

CITY OF BENICIA
COMMUNITY SUSTAINABILITY COMMISSION

**2011-to DATE: ANNUAL REPORT AND
2012-2013 PLANNING**

**Presented BY THE
COMMUNITY SUSTAINABILITY COMMISSION**

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COMMUNITY SUSTAINABILITY COMMISSION
2011 to May, 2012 Annual Report
AND
2012-2013 Planning

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Attachment

Benicia Home Efficiency Program Executive Summary

CITY OF BENICIA
COMMUNITY SUSTAINABILITY COMMISSION

2011 to MAY, 2012 ANNUAL REPORT
PART I. EXECUTIVE SUMMARY

THE SECOND YEAR AND A HALF HAS BEEN PRODUCTIVE FOR THE COMMUNITY SUSTAINABILITY COMMISSION (CSC). CSC HAS PARTNERED AND COLLABORATED WITH CITY COMMISSIONS, BOARDS, AND OFFICES (ECONOMIC DEVELOPMENT DIVISION) ALONG WITH EXTERNAL PRESENTATIONS AND WORKED WITH SOLANO BUSINESS INNOVATION CENTER (ENERGY UPGRADE CALIFORNIA), SOLANO COMMUNITY COLLEGE AND DOMINICAN UNIVERSITY OF CALIFORNIA. THIS HAS RESULTED IN INCREASED AWARENESS OF ISSUES AND OPPORTUNITIES SURROUNDING BENICIA'S COMMITMENT TO SUSTAINABILITY.

Results

CONTRIBUTING TO ECONOMIC SUSTAINABILITY OF OUR RESIDENTS AND BUSINESSES HAS BEEN THE RESULT OF SEVERAL EFFORTS UNDERWAY AND FORTHCOMING. THE BENICIA HOME EFFICIENCY PROGRAM HAS MADE A MAJOR CONTRIBUTION TO SAVING PARTICIPATING BENICIAN'S MONEY AND REDUCING THEIR CARBON FOOTPRINT. THE CSC PRESENTATIONS TO COMMUNITY ORGANIZATIONS AND PARTNERS HAVE DIRECTLY RESULTED IN THE SUBMISSIONS OF MAJOR GRANT PROPOSALS FOCUSED ON BENICIA'S LARGEST ENERGY CONSUMERS: COMMERCIAL AND INDUSTRIAL ENTERPRISES. THESE PROPOSALS HAVE THE POTENTIAL TO SAVE SIGNIFICANT ENERGY AND WATER DOLLARS AND ADDRESS THE REDUCTION OF GREENHOUSE GAS EMISSIONS. IT IS ESTIMATED THAT FOR EVERY DOLLAR SAVED, A DOLLAR FIFTY RETURNS IN LOCAL SPENDING. WITH OVER \$30M EXPENDED FOR ENERGY ANNUALLY IN BENICIA, CONSERVATION AND EFFICIENCY EFFORTS CAN RETURN MONEY TO USERS AND THE COMMUNITY ALIKE.

Action – Education

THE FIELD OF SUSTAINABILITY IS VAST AND COMPLEX. NEW TECHNOLOGIES AND APPLICATIONS ARE EMERGING ALONG WITH NEW REGIONAL, STATE AND FEDERAL REGULATIONS. A MAJOR EFFORT OF THE COMMISSION ADDRESSED THROUGH THREE EDUCATIONAL SERIES FOCUSED ON UNDERSTANDING SUSTAINABILITY, GREEN BUSINESS AND ENERGY:

- 1 – STEWARDS OF OUR CHILDREN'S FUTURE, A COLLABORATION WITH SOLANO COMMUNITY COLLEGE
- 2 – SUSTAINABLE BENICIA: GREEN BUSINESS, WITH DOMINICAN UNIVERSITY OF CALIFORNIA
- 3 – SUSTAINABLE BENICIA: ENERGY WITH DOMINICAN UNIVERSITY OF CALIFORNIA

Effective Investment: THE COMMISSION REALIZED THAT IT'S MANDATE TO PROVIDE RECOMMENDATIONS FOR SIGNIFICANT PROGRESS ON SUSTAINABILITY ISSUES COULD NOT BE ACHIEVED WITHOUT TWO MAJOR EFFORTS:

- 1) INITIATION OF A **Grant Process** ALLOWING BENICIANS, BUSINESSES AND OTHERS TO APPLY FOR FUNDING TO ACHIEVE CLIMATE ACTION PLAN STRATEGIES. THIS MECHANISM WAS ADDRESSED WITH THE RECOMMENDATION AND COMPILATION OF A GRANT APPLICATION PROCESS RECOMMENDED TO AND APPROVED BY CITY COUNCIL.
- 2) **CLIMATE ACTION PLAN COORDINATOR** TO TAKE ACTION ON THE MAJOR CLIMATE PLAN STRATEGIES AND TRACK GREENHOUSE GAS REDUCTION STATUS. WITH CITY COUNCIL'S APPROVAL AND SUPPORT PROGRESS IS NOW BEING MADE.

PART II. THE PURPOSE AND DUTIES OF THE COMMISSION

“THE PURPOSE OF THE COMMUNITY SUSTAINABILITY COMMISSION IS TO EDUCATE, ADVOCATE AND PROVIDE OVERSIGHT FOR INTEGRATED SOLUTIONS THAT SEEK A SUSTAINABLE EQUILIBRIUM FOR ECONOMIC, ECOLOGICAL, AND SOCIAL HEALTH AND WELL-BEING, BOTH NOW AND IN THE FUTURE.”

Duties:

1. Advise the City Council on implementation of the Benicia climate action plan and related city strategic plan performance measures, as appropriate.
2. Provide recommendations regarding the distribution of climate action and water conservation funds from the 2008 Valero/Good Neighbor Steering Committee Settlement agreement and from future funding sources allocated to support the efforts of making Benicia a more sustained community with reference to the climate action plan.
3. Advise the City Council on matters related to sustainability, climate change and greenhouse gas reductions, including recommendations on forthcoming innovative programs and amendments to the climate action plan, if necessary.
4. Facilitate public outreach, education and collaboration with regards to community sustainability to guide Benicia's transition towards being a sustainable, socially just, economically vibrant, and green community.
5. Prepare an annual report to city council on implementation of this chapter.
6. Make recommendations to the city council regarding funding, including the search for private and public grants consistent with the needs of the community. (Ord. 09-16&2).

Part III. A Review of 2011 and First Half of 2012

The following sections outline the activities and outcomes of the Community Sustainability Commission for 2011

A. Benicia Home Efficiency Program

One of the first and continuing most successful sustainability actions is the Benicia Home Efficiency Program conducted by Watson. (For further details see Appendix B)

- > 215 Benicia homes participating
- > 52,549 kWh saved, 9% (\$6300 annual savings)
- > 13 metric tonnes annual GHG reductions
- > 1.1 million gallons of water savings, 8%
- > 32 Benicia High School Students trained (over two years) with 576 Internship hours paid

B. Education and Public Outreach

The fourth duty of the Community Sustainability Commission and a major component of the Benicia Climate Action Plan is Education and Public Outreach. This duty, given City staffing constraints, has been one that the Commission has been able to make significant strides independent of City support:



Series One – Stewards of our Childrens' Future APRIL – June

Quick Stats:

348 Benicians attended 43 hours of content

All series filmed & uploaded to YouTube:

1516 YouTube views worldwide

Comments from Assessments:

“just keep it up, more of it”

“Of all the things we do in Benicia, we produce little to support the basic needs of the com”

“Benicia is to be congratulated for its leadership in sponsoring these symposia”

2011

THIS SERIES WAS A COLLABORATION WITH SOLANO COMMUNITY COLLEGE AND IN PARTNERSHIP WITH THE ARTS AND CULTURE COMMISSION.

Presenters:

DR. Betsy Julian, Dean: Understanding Sustainability and Climate Change

DR. Pam Muick: Energy Conservation strategies

Commissioners: Kerridge, Beutel, Bardet (EX OFFICIO): Benicia’s Climate Action Plan

Paul Fair: Green Jobs

175 attendees



Series Two – Sustainable Benicia: Green Business

September – November, 2011

THIS SERIES WAS A COLLABORATION WITH DOMINICAN UNIVERSITY OF CALIFORNIA’S GREEN MBA BUSINESS DEGREE PROGRAM FOCUSED ON PROVIDING BENICIA BUSINESS AND PROFESSIONALS AN INTENSE AND SUBSTANTIVE INTRODUCTION TO SUSTAINABLE BUSINESS

Nancy Roberts, MBA Lecturer

DR ROBERTO PICCIONI

DR JOHN LEMMON

39 PARTICIPANTS ATTENDED ALL SEMINARS



Series Three – Sustainable Benicia: Energy

FEBRUARY – May, 2012

THIS SERIES WAS THE SECOND COLLABORATION WITH DOMINICAN UNIVERSITY WHERE EXPERT PANELISTS FOCUSED THEIR PRESENTATIONS TO BENICIA’S NEEDS AND OPPORTUNITIES. ENERGY IS A MAJOR ECONOMIC EXPENDITURE FOR RESIDENTS, BUSINESSES AND THE CITY. IT REPRESENTS THE SOURCE OF MOST OF THE GREENHOUSE GAS EMISSIONS. THE FOCUS OF THE SYMPOSIA WAS TO BUILD KNOWLEDGE AND UNDERSTANDING ABOUT TRADITIONAL AND EMERGING ENERGY SOURCES, ENERGY EFFICIENCIES AND BEST PRACTICES AND POLICIES.

134 attendees at 4 Symposia.

Panelists and Moderators

Martha Amram, CEO Watson

Peter Asmus, Author of the 2009 book Introduction to Energy in California

Steve Attinger, Sustainability Coordinator, City of Mountain View

John Bonds, Ocean Renewable Power Company

Sara Diefendorf, Director, Region IX EPA Environmental Finance Center

Delaine Eastin, Former Assembly Member and Superintendent of Public Instruction

DR. WILLIAM HALSEY, LAWRENCE LIVERMORE LABORATORY

DAVID HERNANDEZ, PROJECT MANAGER AT CHEVRON ENERGY SOLUTIONS

CAROLINE JUDY, ASSISTANT DIRECTOR GENERAL SERVICES AGENCY, ALAMEDA COUNTY

SHAWN MARSHALL, EXECUTIVE DIRECTOR, LOCAL ENERGY AGGREGATION NETWORK US

ARMANDO NAVARO, PG&E PROGRAM MANAGER

ELIZABETH PATTERSON, MAYOR, CITY OF BENICIA

LINDA SIEFERT, SOLANO COUNTY SUPERVISOR

PATRICK STONER, CPUC ENERGY EFFICIENCY BEST PRACTICES COORDINATOR

DR. LINDA SWIFT, GEOLOGIST, WRITER AND MANAGER CHEVRON

MATTHEW WILSON, CEO AND FOUNDER OF FOUNDATION WINDPOWER

C. ESTABLISHMENT OF A GRANT PROCESS

EX OFFICIO COMMISSIONER MARILYN BARDET PROVIDED THE LEADERSHIP IN FORMULATING THE GUIDELINES FOR IMPLEMENTING A GRANT PROCESS ALLOWING APPLICANTS TO ADDRESS BENICIA'S CLIMATE ACTION PLAN STRATEGIES. THIS PROCESS WAS RECOMMENDED TO CITY COUNCIL WHICH VOTED TO APPROVE IMPLEMENTATION.

D. OUTREACH AND COLLABORATION

IN ADDITION TO EDUCATIONAL PROGRAMS, THE COMMISSION CARRIED ON OUTREACH TO OTHER CITY BOARDS, COMMITTEES AND COMMISSIONS AS WELL AS TO OTHER COMMUNITY ORGANIZATIONS.

OUTREACH VIA PRESENTATIONS:

1. ARTS AND CULTURE COMMISSION

PRESENTATIONS TO THE ARTS AND CULTURE COMMISSION DESCRIBING THE COMMUNITY SUSTAINABILITY COMMISSION (CSC) AND ENCOURAGING APPLICATION FOR FUNDING RELATING TO APPLICABLE CLIMATE ACTION PLAN STRATEGIES

2. ECONOMIC DEVELOPMENT BOARD AND CITY STAFF

PRESENTATION TO THE EDB DESCRIBING THE CSC AND ENCOURAGING APPLICATION FOR FUNDING RELATING TO APPLICABLE CLIMATE ACTION PLAN STRATEGIES. THIS RESULTED IN THE CREATION OF THE BENICIA SUSTAINABLE MANAGEMENT PROGRAM, SUBSEQUENT GRANT APPLICATION AND APPROVAL FOR **\$625,000** FOCUSED ON THE BENICIA INDUSTRIAL PARK

3. HISTORIC PRESERVATION REVIEW COMMISSION: TWO CSC COMMISSIONERS PROVIDED INPUT TO THE BICYCLE RACK DESIGN AND PLACEMENT REVIEW

4. ROTARY CLUB, BENICIA BICYCLE CLUB

PRESENTATIONS DESCRIBING THE COMMISSION, ITS PURPOSE AND SOUGHT APPLICATIONS FOR PROJECTS ALIGNED WITH THE CLIMATE ACTION PLAN.

COLLABORATIONS:

1. LIAISON ESTABLISHED FROM CSC TO EDB CONSISTING OF TWO COMMISSIONERS.

2. ENERGY UPGRADE CALIFORNIA – ASSISTED IN THE PROMOTION OF THE SOLANO CENTER FOR BUSINESS INNOVATION CITY HALL PRESENTATION

3. Earth Day - 2011

4. Arbor Day - 2011

E. Reviews and Project recommendations; allocations of Y/GMSC settlement FUNDS

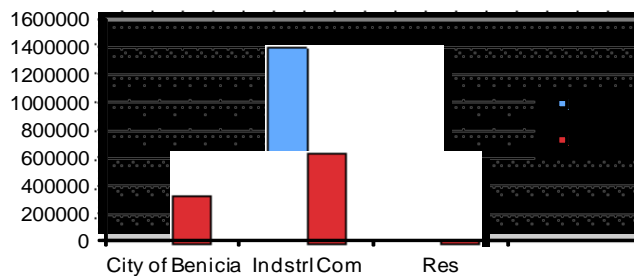
- Water Management Plan review
- Economic Development meetings: Sustainable Business Management
- Website/Lucita RFP - \$17k: Status - *pending*
- Dominican University of California Partnership for Education: Series 2 and 3

Grant Reviews: 2012

- 1) Sustainable Management Program: \$625k for BIP
- 2) Benicia Commercial Building Pilot Program/"Benicia Business Save:"\$48k - BIP
- 3) Library- video and books: \$1500
- 4) Pump Station 3 Solar Array Land Purchase: \$257k
- 5) Benicia Homes Save: \$294k [pending]

Monies recommended for allocation by the CSC and approved by City Council

[City of Benicia 2012: 257k+75k CAP Coord]



F. Climate Action Plan Coordinator - Team - \$150k

The Commission attempted to tackle the mandates for reporting and achieving 20% reduction of Greenhouse Gas Emissions (GHG) by 2020.

Facing the loss in 2009 of a City Staff member, it became immediately apparent that significant progress could not be made by the Commission members alone. Greenhouse Gas emissions data collection itself is a major effort requiring official coordination of data and use of GHG software. Further, research and action required to implement major Climate Action Plan strategies resulting in significant GHG reduction, major energy cost savings and positioning Benicia to become more sustainable require professional attention and expertise.

Based on the above, the Commission recommended to City Council the hiring of a Climate Action Plan Coordinator. This was approved by Council and the Sonoma State team was selected. This team began work in February 2012. The Commission has worked with this team and the City to recommend priorities.

The duties of the Climate Action Coordinator team are to:

- > Prioritize Climate Action Plan strategies
- > Implement the strategies selected from
- > Monitor and verify emission reductions and

- > TRACK PENDING, COMPLETED AND FUTURE PROJECTS
- > Update the Climate Action Plan

PART IV. LOOKING AHEAD TO 2012 -2013

- **EDUCATION AND PUBLIC OUTREACH PROGRAMS**
Sustainable Benicia: Food, in PARTNERSHIP WITH BENICIA COMMUNITY GARDENS
VIDEO PRESENTATIONS, OTHER DEMONSTRATIONS, etc.
- **SEEKING COLLABORATION FOR A BENICIA CLEAN TECH EXPO.** CODR, Allied Waste, Benicia MANUFACTURING FORUM and others have indicated interest.
- **ESTABLISHMENT OF Ad Hoc committees to work on CSC PRIORITIES OTHER THAN THOSE IDENTIFIED BY THE CAP COORDINATOR**
CAP COORDINATOR PRIORITIES:
 - 1) - **STRATEGY E-2.2 PROPERTY ASSESSED CLEAN ENERGY PROGRAM (PACE) and RESIDENTIAL PROGRAM**
 - 2) - **MONITOR AND EVALUATE PROGRESS – EMISSIONS REDUCTION – REPORT JAN 2013**
 - 3) - **STRATEGY IC-1.1 - BUILDING AUDIT AND EFFICIENCY PROGRAM (RELATES TO SUSTAINABLE MANAGEMENT PROGRAM)**
 - 4) - **STRATEGY WW-1.5 INCENTIVES FOR RESIDENTIAL PLUMBING FIXTURE UPGRADES AND OTHER WATER CONSERVING UPGRADES**
 - 5) **RESEARCH ADDITIONAL GRANT FUNDING**
 - 6) - **STRATEGY E-4.1 INCREASED WIND ENERGY GENERATION WITHIN CITY LIMITS**
 - 7) - **STRATEGY T-3.3 IMPLEMENT BICYCLE AND PEDESTRIAN SAFETY MEASURES**
 - 8) - **STRATEGY EO-1.1 UPDATE AND MAINTAIN SUSTAINABLE DEVELOPMENT WEBSITE**
- **CSC PRIORITY LIST – THIS IS BEING DEVELOPED BY THE CSC IN 2012.**

PART V. RECOMMENDATIONS FOR THE BENEFIT OF ALL BENICIANS

1. **THE CITY OF BENICIA HAS A UNIQUE OPPORTUNITY TO PROVIDE RESIDENTS AND BUSINESSES WITH SIGNIFICANT INCENTIVES TO CONSERVE WATER BY PROVIDING A COMPETITIVE ALTERNATIVE TO THE PALERO CONDENSATE II PROPOSAL FOR \$1.6M. THE COMMISSION FEELS THAT THIS IS A MAJOR OPPORTUNITY THAT SHOULD NOT BE LOST AT A CRITICAL FINANCIAL MOMENT FOR CITIZENS AND BUSINESSES. THE CITY SHOULD BE ABLE TO PROPOSE A COMPETITIVE ALTERNATIVE. IDEAS SUCH AS FINANCIAL INCENTIVES FOR PURCHASE AND INSTALLATION OF LOW FLOW TOILETS, HIGH EFFICIENCY CLOTHES WASHERS OR INSTALLATION OF DRIP IRRIGATIONS SYSTEMS COULD BE CONSIDERED AND IMPLEMENTED. STIPULATION COULD LINK THESE FUNDS TO THE ESTABLISHED HOME AUDITS AND PARTICIPATING LOCAL BUSINESSES COULD BENEFIT, E.G., BENICIA PLUMBING, PEDROTTI'S ACE HARDWARE, etc.**
2. **PERIODIC MEETINGS WITH CITY FINANCE MANAGER AND STAFF TO REVIEW Y/GNSC SETTLEMENT FUNDS.**
3. **JOINT MEETINGS AND COLLABORATION WITH OTHER BOARDS, COMMITTEES AND COMMISSIONS.**

4. LAUNCHING THE CSC WEBSITE.

5. TIMELY PERIOD FOR REVIEW OF AGENDAS, GRANTS, AND RFPs.

6. RE-ESTABLISHING THE GREEN TEAM BY THE CITY OF BENICIA PER THE CLIMATE ACTION PLAN.

Benicia Home Efficiency Program

EXECUTIVE SUMMARY

BENICIA HOME EFFICIENCY PROGRAM

RESULTS AS OF MARCH, 2012

The Benicia Home Efficiency Program (BHEP) was launched in March 2010, and about one-fifth of the original funds remain. As we hit the two-year mark, the data is in and we're delighted to report the strong results.

Accompanying this Executive Summary are several other documents:

- Paper analyzing BHEP results accepted by the *American Council for an Energy Efficient Economy (ACEEE)* for their national conference in the summer of 2012. BHEP is receiving national attention because it is a cost-effective, community-based behavior change program with validated results. Martha Amram (CEO of WattzOn) has met with ACEEE staff who called the program a "wow", "cutting-edge" and "where many other programs want to go."
- Additional data and tables useful in reviewing results
- A summary file containing website screen shots, sample marketing materials and a sample home report
- WattzOn – Tour of the Tools – March 2012. These resources are available to all BHEP participants via the WattzOn website.

HIGHLIGHTED RESULTS

- 215 homes participating
- Energy Savings (electricity): 52,549 kWh total; 9% average savings (when measured against PG&E bills by non-participants.) (year-over-year)
- CO₂ Savings: 13 metric tonnes total; 7.3% average savings. (year-over-year)
- Water Savings: 1,480 CCF/YYY = 1,107,040 gallons/yr; 8% average savings (year-over-year)
- Benicia High School Students: 32 total students trained over two years; 576 hours of internship paid; All students were from the SAGE club; SAGE team won 2nd place (2009); 5th in the world (2009) and 3rd place U.S. (2010).
- Integrated into Green Academy curriculum at Benicia High School

LESSONS LEARNED

- Outreach
 - Get students involved—the town loves to support BHS!
 - City assistance with outreach makes a big difference: keep program information on city website; advertise on the city TV channel; place inserts in water bills; showcase elected officials who participate; use city logo on program materials.
- Clear participant requirements
 - Participants must have a computer and internet access
 - Participants need to assist program in getting PG&E billing data
 - Small fee for cancelling appointments at the last minute
- Role of high school students
 - Not all homeowners are comfortable with a student in their home, give residents a choice
 - Outreach by students is universally welcomed
 - WattzOn needs to provide additional staff time for coordinating with students as BHS staff time is increasingly stretched thin

PROGRAM PERFORMANCE

EPA issued program benchmarks in 2009, based on thousands of homes participating in hundreds of programs nationwide. The EPA program is a home weatherization visit, with installation of efficient lighting, caulking for drafts, light insulation and so on. In contrast, BHEP is behavior coaching with a small installation of efficient light bulbs. The results are:

- BHEP home 70% cheaper than EPA home
- BHEP saved 88% more kWh per home than EPA program

	EPA BENCHMARK	BHEP
kWh Saved per Home	260	489
Source Mbtu Saved per Home	4.6	4.9
Cost per Home	\$1,200	\$362

Source: *Rapid Deployment Energy Efficiency (RDEE) Toolkit: Planning & Implementation Guides*, December 2009.
http://www.epa.gov/cleanenergy/documents/suca/rdee_toolkit.pdf

PROGRAM BUDGET

The majority of program funds used to date have gone to the cost of home visits and direct install products (largely CFL light bulbs). The direct install cost per home has been an average

of \$70. Going forward, we expect to increase the amount of time with student supervision and coordination, and on outreach.

BHEP Expense Allocation, as of March, 2012

Home Visit Labor	Student Supervision and Training	Direct Install	Program Management and Outreach
56%	7%	17%	20%
\$43,506	\$5,760	\$13,430	\$15,164

COOL SUMMERS

To better understand the energy savings data, we first show the weather data from the program years. 2009 is before BHEP began, and thus serves as a base year. As the following table shows, both 2010 and 2011 had relatively cool summers.

We do not expect the cooler summers to affect electricity use, as so few residents use air conditioning.

The cooler summers may have affected water use, we will be working with the city to get the appropriate data to analyze this possible effect.

The BHEP program does not address the use of natural gas, except for hot water, and thus we do not track winter temperatures. (Most homes have natural gas furnaces.)

Difference in Average Monthly Temperatures

Difference	MAY	JUN	JUL	AUG	SEP	SUMMER TOTAL
2009 vs. 2010	-3.26	4.44	0.82	-2.31	-3.4	-3.71

2009 vs. 2011	-2.3	0.7	1.79	-1.53	-3.85	-5.19
2010 vs. 2011	0.96	-3.74	0.97	0.78	-0.45	-1.48

Note: The entries should be read as follows: - 3.26 means that May 2010 was on average

3.26 degrees (F) cooler than May 2009.

ELECTRICITY SAVINGS

Two comparisons have been made to demonstrate electricity savings. First, we compared participants' electricity use after the home visit to the prior year. These results are reported in the ACEEE paper, and averaged 7% per home.

A better measure of savings compares participants to non-participants during the same calendar month. To create this savings estimate, the city of Benicia requested city-wide data from PG&E for the residential sector. PG&E will have 2011 data available in May, 2012. Our analysis of 2009 and 2010 data is in the following table.

The analysis shows that BHEP participants saved every month, when compared to other homes in Benicia.

<u>Electricity</u>			
2009 vs. 2010	BHEP % Diff	PG&E % Diff	Diff BHEP vs. PGE
April	-22%	-10%	-12%
May	-13%	-7%	-6%
June	12%	18%	-6%
July	-21%	-12%	-9%
Aug	-9%	0%	-9%
Sept	-8%	1%	-10%
Oct	-13%	-2%	-11%
Nov	-2%	11%	-13%

Dec	-10%	-3%	-7%
Overall Difference			-9%

CARBON DIOXIDE SAVINGS

Homes with one year of follow-up data

Electricity			Natural Gas		
lbs. CO ₂ saved	CO ₂ EMT saved/home	avg. CO ₂ EMT saved/home	lbs CO ₂ increased	CO ₂ EMT increased/home	avg. CO ₂ EMT increased/home
28,600	13.0	0.14	25,916	11.8	0.12

1 kWh = 0.559 lbs CO₂

1 therms = 11.7 lbs CO₂

Source: Greenhouse Gas Emissions Factor Information Sheet

http://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf