to experience some of the highest unemployment and foreclosure rates in Southern California. A significant number of those impacted are laid off construction workers – people who could benefit most from a successful program.

With that in mind, we recognized the need to establish a comprehensive network of community stakeholders to help identify key audiences, build local enthusiasm for the project and promote participation in conservation and efficiency measures: everything from swapping out light fixtures with CFL bulbs to retrofitting Net-Zero energy homes.

B. Techniques

1. Issue: Identify Stakeholders

Given the importance of community and grass-roots participation in the program, our efforts began with identifying potential stakeholders who could help build awareness and community support through a program Steering Committee.

Those participants included:

- Government (City of SB, County of SB Workforce Investment Board)
- Utilities (Southern California Edison, Sempra/Southern California Gas Company)
- Education (San Bernardino Community College District, Chaffey College)
- Non-profit Organizations (Green Valley Initiative, SB Green Alliance, Uncommon Good)
- Professional Organizations (USGBC-Inland Empire Chapter, California Building Performance Contractors Association, National Electrical Contractors Association, International Brotherhood of Electrical Workers, CalCERTS)

Beacon conducted an initial meeting to discuss the program and identify key tasks that each representative would undertake.

Observation: Collaboration and Innovation



SAN BERNARDINO STEERING COMMITTEE

L-R

Back Row: Imran Farooq, Sustaining Our Society; Michael Bachand, CalCERTS; Casey Dailey, Asst. to San Bernardino Mayor Patrick Morris.

Front Row: Brandon Shamim, Beacon Management Group; Diane Wirth, USGBC-IE Chapter; Amri Christianito, SCE; Cynthia Swaim, Sempra Utilities; Shellie Swanston, SB County Workforce Development; Kenji Collins, SB Community College District.

The Steering Committee, once formed, produced dynamic participation from a number of constituencies. The utilities were excited about integrating the program with the state’s upcoming Energy Upgrade California program. Area colleges were eager to harness the potential for enhanced training opportunities and the job placement potential associated with the program. Workforce investment representatives saw the program as a great opportunity to provide employee subsidies and other incentives to contractors who signed up for the program. Community and professional non-profits embraced the program as yet another worthy service they could provide to their communities.

Recommendation: Let community take some ownership of the project

In discussions with the stakeholders, it was determined that a Green Jobs Summit would be coordinated as our kickoff community workshop to present information on job training and performance contract certification requirements offered by the utilities, workforce funding availability and other program details to area contractors, providers and potential employees.

Energy-efficiency programs are not simply about presenting a message to homeowners and business owners about the benefits of retrofitting their buildings. A great deal of education



planning along with preparation – training the workforce and filling the jobs to do the work – before that message is delivered to the larger community can begin. This required the program to:

- Alert contractors and employers about training and certification requirements
- Connect displaced construction workers and other trainees with workforce related agencies that offer the training they need
- Inform providers such as HVAC and window contractors, insulation experts and energy auditors about the parameters of the program so that they can make informed presentations to their customers
- Compile information for customers and property owners regarding rebates and other financial incentives available to homeowners and building owners

According to several stakeholders including the Building Performance Institute, the authority of energy efficiency certified specialists and Energy Upgrade California representatives, our Green Jobs Summit, held September 29, 2010, was viewed as one of the **most successful events of its kind**, attended by more than 170 participants. The synergy and momentum established at the event has the potential to sustain and expand the program through the City and eventually the SCAG region. To enable this community-building process, the following tools were deployed and created for the campaign.

C. Tools

2. Issue: Develop a cohesive message that integrates within an existing framework, and develop a strategy for broadcasting it to varied audiences.

In the year 2010, City of San Bernardino celebrated its bicentennial anniversary. Leveraging the public awareness associated with the yearlong theme, Beacon developed messaging for the program that meshed with the City’s very important milestone.

The program’s slogan, *“Proud of our Past, Transforming our Future,”* blended existing themes of heritage, history and pride associated with the bicentennial with forward-thinking trends of energy efficiency, home energy retrofits, renewable energy and energy independence.

Another important theme to the program was the creation of jobs for the community and the establishment of a green industry that would sustain itself long into the future.

The Mayor’s Office had already established a green program for the City of San Bernardino called “Sustainable San Bernardino.” The energy efficiency program was intended to serve as a kick-off project of Sustainable San Bernardino and printed materials associated with the program were the first time the Sustainable San Bernardino brand logo was publicly promoted (see **Appendix C** for publicity materials)

All printed materials replicated the theme of the logo in color and style, the idea being to brand all sustainable efforts of the City and to associate the SCAG Compass Blueprint project as one component of the holistic effort.

Community Outreach Kit and Media Kit

Observation: Consistent messaging and design promotes greater awareness; community involvement leads to broader, more effective participation

In replicating the existing framework of the City of San Bernardino’s Sustainable San Bernardino program, and linking it to a historic event for the community – the bicentennial anniversary– the Beacon team developed a message that was transferable through multiple audiences: from community-based organizations to homeowners.

Once the messaging was defined, it was important to produce and distribute written and digital material that reflected that cohesive branding.

Produce materials

To that end, we completed a comprehensive marketing strategy that included:

- The development of a marketing framework, messaging and branding
- The development of a community outreach kit
- The development of a media kit and media outreach

Community Outreach Kit:

When it comes to energy retrofits, it can be difficult to convince building owners to invest money up front for long-term savings, particularly in an uncertain economy. We were cognizant of that reality from the onset of the campaign and thus developed key relationships with community partners to broaden the message, boost the credibility of the program and promote sustained interest in improving the quality of life of City residents.

The Beacon team developed an outreach kit for organizations and community partners to use when making presentations to their stakeholders about the program. These kits included:

- A press release about the organization’s participation in the program
- Web content for them to post on their site
- A “Save the Date” card announcing our first community workshop
- A flier announcing the workshop
- A flier announcing the program
- A tip sheet on energy efficiency for homes
- A tip sheet on energy efficiency for businesses
- A social media “how to” guide to help them spread the word through the Internet

- A PowerPoint presentation on the program, potential benefits to homeowners and the long-term benefits locally, regionally and national of saving energy.
(See **Appendix C** for Community Outreach Kit)

Media Kit

Much of the information contained in the Community Outreach Kit can be used in a Media Kit, as well. The messaging for both stakeholders is virtually the same: focused on the tangible benefits of energy efficiency, the key components of the program and what it might mean for the future.

The media kit includes:

- A press release about the program’s kickoff community event: The Green Job Summit
- A fact sheet on the program
- A fact sheet on energy efficiency for homes
- A fact sheet on energy efficiency for businesses

All printed materials replicated the theme of the logo in color and style, the idea being to brand all sustainable efforts of the City and to associate the Compass Blueprint project as one component of that holistic effort.

Distribute materials: The Community Outreach Kits were given to members of our Steering Committee to share with others in their organizations. Each member was encouraged to make presentations about the program to their distinctive audiences.

Steering Committee members used their e-mail databases to distribute information about the Green Job Summit to people they felt would want to become involved and be informed.

Media kits were assembled for use at our kickoff community event as well as for any future media inquiries that may arise.

The event flier was converted for complementary display advertisement provided by the local paper, the *San Bernardino Sun*. Other media outlets supported the program as well with Public Service Announcements (PSAs) announcing the summit.

Additionally, the press release was distributed in advance of the Green Job Summit to several area media outlets and to reporters who wrote regularly on issues related to business, green industry and/or energy. The event was also posted on web-based community calendars.

Our media distribution and outreach efforts yielded the following results:

- 8 newspaper articles
- 3 Web postings: 10 blogs, 1 tweet

- PSAs in at least 2 radio stations, 1 TV station
- Sponsored advertisement in the *San Bernardino Sun*

Media coverage included a comprehensive article by *The Press-Enterprise* (“Construction Pins Hopes on Green,”) on the state of the construction industry in the Inland Empire and how the Green Jobs Summit was the launch of a transformation toward building performance retrofit work for the future. (See **Appendix E** for a copy of article).

In the end, more than 170 people attended the Summit, which was widely viewed as a success. Attendance for the event came from multiple sources: another indication that it is important to use multiple methods of communication that are informative, educational and authentic. The majority of meeting attendees learned about the event through e-mails from a member of the Steering Committee. Others read about it in the newspaper or heard it announced on the radio.

Recommendation: Continue ongoing outreach and community participation as program moves forward.

Community participation and ongoing communication is the key to any successful public outreach campaign.

Steering Committee members should be provided an opportunity for active involvement to not only help develop successful strategies, but to make educate, inform and motivate their respective constituents. This will serve to influence their attitudes about the program which will translate to a stronger message to their constituencies.

This strategy is recommended for any city implementing a program such as Sustainable San Bernardino: identify a relevant messaging connection such as the bicentennial, an ongoing public campaign or some other high profile event/activity. Leverage the efficiency program into that existing platform to reinforce the view of progress and to gain credibility among diverse stakeholders.

Media outreach should remain constant as well, with home or business retrofit case studies, statistics on jobs created, a business feature on a construction company now hiring or any other story opportunity that provides a favorable impression of the positive impacts the program will create.

Social Marketing

- 3. Issue: We must change behaviors and attitudes of end consumers to a more energy efficient one.**

In order to have a sustainable impact on energy consumption, we must encourage San Bernardino residents to change the way they view their use of energy. Changing people's behaviors and attitudes is not an easy task and achieving it can be a daunting challenge.

Observation: Social Marketing is a critical technique to educate and influence the next generation of consumers.

In the U.S., on average, only 34% people know that there are programs designed to optimize electricity consumption. Of that number, only 58% know if their electricity provider offers such programs. Statistics also show that consumers prefer speaking directly with providers about information regarding electricity management programs than with other organizations. Only 29% of consumers actually trust their providers about the information given to them regarding the optimization of electricity consumption. For consumers the main reason they would stay away from such programs would be that it could increase their energy bill in the long run, that the provider would sell saved energy at a profit to the consumers, and that it would give providers access to consumer energy usage patterns that are private.

In the U.S., the matter of most importance to consumers when entering an energy management program is utility control. Forty-three percent of those surveyed expressed that the matter of most concern is the remote controlling of certain appliances by the providers. The second matter of importance is the impact on their energy bill.

The U.S. market remains hesitant about energy management programs and displays low trust towards energy providers. Surveys show that the largest demographic of the U.S. market is classified as Skeptical (31%) and the second largest as Pragmatic (25%). Skeptical consumers have low acceptance to utility control and low trust towards energy providers. They typically have a higher income and higher gas consumption for heating. Pragmatic consumers possess low acceptance of utility control, but are sensitive to bill savings; this demographic consists mostly of men.

Consumers, overall, do not fully understand the impact that their energy usage has on the environment and they often overestimate what they understand about optimizing consumption. Many also confuse different environmental issues, assuming that they are doing enough by using less water and recycling. This results in consumers placing electricity conservation as a very low priority.

There is a growing need for energy providers to educate consumers on the connection between their usage and the environment. Customers need to know about the effects of their consumption without ambiguity, otherwise misperceptions can cause a detrimental effect in their consumption patterns.

Utilities/energy providers need to build increased consumer knowledge by engaging in a multi-

tiered awareness program that involves collaboration with stakeholders such as government, environmental groups and an array of local and online communities.

Energy providers also need to work on generating trust among consumers. This is an issue of great importance because consumer cooperation will not happen unless a relationship of trust is established. Programs such as Sustainable San Bernardino should be used as a springboard by utility agencies to gain consumer confidence to positively influence decisions about energy management programs.

Recommendation: Focus on emotional triggers for target audience

We believe social marketing is the most efficient and effective way to reach to create an emotional response that makes the campaign accessible and engaging. Knowing that changing behaviors is not an easy endeavor, we propose that our message exhibit some or all of the following characteristics to the target audience:

- It conveys a relative advantage over what currently exists
- It conveys tangible benefits in everyday terms that people can relate to
- It is broadly inclusive, permissive in opting-in
- It positions energy efficiency as a long-term lifestyle issue

What this translates to is that the people and businesses that the program is targeting must see a clear advantage to becoming more efficient with their energy consumption. While the legislative mandates will create incentives and regulatory compliance standards will mandate certain actions, until individuals internalize the message in a real and authentic way with local advocates and early adopters, efforts will not be as meaningful. In addition to this, they must have the sense that changing these attitudes and behaviors will not be difficult or costly. They must also feel secure that such a change will not be disruptive or harmful to their existing lifestyles.

In order to disseminate this message, it is essential keep the local audience in mind. Social marketing begins and ends with the target audience and hence we must understand what economic, social, and environmental barriers must be overcome to help create resonance and relevance to the call to action. Through the deployment of a large-scale community engagement process, it will provide an opportunity for information exchange, consensus-building and dialogue of what products, services and messages will be well received. In today's world of immediate response, people may have certain perceptions and expectations of energy efficient solutions. Knowing this, expectations will have to be managed through a community-focused approach that applies effective listening, change management, conflict resolution and customer-service principles.

We further recommend the target audiences should be able to see the results of a change in behavior through concrete examples. This should be widely communicated through the City's

website and through a media driven effort. Comparisons should be made from energy efficient homes and businesses to non-efficient buildings. The use of visual charts and universally understandable graphics will be essential to conveying the story. Building on the cooperation that is already underway, in conjunction with the utilities and community partners, the tone of the marketing campaign should be empowering, educational, and focused on tangible outcomes in terms of improving the quality of life and providing economic benefits to local residents and business owners.

VIII. Recommendations for Implementing an Energy Efficiency Program

Considering all the previous information, we have identified several potential issues with residential as well as commercial buildings. We analyzed these issues and made key observations regarding these questions and developed pertinent recommendations in response.

Issue: Which is typically a more cost effective investment, energy efficiency or an alternate energy system?

Observation: It is almost always more cost effective to invest in energy efficiency than in alternative energy systems. In other words, it is cheaper to save energy than to produce it. Another advantage of first improving energy efficiency is that a smaller, less expensive alternative energy system is then required to offset the remaining energy use.

Recommendation: REEP related audits, loans and other alternative energy system incentives should be coupled to first increasing energy efficiency.

Issue: What are the most viable alternate energy technologies for San Bernardino?

Observation: The most viable current alternative energy technology is photovoltaic (solar electric) electricity systems. Wind is not commercially viable in most of the Los Angeles basin because the wind speed is not sufficiently constant, though there may be sufficient wind in some of the more mountainous areas of San Bernardino and there are a growing number of “architectural wind” units on the market that are designed to be mounted on buildings. There are other potential technologies, some of them renewable and others that are not, including ground source (geothermal) heat pumps which utilize the constant temperature of the earth to improve the efficiency of space heating and cooling; fuel cells which generate electricity through chemical reaction; and thermal energy storage, which freezes water or another liquid at night when electricity rates are lowest and then uses the ice to help air condition a building during the peak periods of the next day when electricity is more expensive.

Recommendation: Support only proven technologies with a reasonable return on investment.

Issue: How do utility rate structures impact energy efficiency investments?

Observation: Natural gas, electric and water bills have many elements, including both fixed and variable charges. Fixed charges must be paid regardless of how much energy is consumed and typically include a monthly customer charge; variable or energy charges depend on the amount of energy used. Utility rates usually include a lower rate for an allowed baseline of energy use; fees escalate in tiers for energy consumed above the baseline. Bills also contain government fees and taxes.

Electricity rates for larger commercial customers are particularly complex because the variable charges have two major components: energy use, expressed as a cost per kilowatt hour (kWh), and demand charges, which are calculated on a per-kilowatt (kW) basis for a customer's maximum registered power demand. Energy use rates vary during the time of day and the time of the year since electricity demand is higher during afternoons and hotter periods and it is expensive to meet peak demand. The “maximum registered power demand” is the peak demand during a billing period. For a building owner or occupant, it can therefore be as important or more important financially to lower the peak demand (known as load management) as it is to conserve energy. Similar rate structures will likely be changed to residential and small businesses once smart meters are installed.

Natural gas rates are based on the number of therms consumed. Natural gas rate structures are usually less complex than those for electricity because the peaking issues are less significant.

Recommendation: The REEP implementation strategy needs to incorporate the complexity of utility bills, particularly time-of-use rates and demand charges.

Issue: What is the impact of rising energy rates?

Observation: Increases in natural gas and electricity rates make energy efficiency and alternative energy system investments more cost effective. While projections of future rates are available, they can be frequently incorrect because the price of fuels for utilities can vary substantially.

Another impact of energy rate increases is that savings from energy investments may become partly or all cost avoidance rather than a straight reduction in cost. Using an oversimplified example, if a building's annual electricity bill was \$10,000 and energy efficiency investments decreased energy use by 20 percent, the bill would not necessarily drop to \$8,000. If the bill would have risen to \$12,000 without an increase in efficiency due to rate hikes, a 20 percent

savings is \$2,400 and would result in a bill of \$9,600. The apparent “savings” is only \$400. This makes the savings from energy efficiency investments less obvious and therefore more difficult to understand and sell.

Recommendation: REEP’s outreach should not oversimplify the costs and benefits of energy efficiency and alternative energy systems, while finding ways to explain the complexities without confusing customers.

Issue: How important is it that REEP coordinate with other stakeholders?

Observation: City of San Bernardino staff and the REEP consulting team have established relationships with a number of key stakeholders, including Southern California Edison, the Southern California Gas Company, and local community based organizations and educational institutions that manage affordable housing and/or provide job training and related services.

Recommendation: REEP can only reach its potential if implemented in partnership with interested stakeholders. Some stakeholders will help REEP reach out to target audiences; some will service their constituencies directly; others will provide trained auditors and installation technicians. Additional stakeholders that should be contacted include the Chamber of Commerce and BOMA (Building Owners and Management Association).

Issue: Is water efficiency important to reduce energy use and should it be included in REEP?

Observation: According to the California Energy Commission’s Water-Energy Relationship report (2005), water-related energy use consumes 19 percent of the state’s electricity, 30 percent of its natural gas, and 88 billion gallons of diesel fuel every year. The report is available at:

<http://www.energy.ca.gov/2005publications/CEC-700-2005-011/CEC-700-2005-011-SF.PDF>. A larger percentage of the electricity consumed for water is due to shipping it from Northern California and the Colorado River to Southern California. The city’s water-energy connection is less substantial than other local communities because much of the city’s water supply is from an underground aquifer, known as the Bunker Hill Basin, which is concentrated at the Northwestern end of the city (source: http://www.ci.san-bernardino.ca.us/sbmwd_about/default.asp). Energy Upgrade California, the utility-sponsored residential energy efficiency program, includes water efficiency among its target measures.

Recommendation: The REEP implementation strategy should consider the appropriateness and value of including water efficiency in its audits and other programs.

COMMERCIAL BUILDINGS

Issue: What are the most appropriate commercial sector target markets? What are the important variables?

Observation: The major San Bernardino commercial building sectors are logistics (i.e., warehouses), office and retail. Each of these make up a significant portion of San Bernardino’s commercial building stock and each has sizeable energy efficiency potential. The logistics sector is of particular importance to the city as it has been a large source of job growth.

The relevant REEP database variables include building age, ownership, market segment, and construction type/installed equipment. Owner-occupants are the best target as they have the most to gain through lower utility bills. For leased buildings, buildings with a single tenant are easier targets, especially those with leases of at least 5 to 10 years. Large property owners and those who lease a significant number of local sites or square footage, such as the grocery chain Stater Bros., also make good targets.

Recommendation: Focus the commercial building effort on office buildings, logistics and retail.

Issue: What types of commercial energy audits are recommended?

Observation: ASHRAE (American Society of Heating and Refrigeration and Air Conditioning Engineers) audits are the industry standard, and are recognized by LEED-EBOM (Existing Buildings: Operations & Maintenance). Retro-commissioning is a step beyond the ASHRAE audits that focuses on ensuring a building’s existing systems are operating as intended.

- An ASHRAE Level I Audit involves a preliminary energy use analysis conducted by an engineer through a site visit and a follow up report listing identified low-cost/no-cost measures and capital improvements.
- An ASHRAE, Level II Audit includes the Level I preliminary energy use analysis plus more detailed energy calculations and a financial analysis of proposed energy efficiency measures. A Level II audit They also include an audit of the building’s energy consuming equipment; an analysis of past utility bills; a utility audit to determine any billing errors; the appropriateness of utility rates; and an energy balance. The report will include a list of energy conservation measures recommended for implementation with an economic analysis presenting costs, potential utility incentives, and simple payback information.
- Retro-Commissioning (RCx) is a systematic, documented process that identifies low-cost operational and maintenance improvements in an existing building with the intent of bringing the building up to the design intentions based on its current usage. RCx focuses on

energy-using equipment including mechanical equipment, lighting and related controls, though it can address other systems. It usually optimizes existing system performance rather than relying on major equipment replacement. The typical results include improved indoor air quality, comfort, controls, and energy and resource efficiency.

RCx includes an audit of the entire building, a study of past utility bills, and interviews with facility personnel. Following the study, building system diagnostic monitoring and functional tests are executed and analyzed. Once initial modifications are made, building systems are retested and remonitored to fine-tune improvements. This process helps find and repair operational problems. More complex problems are also presented to the owner, as well as a final report, recommissioning plan, and an implementation schedule.

Southern California Edison offers a retro-commissioning program at <http://www.sce.com/rcx/default.htm>.

- Both Southern California Edison and the Southern California Gas Company offer online commercial facility energy surveys. These are available at <http://www.sce.com/business/ems/> and <http://www.socalgas.com/business/energysurvey/index.html>.

Recommendation: Utilize recognized energy efficiency audit protocols to ensure optimal cost-effective savings and eligibility for rebates and other incentive programs.

Issue: Have San Bernardino commercial building owners rated their buildings using ENERGY STAR Portfolio Manager?

Observation: San Bernardino currently has 12 Energy Star rated office buildings:

- Brier Corporate Center, 862 E. Hospitality Lane
- Hospitality Office, 348 W. Hospitality Lane
- Inland Regional Center, 674 Brier Dr
- Lakeside Tower, 650 E. Hospitality Lane
- Northpointe, 1003 E. Brier Drive
- One Carnegie Plaza I, 621 Carnegie Drive
- One Carnegie Plaza II, 625 Carnegie Drive
- One Parkside, 560 E. Hospitality Lane
- One Vanderbilt, 301 E. Vanderbilt Way
- Three Carnegie Plaza, 735 E. Carnegie Drive
- Two Carnegie Plaza, 685 Carnegie Drive
- Vanderbilt Plaza, 451 E. Vanderbilt Way

These buildings have an ENERGY STAR rating of at least 75, meaning that they perform better than 75 percent of all buildings in their classification. The list is available at http://www.energystar.gov/index.cfm?fuseaction=labeled_buildings.showMap&FILTER_B_ID=&S_CODE=CA&PROFILES=&YEAR=&BUILDING_TYPE_ID=ALL&SEARCH_OWNER_ID=&CITY=San%20Bernardino&ZIP=&SEARCH_SPP_ID=&SEARCH_PROP_MANAGER_ID=:

It is likely that numerous other San Bernardino office building owners have analyzed their properties utilizing EPA’s ENERGY STAR Portfolio Manager but did not receive a rating of at least 75. Approximately 40% of all offices in the US have voluntarily used Portfolio Manager.

ENERGY STAR currently only offers benchmarking of buildings against others of the same type for a limited number of classifications: office buildings, K-12 schools, grocery stores, hotels, and hospitals. However, Portfolio Manager can be used by owners of other commercial building types to analyze and track their buildings’ energy usage.

Recommendation: Recognize and honor the local ENERGY STAR labeled buildings. Promote the value of using ENERGY STAR Portfolio Manager to all local commercial building owners, especially those in the classifications offering national benchmarking.

Issue: Is it difficult for San Bernardino commercial property owners to use ENERGY STAR Portfolio Manager?

Observation: Portfolio Manager is not difficult to use. The data required includes the building address, year built, 12 months of utility data, gross square footage, number of onsite works, operating hours, number of personal computers in the facility, and the percent of the building that is heated and cooled. The Portfolio Manager website is http://www.energystar.gov/index.cfm?c=business.bus_index

Upon the request of a building owner, both Southern California Edison and the Southern California Gas Company will electronically upload utility bill information directly to Portfolio Manager. For the Gas Company, this is available at <http://www.socalgas.com/business/benchmarking/>, for Edison at http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager_benchmarking.

Recommendation: Inform commercial building owners of the ease with which utility data can be uploaded to Portfolio Manager.

Issue: What are green leases and what is their importance?

Observation: Green leases are leases that provide both owners and tenants with an incentive to implement energy efficiency and other green strategies. Most leases are triple net, under which the tenants pay all utility costs. This removes much of the incentive for owners to increase energy efficiency. Multi-tenant buildings present a particular challenge as the utility costs are frequently prorated based on each tenant’s square footage and therefore all tenants pay the same rate regardless of their efficiency. The green lease movement is still in its infancy but growing rapidly. Model green leases and seminars on the issues are available.

Recommendation: Incorporate lease issues and model green leases into the REEP commercial strategy.

Issue: Should REEP target public agencies other than the City?

Observation: There are a number of public agencies in San Bernardino with a sizeable building stock, including the San Bernardino Unified School District, the San Bernardino Community College District, and California State University, San Bernardino.

Recommendation: The REEP implementation strategy should analyze the status of energy programs at these institutions and determine if they are an appropriate target.

RESIDENTIAL BUILDINGS

Issue: For residential properties, the REEP Request for Proposal only identifies single family homes as a target market. Should multi-family homes also be included? What about owner occupied versus rental properties?

Observation: Single family owner-occupants are the best target for REEP because they have the most to gain.

Affordable housing is another good target because low income residents, with their limited resources, have a larger need to minimize utility costs. In addition, San Bernardino community-based organizations have expressed a strong interest in participating in REEP to both help residents lower their utility bills and to train and place individuals in green jobs.

Market rate apartments may prove difficult because both landlords and renters have a limited incentive to invest to improve energy efficiency because individual apartments usually have separate electric and gas meters. Because water is usually master metered and apartment building owners therefore pay the entire water bill, water efficiency may be easier to sell.

Another possible focus in this sector is common areas, where the valuable energy strategy for owners is likely improving lighting efficiency.

Tenant occupied single family homes present similar challenges to apartments in that both landlords and tenants have little incentive to invest in the properties.

Condominium owners may be interested in participating to improve both their individual units and their common areas. Condominium owners will be able to directly implement only the energy efficiency strategies that are available within their units, such as energy efficient lighting and ENERGY STAR rated appliances. Work outside the building walls, including roofing, insulation and replacing heating and air conditioning units installed on rooftops, will likely require the approval of the condominium Board of Directors as well as the participation of other owners.

Recommendation: REEP should initially focus on the residential sectors that can be early adopters, particularly single family owner-occupied homes and affordable housing. The lessons learned from these sectors can be applied to other sectors as the program expands its market.

Issue: Beyond residential structure type and ownership, what other residential issues should REEP consider?

Observation: Housing built before 1978 is the best target as it predates the California Title 24 Energy Performance Standards (Title 24, Part 6). While it is possible that at least some energy efficiency strategies have been installed in many of these older homes, it is unlikely that a comprehensive audit has been conducted. Because the Title 24 energy standards are reissued and tightened every 3 years, the older the housing the less efficient it will likely be and therefore the larger the opportunity for energy efficiency.

Local contractors are potential REEP partners. Relevant trades include space conditioning (heating and cooling) contractors, roofing contractors (re-roofing is the ideal time to insulate and switch to a cool (reflective) roof), and window replacement contractors (they frequently advertise widely and are selling one of the more expensive energy efficiency retrofit technologies).

Recommendation: Initially target older homes as they are likely less energy efficient than newer dwellings. Seek to partner with contractors in related fields.

Issue: The Energy Upgrade California utility audit program does not provide rebates for housing that already incorporates some of the target energy efficiency measures.

Observation: This restriction limits the usefulness of EUC, especially since rebates are one of the key drivers.

Recommendation: REEP should focus at least its program on housing units that are eligible for utility-provided rebates and other incentives.

Issue: What are Smart Meters? When will they be installed in San Bernardino? What will be their impact?

Observation: A smart meter is an advanced, digital electricity meter designed to help electricity users make informed energy choices and manage their energy use to save money. Southern California Edison, through their SmartConnect program, is installing approximately 5 million smart meters for their residential and small-business customers between 2009 and 2012 on a community-by-community basis. This is part of Edison’s effort to create a smart electric grid.

Based on next-generation communications technology, smart meters transmit information electronically from customers to Edison, replacing meter readers. In turn, customers will be able to monitor their electricity use and costs online through new tools, programs and services. One important program will be time-of-use rates under which electricity prices are higher during periods of peak demand, typically between noon and 5:00 PM weekdays especially during the summer. Larger commercial customers already have time-of-use rates.

Customers will be able to monitor their energy consumption and costs online the next day in hourly increments for residential customers and 15-minute increments for business customers. Smart meters will also help Edison manage the electricity grid by enabling them to more quickly identify system issues such as outages, and, in many cases, resolve them remotely.

Recommendation: Incorporate the new smart meters into REEP by informing impacted Edison customers of the timing of their installation (if not already complete), and their impact and related programs, including how to take advantage and avoid the pitfalls of the new meters.

Issue: What is the impact on REEP of San Bernardino’s weak economy? Does the economy, besides limiting people’s ability to invest in energy efficiency, present any opportunities?

Observation: San Bernardino currently has a high unemployment rate that is substantially above the rate for many other cities in the SCAG region. In addition, like other cities in the region, the value of San Bernardino’s residential structures has declined substantially and there have been many home foreclosures. In the current economy, residents may not want to or be able to invest in their homes to improve energy efficiency or for any other purpose. This may be due to job loss; underemployment; concern that their jobs may not be secure; difficulty in

paying mortgages or rent; and mortgages that are “under water,” i.e., larger than the value of a home.

Ironically, people without jobs spend more time at home and therefore may currently have higher utility bills than when they were working. Needless to say, the bills may ease when people return to work. A potential silver lining is that many of San Bernardino’s unemployed are construction workers and therefore have the skills to support the implementation of REEP and to work on their own homes.

Recommendation: The implementation of REEP needs to recognize the challenges presented by San Bernardino’s current economy. Data on home values, foreclosures and potential foreclosures should be incorporated into the analysis of potential target markets.