City of Brea Sustainability Plan: Leadership in Energy Efficiency

CEESP: Strategic Plan: Section 12

Southern California Edison
Strategic Plan Task 3.2.1
Task 3.B
Deliverable 3.B.3

Funded by
Southern California Edison Company
Local Government Strategic Plan Strategies Program
2010–2012 Program Period
under the auspices of the California Public Utilities Commission

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November 29, 2012

City of Brea

Sustainability Plan

Leadership in Energy Efficiency

BREA
CALIFORNIA

November 2012

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I. Executive Summary

The City of Brea is pleased to have completed this Plan, the "2012 Sustainability Plan: Leadership in Energy Efficiency." Sustainability planning and being proactive is important to Brea.

From its beginning in 1911 as Olinda, a small oil town, to incorporation as Brea (Spanish for "tar") in 1917, Brea has become a regional leader and a hub for retail and industry, with over 40,000 residents. It is also a leader in energy and resource conservation.

With a population growth rate of 10.9% over the past decade, and with growth projected at 22.8% for the current decade[1], planning to minimize resource demands and sustain the economy and environment is ever-more important. This Sustainability Plan supports and will augment the General Plan to maintain the high quality of life to which the City is committed.

This Plan and planning process has been supported by Southern California Edison (SCE) and its ratepayers. The City appreciates SCE's resources to enable this work, and guidance on how to identify energy strategies that will both save money and protect the environment. Brea supplemented SCE resources to round out the Sustainability Plan to include non-energy elements. Brea also provided City resources to fund the development of the companion Greenhouse Gas Inventory (GHG Inventory).

This Sustainability Plan is part of a suite of sustainability services. It is based in part on the City's 2012 Greenhouse Gas Inventory,[2] with a baseline year of 2010, and the City's 2012 Energy Action Plan developed by The Energy Coalition. Together, these three documents help chart a course for Brea to continue to serve residents and businesses and prepare for anticipated regulation.

This Plan presents resource efficiency goals, matched with policies and implementation steps to save energy, water, and other resources, while aligning Brea for AB 32 compliance.

Energy Efficiency

The title of the Sustainability Plan contains the subtitle, "Leadership in Energy Efficiency." The City of Brea will continue to implement energy efficiency actions designed to save energy and money while protecting the environment. This involves all forms of energy use, as well as embedded energy such as that in hot and cold water. The City has already made significant progress in these areas, having earned Southern California Edison's Gold rating for Energy Leadership, and is home to the largest municipal solar system in Orange County.

[1] Center for Demographic Research California State University Fullerton http://www.fullerton.edu/cdr/cities/Brea.pdf

[2] City of Brea 2012 Greenhouse Gas Inventory, Baseline Year 2010, available in Appendix B.

The Sustainability Plan focuses on the nexus between valued energy efficiency measures and the most cost-effective resource conservation and greenhouse gas mitigation measures. Studies show huge potentials for this nexus, with 45% of carbon reduction measures having a net zero cost.[3] This Plan steers the City of Brea and its leaders and stakeholders to a reasoned approach to sustainability, quality of life, and regulatory compliance related to greenhouse gas mitigation.

Implementation Measures

For this Plan, "Implementation" is focused on reducing the amount of greenhouse gases[4] being emitted into the atmosphere each year. This is expressed as metric tons of carbon dioxide avoided. Many energy efficiency measures are perfectly aligned, both saving energy and reducing emissions of carbon dioxide.

Many implementation steps are simple and cost-effective. Many steps are already in process in Brea: Poorly insulated homes, for example, can be upgraded cost-effectively with current technologies, as can aging appliances. Similarly, internal combustion engines used in cars and trucks are inherently inefficient and release significant levels of carbon dioxide. They can be replaced with newer, highly efficient models or alternatively fueled vehicles cost-effectively, providing returns for cities while achieving climate protection goals.

In-fill communities walkable to shops, restaurants, and other amenities cut this footprint while providing desirable housing. Brea has been a leader in this regard. Behavioral change is free and can also result in significant economic (bill) and energy savings, often at peak periods. These are among the measures planned by Brea, building on its record as a sustainable city.

This Sustainability Plan echoes the goals of the City that are introduced by Brea's General Plan in its very first paragraph, which starts with "Imagine Brea." The Brea of the future that is described in the General Plan will be supported by the seven spheres of life activity contained within this Sustainability Plan. Of the four overarching goals in the General Plan, this Plan directly focuses on two in particular: "sustainable stewardship of natural resources," and "decreased dependence on cars." The Plan is also linked with the fourth goal of promoting a "sustainable economic base."

Sustainability Targets

The City has already taken significant steps to manage energy use and demonstrate sustainability principles with notable results: According to Southern California Edison records, use of electricity community-wide went up 14% from 1990 to 2005. Thereafter, and as a result

[3] Pathways to a Low-Carbon Economy: Carbon Abatement Cost Curve: McKinsey and Company: https://solutions.mckinsey.com/ClimateDesk/default.aspx

[4] The common greenhouse gases are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). They are so labeled because, like a greenhouse, they trap heat close to the surface of the earth. The greenhouse effect has been tied to global warming and climate change.

of City policies, programs, and initiatives and the macro-economy, community-wide electricity use was reduced by 11.7% by 2011.[5]

Despite significant gains in efficiency and sustainability, population growth and increasing use of energy for comfort and convenience will cause emissions levels that are addressed in this Plan. The more people within the City and the more energy each person uses result in a higher total level of emissions. It is this total figure that the GHG Inventory addresses, not a per capita figure.

Significant savings can be anticipated thanks to state and federal programs continuing and coming online.[6] But even with these savings, if Brea continues with "Business as Usual," its carbon footprint will remain significantly above the state's goal for 1990 levels by 2020. Figure 1 shows the emissions forecast.

If the projected 22.8% growth rate for the 2010–2020 decade is realized (representing 8,970 citizens), Brea will be responsible to reduce emissions by 34,772 tonnes CO_2e.[7] This is equivalent to cutting its current use 4.4% to meet 1990 emissions, or by cutting 6.3% of projected 2020 levels.

The City has also explored a second, "low growth scenario" through 2020 based on the actual average population growth rate for the prior decade. In this scenario, a 30,150 tonne "gap" would need to be addressed with local implementation steps. City planners will track actual population and development activity and adjust implementation of the Sustainability Plan accordingly.

[5] Southern California Edison, Energy Leader Partnership Briefings.

[6] SEEC Greenhouse Gas Forecasting Assistant, October 2011, provides values for state and federal programs that will drive down emissions concurrent to local action. The "Business as Usual" line represents emissions net of these state and federal initiatives.

[7] Emissions are traditionally measured in metric tons (or "tonnes") of carbon dioxide, CO_2Gases other than CO_2 are converted to their equivalent in CO_2, and labeled CO_2e.

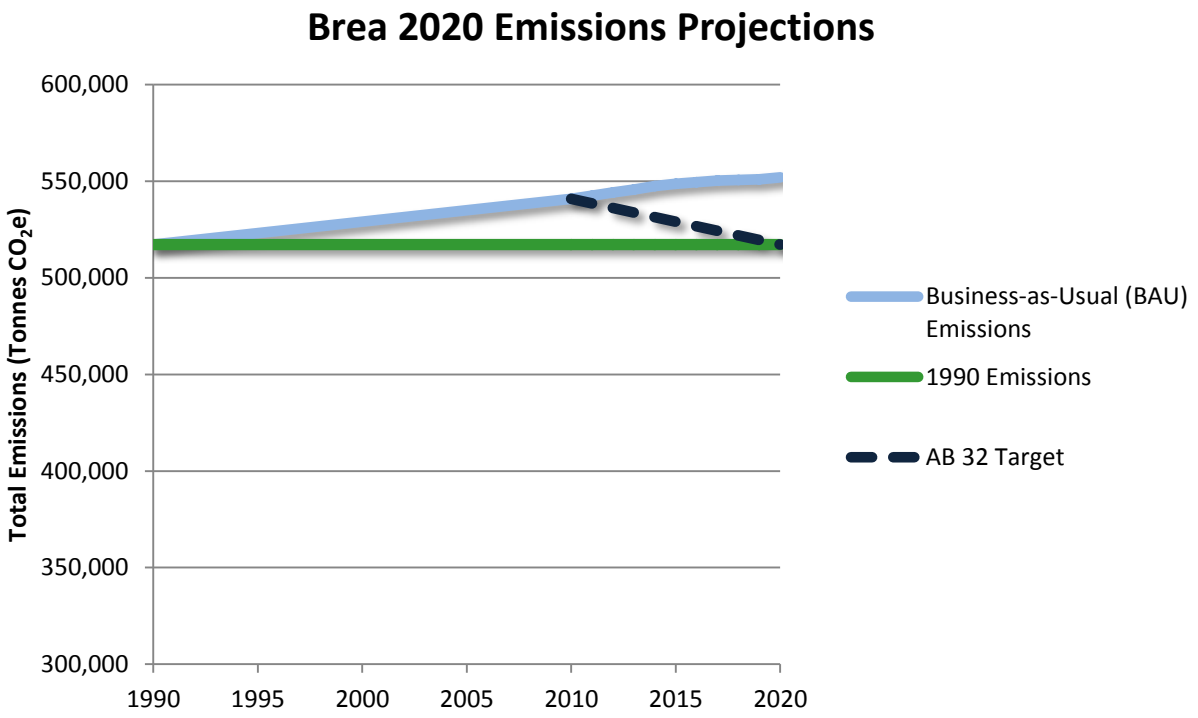

Figure 1: Brea 2020 Projected Emissions

Figure 1 summarizes the position of Brea based on available data from 1990 and 2010 based on the 2012 Greenhouse Gas inventory. The light blue line shows "Business as Usual" for the City assuming population growth tempered by state and federal programs to reduce emissions such as California's Low-Carbon Fuel Standards and the Renewable Portfolio Standard for electricity. The darker green line shows the 1990 emission levels based on 2010 "backcasted" estimates. The dark blue dotted line shows the trajectory required to reach AB 32 Targets by 2020.

Based on current figures, emissions reductions goals are summarized in Table 1:

Table 1: Brea's 1990, 2010, and Projected 2020 Emissions

Scenario	Total Emissions (Tonnes CO_2e)	Tonnes over 1990	% Reduction Needed
1990 Emissions Level	517,231	-	-
2010 Baseline	540,908	23,677	4.4%
2020 Business-as-Usual	552,003	34,772	6.3%

The Sustainability Plan describes the goals, policies, and implementation steps the City and its residents can take to maintain its progress and reach targets.

II. Sustainability Planning

This City of Brea 2012 Sustainability Plan complements the City's General Plan. It builds on the values presented in the City's Greenhouse Gas Inventory. It builds on the City's prior energy management efforts, and with community input, presents sustainability goals and policies, and implementation measures to achieve them. The City will use the Plan as a guide to the largest and most cost-effective emission reductions that are in alignment with other City goals.

Defining Sustainability

The United Nations World Commission on Environment and Development defines sustainability in the following way: "Sustainability meets the needs of the present without compromising the ability of future generations to meet their own needs."

To some, sustainability goes beyond environmentalism. Whereas environmental sustainability is a condition during which we make sure not to deplete finite natural resources, social sustainability encompasses adequate access to health care and educational and employment opportunities.

For others, sustainability encompasses wellness. In a socially sustainable community all people have a sense of well-being and purchasing power. Financial sustainability is living within our means, our ability to pay. While this Plan focuses on environmental sustainability, in the broadest context, sustainability can include social, health, and economic facets of a community.

AB 32 Compliance

Climate change is among the greatest threats to sustainability. To address this threat, California passed the Global Warming Solutions Act of 2006 (AB 32). It will now force all major emitters to measure and reduce energy and natural resource use and emissions. The AB 32 goal is to reduce emissions statewide to 1990 levels by the year 2020.

Governor Arnold Schwarzenegger's Executive Order S-3-05 set an even more aggressive goal—80% below 1990 levels by 2050—and identified local governments as key partners in reaching these goals. The good news for Californians is that our overall emissions have remained relatively stable over the past 15 years.

The California Air Resources Board has been instructed to implement AB 32. Its Climate Change Scoping Plan was approved in 2008 and readopted in 2011 and outlines the state's plan to achieve GHG reductions required in AB 32.[8] In the Scoping Plan, CARB encourages local governments to adopt a reduction goal for municipal operations emissions and move towards establishing similar goals for community wide emissions that parallel the State's commitment to reduce GHGs.

[8] "Climate Change Scoping Plan: A Framework for Change," California Air Resources Board, Pursuant to AB 32: The California Global Warming Solutions Act, December 2008.

While no more specific directives have been issued on AB 32 implementation for local governments at this time, activity in the realm of emissions measuring and reduction is increasing:

- On January 1, 2012, California's "Cap-and-Trade" regulation became effective. Part of the state's plan to meet AB 32 targets, this plan assigns 85% of all major emitters a "cap" on emissions, and forces them to either reduce emissions to meet the cap or to buy (or "trade") offsets to meet their target.

- On June 4, 2012, separate emissions reductions targets for the Southern California region (which includes Brea) were approved as part of Senate Bill 375 legislation. SB 375, originally passed in 2008, seeks to limit emissions through transportation and land-use planning. The California Air Resources Board and the South Coast Air Quality Management District have taken the lead on implementing action to meet SB 375 goals.

- The California Attorney General continues to monitor and actively challenge greenhouse gas inventories or other aspects of environmental impact plans that are not deemed adequate. A recent case occurred in January, 2012, when the adequacy of the Environmental Impact Report certified by the San Diego Association of Governments, for its 2050 Regional Transportation Plan, was challenged.

This Sustainability Plan is proactive. It prepares the City of Brea for compliance with statewide mandates to reduce emissions. At the same time, Brea intends to:

- Increase energy efficiency in local government operations
- Promote cost-effective energy efficiency and renewable energy in the community
- Create new jobs associated with smart energy management
- Create energy cost savings that can be reinvested in the community
- Maintain or increase the lifestyle of residents and visitors
- Participate in effective regional climate planning

External Factors

Factors outside of the City's control influence emissions. For example, electricity production in California is getting cleaner thanks to the state's Renewable Portfolio Standard (RPS) requiring that utility energy portfolios include higher percentages of "renewable energy." The state also regulates the efficiency levels of new building, with stringent standards that ratchet up and are incorporated into each three-year cycle of Title 24 updates.

California's Low-Carbon Fuel Standard causes the mix of fuel sold in the California market to comply with declining targets for greenhouse gas emissions—a reduction of at least 10 percent in carbon intensity by 2020. These factors are incorporated into the values presented in this Plan, and mean that "Business as Usual" will not be as carbon intense as in past years. External

factors are of significant benefit to Brea (representing a reduction of 112,392 metric tonnes per year), while imposing no direct costs to the City.

California Leadership in Energy Efficiency

California is the nation's leader for energy efficiency and conservation. Its record began in 1974 with the formation of the California Energy Commission. Since then, per capita energy use in California has been relatively stable, while energy use per person in the United States has increased 50% as the graph below shows.[9] California's efforts have driven down greenhouse gas emissions and have saved Californians billions of dollars in energy costs.

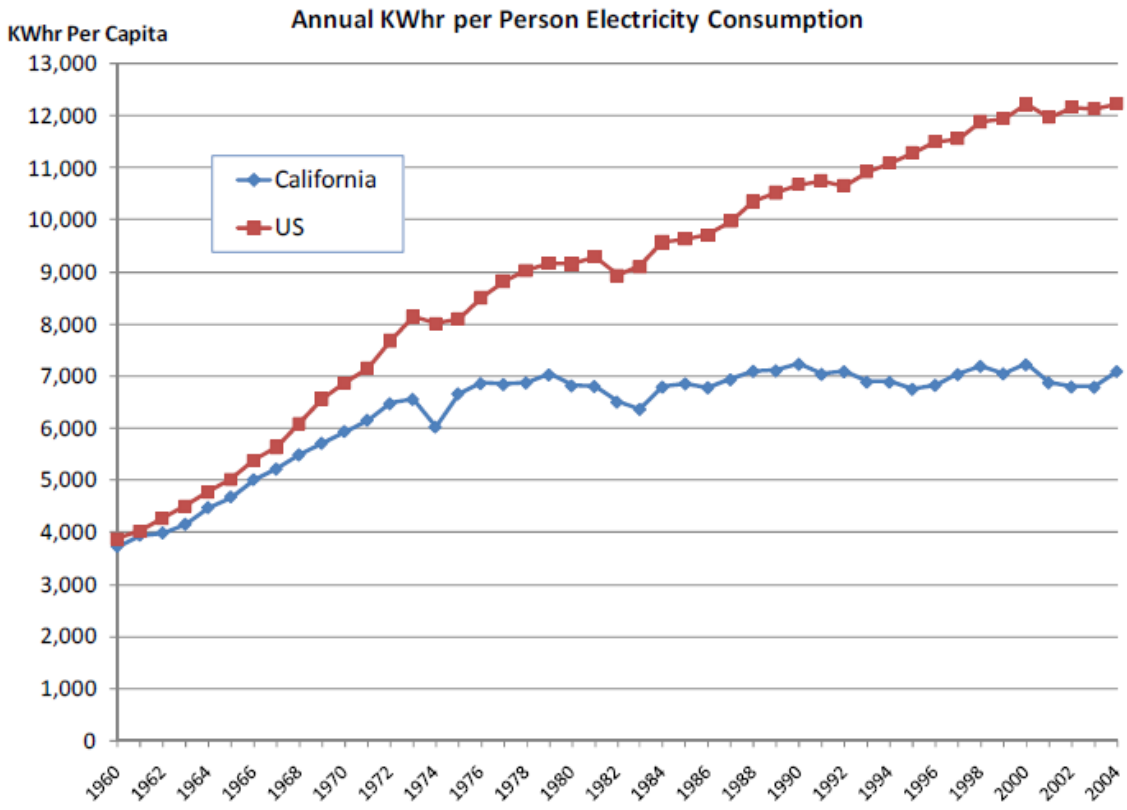

Figure 2: California vs. U.S. Per Capita Electricity Consumption, 1960–2004

Concerns about greenhouse gas concentrations increasing to intolerable levels have been growing for decades. By the turn of the century, the Intergovernmental Panel on Climate Change (IPCC) of the United Nations had forged a broad consensus that man's activity on earth is having an effect, and that climate patterns will change, and sea levels will rise.

[9] Integrated Energy Policy Report, Figure 1, California Energy Commission, 2007.

California's Emissions 2009

California emitted 452.97 million tonnes of GHG emissions in 2009, approximately 12.2 tonnes per capita.[10] Of this, the largest emitters were transportation (172 million tonnes), electric power (104), residential and commercial fuel use (43), industry (81), agriculture—livestock, fertilizers, and general fuel use (32), and waste streams and landfills (7.3). Emissions were 5.8% lower in 2009 than 2008. Based on 2009 data, the state is 25 million tonnes from its 427 million tonne 1990 footprint goal.

Utility Leadership in the City of Brea

As a member of the Community Energy Partnership, Brea has benefitted from partnerships with its serving utilities since October, 2002. Southern California Edison and Southern California Gas have and continue to provide programs and services that have helped Brea homes, businesses, and institutions save resources and money.

The Planning Process

The Sustainability planning process is necessarily integrated. It involves residents and municipal government, and energy, water, and materials from cradle to grave. This Sustainability Plan addresses the impact of energy and resource conservation on citizens' lives in seven spheres of activity. It is supported by a Greenhouse Gas Inventory, completed in 2012 for the City of Brea.

The spheres address:


Where We Live (Residential Sector)


Where We Work (Business sector)


How We Build (Building sector)


How We Get Around (Transportation)

[10] State of California Greenhouse Gas Emissions Inventory, California Air Resources Board, April 2012. This edition of the inventory covers the years 2000–2009.

How We Govern (Municipal sector)

Where We Visit and Play (Hospitality/recreation)

How We Teach and Learn (Education sector)

Each sphere of activity roughly corresponds to the sectors listed above. The Plan presents goals and then policies, programs, as well as a phased roll-out of implementation measure for Brea to meet the goals. Ultimately the City of Brea plans to include the Sustainability Plan as an element in its General Plan. Each Implementation Measure recommended includes CO_2 mitigation estimates and a timeframe for implementation.

III. 2012 Greenhouse Gas Inventory Results

Brea's first Greenhouse Gas Inventory was completed in 2012 and presents data for a 2010 baseline year. The inventory shows the sources and sectors of the City's "carbon footprint," and presents data that highlights opportunities for emission reductions.

Key findings of the Greenhouse Gas Inventory for Brea:

- In 2010, Brea emitted 540,908 metric tons (or tonnes) of CO_2e, 4.4% above 1990 levels.
- In 2010, the largest percentage of emissions—60.1%—came from the combustion of fuels used to power vehicles operating within the City limits. This figure includes all transportation occurring on roads and highways within Brea city limits.
- If Brea continues with "Business as Usual," its carbon footprint will be 34,772 tonnes (or 6.3%) above the state's goal for 1990 levels by 2020.

The community's total emissions came from a number of sources, as shown below:

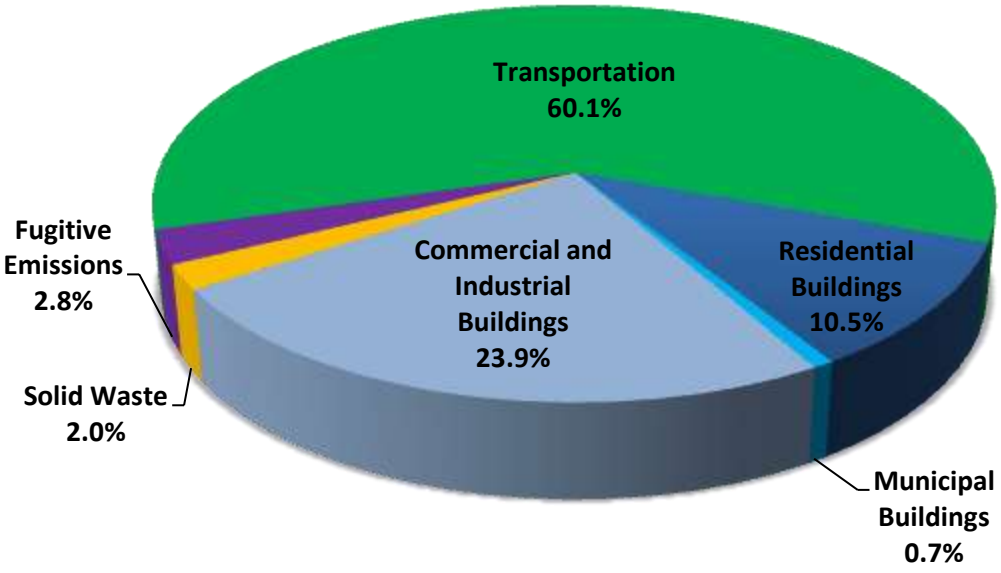

Figure 3: 2010 Brea Community Emissions by Sector (Tonnes CO_2e)

Emissions Reductions Goals

Despite significant gains in efficiency and sustainability, population growth and increasing use of energy for comfort and convenience will cause emissions levels that are addressed in this Plan. The more people within the City and the more energy each person uses result in a higher total level of emissions. It is this total figure that the GHG Inventory addresses, not a per capita figure.

Significant savings can be anticipated thanks to external factors such as the state and federal programs continuing and coming online.[11] But even with these savings, if Brea continues with "Business as Usual," its carbon footprint will remain significantly above the State's goal for 1990 levels by 2020. Figure 4 shows the emissions forecast.

[11] SEEC Greenhouse Gas Forecasting Assistant, October 2011, provides values for state and federal programs that will drive down emissions concurrent to local action. The Business-as-Usual line represents emissions net of state and federal initiatives.

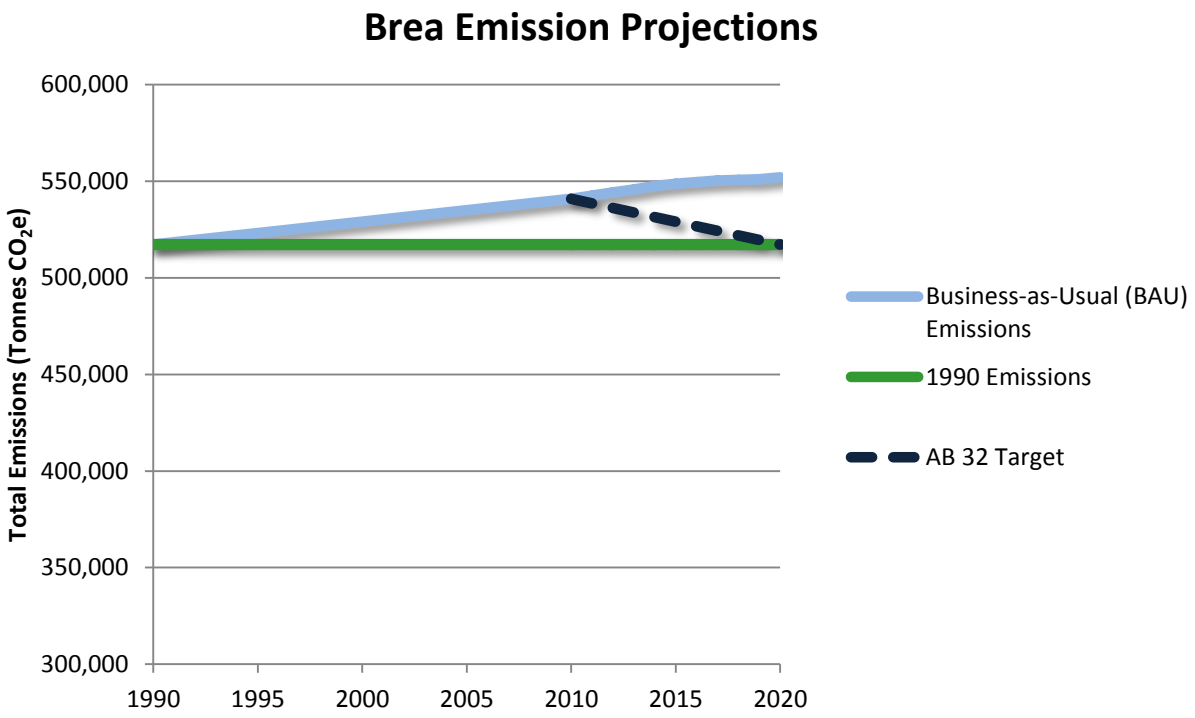

Figure 4: Brea Forecasted Emissions to 2020

If the projected 22.8% growth rate for the 2010 – 2020 decade is realized, (representing 8,970 citizens) Brea will be responsible to reduce emissions by 34,772 tonnes CO_2e[12]. This is equivalent to cutting its current use 4.4% to meet 1990 emissions levels by 2020 and cutting projected 2020 emissions by 6.3%.

Table 2: Brea's 1990, 2010, and Projected 2020 Emissions

Scenario	Total Emissions (Tonnes CO_2e)	Tonnes over 1990	% Reduction Needed
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The City has also explored a second, "low growth scenario" through 2020, based on the actual average population growth rate for the prior decade. In this scenario, a 30,150 tonne "gap" would need to be addressed with local implementation steps. City planners will track actual population and development activity and adjust the Sustainability Plan accordingly.

[12] Emissions are traditionally measured in metric tons (or "tonnes") of carbon dioxide, CO_2. Gases other than CO_2 are converted to their equivalent in CO_2, and labeled CO_2e.

Portfolio of Implementation Steps

Informed by the Greenhouse Gas Inventory, and with goals set, the Sustainability Plan presents a roster of implementation measures, with suggested timeframes to achieve the targets. Phase I measures are considered short-term and will be implemented within the next two years, 2013–2014. Phase II measures follow in 2015–2017. Phase III covers the 2018–2020 timeframe.

Goals and policies are outlined in the next section, with a complete appendix of corresponding implementation measures attached to this report. The measures tables included with each sphere are combined in the appendix. The list presents measures providing 35,144 tonnes of CO_2e offset, significantly over the amount required to reach AB 32 compliance.

IV. Goals and Policies for Sustainability

To meet AB 32 targets, and assuming population growth as projected, by 2020 the City needs to achieve emissions reductions of 34,772 tonnes to reach the 517,231 tonne/1990 level.

Opportunities for sustainability and greenhouse gas reductions have been examined and analyzed for Brea. "Implementation Measures" have been selected from suggestions and recommendations from a number of sources: interviews with City officials and staff, conversations with the public at outreach events, interaction with local businesses at a Chamber of Commerce event on May 10, 2012, and from best practices gleaned from around the country.

Community Comments on Sustainability: Public Works Open House

The information below reflects public comment at an outreach event on May 12, 2012. The public participants received an overview of the City's work toward sustainability goals and policies, reviewed information, and were asked "What's important to you?"

- *"Build more bike lanes and trails."*
- *"Solar Energy info on the website is a good idea."*
- *"Put a bucket in the shower to collect water for house plants."*
- *"We all can learn to save energy from tips from each other."*
- *"We changed out our lights to CFL bulbs."*
- *"Energy efficient new homes for new construction – single story homes."*
- *"We installed a solar system and our electric bill was 12 cents last month, expect it to pay for itself within 10 years."*
- *"Conserve water."*
- *"Two of our neighbors have now installed solar systems and we can learn from their experience."*
- *"The community pool at Tomlinson Park should be solar heated."*
- *"Put more recycling bins in public places."*
- *"We should have water aerators on all faucets."*
- *"There need to be more EV charging stations around town."*

- *"Plant more trees."*
- *"I moved to within a mile of my work and now I walk to work sometimes."*
- *"The whole thing is such a scam…"*
- *"Free composting."*
- *"We bike and walk everywhere."*
- *"Carpool more."*
- *"Every school should have a green team"*

The Plan addresses Implementation Measures in the seven spheres that correspond to residents' daily lives. The City of Brea has opportunities to influence reductions within each sphere whether through information, incentive, or mandate. Each implementation measure has been chosen based on its suitability to the local climate, its effectiveness, and feasibility in the current economy.

Where We Live

- Household energy conservation and efficiency
- Household water conservation and efficiency
- Waste management and recycling
- Renewable energy systems
- Homeowner and renter education

Brea has 14,266 reported households (2010 Census), with the majority of people living in single family homes. The General Plan reported in 2003 that one-third of the City's homes were over 30 years old, with some as old as 80–90.

Brea has a track record of promoting residential energy savings programs, from high efficiency pool pumps to interior lighting. There is considerable opportunity in this sphere for energy and water efficiency gains, and thus corresponding GHG reductions, and increasing solid waste diversion.

Brea has already proven itself a "Tree City USA." Homeowners generally support tree planting efforts, which cut air conditioning costs, thus saving energy and cutting carbon. Promoting the "right tree" – affordable, hardy, climate appropriate, drought-tolerant -- is important to achieve these complementary objectives.

Brea can promote simple steps for homeowners—encouraging light bulb replacements, exchanging old, inefficient appliances for new Energy Star varieties, and promoting "sustainable" remodeling. The City can support more sophisticated steps including insulation and major heating, ventilation and air conditioning (HVAC) upgrades that make financial sense.

Brea supports regional and state efforts for PACE financing as it becomes available and enabled by lenders. PACE, or Property Assessed Clean Energy financing, makes funds available to property owners for energy-related upgrades, with the repayment taking place via a property tax assessment instead of through traditional banking mechanisms. The City also supports utility financing activity for energy efficiency.

Household appliances and systems have dramatically advanced. New systems use less natural gas and electricity while providing superior comfort and more control. Brea will reinforce these messages. Through a rewards and recognition program, Brea can stimulate more and more retrofit activity for the benefit of consumers, our utilities, the City, and state.

Table 3: Goals and Policies for "Where We Live"

Goal SP – Live 1:	**Maximize cost-effective energy efficiency in homes.**
Policy SP – Live 1.1	Leverage residential programs offered by utilities.
Policy SP – Live 1.2	Partner in financing programs that enable residential property owners to complete energy efficiency retrofits and renewable system investments.
Policy SP – Live 1.3	Expedite City procedures for energy-efficient projects that will reduce community GHG emissions.
Goal SP – Live 2:	**Promote vibrant neighborhoods that lessen carbon footprints while increasing personal well-being.**
Policy SP – Live 2.1	Test pilot programs to bring amenities into neighborhoods to shorten commutes and promote walking.
Goal SP – Live 3:	**Maximize water efficiency to assure a sustainable water supply and demand balance.**
Policy SP – Live 3.1	Implement water conservation ordinance(s) to address inefficient use in the community.
Policy SP – Live 3.2	Promote drought-tolerant landscaping through education, demonstration, and turf buy-back initiatives.
Goal SP – Live 4:	**Increase solid waste diversion rates to exceed state mandates, cutting costs and demonstrating leadership.**
Policy SP – Live 4.1	Establish solid waste diversion goals for 2015 and 2020.

Where We Work

- Workplace energy conservation and efficiency
- Workplace water conservation and efficiency
- Materials management and recycling
- Transportation and telecommuting

Brea is home to a number of major industries: Beckman Coulter and American Suzuki are headquartered in Brea. Other major industries include Mercury Insurance, the Brea Mall (which opened in 1977), Albertson's Distribution Center, and United Technologies (Goodrich Corporation). These are strong partners in the City's pursuit of economic development and environmental stewardship. Far from its roots in oil and citrus farming, Brea has gone high-tech.

The City has used its central location for benefit: In Northeastern Orange County, Brea is a gateway to three counties: Los Angeles, San Bernardino, and Riverside County. Completion of the Orange Freeway (57) in 1972 ushered in a new era for Brea, as the oil industry subsided in the 1940–1960 timeframe.

Providing more jobs than available housing, continual business improvement is essential for supporting ongoing economic development in Brea. Programs that reduce commuting, for example, add to employee satisfaction, improve productivity, and cut transportation emissions. Studies show that green building upgrades can cut operating costs, lead to decreased illnesses and absenteeism, and longer-term tenants and increased productivity.

The City can have an impact on the way supplies and raw materials are delivered, and on how excess or waste materials are disposed of. A rewards program is contemplated, as is a pilot restaurant composting program.

The City of Brea is committed to creating healthy office and work environments as an important part of a sustainable lifestyle. Healthy work places are aligned with the City's wellness emphasis. Given the percent of time that many residents spend at work, the focus on "Where We Work" has multiple benefits.

Table 4: Goals and Policies for "Where We Work"

Goal SP – Work 1:	**Maximize cost-effective energy efficiency in Brea workplaces.**
Policy SP – Work 1.1	Partner with utilities to encourage businesses to take advantage of energy efficiency incentives and services.

Policy SP – Work 1.2	Partner in financing programs so that business property owners have means to complete energy efficiency retrofits and renewable system investments.
Policy SP – Work 1.3	Expedite City procedures for commercial energy-efficient projects that will reduce community GHG emissions.

Goal SP – Work 2: Maximize water efficiency in businesses and institutions.	
Policy SP – Work 2.1	Explore adoption of additional commercial-sector water conservation and efficiency standards

How We Build

- Green building materials
- Codes and standards
- Land use policy
- Lighting, HVAC systems, etc.
- Renewable energy system integration

The building sector is of great importance to Brea and this Sustainability Plan given 1.6% annual growth rate projections for population for the decade. Growth has slowed over the past few years, but is expected to be a future factor.

The City adopted the 2010 Green Building Code. While California has the nation's leading building standards—thanks to Title 24—there are still ways for Brea to make new and old buildings healthier and more sustainable.

The green building movement is a catalyst for creating win-win-win solutions between costs, health, and security. Thanks in large part to the U.S. Green Building Council, LEED and other green building certifications prepare builders and buyers for the benefits of green and highly efficient buildings. Brea can link efforts with these groups with rewards and recognition.

The City of Brea will keep sight of its biggest opportunities for building energy efficiency which lie with existing buildings. Residential buildings, commercial, and City buildings can benefit from efficiency upgrades and sophisticated controls. They may also be able to contribute renewable sources of electricity by way of solar or wind installations, thereby reducing emissions from carbon-based sources.

The City will continue to collaborate with local utilities and county or state programs to help offset the costs of building upgrades. The City will engage in the "net zero" building movement. It will also support the development of a regional and/or statewide PACE program for retrofits.

Table 5: Goals and Policies for "How We Build"

Goal SP – Build 1:	**Maximize cost-effective energy efficiency in new construction and existing facilities.**
Policy SP – Build 1.1	Promote programs that support efficiency in new construction.
Policy SP – Build 1.2	Support high efficiency affordable housing and sustainable infrastructures.
Policy SP – Build 1.3	Promote green building measures and renewable energy installations.

How We Get Around

- Alternative fuels (EVs, hybrids, etc.)
- Trip reduction, optimization
- Biking and walking
- Buses, shuttles, and transit oriented development
- Transportation infrastructure
- Efficient driving habits through training and ordinances

In Brea, emissions from transportation and "How We Get Around" represent the largest source of emissions, mainly due to the Orange 57 Freeway bisecting Brea. Transportation thus shapes the community while having the major carbon emissions footprint.

The City's transportation emissions also count the travel of approximately 100,000 people who come to Brea each day to work, shop, or play.

The "Imagine Brea" statement from the City's General Plan puts it this way: "Imagine Brea with walkable, tree-lined streets and linked trails and bicycle paths. Imagine high-quality residential neighborhoods with shops, services, schools and parks within close walking distance." All this reduces dependence on cars and the key emissions metric, vehicle miles travelled.

The transportation goals above may be challenging, but Brea is making huge strides. The Tracks at Brea will add four miles of bike and walking trails for residents. Orange County Transportation Authority provides 12 bus routes that run through Brea. Still, given the

accessibility of services within the 12.1 square mile city, the residents want even more. The City of Brea has used a downtown trolley and may consider it again as demand increases.

Transportation covers a wide swath of opportunity. It tackles fundamental issues such as the driving patterns associated with land use, the efficiency of vehicles, as well as the use of alternative fuels and alternative methods of getting around.

Table 6: Goals and Policies for "How We Get Around"

Goal SP – Mobility 1: Reduce emissions from automobiles and trucks.	
Policy SP – Mobility 1.1	Promote mass transit.
Policy SP – Mobility 1.2	Promote shared vehicles, hybrid and other high efficiency vehicles, and charging stations.
Policy SP – Mobility 1.3	Promote restricted idling of private and commercial vehicles
Policy SP – Mobility 1.4	Explore "golf cars," bike-sharing or other alternatives.

How We Govern

- Energy management
- Policies, codes, and ordinances
- Economic development
- Regional collaboration

The City of Brea's government operations are responsible for only 1.6% of total community emissions. Nevertheless, the City recognizes its disproportionately important role as a leader within the community and thus will maintain its stance within the community as a leader.

Cities can control the programs and policies they set for their own employees. City facilities can often be used as test beds for new technologies and pilot programs. The solar systems at the Civic Center and Community Center are major icons and symbols of the City's support for a sustainable future. Through leadership, Brea continues to set an example for the community.

City leadership can be seen in many areas, from land-use policies that encourage or dictate transportation requirements, to purchasing and maintenance policies, to regional collaborations and financing programs. Through outreach and education, the City can involve the community and recognize the accomplishments of individuals, neighborhoods, and groups.

Taking Action on Sustainability in Municipal Facilities

The City of Brea is committed to developing programs and practices that are energy efficient and sustainable in order to minimize the environmental impacts of operations and to reduce costs. In April of 2012, the City of Brea completed its first Energy Action Plan in collaboration with Southern California Edison and The Energy Coalition. It is presented in its entirety in Appendix D.

The purpose of the Energy Action Plan is to accomplish and encourage natural resource conservation and encourage increased environmental stewardship throughout the community. The Energy Action Plan is a roadmap for achieving ever-greater savings in municipal facilities. It is also a means of rising from Southern California Edison's Gold Energy Leader Partnership level to the Platinum level, the first city in Orange County poised to do so.

The Energy Action Plan presents goals for municipal energy savings as well as specific action steps to achieve these goals. The Plan will guide the City in moving forward and tracking its efforts in becoming more energy efficient. In the process, the Energy Action Plan and its coordinated approach will help save the City money, improve the environment, contribute towards reaching greenhouse gas reduction goals, and serve as a model for the community at-large.

Table 7: Goals and Policies for "How We Govern"

Goal SP – Govern 1:	**Manage energy use in new and future public and private facilities.**
Policy SP – Govern 1.1	Establish policies to increase efficiency in City buildings.
Policy SP – Govern 1.2	Explore public/private partnerships for energy management systems, renewable energy systems, and energy efficiency upgrades.

Where We Visit and Play

- Hotels and restaurants
- Golf courses and parks
- Native or drought-tolerant landscaping
- Water efficiency
- Enhanced visitor transportation

The City of Brea takes great pride in the quality of life in town. No one wants sustainability to negatively impact the quality of life in Brea, from its hillside neighborhoods to thriving downtown mall business and retail cores.

Health and wellness have been and continue to be core values for the City and its leaders. In 1996 the City opened a 52,000 square foot community center, a health and fitness complex with meeting and banquet rooms. Since then, the City has also opened a 26-acre sports park. The City will continue to promote outdoor activities.

This Sustainability Plan highlights ways that Brea can enhance lifestyle while becoming ever-more sustainable. Carefully designed landscape palettes exemplify this, as do passive solar designs that keep buildings shaded and cool. This Plan finds win-win solutions; for instance, making buildings more comfortable while more efficient, and revitalizing the downtown core (completed in 2000) as an amenity for residents while boosting the economy.

Table 8: Goals and Policies for "Where We Visit and Play"

Goal SP –Recreate 1: Maximize energy efficiency in Brea hotels and recreational facilities.	
Policy SP – Recreate 1.1	Partner with hospitality sector to promote energy management policies and systems.
Policy SP - Recreate 1.2	Reduce golf course and park area irrigation through education, design, and drought-tolerant plants.

How We Teach and Learn

- Student education
- Resident education
- Business education
- Community centers and youth programs
- Workforce development
- Demonstration projects and community outreach

Brea recognizes that today's students are tomorrow's consumers. How youth is educated has major impact on the sustainability of Brea, the region, and state.

The City will continue to support sustainability and raising awareness of the public on the benefits of sustainability for the economy and environment. The City will promote workforce development from a young age through retraining: The process of teaching a sustainability ethic begins in elementary schools, is augmented in local high schools, and continues at local institutions of higher learning.

The City of Brea understands its role in supporting green values in youth, and then providing pathways for green careers so essential to sustainability in partnership with Cal State Fullerton and others.

Training also takes place in homes and businesses throughout the community, as residents become aware of new opportunities and often, new incentives. The City understands its role in raising awareness and understanding of the benefits of sustainability, and will include, when appropriate, an internship program for young adults keen on forging green jobs and green careers.

Table 9: Goals and Policies for "How We Teach and Learn"

Goal SP – Learn 1: Support education of Brea students about "green careers."	
Policy SP – Learn 1.1	Promote workforce development in partnership with local colleges and agencies.
Policy SP – Learn 1.2	Provide internships in Public Works and Community Development related to sustainability.

V. Implementation

Timeline

This 2012 Sustainability Plan presents an implementation plan for the next eight years, corresponding to both the timeframe in the City of Brea 2003 General Plan and to AB 32. The Plan presents 88 measures that make up a portfolio necessary to achieve the target.

Phase I activities will be completed in calendar years 2013 and 2014. Phase II activities will be implemented in the years 2015, 2016, and 2017. Phase III activities will take place in 2018, 2019, and 2020.

The following table presents a potential scenario for eight-year implementation, leveraging large community benefits in the process.

Summary of Measures by Phase

Phase	# Measures	Emissions Reduced (Tonnes CO_2e)
I	26	12,528
II	46	16,359
III	16	6,257
Totals:	**88**	**35,144**

Phase I Activities

The table in Chapter VII presents an initial menu of suitable implementation measures for Phase I, II, and III implementation. Given the region's financial predicament as a result of the "Great Recession," Phase I activities primarily rely on ordinances, public education, utility programs, regional financing, and public/private partnerships to achieve the goals.

Table 10: Phase I Implementation Measures

Sustainability Policy	General Plan Policy/Element	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)
Live 1.2	Housing	Residential Lighting: Leverage and expand on Community Energy Partnership residential lighting programs…purchase (using grant funds), compact fluorescent lamps and LEDs for giveaways to demonstrate their value in homes	I	30
Live 1.2	Housing	Efficient Pool Pumps: Promote high-efficiency, variable speed pool pumps to households at community fairs and retail outlets	I	59
Live 1.3	Community Services	Plan Checking and Permitting: Expedite plan check process for remodels that reduce carbon emissions	I	66
Live 4.1	Community Development	Solid Waste Diversion: Increase solid waste diversion rate by another 5% by 2015	I	4,604
Work 1.1	Community Development	Commercial PACE: Promote, partner and engage in a PACE program, if available and enabled by lenders, to provide commercial property owners—from retail to resorts to manufacturing—with funding for energy efficiency upgrades at reasonable rates	I	2,149

Sustainability Policy	General Plan Policy/Element	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)
Work 1.1	Community Development	Commercial PACE: Promote, partner and engage in a PACE program if available and enabled by lenders, to provide commercial property owners—from retail to hospitality to manufacturing—with funding for renewable energy generation at reasonable rates	I	769
Work 1.1	Community Development	SCE & SCG Business Incentives: Promoted through Community Energy Partnership and utility incentives targeted at small businesses for both SCE and SCG	I	193
Work 1.2	Community Development	On-Bill Financing: Encourage On-Bill Financing/Repayment of energy efficiency and renewable measures through Southern California Edison, Southern California Gas with community-wide green messaging	I	1,433
Work 1.2	Community Services	Efficient Lighting Incentives: Leverage through Community Energy Partnership and promote and leverage existing incentives for efficient lighting to eliminate remaining T-12 lamps in commercial buildings	I	352
Work 1.3	Community Services	Plan Checking and Permitting: Expedite plan check process for tenant improvements that reduce carbon emissions	I	133
Build 1.1	Community Services	Plan Checks and Permitting: Expedite plan check for energy efficient building projects and remodels	I	81
Build 1.2	Community Development	Affordable Housing: Promote the construction of energy-efficient affordable housing with private-sector partners	I	128
Build 1.3	Community Services	Shade Trees: Augment existing tree program and leverage Tree City USA status to promote properly sited and selected shade trees to reduce heat islands and provide shade to offset air conditioning on public land and provide expanded services to encourage tree planting on private land	I	35
Build 1.3	Housing	Local Energy Programs: Promote Energy Upgrade California program to incentivize residential energy efficiency projects	I	17
Mobility 1.2	Community Development	Electric Vehicle Charging Station: Seek grant funding and private sector partnerships to install 10 EV charging stations on public property	I	60
Mobility 1.4	Community Development	Eco-conscious Driving: Promote eco-conscious driving campaign for residents to maximize fuel efficiency and minimize emissions through improved awareness of conservative and fuel efficient driving behaviors, reduced wind resistance, reduced idling, higher tire pressures, regular maintenance,	I	60
Mobility 1.4	Community Services	Bike and Walk Way Expansion: Expand bikeways, bike lanes on existing streets, "The Tracks at Brea" trail, and walking paths connecting residential neighborhoods and commerce	I	5
Mobility 1.4	Community Development	Police Bicycles: Promote use of bicycles for police use through training and operations support	I	2
Govern 1.1	Community Development	The Temperature Club: Promote community partnership through policies to adjust indoor temperatures to save energy	I	97
Govern 1.1	Community Development	EEMIS: Maximize use of the Los Angeles County Energy Enterprise Management Information System (EEMIS) to manage municipal facilities	I	116
Govern 1.1	Community Development	Benchmarking: Participate in regional benchmarking program to gauge relative energy use and efficiency of major facilities	I	77
Govern 1.2	Community Development	Community Energy Partnership: Continue to actively partner with serving utilities to fully leverage Community Energy Partnership energy efficiency and demand response programs in municipal facilities	I	833

Sustainability Policy	General Plan Policy/Element	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)
Govern 1.2	Community Development	Group Purchasing: Promote and participate in group purchasing of energy efficiency goods and services with other Community Energy Partnership cities	I	15
Govern 1.2	Community Development	Public/Private Partnerships: Explore private-public partnerships for renewables and energy efficiency (performance-based contracts and power purchase agreements)	I	688
Learn 1.1	Community Resources	Sustainability Education: Target residents and students with education on sustainability and smart energy management such as LED Lighting, high SEER AC units, insulation, better windows, etc.	I	476
Learn 1.1	Community Development	Community Energy Champion: Solicit nominations and promote a community Energy Champion to show value of efficiency and its energy, dollar, and carbon savings	I	50
		Sub-Total of Phase I Measures	**26**	**12,528**

Phase II and III Activities

The next two implementation phases expand the base of measures implemented in Phase I. As development picks up, green building required by Title 24 will guide infrastructure upgrades towards sustainability. Advances in mobility and auto efficiency will drive down transportation-related emissions.

These measures and phases will be refined in years to come. Phase II and Phase III implementation measures will be based on economic conditions, additional regulation, advances in technology and financing. The City of Brea will also track advances in the California Executive Order S-03-05 that calls for an emissions reduction of 80% from 1990 levels by 2050.

Table 11: Phase II Implementation Measures

Sustainability Policy	General Plan Policy/Element	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)
Live 1.1	Community Development	Residential PACE: Promote, partner and engage in a PACE program if available and enabled by lenders, to provide residential property owners with funding for upgrades at reasonable rates.	II	1,676
Live 1.1	Community Development	Residential PACE: Promote, partner and engage in a PACE program if available and enabled by lenders, to provide residential property owners with funding for renewable energy systems.	II	1,414
Live 1.2	Community Development	On-bill Financing: Encourage on-bill financing/repayment for energy efficiency retrofits through Southern California Edison and Southern California Gas	II	650
Live 1.3	Community Services	Plan Checking and Permitting: Expedite plan check process for remodels that reduce carbon emissions	II	66
Live 3.1	Housing	Water Conservation Ordinance: Promote residential water conservation and efficiency	II	536
Live 3.2	Housing	Drought Tolerant Landscaping: Promote, and with grant funds, augment water district rebates for drought tolerant planting, turf replacement and buy-back	II	214

Sustainability Policy	General Plan Policy/Element	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)
Work 1.1	Community Development	Commercial PACE: Promote, partner and engage in a PACE program, if available and enabled by lenders, to provide commercial property owners—from retail to resorts to manufacturing—with funding for energy efficiency upgrades at reasonable rates	II	2,149
Work 1.1	Community Development	Commercial PACE: Promote, partner and engage in a PACE program if available and enabled by lenders, to provide commercial property owners—from retail to hospitality to manufacturing—with funding for renewable energy generation at reasonable rates	II	769
Work 1.1	Community Development	Telecommuting: Promote telecommuting and flex-time for local businesses through Council commendation	II	146
Work 1.2	Community Development	On-Bill Financing: Encourage On-Bill Financing/Repayment of energy efficiency and renewable measures through Southern California Edison, Southern California Gas with community-wide green messaging	II	1,433
Work 1.2	Community Development	Data Center Program: Work with the Community Energy Partnership to take advantage of new program for Data Centers offered by Edison	II	14
Work 1.2	Community Services	Efficient Lighting Incentives: Leverage through Community Energy Partnership and promote and leverage existing incentives for efficient lighting to eliminate remaining T-12 lamps in commercial buildings	II	352
Work 1.2	Community Development	Efficient Machinery Incentives: Leverage through Community Energy Partnership and promote and leverage existing incentives targeted at process machinery efficiency for both SCE and SCG	II	100
Work 1.2	Housing	Demand Response Program: Promote through Community Energy Partnership and encourage businesses to enroll in Southern California Edison Energy Efficiency and the Pilot Demand Response program	II	193
Work 1.2	Community Development	Energy Audits: Leverage through Community Energy Partnership and promote energy audits for major buildings and confirm replacement/upgrade schedule to comply with AB 1103	II	730
Work 1.3	Community Development	SCE & SCG Business Incentives: Promoted through Community Energy Partnership and utility incentives targeted at small businesses for both SCE and SCG	II	193
Work 2.1	Community Development	Water Efficiency/Conservation Ordinance: Explore adoption of additional commercial-sector water conservation and efficiency standards	II	1,000
Build 1.1	Community Development	New and Efficient Construction: Promote the Savings by Design Program from Southern California Edison	II	137
Build 1.2	Community Development	Green Home Tours and Recognition: Promote programs and provide energy efficient builders with recognition at Council; administer efficient/green home tours annually	II	28
Build 1.3	Community Development	Heat Island Effect: Program to reduce the heat island effect through the promotion of parking lot coverings and coatings and semipermeable surfaces	II	3
Build 1.3	Community Development	Cool Roofs: Promote the installation of reflective roofing on commercial properties in the community with recognition for early adopters	II	15
Build 1.3	Community Development	Lighting Controls: Promote energy-efficient lighting linked to building controls and occupancy sensors	II	822
Mobility 1.2	Community Development	Hybrid and Alternative Fuel Vehicles: Promote the purchase of hybrid and alternative fuel vehicles in the community	II	6

Sustainability Policy	General Plan Policy/Element	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)
Mobility 1.2	Community Development	CNG/EV Charging Stations: Work in partnership with private sector to promote CNG and EV charging stations with public access	II	57
Mobility 1.2	Community Services	Car Share: Promote ZIP or Car Share programs through preferential parking and promotion with signage	II	195
Mobility 1.2	Community Development	Van-pools: Encourage, partner, and recognize major employers for employee van-pools	II	10
Mobility 1.2	Community Development	Municipal Employee Commute: Employee commute program for Municipal employees	II	198
Mobility 1.2	Community Development	Electric Vehicle Charging Station: Seek grant funding and private sector partnerships to install 10 EV charging stations on public property	II	60
Mobility 1.4	Community Development	Shared Bicycles: Partner with private vendors and provide "Shared Bicycle Program" for daily trips using public/private partnership model	II	17
Govern 1.1	Housing	Residential Solar and Energy Efficiency: Support residential solar systems, and residential energy efficiency through building envelope improvement	II	660
Govern 1.1	Community Services	Transit Oriented Development: Promote transit oriented development to foster development in line with Bus Rapid Transit corridors	II	1,188
Govern 1.1	Community Development	Payback Threshold Policy: Consider City's Energy Action Plan to invest in measures with less than a four-year, simple payback	II	500
Recreate 1.1	Community Development	Energy Management Systems: Promote the installation of key card based energy management system for hotels in Brea	II	260
Recreate 1.1	Community Development	"Brea Green" Promotion: Work with hospitality sector to define and promote “Brea Green” for conference venues, hotels, etc.	II	20
Recreate 1.1	Community Development	Sustainable Events: Develop a checklist to help special purpose events to be sustainable with net zero energy and waste	II	2
Recreate 1.1	Community Services	Restaurant Composting: Partner with Orange County Health Department and provide information for a pilot restaurant composting and recycling program for restaurants	II	40
Recreate 1.1	Community Development	Comprehensive Pool Efficiency: Promote all manner of pool efficiency: variable speed pool pumps, covers, solar heating, etc.	II	100
Recreate 1.2	Community Development	Drought Tolerant Landscaping: Promote reduced need for golf course and green space irrigation through design and use of drought-tolerant plants	II	2
Recreate 1.2	Community Development	High Efficiency Water Pumping: Promote highly efficient water and reclaimed water pumping for Brea golf courses	II	6
Recreate 1.2	Community Development	Storm Water Capture: Promote storm water capture and retention for exterior landscape use (cisterns, rain barrels) through partnerships with regional water suppliers	II	2
Recreate 1.2	Community Development	Ball field Lighting Timers: Promote the installation of high efficiency lighting and timers for all ball field or other recreational lighting at schools and city facilities (similar to Junior High Park project)	II	60
Learn 1.1	Community Development	Workforce Development: Promote workforce development in partnership with local colleges such as California State Fullerton Business College to promote "green careers"	II	4
Learn 1.1	Community Resources	Green Building Lectures and Continuing Education: Provide lectures, seminars and training on energy efficient and green building options with emphasis on residential through web site and over the counter services	II	219
Learn 1.1	Community Development	Green Business Lectures and Continuing Education: Provide lectures, seminars and training for businesses	II	12

Sustainability Policy	General Plan Policy/Element	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)
Learn 1.1	Community Development	Green Business Education: Target businesses for special "Energy Efficient and Green Education Program" or energy "tune-ups"	II	97
Learn 1.2	Community Development	Internships: Provide internships in Public Works and Community Development related to sustainability	II	4
		Sub-Total of Phase II Measures	**46**	**16,359**

Table 12: Phase III Implementation Measures

Sustainability Policy	General Plan Policy/Element	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)
Live 2.1	Community Services	Walkable Neighborhoods: Test pilot programs to bring amenities into neighborhoods to shorten commutes and promote walking	III	5
Live 4.1	Community Development	Plastic Bags: Consider an ordinance banning the use of single use plastic bags	III	29
Live 4.1	Community Development	Polystyrene Packaging: Promote or mandate alternative take-out containers to eliminate use of polystyrene packaging	III	314
Live 4.1	Community Development	Solid Waste Diversion: Increase solid waste diversion rate by another 5% by 2020 to support 80% goal by 2020	III	3,585
Work 1.1	Community Development	Commercial PACE: Promote, partner and engage in a PACE program if available and enabled by lenders, to provide commercial property owners—from retail to hospitality to manufacturing—with funding for renewable energy generation at reasonable rates	III	769
Work 1.1	Community Development	Shared Vehicle Program: Promote "Shared Vehicle at Work" programs to encourage community carpooling and mass transit with a "guaranteed-ride home"	III	114
Build 1.2	Community Development	Green Home Tours and Recognition: Promote programs and provide energy efficient builders with recognition at Council; administer efficient/green home tours annually	III	28
Build 1.3	Community Development	Solar Energy Generation: Promote Solar on existing carport and parking structures	III	172
Mobility 1.1	Community Services	Bus Routes: Explore OCTA route reform to promote smaller buses and more routes/frequencies.	III	546
Mobility 1.1	Community Services	Bus Rider Incentives: Promote the benefits of OCTA buses to increase ridership, provide promotions and incentives for new riders	III	83
Mobility 1.3	Community Development	Anti-idling: Craft and implement an “anti-idling” ordinance for private automobiles and commercial vehicles	III	100
Mobility 1.4	Community Development	Golf Carts: Explore a coordinated state legislation to implement a “golf carts” ordinance for low speed streets	III	287
Govern 1.1	Community Development	Efficient and Green New Construction: Continue to construct all new municipal buildings to achieve LEED guidelines or equivalent program	III	182
Recreate 1.1	Community Development	Neighborhood Electric Vehicle Program: Promote Neighborhood Electric Vehicles and consider designing a program for implementing the use of such vehicles for Brea visitors and workers	III	6
Recreate 1.2	Community Services	Irrigation Control Sensors: Promote the installation of weather-based irrigation control sensors at parks and golf courses	III	33
Recreate 1.2	Community Services	Reclaimed Water Initiative: Promote and facilitate the design and implementation of a reclaimed water initiative for the city golf courses and other City facilities where possible	III	4
		Sub-Total of Phase III Measures	**16**	**6,257**

VI. Tracking Results and Measuring Progress

The practice of reducing greenhouse gas emissions is new to most California cities. While many of the policies, programs, and initiatives are familiar—they address electric efficiency, water use, our mobility, etc. —they are presented in this Sustainability Plan in a new way and with a new focus. Many assumptions are made, making the practice of measuring actual results all the more important to direct mid-course programmatic changes as need be.

The City of Brea will track results to verify reductions and to gauge their impacts toward the goals set. Progress reports will be provided to the City Council as the Plan is implemented. Each year, the City Manager's designee, with the support of the City's Energy Committee, will review the progress toward the City's sustainability goals, and report on same, flagging overall progress, key accomplishments and lessons, as well as challenges to successful implementation.

Each year, the Planning Department, with the support of staff and consultants as need be, will review the progress toward the City's climate protection goals. The potential for interns to assist in this process is being evaluated. Metrics that will be tracked for both municipal operations and community-wide include resource savings, economic savings, job creation, and carbon reductions:

Resource Savings

- Kilowatt-hour savings
- Therms of natural gas savings
- Gasoline and other transportation fuel savings
- Water savings
- Recycling diversion rate

Economic Savings

- Electricity bill savings
- Natural gas bill savings
- Water efficiency savings
- Other resource savings

Job Creation

- Types of jobs
- Number of jobs
- Economic development value

Greenhouse Gas Savings

- Source of emissions reductions
- Tonnes of emissions reductions
- Cost per tonne of avoided emissions
- Percentage of reduction goal achieved in each period

Economic values will be considered and analyzed to track discrepancies with the Plan, and to update the Plan accordingly. Which programs are successful? Which areas need additional support? What new opportunities are on the horizon? A working draft will be maintained with quarterly updates; every two years the Sustainability Plan will be updated and reissued.

Figure 5: Downtown Brea

Appendix A: List of Implementation Measures by Sphere

Sustainability Policy	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)	Assumptions
Goal SP - Live 1: Maximize cost-effective energy efficiency in homes.				
Live 1.1	Residential PACE: Promote, partner and engage in a PACE program if available and enabled by lenders, to provide residential property owners with funding for upgrades at reasonable rates.	II	1,676	15% of housing stock (2,140 homes), 40% kWh savings, 30% therms Nat Gas savings. Saving 2,945,068 kWh and 119,091 therms Nat Gas annually
Live 1.1	Residential PACE: Promote, partner and engage in a PACE program if available and enabled by lenders, to provide residential property owners with funding for renewable energy systems.	II	1,414	200 homes with 10kw solar PV saving 1,376 tonnes CO2e, saving 4,015,000 kWh and saving $505,890 annually and 100 homes with solar DHW saving 38 tonnes CO2e, saving 13,003 kWh electricity and 6,036 therms Nat Gas and $8,037 annually
Live 1.2	On-bill Financing: Encourage on-bill financing/repayment for energy efficiency retrofits through Southern California Edison and Southern California Gas	II	650	5% of housing stock (713 homes), 40% kWh savings, 30% therms Nat Gas savings. Saving 1,766,215 kWh and 7,936 therms Nat Gas annually
Live 1.2	Residential Lighting: Leverage and expand on Community Energy Partnership residential lighting programs…purchase (using grant funds), compact fluorescent lamps and LEDs for giveaways to demonstrate their value in homes	I	30	2000 bulbs Each bulb saves 44 kWh/yr., each bulb costs $1.50 each, and administration for give-a-ways costs $3,000
Live 1.2	Efficient Pool Pumps: Promote high-efficiency, variable speed pool pumps to households at community fairs and retail outlets	I	59	100 pumps @ 1,712 kWh/yr. savings per pump 171,200 kWh/yr., $0.207/kWh
Live 1.3	Plan Checking and Permitting: Expedite plan check process for remodels that reduce carbon emissions	I	66	70 homes, 30% kWh savings , 5% Natural Gas savings
Live 1.3	Plan Checking and Permitting: Expedite plan check process for remodels that reduce carbon emissions	II	66	70 homes, 30% kWh savings , 5% Natural Gas savings
Goal SP - Live 2: Promote vibrant neighborhoods that lessen carbon footprints while increasing personal well-being.				
Live 2.1	Walkable Neighborhoods: Test pilot programs to bring amenities into neighborhoods to shorten commutes and promote walking	III	5	200 weekly trips switched from vehicles to walking, 1 mile trip length avoided, 19.5 mpg avg. passenger fuel economy 10,400 vehicle mile reduction saving 528 gallons of gas,
Goal SP - Live 3: Maximize water efficiency to assure a sustainable water supply and demand balance.				
Live 3.1	Water Conservation Ordinance: Promote residential water conservation and efficiency	II	536	15% savings under ordinance, domestic water cost of $0.0025/gallon, avg. use of 350 gal/home/day, .0054 kWh energy use per gallon
Live 3.2	Drought Tolerant Landscaping: Promote, and with grant funds, augment water district rebates for drought tolerant planting, turf replacement and buy-back	II	214	700 homes, .5 acre yard, 4 gal of gasoline used per lawn annually, 19 lbs. of VOC produced per mower annually, 652,000 gallons of water used per acre, 0.0035 kWh used per gallon of water
Goal SP - Live 4: Increase solid waste diversion rates to exceed state mandates, cutting costs and demonstrating leadership.				
Live 4.1	Solid Waste Diversion: Increase solid waste diversion rate by another 5% by 2015	I	4,604	Cal-Recycle with EcoMotion data analysis
Live 4.1	Plastic Bags: Consider an ordinance banning the use of single use plastic bags	III	29	3 lbs. of plastic and paper bags per capita annually 117,846 lbs. diverted annually
Live 4.1	Polystyrene Packaging: Promote or mandate alternative take-out containers to eliminate use of polystyrene packaging	III	314	33 lbs. of containers per capita annually…1,296,306 lbs. diverted annually
Live 4.1	Solid Waste Diversion: Increase solid waste diversion rate by another 5% by 2020 to support 80% goal by 2020	III	3,585	Cal-Recycle with EcoMotion data analysis
	Sub-Totals	**14**	**13,248**	

Sustainability Policy	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)	Assumptions
Goal SP - Work 1: Maximize cost-effective energy efficiency in Brea workplaces.				
Work 1.1	Commercial PACE: Promote, partner and engage in a PACE program, if available and enabled by lenders, to provide commercial property owners—from retail to resorts to manufacturing—with funding for energy efficiency upgrades at reasonable rates	I	2,149	Efficiency upgrades (1,500,000 sq. ft. comm space…25% reduction in elec. 5% reduction in natural gas) savings of 5,842,500 kWh/yr. and 26,250 therms Nat Gas/yr.
Work 1.1	Commercial PACE: Promote, partner and engage in a PACE program, if available and enabled by lenders, to provide commercial property owners—from retail to resorts to manufacturing—with funding for energy efficiency upgrades at reasonable rates	II	2,149	Efficiency upgrades (1,500,000 sq. ft. comm space…25% reduction in elec. 5% reduction in natural gas) savings of 5,842,500 kWh/yr. and 26,250 therms Nat Gas/yr.
Work 1.1	Commercial PACE: Promote, partner and engage in a PACE program if available and enabled by lenders, to provide commercial property owners—from retail to hospitality to manufacturing—with funding for renewable energy generation at reasonable rates	I	769	1000kW PV producing 2,007,500 kWh/yr., ., $332,576…90 businesses with solar hot water saving 58,081 kWh and 11,983 therms Nat Gas/yr. $24,214
Work 1.1	Commercial PACE: Promote, partner and engage in a PACE program if available and enabled by lenders, to provide commercial property owners—from retail to hospitality to manufacturing—with funding for renewable energy generation at reasonable rates	II	769	1000kW PV producing 2,007,500 kWh/yr., ., $332,576…90 businesses with solar hot water saving 58,081 kWh and 11,983 therms Nat Gas/yr. $24,214
Work 1.1	Commercial PACE: Promote, partner and engage in a PACE program if available and enabled by lenders, to provide commercial property owners—from retail to hospitality to manufacturing—with funding for renewable energy generation at reasonable rates	III	769	1000kW PV producing 2,007,500 kWh/yr., ., $332,576…90 businesses with solar hot water saving 58,081 kWh and 11,983 therms Nat Gas/yr. $24,214
Work 1.1	SCE & SCG Business Incentives: Promoted through Community Energy Partnership and utility incentives targeted at small businesses for both SCE and SCG	I	193	100 businesses participating, (assume 4000 kWh and 100 therms Nat Gas saved per business annually) saving 400,000 kWh and 10,000 therms Nat Gas saved annually
Work 1.1	Telecommuting: Promote telecommuting and flex-time for local businesses through Council commendation	II	146	100 telecommuting employees, one day a week, 32 mile distance, 19.7 mpg, $3.50 gal/gas, 15,594 gal gas saved /year
Work 1.1	Shared Vehicle Program: Promote "Shared Vehicle at Work" programs to encourage community carpooling and mass transit with a "guaranteed-ride home"	III	114	Increase community employee use of alternative transportation by 15%, Assumed 200 employees, 32 mile round trip, 6,472 gallons gas saved
Work 1.2	On-Bill Financing: Encourage On-Bill Financing/Repayment of energy efficiency and renewable measures through Southern California Edison, Southern California Gas with community-wide green messaging	I	1,433	Efficiency upgrades (1,000,000 sq. ft. comm space…25% reduction in elec. 5% reduction in natural gas) savings of 3,895,000 kWh/yr. and 17,500 therms Nat Gas/yr.
Work 1.2	On-Bill Financing: Encourage On-Bill Financing/Repayment of energy efficiency and renewable measures through Southern California Edison, Southern California Gas with community-wide green messaging	II	1,433	Efficiency upgrades (1,000,000 sq. ft. comm space…25% reduction in elec. 5% reduction in natural gas) savings of 3,895,000 kWh/yr. and 17,500 therms Nat Gas/yr.
Work 1.2	Data Center Program: Work with the Community Energy Partnership to take advantage of new program for Data Centers offered by Edison	II	14	280 business licenses assume 10% have data centers and assume 14 of those would be targeted for the Edison program
Work 1.2	Efficient Lighting Incentives: Leverage through Community Energy Partnership and promote and leverage existing incentives for efficient lighting to eliminate remaining T-12 lamps in commercial buildings	I	352	500,000 sf of facilities retrofitted with efficient lighting, electricity cost of $0.126/kWh, annual lighting usage of 6.85 kWh/sf, 30% savings with retrofit of 1,027,500 kWh/yr.
Work 1.2	Efficient Lighting Incentives: Leverage through Community Energy Partnership and promote and leverage existing incentives for efficient lighting to eliminate remaining T-12 lamps in commercial buildings	II	352	500,000 sf of facilities retrofitted with efficient lighting, electricity cost of $0.126/kWh, annual lighting usage of 6.85 kWh/sf, 30% savings with retrofit of 1,027,500 kWh/yr.

Work 1.2	Efficient Machinery Incentives: Leverage through Community Energy Partnership and promote and leverage existing incentives targeted at process machinery efficiency for both SCE and SCG	II	100	EcoMotion estimate
Work 1.2	Demand Response Program: Promote through Community Energy Partnership and encourage businesses to enroll in Southern California Edison Energy Efficiency and the Pilot Demand Response program	II	193	100 businesses participating, (assume 4000 kWh and 100 therms Nat Gas saved per business annually) saving 400,000 kWh and 10,000 therms Nat Gas saved annually
Work 1.2	Energy Audits: Leverage through Community Energy Partnership and promote energy audits for major buildings and confirm replacement/upgrade schedule to comply with AB 1103	II	730	1,000,000 sf community wide (approx. 50 buildings), 15.6 kWh/sf usage .35 therms Nat Gas/sf usage, achieve 10% electricity and natural gas savings post-audit, savings of 1,558,000 kWh, 35,000 therms Nat Gas
Work 1.3	SCE & SCG Business Incentives: Promoted through Community Energy Partnership and utility incentives targeted at small businesses for both SCE and SCG	II	193	100 businesses participating, (assume 4000 kWh and 100 therms Nat Gas saved per business annually) saving 400,000 kWh and 10,000 therms Nat Gas saved annually
Work 1.3	Plan Checking and Permitting: Expedite plan check process for tenant improvements that reduce carbon emissions	I	133	140 businesses, 30% kWh savings , 5% Natural Gas savings
Goal SP - Work 2: Maximize water efficiency in businesses and institutions.				
Work 2.1	Water Efficiency/Conservation Ordinance: Explore adoption of additional commercial-sector water conservation and efficiency standards	II	1,000	20% savings for medium and large users
	Subtotal:	**19**	**12,991**	

Sustainability Policy	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)	Assumptions
Goal SP - Build 1: Maximize cost-effective energy efficiency in new construction and existing facilities				
Build 1.1	New and Efficient Construction: Promote the Savings by Design Program from Southern California Edison	II	137	Provide information to local builders/remodelers on how to access and leverage this design assistance. ..25 homes a year
Build 1.1	Plan Checks and Permitting: Expedite plan check for energy efficient building projects and remodels	I	81	1% of housing stock (140 homes), 8,661 avg. kWh usage, 20% kWh savings (1,732 kWh)
Build 1.2	Green Home Tours and Recognition: Promote programs and provide energy efficient builders with recognition at Council; administer efficient/green home tours annually	II	28	Provide tours at minimal cost to local homes and small businesses…1 tour a year…yield 6 new homes build green over phase
Build 1.2	Green Home Tours and Recognition: Promote programs and provide energy efficient builders with recognition at Council; administer efficient/green home tours annually	III	28	Provide tours at minimal cost to local homes and small businesses…1 tour a year…yield 6 new homes build green over phase
Build 1.2	Affordable Housing: Promote the construction of energy-efficient affordable housing with private-sector partners	I	128	115 new housing units, 16,000 kWh and 400 therm Nat Gas typical use annually, 25% savings at 197,829 kWh, 10,666 therms Nat Gas
Build 1.3	Shade Trees: Augment existing tree program and leverage Tree City USA status to promote properly sited and selected shade trees to reduce heat islands and provide shade to offset air conditioning on public land and provide expanded services to encourage tree planting on private land	I	35	500 trees, $0.126/kWh, 204 kWh saved per mature tree annually, $224 to plant each tree (CAPPA defaults) saves 102,000 kWh
Build 1.3	Solar Energy Generation: Promote Solar on existing carport and parking structures	III	172	Add 250 kW of residential solar PV producing 501,875 kWh annually
Build 1.3	Heat Island Effect: Program to reduce the heat island effect through the promotion of parking lot coverings and coatings and semipermeable surfaces	II	3	25 homes savings 5% of electricity annually from reduced AC saving 8,601 kWh/annually
Build 1.3	Cool Roofs: Promote the installation of reflective roofing on commercial properties in the community with recognition for early adopters	II	15	50,000 sf of roof installed, $0.126/kWh, $1.06/therm Nat Gas, $0.25/sf of incremental cost of Energy Star roofing saving 42,100 kWh

Build 1.3	Lighting Controls: Promote energy-efficient lighting linked to building controls and occupancy sensors	II	822	1,000,000 sf of facilities retrofitted with efficient lighting, electricity cost of $0.126/kWh, annual lighting usage of 6.85 kWh/sf, 35% lighting savings with retrofit of 2,397,500 kWh
Build 1.3	Local Energy Programs: Promote Energy Upgrade California program to incentivize residential energy efficiency projects	I	17	25 residential upgrade projects saving 20% electricity and 10% natural gas
	Subtotal:	**11**	**1,466**	

Sustainability Policy	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)	Assumptions
Goal SP - Mobility 1: Reduce emissions from automobiles and trucks.				
Mobility 1.1	Bus Routes: Explore OCTA route reform to promote smaller buses and more routes/frequencies.	III	546	250 new daily transit passengers, 9.4 passengers per bus, 2.7 leverage factor, 9.8 miles avg. trip length, 19.7 mpg vehicle displaced saving 1,521,450 annual vehicle mile reduction, 77,231 gallons of fuel
Mobility 1.1	Bus Rider Incentives: Promote the benefits of OCTA buses to increase ridership, provide promotions and incentives for new riders	III	83	150 additional passengers, 9.8 mile avg. one-way commute savings of 149 gallons/yr.
Mobility 1.2	Hybrid and Alternative Fuel Vehicles: Promote the purchase of hybrid and alternative fuel vehicles in the community	II	6	40 cars saving 349 gallons per vehicle, $1,048 per vehicle
Mobility 1.2	CNG/EV Charging Stations: Work in partnership with private sector to promote CNG and EV charging stations with public access	II	57	20 electric vehicles purchased saving 6,091 gallons of gas
Mobility 1.2	Car Share: Promote ZIP or Car Share programs through preferential parking and promotion with signage	II	195	200 new car share participants, 30% reduction in vehicle miles, 6,720 avg. annual vehicle miles per person (half Brea avg.)before car share, 19.5 mpg fuel economy 403,200 fewer miles driven saving 20,677 gallons of gas
Mobility 1.2	Van-pools: Encourage, partner, and recognize major employers for employee van-pools	II	10	50 employees offered carpool/vanpool, 8% reduction in commute vehicle trips, 9.8 mile avg. one-way length, 19.7 mpg avg. fuel economy saving 19,520 mile reduction, 990 gallons of gas
Mobility 1.2	Municipal Employee Commute: Employee commute program for Municipal employees	II	198	300 full time employees…assuming the 9/80 plan, one day a week carpool or alternative transportation, using the 5,732 VMT provided by staff for the Brea GHG inventory. Saving 30,457 gallons of gas annually
Mobility 1.2	Electric Vehicle Charging Station: Seek grant funding and private sector partnerships to install 10 EV charging stations on public property	I	60	Supporting an assumed 100 cars saving 3,055 gallons of gasoline per vehicle/yr.
Mobility 1.2	Electric Vehicle Charging Station: Seek grant funding and private sector partnerships to install 10 EV charging stations on public property	II	60	Supporting an assumed 100 cars saving 3,055 gallons of gasoline per vehicle/yr.
Mobility 1.3	Anti-idling: Craft and implement an “anti-idling” ordinance for private automobiles and commercial vehicles	III	100	50 trucks reduced…Per vehicle, idles 1 hour every day for 240 days a year, 1 gallon of diesel used per hour of idling, $3/gallon of diesel 240 gallons per vehicle/yr., $720 per vehicle/yr.
Mobility 1.4	Eco-conscious Driving: Promote eco-conscious driving campaign for residents to maximize fuel efficiency and minimize emissions through improved awareness of conservative and fuel efficient driving behaviors, reduced wind resistance, reduced idling, higher tire pressures, regular maintenance,	I	60	100 participants who travel 13,441(Brea average) miles per year and save an average of 2 miles per gallon with their vehicles. Saving 6,412 gallons of gas annually
Mobility 1.4	Bike and Walk Way Expansion: Expand bikeways, bike lanes on existing streets, "The Tracks at Brea" trail, and walking paths connecting residential neighborhoods and commerce	I	5	100 weekly trips switching from cars to walking/biking, avg. distance 2 miles, 19.5 mpg car displaced, saving 533 gallons of gas
Mobility 1.4	Golf Carts: Explore a coordinated state legislation to implement a “golf carts” ordinance for low speed streets	III	287	100 new electric cars, 19.7 mpg vehicle replaced, average annual miles per vehicle, $3/gal gas, $0.207/kWh saving 30,457 gallons,

Mobility 1.4	Shared Bicycles: Partner with private vendors and provide "Shared Bicycle Program" for daily trips using public/private partnership model	II	17	50 bikes available, avg. 2 trips a day per bicycle, 2 mile avg. trip length savings 1,853 gallons of gas,
Mobility 1.4	Police Bicycles: Promote use of bicycles for police use through training and operations support	I	2	10 trained bike officers using bikes 10 days a year each...16 mpg per police car, 12,042 miles driven annually, Saving 230 gallons of gas annually
	Subtotal:	**15**	**1,686**	

Sustainability Policy	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)	Assumptions
Goal SP - Govern 1: Manage energy use in new and future public and private facilities.				
Govern 1.1	Residential Solar and Energy Efficiency: Support residential solar systems, and residential energy efficiency through building envelope improvement	II	660	500 kW of residential solar PV installed producing 1,003,750 kWh/annually saving $207,776 annually...100 homes (2,500 sq. ft.) targeted saving 779,000 kWh and 8,750 therms Nat Gas annually...$170,528 saved
Govern 1.1	The Temperature Club: Promote community partnership through policies to adjust indoor temperatures to save energy	I	97	100 business participating, 4000 kWh/yr. reduction 100 therms Nat Gas/yr. reduction
Govern 1.1	Transit Oriented Development: Promote transit oriented development to foster development in line with Bus Rapid Transit corridors	II	1,188	200 residential units saving an assumed 4,770 annual VMT per household
Govern 1.1	Payback Threshold Policy: Consider City's Energy Action Plan to invest in measures with less than a four-year, simple payback	II	500	EcoMotion estimate
Govern 1.1	EEMIS: Maximize use of the Los Angeles County Energy Enterprise Management Information System (EEMIS) to manage municipal facilities	I	116	3% of Municipal Electricity and Natural Gas 478,046 kWh and 29,288 therms Nat Gas
Govern 1.1	Benchmarking: Participate in regional benchmarking program to gauge relative energy use and efficiency of major facilities	I	77	2% of Municipal Electricity and Natural Gas 318,697 kWh and 19,525 therms Nat Gas
Govern 1.1	Efficient and Green New Construction: Continue to construct all new municipal buildings to achieve LEED guidelines or equivalent program	III	182	25% electricity and natural gas savings, 100,000 sq. ft., $0.126/kWh, $1.06/therm Nat Gas savings 389,000 kWh, 8,750 therms Nat Gas
Govern 1.2	Community Energy Partnership: Continue to actively partner with serving utilities to fully leverage Community Energy Partnership energy efficiency and demand response programs in municipal facilities	I	833	Community Energy Partnership savings of 2,892,492 kWh as reported in Community Energy Partnership Team Leaders Meeting presentation Jan 2010- March 2011
Govern 1.2	Group Purchasing: Promote and participate in group purchasing of energy efficiency goods and services with other Community Energy Partnership cities	I	15	Due to cost savings... assume a Municipal reduction per the Energy Plan of 0.5% Saving 52,917 kWh
Govern 1.2	Public/Private Partnerships: Explore private-public partnerships for renewables and energy efficiency (performance-based contracts and power purchase agreements)	I	688	1000 kW of solar PV generating 2,007,500 kWh
	Subtotal:	**10**	**4,356**	

Sustainability Policy	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)	Assumptions
Goal SP - Recreate 1: Maximize energy efficiency in Brea hotels and recreational facilities.				
Recreate 1.1	Energy Management Systems: Promote the installation of key card based energy management system for hotels in Brea	II	260	Assumed 5% savings in hotel energy usage
Recreate 1.1	"Brea Green" Promotion: Work with hospitality sector to define and promote “Brea Green” for conference venues, hotels, etc.	II	20	Includes waste avoided to landfill and kWh saved...Does not include increased emissions from event participant's travel and stay.

Recreate 1.1	Sustainable Events: Develop a checklist to help special purpose events to be sustainable with net zero energy and waste	II	2	Waste avoided to landfill, kWh saved
Recreate 1.1	Restaurant Composting: Partner with Orange County Health Department and provide information for a pilot restaurant composting and recycling program for restaurants	II	40	Assume 300lbs saved/per cap/yr….assume $1.00 savings per cap/yr.
Recreate 1.1	Neighborhood Electric Vehicle Program: Promote Neighborhood Electric Vehicles and consider designing a program for implementing the use of such vehicles for Brea visitors and workers	III	6	10 cars 611 gallons per vehicle, $1,833 per year
Recreate 1.1	Comprehensive Pool Efficiency: Promote all manner of pool efficiency: variable speed pool pumps, covers, solar heating, etc.	II	100	Target 1000 pools
Recreate 1.2	Drought Tolerant Landscaping: Promote reduced need for golf course and green space irrigation through design and use of drought-tolerant plants	II	2	2 courses 1-18 hole and 1-9 hole
Recreate 1.2	Irrigation Control Sensors: Promote the installation of weather-based irrigation control sensors at parks and golf courses	III	33	26% savings, 100 acres, 218,000 gallons of water used per acre, $0.0025/gallon, 0.0035 kWh/gallon, $50/acre to install sensor saving 50,856,000 gallons of water, 177,996 kWh,
Recreate 1.2	High Efficiency Water Pumping: Promote highly efficient water and reclaimed water pumping for Brea golf courses	II	6	Default water savings for 2 courses (1-18 hole and 1-9 hole)
Recreate 1.2	Reclaimed Water Initiative: Promote and facilitate the design and implementation of a reclaimed water initiative for the city golf courses and other City facilities where possible	III	4	2 courses 1-18 hole and 1-9 hole (EcoMotion estimate)
Recreate 1.2	Storm Water Capture: Promote storm water capture and retention for exterior landscape use (cisterns, rain barrels) through partnerships with regional water suppliers	II	2	Implement free or reduced-cost rain barrel program with additional design, best practices, and building assistance for cistern construction with a goal of 400 units saving an average of 730 gallons per unit/year saving 292,000 gallons a year
Recreate 1.2	Ball field Lighting Timers: Promote the installation of high efficiency lighting and timers for all ball field or other recreational lighting at schools and city facilities (similar to Junior High Park project)	II	60	120 high-pressure sodium lamps cut back 2 hrs. every day saving 175,200 kWh/yr….Brea has additional numbers on their project's success
	Subtotal:	**12**	**535**	

Sustainability Policy	Implementation Measure Description	Phase	Annual Savings (Tonnes CO_2e)	Assumptions
Goal SP - Learn 1: Support education of Brea students about "green careers."				
Learn 1.1	Workforce Development: Promote workforce development in partnership with local colleges such as California State Fullerton Business College to promote "green careers"	II	4	Estimated blended cumulative savings from green education in the community through individual EE measures, efficiency gains through educated purchases and actions
Learn 1.1	Sustainability Education: Target residents and students with education on sustainability and smart energy management such as LED Lighting, high SEER AC units, insulation, better windows, etc.	I	476	1,400 households targeted, 8661 kWh and 300 therm Nat Gas annual consumption, 10% electricity savings, 5% gas savings, $0.126/kWh, $1.06/therms Nat Gas saving 963,340 kWh, 25,970 therms Nat Gas, $162 per household
Learn 1.1	Community Energy Champion: Solicit nominations and promote a community Energy Champion to show value of efficiency and its energy, dollar, and carbon savings	I	50	Estimated blended cumulative savings from energy education in the community through individual EE measures, efficiency gains through educated purchases and actions
Learn 1.1	Green Building Lectures and Continuing Education: Provide lectures, seminars and training on energy efficient and green building options with emphasis on residential through web site and over the counter services	II	219	4 new homes added/rehabbed annually 468,000 kWh and 10,500 therms Nat Gas saved annually

Learn 1.1	Green Business Lectures and Continuing Education: Provide lectures, seminars and training for businesses	II	12	2 business added annually 23,000 kWh and 734 therms Nat Gas saved
Learn 1.1	Green Business Education: Target businesses for special "Energy Efficient and Green Education Program" or energy "tune-ups"	II	97	50 businesses targeted, (assume 4000 kWh and 100 therms Nat Gas saved per business annually) saving 200,000 kWh and 5,000 therms Nat Gas saved annually
Learn 1.2	Internships: Provide internships in Public Works and Community Development related to sustainability	II	4	Estimated blended cumulative savings from green education in the community through individual EE measures, efficiency gains through educated purchases and actions
	Subtotal:	**7**	**862**	

Grand Total:	**88**	**35,144**

AB 32 Target	34,772
Brea "Low Growth" AB 32 Target	30,150

Appendix B: City of Brea 2012 Greenhouse Gas Inventory

Appendix C: Glossary of Terms and Abbreviations

This glossary contains definitions for common terms and abbreviations used in the Brea Sustainability Plan. The definitions were adapted from a number of sources including the U.S. Environmental Protection Agency, the California Air Quality Board website, Merriam-Webster Online, and Wikipedia.

AB 32: See California Assembly Bill 32, the Global Warming Solutions Act of 2006.

Adaptation: The ability of a system to adjust to the potential impacts of climate change or other environmental disturbances. Compare to Mitigation, which means the ability to reduce the amount of emissions caused by an activity.

Alternative Fuels: Substitutes for traditional fossil-fuel-derived liquid motor vehicle fuels like gasoline and diesel. Alternative fuels include biodiesel, hydrogen, electricity, compressed natural gas, methanol, ethanol, and mixtures of alcohol-based fuels with gasoline.

Alternative Fuel Vehicle: A vehicle powered by an alternative fuel as opposed to traditional gasoline or diesel.

Anthropogenic: Refers to greenhouse gas emissions or reductions that are a direct result of human activities.

Assembly Bill 32 (AB 32): The Global Warming Solutions Act of 2006 is the law that set the State of California's 2020 greenhouse gas emissions reduction target of reducing greenhouse gas emissions to 1990 levels. It also directed the California Air Resources Board to develop a Scoping Plan to outline how best to reach the 2020 target.

Atmosphere: The blanket of air surrounding the Earth that supports life. The atmosphere absorbs energy from the sun and retains heat. It also recycles water and other chemicals and protects the Earth from high-energy radiation and the frigid vacuum of space.

Baseline Emissions: The amount of greenhouse gas emissions released in a designated year against which future changes in emissions levels are measured. The baseline year for the Brea Greenhouse Gas Inventory is 2010.

BAU, or Business as Usual: What to expect in the normal course of events.

Biodiesel: A form of diesel fuel manufactured from vegetable oils (used or new) or animal fats. Biodiesel can be used in its pure form (B100) or blended with petroleum diesel in varying proportions.

Building Envelope: The physical separation between the interior and the exterior of a building – made up of the walls and insulation, windows and doors, roof, foundation, etc. The envelope serves as the outer shell (sometimes called the skin) of the building, and allows for control of the indoor environment (e.g., heating, cooling, moisture control, air pressure).

California Public Utilities Commission (CPUC): Regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. Its purpose is to "protect consumers and ensure the provision of safe, reliable utility service and infrastructure at reasonable rates, with a commitment to environmental enhancement and a healthy California economy."

Carbon Dioxide (CO_2): The dominant greenhouse gas. CO_2 also serves as the reference to compare all other greenhouse gases (see Carbon Dioxide Equivalent). The major source of CO_2 emissions is fossil fuel combustion. Significant CO_2 emissions are also produced by forest clearing, biomass burning, and non-energy production processes such as cement production.

Carbon Dioxide Equivalent (CO_2e): A metric used to compare emissions of various greenhouse gases. The greenhouse gas inventory process converts all other gases to their carbon dioxide equivalents by multiplying the mass of the gas by its global warming potential.

Carbon Footprint: The total set of greenhouse gas emissions caused directly and indirectly by an individual, organization, event, or product. The Greenhouse Gas Inventory measures the carbon footprint of local government operations as well as of the entire community.

Climate: The average weather (usually taken over a 30-year time period) for a particular region and time period. Climate is not the same as weather. It is the average pattern of weather for a particular region. Climatic elements include average annual temperature, humidity, sunshine, wind speed, precipitation, and other measures of atmospheric conditions.

Climate Action Plan: A plan that is in set in place for a city or other jurisdiction to follow in order to control and improve its energy use and emissions

CEP or Community Energy Partnership: A partnership aimed at promoting energy efficiency through programs and incentives offered to Brea by Southern California Edison and Southern California Gas.

Demand Response: Actions or programs offered by the local utility to induce ratepayers to temporarily reduce or shift peak electrical consumption when so requested. These requests would typically be in response to either a constrained electrical grid or suddenly increasing electrical prices.

Emissions: Pollution (including noise, heat, radiation and greenhouse gases) discharged into the atmosphere by individual, residential, commercial, and industrial activities and facilities. A greenhouse inventory measures emissions from a variety of sources (for example: from the

burning of natural gas or of transportation fuels) and sectors (such as from industrial or residential buildings).

Emissions Coefficients: The greenhouse gas "impact" that comes from a given utility's fuel mix. Every electric utility, for example, generates power from a "portfolio" of power sources: natural gas plants, nuclear plants, dams, etc. That utility's emissions coefficients are determined by its specific mix. The coefficients change on a year-to-year basis.

Energy Conservation: Reducing energy consumption. Energy conservation can be achieved by simply turning off appliances or equipment, or through advances in efficiency (getting the most productivity from each unit of energy).

Energy Efficiency: Using less energy to provide the same level of service or complete the same task. For example, a more efficient light will use less electricity to provide the same amount of illumination.

Flexible Work Arrangements: Work arrangements that allow employees to deviate from a set schedule or location. This could include options for telecommuting, working a compressed work week, and starting or ending the workday at times other than conventional shift times.

Fuel Efficiency: The distance a vehicle can travel on an amount of fuel. This is most often measured in miles traveled per gallon of fuel. A higher-efficiency vehicle travels farther on a gallon of fuel than similar vehicles.

Fuel Mix: Every electric utility generates power from a "portfolio" of power sources: natural gas plants, nuclear plants, dams, etc. That utility's fuel mix determines its emissions rate per kWh of electricity produced. In California, the Renewable Portfolio Standard regulates the utility mix.

Fugitive Emissions: Miscellaneous emissions released from a given activity, like refrigerants released as a result of leaks, fertilizers from golf courses, etc.

General Plan: A long-range policy document to guide land use decisions about physical, economic, and environmental growth. California State law requires counties and cities to have a General Plan which contains seven elements: Land Use; Transportation; Housing; Open Space; Conservation; Safety; and Noise. County general plans cover unincorporated areas.

Global Protocol for Community-Scale GHG Emissions: A tool to assist local governments to develop community-scale inventories, developed by C40 Cities Climate Leadership Group and ICLEI Local Governments for Sustainability In collaboration with: World Bank, UNEP, UN-HABITAT, and the World Resources Institute.

Global Warming: An increase in the near-surface temperature of the Earth. Global warming has occurred in the distant past as the result of natural influences, but the term is most often used

to refer to the warming occurring now or predicted to occur as a result of increased emissions of greenhouse gases due to human activity. Also known as “climate change” given the anticipated variations in heating and cooling, floods and droughts, etc.

Global Warming Potential: A value that is used to compare the abilities of different greenhouse gases to trap heat in the atmosphere. GWPs are based on the heat-absorbing ability of each gas relative to that of carbon dioxide (CO2). For example, methane has a global warming potential of 21.

Green Building: A structure constructed using materials and building practices that reduce its impact on the environment throughout its entire life (siting, design, construction, operations, and deconstruction). Green buildings are resource efficient, using less energy, water, and other materials.

Green Infrastructure: The network of trees, plants, and natural ecosystems in a community. These provide services to a community, such as decreasing rainwater runoff, providing healthy soils, removing air pollutants and greenhouse gases from atmosphere, and providing shade and beautification.

Greenhouse Effect: Carbon dioxide and other atmospheric gases warm the surface of the planet by trapping heat close to the surface of the Earth. In a natural state, the greenhouse effect warms the planet, making it habitable by humans. However, human activities have dramatically increased the amount of carbon dioxide and other greenhouse gases in the atmosphere. Higher levels of greenhouse gases trap more heat, causing average global temperatures to rise.

Greenhouse Gas (GHG): A gas, including water vapor, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), which traps heat close to the surface of the Earth, contributing to global warming and climate change.

Greenhouse Gas Inventory (GHG Inventory): The EPA defines a GHG Inventory as follows: **“**A greenhouse gas inventory is an accounting of greenhouse gases (GHGs) emitted to or removed from the atmosphere over a period of time. Policy makers use inventories to establish a baseline for tracking emission trends, developing mitigation strategies and policies, and assessing progress. An inventory is usually the first step taken by entities that want to reduce their GHG emissions.”

Infrastructure: The basic shared physical structures needed for an urban area to function in an efficient, safe manner. The term typically refers to items such as roads, drinking water systems, sewers, energy systems, and telecommunication systems in a community.

Grid: The transmission and distribution system for electricity made up of a network of synchronized power providers and operated by one or more control centers. The United States mainland has three grids: the Eastern Interconnect, the Western Interconnect, and the Texas Interconnect.

ICLEI, International Council for Local Government Initiatives, now known as Local Governments for Sustainability USA: International organization at the forefront of measuring greenhouse gases. Developed the first inventories starting in 1990. Today, members come from 70 different countries and represent more than 569,885,000 people. ICLEI provides technical consulting, training, and information services to build capacity, share knowledge, and support local government in the implementation of sustainable development at the local level.

LGOP, **Local Government Operations Protocol**: A standard set of guidelines developed by ICLEI, the World Resources Institute and the California Air Quality Board, aimed at assisting local governments in developing their greenhouse gas inventories.

Kilowatt (kW): A unit of power equal to one thousand watts. The amount of power that a power source has the capacity to generate is typically measured in terms of kW (or, in the case of larger systems, in terms of megawatts (MW). Kilowatt-hours (kWh), by contrast, is a measure of how much energy is actually used or generated over a specific period of time (i.e., one hour).

Kilowatt-hour (kWh): An amount of electricity equivalent to the use of one kilowatt for one hour. A hundred watt light bulb that is on for 10 hours uses one kilowatt-hour of electricity (100 watts x 10 hours = 1,000 watt-hours = 1 kilowatt-hour).

Kyoto Protocol: A treaty negotiated in December 1997 at the city of Kyoto, Japan. It committed its signatories to reduce their collective emissions of greenhouse gases by 5.2% compared to the year 1990. Some 37 industrialized countries and the European Community signed the treaty, which provided for a number of flexible mechanisms to reach the reductions goals. The United States did not sign the treaty, and Canada withdrew from the treaty in 2011.

LEED or Leadership in Energy and Environmental Design: A building certification program run under the auspices of the U.S. Green Building Council (USGBC). LEED concentrates its efforts on improving performance across five key areas of environmental and human health: energy efficiency, indoor environmental quality, materials selection, sustainable site development and water savings.

Measures: The primary component of the Climate Action Plan. The "implementation" measures are specific short and long-term policies, programs, and actions that the organization will carry out to reduce its greenhouse gas emissions.

Megawatt (MW): One million watts. A typical power plant generates 500 - 1,000 MW of power.

Methane (CH4): A greenhouse gas that traps 21 times the amount of heat as carbon dioxide. Methane is produced through the decomposition of waste in landfills, animal digestion, decomposition of animal wastes, incomplete fossil fuel combustion, and the production and distribution of natural gas, oil, and coal.

Metric Ton (or tonne): Common international measurement for the quantity of greenhouse gas emissions. A metric ton is equal to 2,205 lbs. or 1.1 short tons (the common form of ton used in the United States).

Mitigation: A human intervention to either reduce the amount of greenhouse gases being emitted into the atmosphere or remove previously emitted gases from the atmosphere.

Nitrous Oxide (N_2O): A greenhouse gas with the ability to trap 320 times the amount of heat as a molecule of CO_2. Major sources of nitrous oxide include soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.

Off-Peak: The opposite of Peak (see below), that is, the time or hours of the day when demand for electricity is at its lowest.

PACE, or Property Assessed Clean Energy financing: PACE financing, first enabled in California by AB 811 in 2008 and then spreading across the country, makes it possible for financing of energy upgrades to be repaid via a property tax assessment. PACE programs may be set up and administered by local governments or by third parties.

Peak Usage Period or Peak Demand: The time period during which the maximum level of demand for electricity occurs. Peak demand may be measured daily, monthly, seasonally or yearly, but for a utility it is typically the single half hour or hour representing the highest point of customer consumption of electricity on a given day.

Photovoltaic (PV): Refers to the effect of sunlight (photons) generating electricity without mechanical conversion. Typically used in conjunction with the equipment associated with a solar electric system, such as “PV panels” or “PV system.”

Renewable Energy/Power: Energy generated from sources that are naturally replenished or not used up in the course of providing power (e.g., wind, solar, biomass, and geothermal). This is in contrast to the burning of fossil fuels, which destroys the fuel source and thereby depletes the overall amount of fuel available.

Renewable Portfolio Standard (RPS): Each electric utility generates power through a “portfolio” of sources: natural gas power plants, nuclear plants, large hydroelectric plants, etc. In California, the make-up of the portfolio is regulated by the Renewable Portfolio Standard. In

2010 the standard was raised to require 33% of all energy be from “renewable sources” by 2020.

SB 375: California Senate Bill 375, passed in 2008, was designed to reduce vehicle emissions by integrating land use with transportation planning.

Sequestration: The uptake and storage of carbon from the atmosphere. Most commonly refers to trees and plants absorbing carbon dioxide through photosynthesis.

Smart Grid: An electricity system that utilizes two-way communication between power suppliers and consumers. This allows for adjustments to a facility’s operations to save energy, reduce cost, and increase the reliability of the power supply. A smart grid includes a monitoring system at facilities that can turn off or adjust systems to reduce demand at peak times when power is more expensive. For example, a smart grid could temporarily turn off selected appliances, such as washing machines, or adjust a building temperature by a few degrees to save power.

Smart Meter: An electrical meter that tracks power consumption in real-time, communicates with the local utility company for monitoring and billing purposes, and (if connected to a smart grid) can adjust a building’s energy use automatically to reduce demand on the power grid at peak use times.

Solar Panel: A photovoltaic cell that can convert light directly into electricity. Typical solar cells use semiconductors made from silicon.

Solar Thermal: Refers to devices that use the heat from the sun to heat water.

Strategies: Groups of similar emissions reduction measures included in the Climate Action Plan.

Sustainability: In a broad sense, the capacity to endure. In ecology, the word describes how biological systems remain diverse and productive over time. For human society, it is the potential for long-term maintenance of well-being, which in turn depends on the well-being of the natural world and the responsible use of natural resources. Sustainability has multiple facets: environmental, economic, and social.

Therm(s): A unit of measurement of natural gas. A single therm is approximately the energy equivalent of burning 100 cubic feet of natural gas. It is equivalent to 100,000 British thermal units (BTU) or about 29.3 kilowatt-hours of electrical energy.

Tonne: see Metric Ton

U.S. Environmental Protection Agency (EPA): The Federal environmental science, research, education, assessment, and regulatory agency. The mission of the Environmental Protection Agency is to protect human health and the environment.

Waste Characterization Study: An analysis of a facility's waste not being recycled or composted that involves sorting the garbage produced by type (e.g., paper, food waste, plastic) to determine what is being thrown away.

Waste Diversion: A waste reduction strategy focused on the recycling or composting of materials, diverting what would otherwise have been sent to a landfill for use in new products or materials. The waste diversion rate refers to the percentage of wastes being reduced, reused (repurposed), and recycled.

Waste Reduction: Techniques such as source reduction, recycling, or composting that reduce waste generation or prevent waste from being created at all.

Waste Stream: The total flow of solid waste from homes, businesses, institutions and manufacturing plants that is recycled, composted, burned, or disposed of in landfills.

Watt: The standard measure of an amount of energy, usually electricity. For example, a 60 watt light bulb requires 60 watts of electricity to turn on. Energy use is measured in terms of the number of watts used over a period of time (see kilowatt-hour).

Weather: The specific condition of the atmosphere at a particular place and time. It is measured in terms of such factors as wind, temperature, humidity, atmospheric pressure, cloudiness, and precipitation. In most places, weather changes from hour to hour, day to day, and season to season. Climate is the average of weather over time and space. A simple way of remembering the difference is that climate is what you expect (e.g., cold winters) and weather is what happens (e.g., a blizzard).

Appendix D: City of Brea 2012 Energy Action Plan