

Hermosa Beach Municipal Carbon Neutral Plan



kaizenenergy

Prepared for the City of Hermosa Beach
and the Southern California Association of Governments
January 2015

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The preparation of this report has been financed in part through grant(s) from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) through the U.S. Department of Transportation (DOT) in accordance with the provisions under the Metropolitan Planning Program as set forth in Section 104(t) of Title 23 of the U.S. Code.

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Hermosa Beach Municipal Carbon Neutral Plan

Hermosa Beach's Climate Action Baseline

Municipal Greenhouse Gas Emissions Inventory

A recent draft update to Hermosa Beach's greenhouse emissions inventory for municipal operations indicates that streetlights and traffic signals, vehicle fleet, and building and other electricity make up Hermosa Beach's top three municipal emissions sources. The City's municipal operations inventory is being updated as part of the Energy Efficiency Climate Action Plan process. The 2005 inventory is compared to the draft 2012 inventory below.

Top Municipal Operations Emissions Sources in Hermosa Beach (2005 to 2012)

Emissions Source/Activity (Scope)	2005 MT CO ₂ e (% of total)	2012 MT CO ₂ e (% of total)	% Change in MT CO ₂ e (2007-2012)
Streetlights and Traffic Signal Electricity (2)	405 (27%)	359 (26.2%)	-11.4%
Employee Commute (3)	348 (23.2%)	218 (15.9%)	-37.4%
Building & Other Facility Electricity (2)	301 (20%)	305 (22.2%)	1.3%
Vehicle Fleet (1)	227 (15.1%)	328 (23.9%)	44%
Solid Waste - Contract Services (3)	215 (14.3%)	162 (11.8%)	-24.7%
Total	1,501	1,372	-8.6%

Source: EECAP Final Inventory, Forecasting, and Target-Setting Report. Note: Some 2005 figures in EECAP Draft inventory are inconsistent with [2005 & 2007 Inventories](#).

City of Hermosa Beach Actions toward Carbon Neutrality

Like many communities in California, the City of Hermosa Beach has developed a number of plans and strategies to address climate change and reduce the city's greenhouse gas emissions. The latest effort, an Energy Efficiency Climate Action Plan (EECAP), has provided the City of Hermosa Beach with a foundation in development of a comprehensive Climate Action Plan (CAP) by understanding community and municipal energy use, identifying local level



strategies resulting in long term energy efficiency, developing implementation plans, and establishing progress reports.

In pursuit of carbon neutrality, the City of Hermosa Beach has taken progressive steps in the planning, collaborating, and goal-setting for GHG reductions. Since setting the goal of carbon neutrality, the City Council has developed or is working on community discussions, strategic plans, and updates to the General Plan in keeping with its new sustainability targets. They have contracted outside vendors to inventory municipal GHG emissions so City operations and building may become the beacon of carbon reductions for the entire community. As a result of this inventory, the City has begun specific financial and technical assessments of its energy procurement. It has also begun exploring options to reduce energy use, including park and street lighting, and minimize GHG emissions by City operations. In doing so, the City set green purchasing and fleet policy goals to allow considerations for their target reductions and initiated a preliminary review of their employee rideshare program.

The keystone of Hermosa Beach's existing climate action planning activities is the [Hermosa Beach Sustainability Plan](#) prepared by its Green Task Force and accepted by the City Council in 2011. This prior plan is estimated to support a 25% reduction in emissions below 2005 levels by 2020.



Existing Plans, Measures, and Documents Related to Climate Action

Title	Description
<u>Assessing Options to Deliver Carbon Neutral Electricity to the City of Hermosa Beach</u>	A report assessing options to deliver carbon neutral electricity to the City. It focuses on Community Choice Aggregation (CCA) and SCE's version of a Green Tariff Shared Renewables (GTSR) program as solutions.
Assessment and Planning Report for an Energy Efficiency Climate Action Plan (Draft)	Describes actions that the City, the SBCCOG, and region have already taken toward the goals of reduced energy use and GHG emissions, and outlines the process for planning and implementing new measures to continue to work toward those goals. (Prepared by SBCCOG in consultation with city)
<u>Beacon Award Program</u>	Resolution to participate in recognition program "Beacon Award: Local Leadership toward Solving Climate Change Leader Partnership Program" run by the Institute for Local Governments.
<u>Carbon Neutral Issue Paper: City Council Staff Report</u>	The document summarizes issues and actions taken toward carbon reduction for municipal operations. (January 3, 2014)
<u>Carbon Neutral Road Map for Municipal Facilities & Operations</u>	Definitions, actions and target date for carbon neutrality. Summary of accomplishments, 2005 baseline, Sustainability Plan Targets. (SCAG Grant).
<u>Carbon Neutral Scoping Plan</u>	Provides analysis of emissions conditions by sector and identifies scenarios and options for GHG reduction to achieve carbon neutrality (GHG emissions model).
<u>City Council Strategic Plan</u>	The plan sets City Council goals and action plans (5-year/current year), such as a road map to carbon neutrality.
<u>Clean Fleet Policy and Action Plan and Update</u>	City Council adopted the policy, targets, and a plan to green the City fleet.
<u>Community Dialogue: Decision-Making Tool, Quality of Life, Fiscal/Financial</u>	A summary of the community character and what people value about the City. Provides a comparison of the City's financial/fiscal condition as compared to other peer communities. City Council incorporated Decision Making Tool into its Strategic Plan, 2014.



Title	Description
Employee Commute Survey and Reduction Strategies (Draft): 2013 Employee Commute Survey.	Summary identifies strategies for the Employer Commuter Program to support the City's carbon neutrality goal.
Enterprise Energy Management Information System	A program designed to track electricity, natural gas, and water data in real time.
Energy Savings at a Glance Quarterly Report	Reports created by GSE Solutions for the SBCCOG. The reports summarize total annual energy use for all municipal facilities and energy-savings projects completed, in progress, and planned/identified and quantify opportunities for reducing operating costs.
<u>Energy Study Report</u>	This report, by GSE Solutions, assesses the City's options for energy efficiency retrofits and makes recommendations to pursue the most cost-effective options through on-bill financing.
Greenhouse Gas Emissions Inventory: <u>Community-wide</u> and <u>Municipal</u>	Community and municipal GHG inventories per Local Government Operations Protocol and International Local Government GHG Emissions Analysis Protocol. The baseline year is 2005, interim year is 2007, and 1990 is the historic level.
<u>Municipal High-Efficiency Product Procurement Policy</u>	Allows energy efficiency to be a consideration in purchasing.
Solar Project Proposal	Conceptual proposal by PSOMASFMG for 2 solar sites (total system size of 176 kW-DC) with a net purchase price of \$740,843 and annual O&M of \$4,893 in year 1. Sites include solar energy systems mounted on carports at City Hall and Community Center.
<u>Strategy and Steps to Accelerate Energy Reduction and Cost Savings</u>	Report includes recommendations to implement energy reduction projects for City building, park lighting, and street lighting through CIP funds and on-bill financing agreement with SCE and adoption of a Municipal High Efficiency Product Procurement Policy.
<u>Sustainability Plan</u>	A plan of actions to reduce GHG emissions City-wide by 15% from 2005 by 2020.



In-Progress Plans, Measures, and Documents Related to Climate Action

Title	Description
Energy Element: Climate Action Plan	The South Bay Cities Council of Governments (SBCCOG) is developing the EECAP, which is the electricity section of the City's Climate Action Plan. The Energy Element will provide the foundation and framework to develop a comprehensive CAP and put the city on a measurable path toward energy and GHG emissions reductions. This report will describe actions already taken towards reducing energy use and GHG emissions. It will also provide an energy and emissions inventory, forecasts, and targets, potential measures for energy efficiency and GHG reduction, and the proposed processes for public participation, environmental review, and ongoing monitoring processes.
General Plan Update Integrating the Coastal Land Use Plan Focused on Sustainability and a Low Carbon Future	A General Plan Update will be focused on sustainability and carbon reduction targets adopted by the City prior to or through the process.
Municipal Carbon Neutral Plan	This plan helps the City navigate its pathway to Carbon Neutrality and ancillary benefits.





Hermosa Beach Municipal Carbon Neutral Plan

Defining Hermosa Beach's Climate Commitment

Determining the City's Municipal Climate Action Goal

The Elements of a Climate Action Goal

Local governments have various options in defining their climate commitment. The time frame, magnitude, boundary, and control options are detailed in the table below. Goals with larger magnitude reductions and future years that are nearer are seen as more aggressive. For instance, an 80% reduction in emissions by 2030 is viewed as far more aggressive than an 80% reduction in emissions by 2050 or a 50% reduction in emissions by 2030.

Choices for Climate Action Goals

Goal Element	Goal Choices
Time Frame	Choose both: • Base Year - typically in the past • Future Year - the year by which the entity commits to meeting its climate commitment
Magnitude	Choose an absolute or percentage reduction, relative to the base year
Applicable Boundary	Choose one depending on the type of goal: • Organizational boundary (for entities) • Geographic boundaries (for communities)
Control over Emissions	Determine which emissions are within and outside of control: • Direct & indirect emissions (scopes 1 through 3, for entities) • Activities & sources (communities)

Note: Communities and entities will typically use a greenhouse gas accounting protocol to aid in identifying applicable boundaries and control over emissions.

Most goals follow the following format: an X% reduction in boundary-wide greenhouse gas emissions versus Base Year levels by the future year. For example, California's greenhouse gas reduction goal is to achieve 1990 levels in statewide emissions by 2020. This is a 0% reduction in all statewide emissions (adjusting for electricity imports) versus 1990 levels by 2020.

The most common local climate commitment is the U.S. Mayor's Climate Protection Agreement. Mayors from the 1,060 cities that have signed onto the agreement indicated their City's



commitment to “strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking actions in our own operations and communities.” Kyoto targets were 7% below 1990 levels by 2012. Former Hermosa Beach Mayor Sam Edgerton III signed onto this agreement.

In commissioning this Carbon Neutral Plan for Municipal Operations, Hermosa Beach wishes to explore the feasibility of a 100% reduction in net greenhouse gas emissions. While this determines the magnitude, the City has yet to determine the future year, boundary, and control over emissions. The base year becomes important if Hermosa Beach seeks to go beyond carbon neutrality by offsetting additional emissions to become “climate positive” or “carbon negative”.

Defining the “Carbon Neutral” goal for Municipal Operations

In pursuing carbon neutral municipal operations, Hermosa Beach is striving for a 100% reduction in emissions from local government operations. The key remaining decisions are:

- Determining the future year by which Hermosa Beach plans to achieve carbon neutrality.
- Deciding which local government emissions are subject to the goal.
- Deciding whether to set a goal for “gross” emissions in addition to net emissions. Gross emissions are subtotals before any use of offsets.

In determining the future year, Hermosa Beach must balance its desire to be a state, national, or international climate action leader with a desire to make pursuit of carbon neutrality as cost-effective as possible.

Prior work on greenhouse gas accounting for local governments and prior actions by the California Air Resources Board (ARB) have largely determined which emissions should be subject to Hermosa Beach’s goal. An understanding of these accounting procedures and consideration of the boundary and control decisions made by other cities are useful in determining which emissions the City should seek to neutralize.

Accounting Standards for Local Government Operations

The California Air Resources Board recommends that municipalities that seek to inventory their entity’s emissions use the Local Government Operations Protocol, which it helped develop.

The Local Government Operations Protocol provides specific guidance for accounting and reporting Greenhouse Gas Emissions throughout North America, with additional guidance for California. The Local Government Operations Protocol is based on the North America-specific [General Reporting Protocol](#), published by The Climate Registry. Forty-one US States have declared The Climate Registry’s General Reporting Protocol as their preferred greenhouse gas emissions accounting and reporting guidance. The General Reporting Protocol is based on the



worldwide [Corporate Standard](#), jointly published by the World Business Council on Sustainable Development and the World Resources Institute.

All three documents are used for entity-based greenhouse gas emissions accounting and reporting. Entity-based accounting differs from geographic-based accounting and reporting, which is used to account for and report emissions from the community, a state, or a nation. The [U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions](#) and the IPCC Guidelines for National Greenhouse Gas Inventories are two commonly-accepted guidance documents for geographic-based accounting.

Both entity-based and geographic-based accounting and reporting guidance require an inventory to include gross emissions totals before adjusting for any offsets. Offsets and the inventory's gross emissions after adjusting for offsets are included as an informational item.

Looking at requirements for state agencies may shed light on what accounting procedures local governments would need to use should the state one day mandate greenhouse gas reductions from local government operations. California Law requires state agencies that are [members of the Climate Action Team](#) to estimate their greenhouse gas emissions from their operations. An Executive Order (B-18-12) requires all other state agencies to prepare an annual inventory. The guidance to [state agencies dictates](#) that inventories should be conducted using protocols established by The Climate Registry, which includes the Local Government Operations Protocol.

The following cities in Los Angeles County are members of The Climate Registry: Lomita, Long Beach, Santa Monica, and Vernon. Only Vernon has reported a third-party verified GHG inventory to The Climate Registry. Los Angeles County is also a member of The Climate Registry. The [2005 and 2007 municipal inventories](#) and current draft of the City of Hermosa Beach GHG Inventory, Forecasting, Target-Setting Report for an Energy Efficiency Climate Action Plan also uses the Local Government Operations Protocol.

➤ Because the Local Government Operations Protocol is currently recommended and is the most likely candidate if municipal accounting and reporting were ever made compulsory, Hermosa Beach should use this protocol to determine which local government operations emissions are subject to its carbon neutrality goal.

Defining Organizational Boundaries for the Local Government Organization

Each of the three entity-based reporting standards discussed earlier allows entities the option of reporting emissions using operational control or financial control.



- **Operational Control:** Occurs when an entity wholly owns the operation, facility, or source, or when it has the full authority to introduce and implement operational and health, safety, and environmental policies (including both GHG- and non-GHG-related policies).
- **Financial Control:** Occurs when a local government wholly owns an operation, facility, or source, or is a majority partner in a joint venture. A local government may own an asset (e.g. a transit bus), but not maintain operational control (e.g. transit operations and maintenance are contracted out).

Because of the unique nature of local governments, the Local Government Operations Protocol “strongly encourages local governments to utilize operational control when defining their organizational boundary.” In addition, the Local Government Operations Protocol makes several reporting recommendations for jointly-controlled operations, sources, or facilities.

Organizational Boundaries for Local Governments

Structure	Reporting Recommendation in Local Government Operations Protocol
Joint Powers Authority (JPA)	A JPA is considered a distinct entity; a local government should not report emissions from a JPA of which it is a member.
Special Districts	Special Districts are considered distinct entities; however, a local government may optionally report as scope 3 those emissions which are attributable to the local government (e.g. emissions at a special district operated landfill attributable to the municipal government’s waste)
Community Choice Aggregation	Community Choice Aggregation is a distinct entity when implemented through a Joint Powers Authority; a local government should not report emissions from community electricity used through a CCA. The local government should report emissions from municipal electricity procured via a CCA.



Hermosa Beach should use operational control to define its organization for purposes of GHG emissions accounting and reporting. Scope 3 emissions from special districts can be incorporated on a case-by-case basis, as determined by the relevancy of emissions to municipal operations.

Determining Appropriate Emissions within the Municipal Operations Boundary

To become carbon neutral, Hermosa Beach would have to reduce or offset emissions from all sectors, activities, and sources for which it reports emissions. The Local Government Operations Protocol suggests that municipalities report scope 1 and 2 emissions over which they have operational control from the following 11 sectors:



Local Government Operations Protocol Sectors and Reporting Recommendations for Hermosa Beach

Sector	Operational Control in Hermosa Beach	Recommendation
Buildings and other facilities	✓ Operational control over City-owned buildings.	Report these emissions.
Streetlights and traffic signals	✓ Operational control over City-owned streetlights. ✗ Limited or no operational control of streetlights provided by Southern California Edison.	Report these emissions, including emissions from SCE-owned street lighting.
Water delivery facilities	✗ No operational control: ○ Water is imported, recycled, treated, and supplied by West Basin Municipal Water District. ○ Water is delivered by California Water Service Company (Rancho Dominguez/Hermosa-Redondo).	Consider reporting emissions from water distribution.
Port facilities	✗ No port facilities.	Do not report.
Airport facilities	✗ No airport facilities.	Do not report.
Vehicle fleet	✓ Owned municipal vehicle fleet	Report these emissions
Transit fleet	✗ No operational control. Hermosa Beach is served by Beach Cities Transit (controlled by Redondo Beach, operated by Transportation Concepts), the Los Angeles County Metropolitan Transportation Authority Lines 130 & 232, (operated by MV Transportation), Los Angeles Department of Transportation Commuter Express Route 438 (operated by MV Transportation).	Consider these emissions as an informational item.
Power generation facilities	✗ Service provided by Southern California Edison.	Emissions reported in other sectors as scope 2.



Sector	Operational Control in Hermosa Beach	Recommendation
Solid waste facilities	✓ Operational control via contracting. Athens Services provides haulage and sorting, landfills are owned by a third party.	Report community-wide collection and haulage emissions. Report landfill emissions from waste generated by municipal operations.
Wastewater facilities	✗ Services provided by the Southern California Sanitation Control District / South Bay Cities District.	Consider these emissions as an informational item.
Other process & fugitive emissions	These are cross-sectoral emissions.	Report fugitive emissions of common high-GWP gases (refrigerants and fire suppression systems) over which the City has operational control
Other special districts of which Hermosa Beach is a part These sectors are not included in the Local Government Operations Protocol		
Flood Control	Los Angeles Flood Control District	Do not report.
Vector Control	Los Angeles County West Vector & Vector-Borne Control District	Do not report.
Community Health District	Beach Cities Health District - preventative healthcare for the residents of Hermosa, Manhattan, and Redondo Beach.	Do not report.

Emissions from transit and wastewater are not currently included in Hermosa Beach's greenhouse gas inventory. We recommend they are included as an informational item because these services are provided in Hermosa Beach, but by other local government entities.

Greenhouse Gas Emissions Scopes & Biogenic Emissions

Entity-based accounting guidance also classifies emissions into three scopes depending on the operational control possessed over the emissions. Hermosa Beach should report and neutralize all scope 1 and scope 2 emissions, and certain scope 3 emissions.



Emissions Scopes and Local Government Protocol Reporting Requirements

Emissions Scope	Reporting Recommendation for Selected Sectors
1 - Direct Emissions	Include per Local Government Operations Protocol
2 - Indirect Emissions from Imported Energy, Steam, & Cooling	Include per Local Government Operations Protocol
3 - Other Indirect Emissions	Optional per Local Government Operations Protocol Hermosa Beach should include emissions from: • waste generated by government operations, but disposed of outside its organizational boundary; • emissions from employee commuting; and • emissions from employee business travel (not currently included in the City's municipal inventories). Hermosa Beach should consider including: • upstream life-cycle emissions from goods and services consumed by Hermosa's municipal government.

Anthropogenic versus Biogenic Emissions

Anthropogenic sources represent new greenhouse gas emissions, above and beyond the atmospheric carbon balance that existed before industrialization and use of fossil fuels. Much of the carbon emitted is new atmospheric carbon, formerly trapped underground.

Biogenic or non-anthropogenic sources are considered part of the carbon cycle or result from emissions not caused by humans. Because of this difference, greenhouse gas reporting guidelines differentiate between biogenic and anthropogenic sources of greenhouse gas emissions, reducing gross or net inventory figures by biogenic emissions totals. Biogenic CO₂ emissions from the combustion of biomass should be quantified and reported as an informational item rather than as part of scope 1 emissions.

Climate Action Goals by Other Cities

This section examines the context for Hermosa Beach's climate commitment by looking at aggressive local government goals for both the community and municipal operations. In general, cities have set and pursued aggressive climate action goals because of internal pressure to take action to mitigate climate change and provide an example to others rather than to capitalize on any economic benefits that may accrue to climate action leaders.



Hermosa Beach seeks a reputation as a prominent local climate action leader. While the City's position in California gives it clear guidance on choosing the minimum set of emissions which it should neutralize, Hermosa Beach should look to other cities' goals and use of offsets in order to position itself as a climate action leader. When Hermosa Beach adopts and publicizes a goal, it will be compared first and foremost to current and future goals by other cities in California, followed by cities elsewhere in the U.S. Less weight will likely be placed on comparing goals set by Hermosa with those of major world cities.

Cities in California

Davis: Carbon Neutral Community by 2050

In 2008, the City of Davis adopted, by resolution, [GHG targets](#) for community and municipal operations that put the City on a path toward carbon neutrality by 2050, with average reductions of 2.6% per year between 2015 and 2040. Davis plans to use offsets to neutralize emissions it cannot reduce on its own.

Davis uses the Local Government Operations Protocol to account and report municipal emissions and the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions for community emissions. Within its inventory, Davis includes its vehicle fleet, special equipment, refrigerant leakage, natural gas and facility emissions, electricity (buildings, streetlights, traffic lights, and water & wastewater conveyance), as well as direct emissions from treating and processing water and wastewater. In 2010, Davis adopted its [Climate Action and Adaptation Plan](#), which details the City's past and future climate actions.

The City of Davis reported verified emissions to The Climate Registry for calendar years 2009 and 2010.

Berkeley: Reductions by Popular Demand

In 2006, the voters of the City of Berkeley adopted a GHG reduction target of 80% below 2000 levels by 2050. 82.3% of voters favored [Measure G](#). The Office of Energy and Sustainable Development within the Department of Planning & Development [regularly tracks](#) community and municipal progress. Berkeley does not have a carbon neutrality goal.

Palo Alto: Carbon Neutral Electricity

The City of Palo Alto Utilities [Electricity Supply Portfolio Carbon Neutral Plan](#) outlines a strategy to secure long-term contracts for renewable energy, with use of RPS-eligible unbundled RECs and greenhouse gas offsets in the interim (2013-2016). In 2007, the Palo Alto City Council [adopted a goal](#) to reduce municipal and community GHG emissions 15% below 2005 levels by 2020.



Lancaster: “Solar Capital of the World”

The City of Lancaster’s goal is to become the [Solar Capital of the World](#). In 2011, the City formed the Lancaster Power Authority to install solar photovoltaic arrays at local schools and to partner with private clean energy companies. On March 26, 2013, the City adopted an ordinance that required new single family homes to provide solar-generated power. In 2014, the City started [Lancaster Choice Energy](#), a pending community choice aggregator.

The City does not have a climate action plan. In 2010, it passed a [resolution](#) asking the state to suspend AB 32.

San Francisco: A Cautionary Tale on Ephemeral Climate Goals

In his January 2008 [inaugural address](#), Mayor Gavin Newsom pledged to make the City completely carbon neutral by 2020:

“The most important step we can take is make this city completely carbon neutral, and that is exactly what we’re going to do.... Today I want to pledge to make this City -- and this, by the way this is not one of those fanciful pledges that never gets done, you can't measure, and nothing ever happens, and we come and go, and no one holds us to account. Let us pledge today -- with a specific plan that will follow -- to make San Francisco and City government carbon neutral by 2020. I think that’s a fair, reasonable, as well as an audacious goal.”

The resulting [plan](#), released later that year, contained a goal to reduce community emissions to 20 percent below 1990 levels by 2012 through implementation of reduction strategies and the use of offsets. The plan mentioned neutrality, but did not express a future year to make the goal concrete. In 2008, the City adopted [an ordinance](#) to reduce community-wide emissions 25% below 1990 levels by 2017 and 80% below 1990 levels by 2050.

San Francisco [failed to meet](#) its 2012 goal for reductions in municipal greenhouse gas emissions.

Sacramento: Acting Through the General Plan

Sacramento incorporated its 2012 Climate Action Plan into its 2035 General Plan Update in 2014. The City did this to strengthen the plan’s objectives by including them as general plan policies and implementation measures. The [2014 Draft](#) includes a general plan policy to reduce community-wide emissions 83% below 2005 levels by 2050.

The Sacramento Municipal Utility District (SMUD), which provides electric service to the City and surrounding areas, maintains an [offset program](#) and offers opt-in 50% and 100% renewable options through its [Greenergy](#) product.

Neither the City nor the utility have a carbon neutral goal.



Santa Barbara: Concerned about the Cost of Carbon Neutrality

Santa Barbara considered a municipal carbon neutral goal in 2008 through 2009, but ultimately decided against setting aggressive greenhouse gas reduction targets. According to an [agenda](#) from their March 10, 2009 meeting, “The [Finance] Committee is in favor of having City goals in this regard, but has requested additional financial information. Once the Committee receives the additional information, the Committee will review the options and return to the full Council in the near future.” No evidence in the council record suggests that the council ever reconsidered a carbon neutral goal. In Santa Barbara’s 2012 [Climate Action Plan](#), the City adopted the standard AB 32 target of reducing community emissions to 1990 levels by 2020.

Cities Elsewhere in the United States

Seattle, Washington: A Gross Emissions Reduction Goal

In 2005, municipal utility Seattle City Light became the first carbon neutral electric utility, aided by the fact that 90% of the utility’s portfolio comes from hydroelectric resources. Seattle City Light offsets the balance of emissions using offsets registered with the Climate Action Reserve and other third-party organizations.

In May 2011, the City released [Getting to Zero: A Pathway to Carbon Neutral Seattle](#). In October 2011, the City Council adopted a [resolution](#) to set a goal of 87% gross reduction in community emissions by 2050, with the balance neutralized by offsets. The City does not have a separate target for municipal operations. In 2013, the City adopted the [Seattle Climate Action Plan](#), which relies on a combination of pricing, transportation electrification, and integrated transportation and land use planning to move the city towards its long-term goal.

Seattle’s approach to climate action and long-term goal highlight both the urgency of the effort, but also the deliberate process in deciding to decarbonize a local economy. The City made its carbon neutral community commitment 10 years after its first notable climate action, a LEED building incentive program, and five years after its first Climate Action Plan. Control over the electric utility -- and the revenues it provides -- will undoubtedly aid the City in its pursuit.

Austin, Texas: Carbon Neutral Community by 2050; Municipality by 2020

In 2007, Austin adopted, by [resolution](#), a goal of carbon neutral municipal operations by 2020. The resolution included an interim goal to power all City facilities with renewable energy by 2012 (achieved), implement an ordinance to mandate zero net-energy capable¹ new homes by 2015, and create an interdepartmental climate action team to address emissions from the community, and a unified approach to obtain offsets for municipal and community emissions.

¹ Austin defines a net-zero energy capable” homes as a home that is energy efficient enough would produce as much energy as it uses if it were to have a reasonably-sized solar system on the roof



In 2014, Austin adopted a [resolution](#) to pursue community carbon neutrality by 2050, which reiterated the City's 2020 goal for a carbon neutral municipality.

Austin's City Council has control over its electric utility, Austin Energy, which gives the City substantial leeway to fund and implement climate action programs. The City has its own offsets program, which [prioritizes local sources](#) of offsets. Offsets are funded by voluntary contributions from various large events in Austin, including Austin City Limits.

Boulder County and City, Colorado

Boulder County has a [goal](#) of carbon neutral municipal operations by 2020. The County plans to use offsets to achieve this goal. The County's stated goal in its [2012 Environmental Sustainability Plan](#) is to "Achieve carbon neutrality and become more resilient to the potential effects of climate change." The County adopted this goal before the County and other parts of Colorado experienced a once-in-a-century flood in September 2013, which were seen as a potential symptom of climate change.

The City of Boulder's years of consideration provide an example of a thoughtful, deliberative approach to making long-term climate commitments. The City [discussed three climate commitment goals](#) in a council study session on July 30, 2013, following four shorter study sessions in 2013. They are summarized below:

- Realizing that aggressive climate action efforts must span City departments, Boulder has an integrated approach at the top level of administration and policy-making (city manager and general plan level). Boulder also found it important to develop a short-term goal in addition to its long term goal, as this would solidify early actions rather than approaching "analysis paralysis" in determining the ordering of actions towards the long-term goal. As a key part of its efforts to build climate change information into decision-making, Boulder strives to create a more robust and dynamic data management and performance system for monitoring progress.
- Key points of the climate commitment are:
 - Seven Core Principles: be strategic, yet opportunistic; take calculated risks; avoid analysis paralysis; partner with other agencies, nonprofits, and businesses; demonstrate ethical leadership; focus on system change; and harness the economic benefits of climate leadership.
 - Six Pillars of Action: "ramp up renewables", "better buildings" (efficiency and resilience), "travel wise" (sustainable transportation), "waste not" (materials & resource recovery), and "every drop" (conserve water)
 - Five Elements: goal setting, defining targets, strategy development, monitoring and reporting, and community & partner engagement.



Three Goals

The City of Boulder explored 3 community-wide goals for carbon neutrality, from least to most aggressive:

1. An 80% reduction in emissions by 2050 (ultimately selected)
2. Carbon neutral by 2050
3. Carbon neutral by 2030 (determined to be too aggressive)

Staff ultimately decided to recommend the Council consider the first two goals, as the third option would require immediate, drastic reductions (25% per year). The Council ultimately decided on Option 1: an 80% reduction in community-wide emissions by 2020.

While some council members sought the stronger goal, the Council ultimately decided that they would revisit the goal in a few years. A comment from Councilmember Macon Cowles captured the sentiment of the majority: "I don't look at this as an endpoint but as an aggressive goal...that we can revisit again in a couple of years... With this goal (option one), I think that we can do this. But the times are uncertain....Let's make sure we can do this and that we do this." ([3:42:03 in video](#)).

City of Boulder's financial resources for climate action

In 2006, Boulder's voters passed a Climate Action Plan tax as a surcharge on electric utility bills. Voters extended the measure in 2012. Boulder is served by an investor-owned utility, Xcel Energy. The tax, similar to California's Utility Users Tax, provides the City with an opportunity to collect revenues based on electricity usage. Per-kWh rates are \$0.0049 for residential, \$0.0009 for commercial, and \$0.0003 for industrial customers. The tax generates around \$1.8 million per year and funds personnel, energy audits, rebates and incentives, and public education programs.

Next Steps

The July 30th council discussion provided direction for staff, but did not formalize the City's climate commitment. As of September 2014, Boulder has not yet adopted a target via resolution or ordinance.

The City of Boulder and Hermosa Beach are both working with [the Brendle Group](#) on climate action strategy. The Brendle Group conducted much of the background research for the City's climate commitment study.

South Miami, Florida

In 2009, the City adopted a [resolution](#) and work plan committing to carbon neutrality by 2030. The resolution applies only to municipal operations.



Cambridge, Maryland

Cambridge has a “getting to zero” task force scoping options to become a “net zero community.” This term is not defined, but the task force is focused on reducing carbon emissions from building operations.

Cities Outside of the United States

British Columbia, Canada

British Columbia is globally unique due to its low-per capita emissions, pervasive local government climate commitments, and high price of carbon. The province has high utilization of emissions-free energy, since BC Hydro gets more than 90% of its power from hydroelectricity and other clean energy sources. Many British Columbia Municipalities have [signed on](#) to the British Columbia Climate Action Charter and have made a commitment to carbon neutral operations by 2012. British Columbia’s revenue-neutral carbon tax reached its full phase-in value of \$30 per metric ton during 2012.

In measuring municipal carbon neutrality goals, British Columbia considers core services, whether provided directly or contracted. It also considers fuel and energy used for vehicles, facilities, machinery, and equipment (whether or not they are owned or leased). Excluded are non-core services such as airports, janitorial services, staff commuting and travel, and construction emissions. Offsets are used to neutralize gross greenhouse gas emissions. Their use - and controversy - are covered in the discussion of offsets later in this chapter.

Aarhus, Denmark

Aarhus is the central city of a region of about 1,250,000 people. In 2008, the City Council adopted a goal for the community to be CO₂-neutral by 2030. The implementation plan does not include a discussion of offsets.

Copenhagen, Denmark

Copenhagen has a [comprehensive plan](#) to achieve community carbon neutrality by 2025. The City plans to implement aggressive energy efficiency measures, and will offset any remaining emissions via surplus renewable energy generation.

Malmö, Sweden

Across the Sound from Copenhagen, Malmö is a city with a population of about 300,000. In 2009, the City [set a community-wide goal](#) to be “climate neutral” by 2020 (by using offsets) and run on 100% renewable energy by 2030. The City plans to reduce gross emissions 40% below 1990 levels by 2020.

Melbourne, Australia

In 2002, the City adopted a goal of carbon neutral municipal operations by 2020. In 2013, Melbourne [verified](#) its carbon neutral municipal operations status through an [independent audit](#). The City used offsets to achieve this goal: investments in an [Indonesian clean energy plant](#).



The City hopes that its central business district and surrounding areas [will be carbon neutral by 2020](#).

Climate Commitments by Entities Other Than Local Governments

As carbon neutral commitments are relatively uncommon among local governments, climate commitments from other entities -- specifically universities, but also corporations -- are relevant to Hermosa Beach's decision-making. More similarities exist between local government and universities than with corporations. Similarities between local governments and higher educational institutions include: close ties between an individual's identity and the institution and place, 24-hour communities with residential life, and the role of competing missions and priorities in considering climate commitments and action.

Colleges and Universities

The American College and University President's Climate Commitment (ACUPCC) is a national climate commitment registry and information-sharing network designed to enhance the credibility and success of college and university climate goals. As many colleges and universities are on the leading edge of climate action, the ACUPCC effort is the most mature climate commitment effort in the U.S. The effort's commitment requirements and support structure can provide an example for municipalities.

Signatories agree to: (1) complete an emissions inventory; (2) set a target date and interim milestones to become climate neutral; (3) immediately implement short-term actions to reduce GHGs; (4) integrate sustainability into the curriculum; and (5) submit the action plan, inventory, and progress reports to the network.

ACUPCC provides membership-based guidance and technical support, much as ICLEI provides for local governments. Annual dues vary from \$750 to \$4,000 for a basic membership based on the institution's size.

As of September 2014, ACUPCC has 684 signatories, 73 of which are in California.



Southern California Signatories of the American College and University President's Climate Commitment:

Anaheim University	Los Angeles City College	Pitzer College
Antioch Los Angeles	Los Angeles Harbor College	Pomona College
CSU Pomona	Los Angeles Mission College	Santa Monica College
CSU Fullerton	Los Angeles Pierce College	UC Irvine
CSU Long Beach	Los Angeles Southwest College	UC Los Angeles
CSU Northridge	Los Angeles Trade-Technical College	UC Riverside
Chaffey College	Los Angeles Valley College	University of La Verne
Claremont McKenna College	Loyola Marymount University	University of Redlands
East Los Angeles College	Pasadena City College	West Los Angeles College
Harvey Mudd College		West Valley College

Defining Carbon Neutrality for Colleges and Universities

The ACUPCC defines carbon neutrality as “having no net greenhouse gas (GHG) emissions, to be achieved by eliminating net GHG emissions, or by minimizing GHG emissions as much as possible, and using carbon offsets or other measures to mitigate the remaining emissions.”

At a minimum, institutions must report scope 1 (direct) emissions produced through campus activities; scope 2 (indirect-energy) emissions from purchased energy; and scope 3 (indirect) emissions from student, faculty, & staff commuting and institution-funded air travel. ACUPCC recommends (but does not require) that universities evaluate upstream (scope 3) emissions in purchased goods and services.

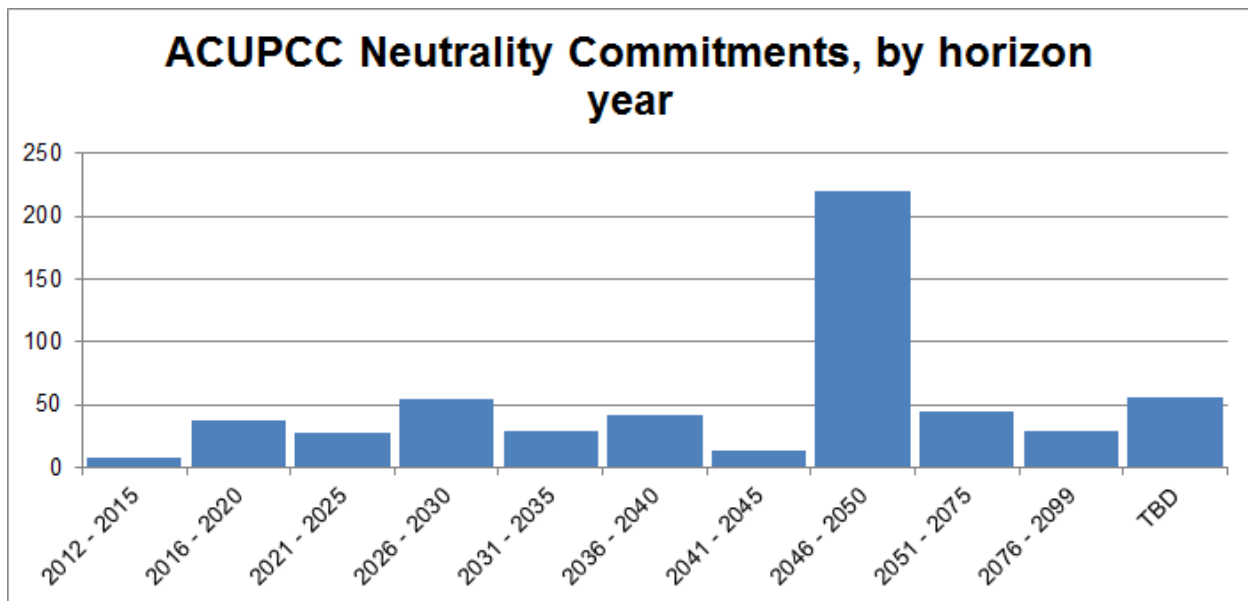
ACUPCC requires use of an accounting method consistent with the Greenhouse Gas Protocol of the World Business Council on Sustainable Development and World Resources Institute. Both The Climate Registry's General Reporting Protocol and its derivative for municipalities, the Local Government Operation Protocol, are consistent.

The ACUPCC has provided a commonly-accepted standard for college and university climate commitments. Because carbon neutral commitments are relatively rare for U.S. local governments, no equivalent commonly-accepted standard exists. This signals a leadership opportunity for Hermosa Beach and other cities considering carbon neutrality goals in the coming years.

Future Year for College and University Climate Commitments

The most common horizon year for college and university carbon neutrality goals is 2050. A few universities have set - and achieved - neutrality goals with horizon years prior to 2014. A discussion of their efforts and use of offsets follows in this chapter.





A Closer Look at University of California's Climate Commitment

The University of California [hopes to be](#) the first research university system to achieve carbon neutrality by 2025. Although the goal has been discussed publicly by the Regents and President Janet Napolitano, it has not been formally adopted as a UC Policy. Existing climate goals are measured against emissions scopes 1, 2, and select scope 3 (student, staff, and faculty commutes and university-funded air travel). In 2011, [the Regents discussed](#) a carbon neutrality commitment, stating that while reductions in gross emissions were preferred, offsets would be required. In order to keep funds within the UC system, the Regents discussed developing a UC offset fund.

Corporate Climate Goals

In 2014, Ceres, a non-profit organization dedicated to sustainable investment and business, released a [report](#) of corporate greenhouse gas goals for Fortune 500 companies using information from the CDP (formerly Carbon Disclosure Project). A total of 53 Fortune 100 companies reported target data to the CDP.



Notable Climate Goals of Fortune 500 Companies

Fortune 500 Company (rank)	Sector	Gross Emissions Goal (before offsets)
Walmart Stores (1)	Retail	30% reduction in GHG-intensity per square foot from 2010 levels by 2020.
General Electric (8)	Industrials / Financials	25% reduction in scope 1 & 2 emissions from 2004 levels by 2015.
JP Morgan Chase (18)	Financials	40% reduction in scope 1 & 2 emissions from 2005 levels by 2020.
Wells Fargo & Company (25)	Financials	35% reduction in scope 1, 2, & 3 emissions from 2008 levels by 2020.
Microsoft (35)	Information Technology	Carbon neutral by 2013. Uses an internal carbon fee to allocate resources.
Goldman Sachs (68)	Financials	Carbon neutral for offices and data centers by 2020.
Nike (126)	Apparel	Carbon neutral facilities by 2015.
Excelon (129)	Utility	eliminate 17.5 million metric tonnes of greenhouse gas emissions per year by 2020
Kohls (148)	Retail	Carbon neutrality goal, 2009 through 2015.
Mattel (395) <i>based in South Bay</i>	Consumer	Reduce emissions per unit of revenue 50% from 2008 levels by 2020.

Many companies have backed off carbon neutrality claims that they made in the mid 2000s. Yahoo, Nike, Pepsi, and Dell are examples. Dell achieved carbon neutral status in 2008, but backed off after a [Wall Street Journal article](#) criticized their lack of transparency and exception of supply-chain emissions.

The shoeware and apparel company Timberland set a goal in 2005 to be carbon neutral by 2010. [By 2010](#), they had reduced 38% of emissions and offset the remaining 62%. Timberland continues to report annual emissions, though it estimates that 96% of life-cycle emissions associated with its products are outside of corporate control. The company continues to have a goal of a 50% reduction in 2006 levels by 2015. VF Corporation bought Timberland in 2011. The change in ownership highlights that decision-maker priorities can change over time.

Defining Climate Goals for Hermosa Beach

The validity of climate action and renewable energy claims is complicated by California's Cap-and-Trade and Renewable Portfolio Standard programs. The climate action and renewable



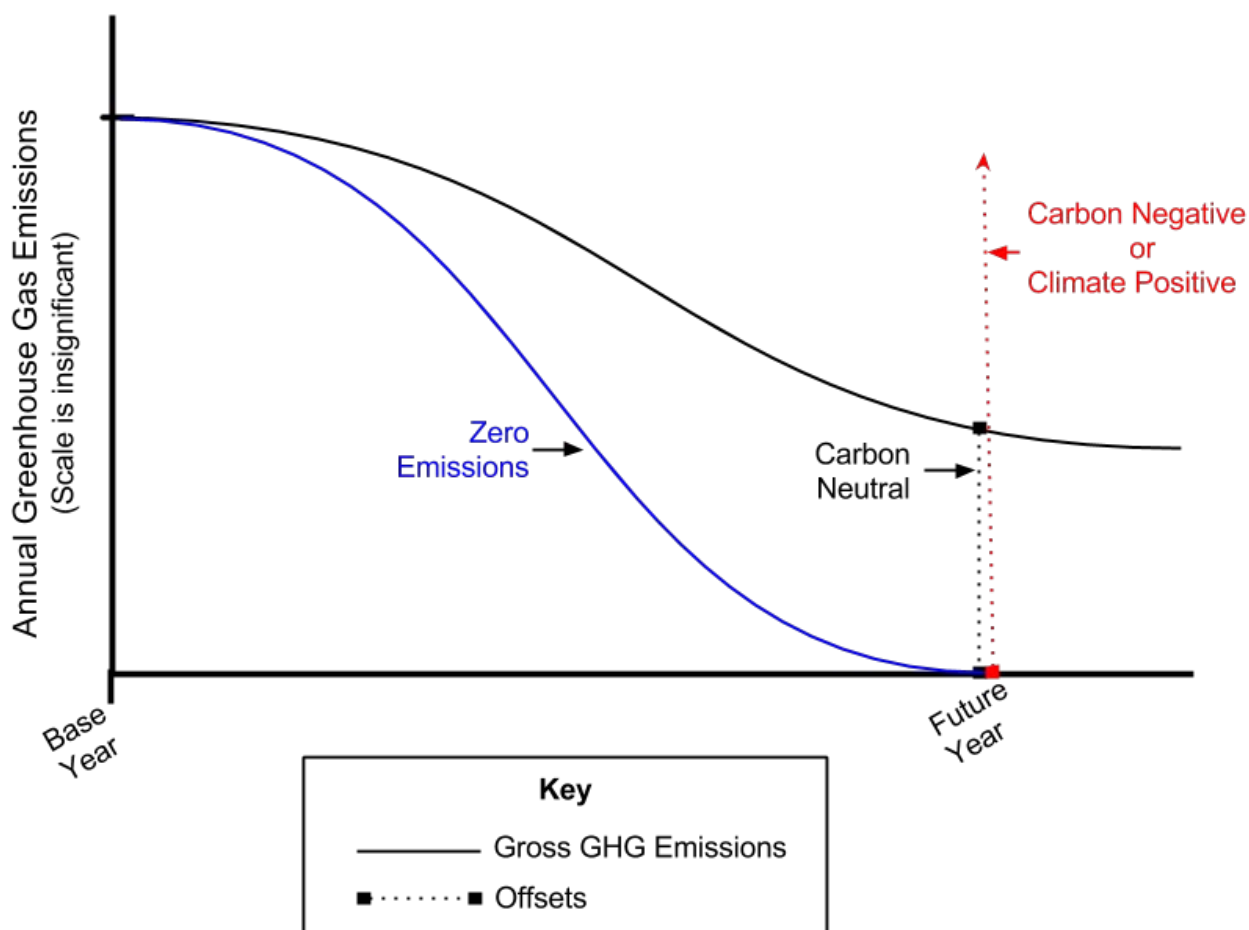
energy goals presented in this section are not mutually exclusive: the concurrent pursuit of multiple goals is possible, and some goals are inclusive within others. It's possible for the City to pursue multiple goals, and achieve some goals along the way towards others.

Summary of Possible Goals for Greenhouse Gas Emissions

Goal	What it means for municipal operations	What it means for the community
Zero Emissions	Zero gross scope 1, 2, and select scope 3 emissions attributable to municipal operations, before accounting for offsets and RECs.	Zero gross greenhouse gas emissions from emissions-generating activities or emissions sources attributable to the community, before accounting for offsets and RECs.
Carbon Neutral	A zero balance of net emissions on a municipal greenhouse gas inventory after accounting for offsets and RECs.	A zero balance of net emissions on a municipal greenhouse gas inventory after accounting for offsets and RECs.
Carbon Negative	A real, additional, and verifiable reduction in California (and global) greenhouse gas emissions equivalent to some base year emissions (e.g. Hermosa Beach's 2005 or 2012 municipal inventory).	A real, additional, and verifiable reduction in California (and global) greenhouse gas emissions equivalent to a community baseline.



Possible Goals for Greenhouse Gas Emissions Reductions



Zero Emissions

Zero Emissions means zero gross emissions, even before accounting for adjustments that appear as informational items on a greenhouse gas inventory, such as use of offsets and Renewable Energy Certificates. Zero Emissions is the strictest definition of carbon neutrality and the most difficult to achieve. Because Hermosa Beach is in California (which has a cap-and-trade program), achieving Zero Emissions would not lead to real, verifiable reductions in global greenhouse gas emissions (see Carbon Negative section).

Zero Emissions requires 100% participation of:

- Facilities and fleet that exclusively operate on zero-emissions electricity or renewable biofuels that emit non-anthropogenic greenhouse gas emissions. Zero emissions renewable electricity could be produced on-site or off-site.
- Employees that either walk, bike, or take electric or biofuel-powered vehicles for commutes.



- Contracted service providers that exclusively use electricity or biofuels, either biodiesel or renewable natural gas.
- Use of landfills and wastewater treatment facilities that employ state-of-the-art greenhouse gas mitigation techniques.

Carbon Neutral

Carbon Neutral status results when a greenhouse gas inventory has a net zero balance after subtracting informational items such as offsets and Renewable Energy Certificates from gross emissions. Carbon Neutral status is possible with less than 100% participation of the activities outlined under Zero Emissions, plus the retirement of greenhouse gas allowances and, in certain cases, Renewable Energy Certificates.

Hermosa Beach can achieve Carbon Neutral status by retiring California-eligible greenhouse gas emissions allowances in an amount equal to its gross emissions inventory. Hermosa Beach can retire qualified renewable energy used for municipal operations through the California Air Resources Board's Voluntary Renewable Energy Program. Hermosa Beach can also purchase and retire California-eligible offsets through direct participation in California's carbon market or through services offered by carbon balancing firms.

Hermosa Beach can also purchase and retire greenhouse gas allowances that are not California-eligible. While non-California allowance retirement can also lead to a reduction in global greenhouse gas emissions, it will not reduce emissions in California and therefore would not meet potential future guidance from the California Air Resources Board. If the City chooses to pursue this route, Hermosa Beach should seek out high-quality offsets that are measurable, real, additional, and verifiable: typically those that are admissible to mandatory greenhouse gas reduction programs with high offset performance standards. In some cases, voluntary allowances may meet this high performance standard, such as those certified by the Climate Action Reserve, Gold Standard, and Verified Carbon Standard.

Carbon Negative

A new term to describe municipal climate action goals is needed for cities subject to a cap-and-trade program. The absolute cap on emissions in such a program means that emissions reductions attributable to activities in Hermosa Beach would be replaced by equivalent emissions from other sources outside of Hermosa Beach, but within the jurisdiction of the cap-and-trade program. Therefore, the overall level of greenhouse gas emissions in California (and globally) remains the same regardless of Hermosa Beach's actions. Cap-and-trade programs allow for guaranteed reductions in program-wide greenhouse gas emissions, but negate emissions reductions from individual entity or community action.



Carbon Negative status means that Hermosa Beach achieves a real, additional, and verifiable reduction (or “dent”) in California and global greenhouse gas emissions. If Hermosa Beach were not located within a cap-and-trade program, achieving Zero Emissions or Carbon Neutral status would lead to a real, additional, measurable, and verifiable reduction in global greenhouse gas emissions equivalent to the City’s business-as-usual baseline.

Hermosa Beach and other entities and communities can achieve Carbon Negative status by retiring greenhouse gas emissions allowances. The retirement of any amount of allowances greater than the City’s gross greenhouse gas emissions inventory allows the City to make Carbon Negative claims. However, as the City’s gross emissions decrease, the “dent” will decrease over time. Thus, the business-as-usual baseline is recommended for offset purchase and retirement targets, as this approximates the “dent” Hermosa Beach would make in global greenhouse gas emissions if it pursued aggressive climate action outside of California’s cap-and-trade program.

Summary of Possible Goals for Use of Renewable Energy

Goal	What it means for municipal operations	What it means for the community
Powered by Renewable Energy	The municipality can validly claim that operations are powered by renewable energy, using Green-e RECs to support the claim.	The community can validly claim that it is powered by renewable energy.
Powered by California Renewable Energy	The municipal can validly claim that operations are powered by renewable energy delivered to California, using direct purchases, on-site generation, and California-eligible RECs to support the claim.	The community can validly claim that operations are powered by renewable energy delivered to California, using direct purchases, on-site generation, and California-eligible RECs to support the claim.

Powered by Renewable Energy

Using Renewable Energy Certificates certified under the Green-e program, Hermosa Beach can make claims that municipal operations are powered by renewable energy. Renewable Energy Certificates represent the environmental attributes of renewable power, and their monetary value has aided in financing additional renewable energy generation in the United States. While valid under commonly-accepted energy accounting principles, such claims may be challenged because there is no credibility that the renewable energy was delivered to California. For instance, the certificate could represent renewable energy generated at a wind farm in West Texas or North Dakota with no connection to the Southern California electricity grid.



Whether Hermosa Beach can take credit for an associated reduction in greenhouse gas emissions depends on a number of factors.

Under the Local Government Operations Protocol, Hermosa Beach can take emissions credit (as an informational item) for net greenhouse gas reductions in scope 2 (electricity) emissions only if the certificates come from electricity generation not delivered to California. This is somewhat counterintuitive and is due to California's cap-and-trade program. Full details are covered in the Section on Electricity. Because California-eligible RECs are desirable for compliance with California's mandatory Renewable Portfolio Standard, less-expensive, voluntary Green-e RECs available for purchase are not California-eligible. Within California, greenhouse gas claims made from use of non-California RECs may ultimately be seen as weak and considered the result of an accounting maneuver.

There is not yet a commonly-accepted standard for the adjusting community-wide emissions inventories for the purchase of Renewable Energy Certificates. This scenario could be applicable under a Community Choice Aggregation program.

Powered by California Renewable Energy

California's Renewable Portfolio Standard requires 33% of statewide electricity consumption to come from qualified renewable energy sources by 2020. Because of this mandate, generation from qualified sources is at a price premium compared to non-qualified sources. Because of California's cap-and-trade program, Hermosa Beach must take the extra step of retiring allowances through the California Air Resources Board's Voluntary Renewable Energy Program in order to claim emissions-related benefits.

Despite being more expensive and requiring an extra step to claim greenhouse gas benefits, California Renewable Energy is likely to be perceived as the gold standard for renewable energy claims in California.

Hermosa Beach could purchase California Renewable Energy from Southern California Edison's Green Rate Option, from a future Community Choice Aggregation program, possibly from direct access provider (through a lottery), or from on-site generation.

A Community Choice Aggregation program could offer, and Southern California Edison's Green Rate Option will offer, California Renewable Energy.

Recommendation for Hermosa Beach

To be seen as a leader in municipal climate action, Hermosa Beach would need to commit to neutralizing emissions from municipal operations within the next 10 years. While a goal of 2025



would still help Hermosa Beach be seen as a leader, the City should match goals set by the City of Austin and County of Boulder and commit to a 2020 goal. Committing to the same goal as other leading local governments would unambiguously establish Hermosa Beach as a climate action leader.

While many British Columbia municipalities have already achieved carbon neutral status for 2010, many have backed off the use of offsets to neutralize greenhouse gas emissions. Hermosa Beach has an opportunity to be achieve “first-to” status for municipal operations in the United States by committing to neutralize as early as 2015.

Hermosa Beach can seek the more aggressive goals of “Carbon Negative” status and “Powered by 100% California Renewable Energy”. However, this level of climate commitment from the City is currently unnecessary for the City to be seen as a national leader. The City should re-evaluate its climate and renewable energy goals in the future if it finds itself undifferentiated in a growing pool of cities with simple “Carbon Neutral” goals, which are currently rare.



Hermosa Beach should set a goal to become Carbon Neutral for municipal operations by the end of 2020.





Hermosa Beach Municipal Carbon Neutral Plan

Electricity

Introduction

Municipal electricity use accounts for 43.4% of total scope 1, 2, & selected scope 3 greenhouse gas emissions reported in the City's 2007 operations inventory.

This section of the Municipal Carbon Neutral Plan focuses on the procurement of emissions-free renewable electricity in order to make carbon neutrality claims and implement Program E5 of the City's Sustainability Plan: Municipal Renewable Energy Generating. Efficiency efforts remain important, nonetheless, and the City should continue to pursue actions outlined in the [Energy Study Report](#) and the Energy Efficiency Climate Action Plan.

The [Hermosa Beach Carbon Neutral Electricity Procurement Plan](#) explored on-site zero emissions generation, Southern California Edison's Green Rate Option, and Community Choice Aggregation (CCA) for community electricity. In this section, we also discuss a Power Purchase Agreement, a municipal lease, Direct Access programs, and the use of Renewable Energy Certificates (RECs) as options. We recommend a combination of on-site generating, RECs, and pursuit of a CCA for achieving the City's carbon neutral goals.

On-site Electricity Generation

Production Incentives for Owned Generation

California Solar Initiative

The California Solar Initiative began in 2007 to provide additional incentives for solar generation in California. When the program began in 2007, non-residential entities were eligible for a \$2.40/watt incentive for installation and a \$0.39/kWh incentive for energy production. The program utilizes a tiered schedule where incentives decline as more solar projects are installed.

In Southern California Edison territory, the [California Solar Initiative](#) incentive for non-residential customers, including local governments, is currently \$0.20 per watt of installed capacity (step 10 is the final step for the incentive). As of July 2014, approximately 72 MW of installed capacity remains available in the program. Go Solar California maintains up-to-date [information on the status of the program](#). The incentive for residential customers in Southern California Edison Territory has been exhausted.



The Local Government Renewable Energy Self-Generation Bill Credit Transfer

The Local Government Renewable Energy Self-Generation Bill Credit Transfer allows local governments with on-site energy generation to transfer excess bill credits between accounts. This would allow Hermosa Beach to generate excess solar power at one facility and transfer any credit to other accounts. According to [CPUC Guidance](#), the program applies only to local government-owned systems and would not apply to a power purchase agreement.

Southern California Edison does not require transfer of the Renewable Energy Certificates (RECs) produced by the generating facility, which would transfer the renewable benefits of the energy to another party. Hermosa Beach could retain these RECs to claim use of renewable energy and associated emissions benefits (if allowances are voluntarily retired) if it has no other agreement to transfer the RECs to another party.

Southern California Edison can offer up to 124.6 MW total under [their](#) bill credit transfer program. As of June 16, 2014 [107.72 MW remains available](#). SCE charges a \$500 set up fee and \$30 monthly billing fee per generating account.

Other Options for Procurement of On-Site Generation

Entering into a Power Purchase Agreement or lease agreement can spread the costs of solar installation over several years, reducing the need for upfront payments. Unlike local governments, private owners of solar generating equipment can also utilize [investment tax credits](#) to reduce system cost.

Power Purchase Agreement

Under a Power Purchase Agreement, a third party owns and installs the equipment needed to generate on-site solar power, and Hermosa Beach signs a contract to purchase all power delivered by the unit at a pre-specified price per MWh. A Power Purchase Agreement can be a compelling option to pay for solar over time, and the City can negotiate the option to purchase the equipment at a substantially reduced rate at the end of the contract term.

The U.S. National Renewable Energy Laboratory has published a [Power Purchase Agreement Checklist for Local Government](#). In addition, a [presentation](#) from the Massachusetts Department of Energy Resources outlines the pros and cons. Among the cons are that the City would receive two electricity bills and that transaction costs for establishing the agreement may be high. Another con is that because the system would be privately owned, the city cannot participate in the Self-Generating Bill Credit Transfer, which would have allowed the city to overproduce at one site and use that energy at a site with a higher demand.

Solar Lease

A third party owns and installs the equipment needed to generate on-site solar electricity, and Hermosa Beach signs a contract to lease this equipment at a pre-specified price. Some



agreements have an option to purchase the equipment at a substantially reduced rate at the end of the lease term. One option unique to local governments is the California Lease Finance Program ([CaLease](#)). However, this program has a \$500,000 minimum financing amount. Another option is the [Southern California Regional Energy Center Public Agency Master Lease](#), which offers a minimum loan of \$250,000, but allows multiple projects to be bundled under a single loan.

Greenhouse Gas Reduction Credit for On-site Renewable Electricity Generating

California's Renewable Portfolio Standard (RPS) requires utilities to procure a [specified](#) quantity of renewable electricity. The current mandate requires 33% of energy to come from renewable sources by 2020. While the use of renewable energy helps the state meet its greenhouse gas cap, additional generation or use of renewable, all else held equal, does not reduce the cap. Any reductions in greenhouse gas emissions that come from meeting or exceeding the RPS requirement will lower an electricity utility's compliance obligation - the allowances they must surrender each year to comply with the cap. Excess procurement will not affect the overall greenhouse gas emissions cap for California, but rather free up additional space under the cap for other sources to emit greenhouse gasses. In effect, greenhouse gas reductions that come from exceeding RPS or implementing greenhouse gas reduction measures would decrease the cost of a compliance unit. The notable exception is presented below.

Because of California's Cap-and-Trade program, the greenhouse gas reduction benefits of renewable energy are separate from other environmental properties. As such, The National Green-e standard has special procedures for creating RECs from voluntary renewable energy generated in California. Voluntary renewable energy is electricity that is procured in excess of an entity's compliance obligation under the State's Renewable Portfolio Standard. This includes electricity rooftop solar projects on Hermosa Beach municipal facilities, whether owned by the City or procured through a lease or Power Purchase Agreement. Southern California Edison would not obtain RPS credit for voluntary renewable energy generated within its service territory.

California's [Voluntary Renewable Electricity Program](#) allows for retirement of greenhouse gas allowances for renewable energy. Each year from 2015 to 2020, [up to 0.25%](#) of allowances under California's Cap-and-Trade program will be retired through the program. Allowances are retired on a first-come, first-served basis. Hermosa Beach cannot own and sell credits produced under the Voluntary Renewable Electricity Program.

Claiming Emissions Reductions

Under The Climate Registry's rule, retiring allowances is not necessary for Hermosa Beach to claim greenhouse gas reductions for on-site renewable energy generation. However, Hermosa



Beach's participation in the program is necessary for it to claim that its use of renewable energy reduced greenhouse gas emissions in California.

If allowances remain in the Voluntary Renewable Energy Reserve Account after the California Air Resources Board serves all greenhouse gas allowance retirement requests, then these allowances may be auctioned. This has two implications for producing real, additional reductions to greenhouse gas emissions in California:

1. **If the Reserve Account is undersubscribed**, meaning that there are fewer requests for retirements than allowances available in the account, then Hermosa Beach's participation produces real, additional reductions in statewide greenhouse gas emissions. This is because the City's participation in VREP prevents another entity from purchasing the allowance via auction. Hermosa Beach could then claim zero-emissions electricity under the ARB's rules.
2. **If the Reserve Account would be exhausted regardless of Hermosa Beach's participation**, then Hermosa Beach's successful retirement of allowances does allow Hermosa Beach to take credit for zero-emissions electricity under the ARB's rules, but does not produce real, additional reductions in statewide greenhouse gas emissions.

Retiring allowances, though not required for Hermosa Beach to claim carbon neutrality under The Climate Registry rules, makes the City's neutrality claim more robust. The City must enact and sustain greenhouse gas reduction activities that allow it to retire allowances in order to make valid Carbon Negative or Climate Positive claims.

Qualified Renewable Energy Sources

[Section 95841.1](#) of the California Cap-and-Trade Regulation identifies general requirements to retire greenhouse gas allowances under the program:

1. The generator must be new and not have served load prior to July 1, 2005.
2. The generator of the renewable energy or RECs must be certified as RPS-eligible by the California Energy Commission or meet the design and installation programs of the Guidelines for California's Solar Electric Incentive Programs in place at the time the system received an approved utility incentive claim. The California Energy Commission maintains a [list of generators](#) that meet RPS-eligibility requirements.
3. Voluntary renewable electricity must be directly delivered to California (PCC-1 and PCC-2).
4. The REC must be generated in the same year that Hermosa Beach requests the retirement of greenhouse gas allowances through the ARB. For example, 2014 vintage RECs can only be retired as 2014 vintage greenhouse gas allowances.
5. The REC must be tracked by and retired with the Western Region Renewable Generation Information System (WREGIS) before submitting an application to the ARB for allowance retirement.



6. The ARB determines the greenhouse gas reduction that comes from a given unit of power consumption.

How to Apply

The annual application deadline for requesting the retirement of a REC(s) is July 1 of the year after the unit of renewable energy was generated. July 1, 2014 was the first deadline for parties to request retirement of allowances. As of September 2014, the [California Air Resources Board](#) reports zero retirements from the program's account.

If Hermosa Beach generates on-site renewable energy in the future, it can [apply](#) to the program. In order to reduce the City's application burden, one application for multiple systems with nameplate capacities of 200 kW or less may be aggregated and submitted together.

Criteria for Siting Solar Photovoltaic Systems

Generating zero-emissions renewable electricity at locations recognizable as city facilities is an attractive option to demonstrate the city's climate actions while reducing gross greenhouse gas emissions. The following criteria will help the City determine appropriate locations for on-site solar photovoltaic systems:

- If rooftop-mounted, the building and roof have the structural integrity to support a solar photovoltaic system.
- The host facility won't undergo significant changes that affect the roof and photovoltaic system during the financing contract, or, if purchased, the assumed 30-year life of the solar system.
- The host facility is part of an electricity service account that has sufficient usage to size a cost-effective solar photovoltaic system. In general, larger systems have a lower cost per watt-hour of electricity, since fixed costs are defrayed over additional units of electricity. Also, in certain financing scenarios the energy must be used on-site as a bill transfer credit is not allowed under a municipal lease arrangement or power purchase agreement.
- Ideally, the solar photovoltaic system would be visible from publicly-accessible areas, allowing the photovoltaic panels to be a visible part of the city's public education and outreach efforts.

Southern California Edison's Green Rate Option

The Green Rate, a high-renewables content energy subscription program, will be available to ratepayers within SCE's territory beginning January 2015. This program enables customers to participate in off-site renewable energy generation through SCE by subscribing to 50% or 100% renewable resource content for a determined price premium. We estimate the Green Rate Charge to be a 6.77 cent/kWh premium over the City's estimated average generating charge of 7.53 cents/kWh. With a subscription to this new program, the City of Hermosa Beach could



meet their entire energy load with one hundred percent renewable energy; however this method will be far more costly than other alternatives. Also under SB 43, the founding legislation for this program, SCE is only required to offer the Green Rate until January 1, 2019. No provisions are currently established to continue the program beyond this deadline.

According to a report compiled by GSE Solutions, the City's average annual energy usage is 1,717,582 kWh. Detailed, itemized bills provided by the City covered 1,339,598 kWh of usage, and we used the rates on those bills to estimate the annual premium for the Green Rate option. The table below shows a comparison of the current annual total paid by the City for electricity with a standard renewables content and the projected annual price should Hermosa Beach subscribe to 100% renewable energy on the Green Rate.

Green Rate vs. Annual Total

	Annual Electricity Use (kWh)	Estimated Annual Green Rate Premium	Current Annual Charge	Total Projected Annual Charges
GSE Solutions Report	1,717,582	\$116,318.09	\$300,961.00	\$417,279.09
Provided SCE Bills	1,339,598	\$90,720.26	\$264,672.61	\$355,392.87

Direct Access Program

Direct Access is an electricity procurement option in California that allows certain customers to purchase their electricity directly from Electric Service Providers. Electric Service Providers are able to offer a greater variety of retail options to electricity customers, offering more competitive pricing or greater renewable energy attributes than is offered by SCE's bundled product. Direct Access first became an option in California in 1998, but was suspended in September 2001. Electricity customers with existing Direct Access contracts could continue. Through 2010, 7,764 GWh of annual customer load remained with the Direct Access program.

Direct Access is an extremely limited option for Hermosa Beach. New direct access connections are offered only via an annual lottery, so there is little certainty that Hermosa Beach would be able to choose this option.

Furthermore, Hermosa Beach's annual electricity demand may be insufficient to obtain a competitive rate quote from an Electric Service Provider. Additionally, as many Electric Service Providers use unbundled RECs to offer green power, there would be no greenhouse gas reductions benefit over separately purchasing and retiring RECs. Hermosa Beach's annual electricity demand in 2010 was under 2 GWh. Even a municipality with over ten times the



annual electricity demand (Santa Monica) found it could not obtain competitive rates from prospective Electric Service Providers for Direct Access service. The [staff report at the time](#) alleged that the City did not receive a competitive rate because the City's 28.95 GWh in annual demand was "too small to offer significant price discounts or flexible terms over a long-term contract."

In 2009, SB 695 re-opened Direct Access to new non-residential customers in 2010. Four phase-in periods were offered via first-come, first-served applications to allocate an additional 3,946 GWh in annual load for new Direct Access customers. In each period, there was more demand for the Direct Access than there was load available, and many potential customers were turned away. Southern California Edison's overall Direct Access program cap is 11,710 GWh per year, about 13.5% of the utility's 2012 load of 86,558 GWh.

Direct Access Lottery

A post phase-in enrollment process allows aspiring new direct access customers to join an annual waitlist. Waitlist applications are accepted during an annual phase-in enrollment period, the second full week of June, and new Direct Access customers are assigned via a lottery if and when existing direct access customers end their contract.

If the City wished to participate in the Direct Access lottery, it would first choose an approved Electric Service Provider.

Before the second week in June, Hermosa Beach's selected Electric Service Provider would complete and submit a [Customer Information Service Request \(CISR\) form](#) to obtain the City's energy usage and billing histories from Southern California Edison. The form requires the signature of the Hermosa Beach City Manager or another person authorized to bind the City to a financial contract. Southern California Edison must receive and approve the CISR in advance of the June enrollment period.

During the second week of June, Hermosa Beach would submit a [Six-Month Advance Notice Form](#) to switch service from Southern California Edison to its chosen Electric Service Provider. Southern California Edison would then assign Hermosa Beach's application a random waitlist number.

Each month, Southern California Edison will review available Direct Access and randomly select numbers from the waitlist and notify Hermosa Beach if load is available. If selected, Hermosa Beach would be allowed to switch to its preselected Electric Service Provider beginning January 1 of the following calendar year. The chosen Electric Service Provider must submit a Direct Access Service Request form in order to complete the transition. Each waitlist is for one calendar year. Hermosa Beach would need to submit a new application each June if it wished to remain on the waitlist.



Customers subscribing to a Direct Access program may be automatically enrolled in a Community Choice Aggregation program, unless they opt out.

The state maintains a [list of registered Electric Service Providers](#), 21 of whom have agreements with Southern California Edison. Two providers are notable for Hermosa Beach's Carbon Neutrality efforts.

1. [Three Phases Renewables](#) is a Manhattan Beach-based company that focuses on 100% renewable energy.
2. The City of Santa Monica has a Direct Access contract with [Commerce Energy](#) to provide 100% of municipal energy demand with 100% renewable power. However, due to a [lapse in service](#), Commerce only supplies 59% of the City's energy demand.

Community Choice Aggregation

AB 117, passed in 2002, established the legislative precedent for forming a Community Choice Aggregation (CCA). This bill enables California cities, groups of cities, or counties to supply electricity to customers within their jurisdiction. Establishment of a CCA allows the community to specifically allocate resources for electricity procurement, while the Investor Owned Utility (IOU) retains ownership of all transmission and delivery systems. Once a city or community forms a CCA, they gain autonomy over their energy sources, and are thus free to pursue specific initiatives like carbon neutral electrical generation. Community Choice Aggregators comply with California's RPS, but they can procure renewable energy above and beyond this requirement.

The City of Hermosa Beach could utilize this procurement method in one of three ways to reach their overall goal of Carbon Neutrality. First, the City may launch its own effort to form a CCA as a single city. This method could prove cost-intensive as none of the fees or surcharges associated with the formation of this entity would be shared. Second, the City could pursue a partnership with surrounding cities, communities, or counties with similar, progressive climate goals and establish a CCA in which startup costs would be split. Finally, the City of Hermosa Beach may opt to join an already emerging or pre-existing CCA.

CCAs have garnered significant success in California since the formation and growth of Marin Clean Energy (MCE) beginning May 2010. Sonoma Clean Power soon followed this success and will provide service by the end of the 2014 calendar year. These successes in the North Bay have given rise to other efforts to form CCAs in California. Listed below is a synopsis of actions taken by California communities toward CCA formation.



Lancaster Choice Energy

[Lancaster Choice Energy](#) plans to be the next operational CCA in California. This entity plans to begin accepting Municipal enrollment in May 2015, Commercial/Industrial enrollment in November 2015, and Residential enrollment in November 2016. Lancaster Choice Energy has reached agreement with SCE as an approved Community Choice Aggregator Service and has already received accreditation on their Service Provider Application.

San Diego Energy District

The [San Diego Energy District](#) is in its beginning stages to become a CCA serving the City and County of San Diego. A Technical Feasibility Study has recently been authorized for the region.

Clean Power S.F.

[Clean Power S.F.](#) is planned to serve residential electricity customers in the City of San Francisco. Thus far, the efforts in the area to form this service have reached just short of residential service, which was expected at the end of 2013 and is currently accepting pre-enrollment.

East Bay Community Choice Energy

The County of Alameda has endeavored to create a CCA serving its residential electricity load excluding the City of Alameda. The Alameda County Board of Supervisors voted to launch a feasibility study in June 2014.



Summary of Current CCA Planning & Pre-operational Efforts in California

CCA	Current Stage
Lancaster Choice Energy	<u>Preoperational:</u> Community Choice Aggregator Service Agreement with Southern California Edison has been approved and Service Provider Application has been approved. <u>Service Begins:</u> • Municipal enrollment May 2015 • Commercial/Industrial enrollment in November 2015 • Residential enrollment by November 2016
San Francisco	<u>Preoperational (delayed):</u> Implementation Plan certified by CPUC and registered as a CCA. For residential customers only. Was expected for late-2013. Pre-enrollment is open.
East Bay Community Choice Energy	<u>Feasibility:</u> After an initial study, Alameda County Board of Supervisors voted to launch a Feasibility Study in June 2014.
San Diego Energy District	<u>Feasibility:</u> Technical Feasibility Study authorized by City of San Diego.
Contra Costa County	<u>Under Consideration:</u> Public information presentations underway
Hermosa Beach	<u>Under Consideration:</u> The City Council adopted a resolution to join with other cities for a feasibility study.
Humboldt County & Arcata	<u>Under Consideration:</u> Student-authored feasibility study released 2011 & 2013 from UC Davis.
San Luis Obispo County	<u>Under Consideration:</u> The County's EnergyWise Plan suggests evaluation of a CCA.
Santa Barbara	<u>Under Consideration:</u> County's emissions reduction strategy includes 'evaluate CAA formation' in Staff Report for Climate Action Plan, August 2014.
Yolo County, City of Davis	<u>Under Consideration:</u> Yolo Climate Action Plan requires the County to determine 'feasibility of CCA Issue' brought up on City Council Agenda in August 2012.



Renewable Energy Certificates

Renewable Energy Certificates (RECs) can be part of a long-term or transitional strategy to incorporate renewable energy into Hermosa Beach's electricity mix. Because California both requires utilities to procure a certain amount of renewable energy and caps greenhouse gas emissions, the rules surrounding the use of RECs for Carbon Neutrality claims is somewhat complicated. RECs [do not directly translate into greenhouse gas offsets](#) because the replacement power is not fully accounted for. However, special rules apply to convert California RECs into offsets, and commonly-accepted greenhouse gas accounting rules allow Hermosa Beach to use certain RECs to reduce gross emissions.

Accounting for Renewable Energy Purchases in the Emissions Inventory

The multi-partner, sector-specific Local Government Operations Protocol and The Climate Registry's General Reporting Protocol provide greenhouse gas accounting and reporting guidance for cities.

Section 6.2.4 of the Local Government Operations Protocol outlines guidance for green power and renewable energy certificate purchases. In summary, the guidance suggests that local governments report "green power" or REC purchases as supplemental information in their inventory report; the purchases should not be deducted from scope 2 emissions. The reasoning behind this recommendation is that deducting this electricity use would result in double counting of the greenhouse gas benefit from renewable energy because the renewable energy is already accounted for in the electricity emissions factor. In the 2010 update, the partners that publish the protocol wrote:

"The partner organizations will continue to monitor and track the evolution of green power programs and the REC market. We hope that a broadly used, credible tracking, and retirement processes will soon be in place and that we will be able to provide better guidance to account for the GHG reductions associated with these purchases in future versions of this Protocol."

It is Kaizenergy's opinion that a [2013 update to the Climate Registry's General Reporting Protocol](#) provides the guidance needed for local governments to adjust scope 2 electricity consumption and emissions for REC purchases. The Local Government Operations Protocol provides sector-specific guidance for implementation of the General Reporting Protocol.

The 2013 update also provides for the use of program-specific utility emissions factors for entities that subscribe to a utility's green power program, such as Southern California Edison's Green Rate Option.

The 2013 update to the General Reporting Protocol also provides a method to adjust for the ownership and retirement of unbundled RECs that meet the [Green-e standard](#). This includes



RECs from solar electric, such as concentrated solar thermal, wind, geothermal, certified low-impact or EcoLogo hydropower, pipeline or irrigation canal turbine hydropower, and biomass (non-chemically treated woody waste, agricultural crops or waste).

Adjusting Hermosa Beach's emissions inventory for REC purchases is simple: the City follows the same methodology as in its 2005 and 2007 municipal emissions inventories, adjusting for the emissions factor of renewable energy. Emissions are calculated by multiplying the quantity, in Megawatt-hours, of qualified, current-year RECs retired on Hermosa Beach's behalf by the emissions factor of the renewable energy source. Some renewable energy generation projects create anthropogenic greenhouse gas emissions, such as additional organic material decomposition behind a hydroelectric dam. Greenhouse gas emissions from any electricity purchases not covered by retiring RECs will be calculated as usual: Megawatt-hours times the emissions factor of the source (e.g. Southern California Edison's utility-specific emissions factor).

Nationally, the use of RECs for greenhouse gas accounting is subject to a number of rules:

- The REC must be separate from offsets. For example, offsets produced by a livestock project that captures and combusts biogenic methane must not include the carbon offsets produced by the renewable energy generation.
- RECs must be of near-similar vintage to the inventory year they will be used to offset electricity purchases. REC accounting standards allow some leeway: RECs can be produced up to six months before or three months after the period covered by the inventory (typically a calendar year).
- To ensure that RECs lead to the creation of new renewable energy generation, they must come from facilities that began operations fewer than 15 years before the inventory year.

The California policy environment creates two additional requirements for RECs:

- RECs must include all renewable and environmental attributes associated with the production of renewable energy. In California, this means that the greenhouse gas benefits of renewable energy production must be retired through the Air Resources Board's Voluntary Renewable Electricity Program
- RECs must be surplus to regulatory requirements. That is, they must be produced above and beyond what's needed to comply with California's Renewable Portfolio Standard.

According to The Climate Registry, RECs bearing the Green-e Energy and EcoLogo tags will meet the national and California requirements. RECs from energy not delivered to California do not require allowance retirement in order to be Green-e eligible.

Green-e Renewable Energy Certificates Requirements for California's Cap and Trade System
Green-e standards require the full greenhouse gas reduction benefits be included with the REC. This creates special procedures for renewable energy delivered to areas where greenhouse gas



emissions are capped, such as California. Green-e standards require RECs created by energy generated in or delivered to California (PCC 1 and PCC2) to have their associated greenhouse gas benefit retired through allowances, procured either through the Voluntary Renewable Energy Program or purchased through other means.

California Renewable Energy Certificates

California Law defines RECs as "a certificate of proof, issued through the accounting system established by the Energy Commission... that one unit of electricity was generated and delivered by an eligible renewable energy resource." This includes "all renewable and environmental attributes associated with the production of electricity from the eligible renewable energy resource, except for an emissions reduction credit issued pursuant to [California's Cap-and-Trade Program] and any credits or payments associated with the reduction of solid waste and treatment benefits created by the utilization of biomass or biogas fuels."

In the table below, each renewable energy classification is presented with procurement options and whether Hermosa Beach could make valid Carbon Neutrality claims under the Air Resources Board (ARB) accounting regulations or The Climate Registry's (TCR) accounting guidance.



Categories of California Renewable Energy

Renewable Energy Classification	Description	Cost Premium (\$/MWh over grid power)	Procurement Options	Carbon Neutrality Claims*
PCC 1	Renewable electricity generated in or near California, with arrangements to deliver the power to California.	\$10-\$30	DA, CCA	ARB, TCR (with allowance retirement)
PCC 2	Renewable electricity generated outside of California, bundled with environmental attributes, but without arrangements to deliver the power to California.	\$5-\$25	DA, CCA	?, TCR (with allowance retirement)
PCC 3	The unbundled (separate from electricity) environmental attributes of renewable energy generated outside of California.	\$1-\$10	REC, DA, CCA	TCR (if Green-e certified)
Green-e Renewable Energy Certificate	The unbundled environmental attributes of renewable energy, generated outside of California.	\$1-\$5	REC, CCA	TCR
California Green-e REC	A Green-e REC from a qualifying PCC 1 or 2 facility with retired CA-eligible CO ₂ allowance.	\$5-\$30	REC, CCA	ARB, TCR

*for zero-emissions renewable generation. Not all renewable generation is zero non-biogenic emissions (e.g. biomass processes that require electricity). Cost estimates are for 2013 from Table 6 of Palo Alto's [Electricity Supply Portfolio Carbon Neutral Plan](#).

Marin Clean Energy use of Renewable Energy Certificates

Many CCA Programs, utility green power purchase programs, and Direct Access providers make use of RECs in order to offer “green” power. Marin Clean Energy uses a mix of California RPS energy and Green-e RECs for its product. According to their [2013 Integrated Resources Plan](#):



“MEA is largely resourced for the next several years, having contracted for most of its projected needs for bundled renewable energy through 2017, non-renewable energy through 2017 and capacity through 2015. However, MEA has a short term need for bundled renewable energy in 2014 (PCC1) and a longer term need beginning in 2017 (PCC1 and PCC2). MEA also has a need for capacity purchases to meet resource adequacy obligations beginning in 2015.

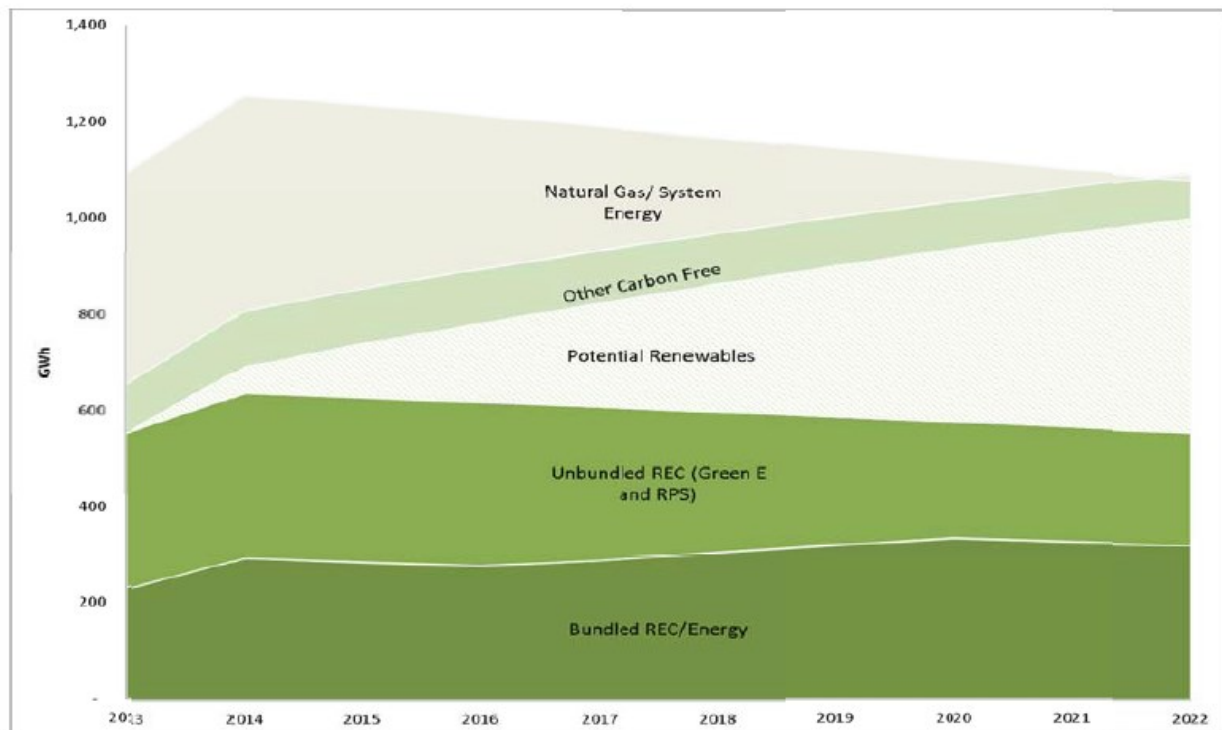
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The majority of MEA’s voluntary renewable energy purchases (those in excess of RPS-eligible purchases) are under contract through the end of 2013. MEA has a need for renewable energy certificates in 2014 and beyond to support RPS compliance (PCC3) and voluntary renewable energy targets (Green-e). MEA also has a need for carbon neutral energy in 2014 and beyond to support voluntary GHG emissions targets.

In 2013, MCE offered 60% renewable or zero emissions energy. Twenty-seven percent of its total load came from RPS-eligible generation. The balance is met with Green-e certified REC purchases.”

The graphic below highlights Marin Clean Energy’s plan to use bundled and unbundled RECs in order to offer its renewable energy programs.

Marin Clean Energy Renewable and Non-Renewable Energy, 2013 to 2022



Recommendations

First and foremost, the City should continue and expand upon existing energy efficiency programs. As the [GSE Solutions](#) report indicates, the City has opportunities to improve building energy efficiency by 40% or more. The City should pursue Projects 1 and 2, and the bundle of hot water and HVAC projects identified in the GSE Solutions report. After committing to Carbon Neutrality, the City should include the cost to neutralize emissions from electricity (approximately 0.3 cents additional per kWh) when evaluating whether to pursue electricity efficiency and retrofit projects.

To take a highly-visible climate action step, Hermosa Beach should take steps to install solar photovoltaic systems on municipal property. The City should continue to explore the options of a Power Purchase Agreement and Solar Lease. The City should also request the retirement of greenhouse gas emissions allowances through the state's Voluntary Renewable Electricity Program in order to claim unambiguous emissions reductions.

RECs are a commonly-accepted element of a green or carbon neutral portfolio, and should be an element of Hermosa Beach's municipal Carbon Neutrality efforts. Some entities employ RECs as a short term strategy while they wait for new generating projects to be built. Hermosa Beach can retire Green-e RECs to make greenhouse gas reduction claims under The Climate Registry's General Reporting Protocol.

Over the long term, Hermosa Beach should establish a CCA program and become one of program's first customers. This would allow for a unified approach to community and municipal greenhouse gas emissions reductions, with community members participating in the same program as the municipality. A CCA program can offer a 100% renewable, emissions-free energy option for the municipality, households, and firms. According to Southern California Edison rate schedule [OBF-2](#), on-bill financing programs for energy efficiency retrofits will continue to be available under a CCA program.

Even with on-site solar generation and a CCA program, Hermosa Beach will likely continue to purchase streetlight services from Southern California Edison, particularly for streetlights on wood poles. The City can shift these accounts to Edison's Green Rate option, or purchase Green-e RECs equal the amount of electricity used by SCE-owned streetlights.





Hermosa Beach Municipal Carbon Neutral Plan

Municipal Fleet

Introduction

The [Clean Fleet Policy and Action Plan](#), created in 2013, specifies a long-term goal of net-zero greenhouse gas emissions for the municipal fleet and alternative fuel used by 100% of contracted city service vehicles. The Plan also sets an interim goal to determine the feasibility of 50% emissions reduction for the City fleet and 20% emissions reduction for contractor service vehicles. These goals demonstrate the City's strong commitment to reducing the carbon footprint of its municipal operations.

The City's policies to "maximize the use of alternative fuel and low emission vehicles used to supply city services," "reduce vehicle emissions through efficient fleet management and operations," and "facilitate infrastructure to support alternative fuel vehicles" are in line with current best practices for California Local Governments, as identified by the Institute for Local Government and the International Council for Local Environmental Initiatives (ICLEI).

Currently, the municipal fleet is comprised of CNG, diesel, gasoline, and propane fueled vehicles. According to Energy Efficiency Climate Action Plan checklist, the City utilizes vehicles with fuel ranges from 11-44 mpg gasoline, 9-12 mpg diesel, 13-30 mpg CNG, and 30 mpg propane, all of which have varying emissions intensities. Though over 20% of the vehicle fleet is comprised of alternative fuel vehicles, making Hermosa Beach ahead of, or in line with many neighboring cities (Manhattan Beach has 13%, for instance), it is behind some area cities. For example, Santa Monica's non-emergency fleet is comprised of [81% alternative fuel vehicles](#). Some national cities also have more aggressive goals. Indianapolis, for instance, is [the first city in the U.S. to pledge](#) to convert its entire municipal non-police fleet to electric or plug-in hybrid electric vehicles by 2025.



Hermosa Beach's City Fleet by Fuel Type

Fuel Type	Number of Vehicles (In Use)	Models
CNG	6	Camry, Interceptor, F-150, F-250
Diesel	8	Leader, Spartan, Fire Truck, Equipment
Gasoline	57	Tahoe, Escape hybrid, Crown Victoria, Durango, F-150, F-250, F-350, F-450, Interceptor, Wrangler, Explorer, Utility truck, Impala, Taurus,
Propane	1	Interceptor

Source: Hermosa Beach Energy Efficiency and Climate Action Plan Checklist

Related Sustainability Plan Goals

The City's [Sustainability Plan](#) details three goals for the City's fleet:

- T10: Adopt a clean fuel/ultra low emission vehicle buying policy for all City vehicles and devise a long-term plan for replacement, identifying several options for low emissions vehicles that includes a cost-benefit analysis for all fleet vehicle types.
- T11: Evaluate CNG filling station for municipal vehicles.
- T12: Provide EV charging stations for City vehicles.

Recommendations for Light-Duty Vehicle Fleet

Hermosa Beach's 2013 City Fleet Policy and Master Plan is aligned with current regional best practices and policies. The City can continue to pursue their goal of Carbon Neutral municipal operations by continuing to adopt the most current trends in green fleet procurement and management. As the technology, performance, cost, financing options, and availability of alternative fuel vehicles are quickly evolving, the fleet policy should be responsive to these trends. The City of Hermosa Beach should review and revise the policy on a regular basis to ensure the City is acquiring the lowest emission vehicles that meet its needs. These recommendations are meant to provide guidance for future fleet procurement and management decisions. The recommendations are based upon the successful practices of other government agencies and best practices identified by respected resources.

To remain consistent with the City Fleet Policy's guideline, which states, "Review available green vehicle options including: electric vehicles, hybrids, CNGs, hydrogen, biodiesels, and any other emission reducing vehicles," the City of Hermosa Beach should continue to consider the latest and lowest-emissions alternative fuel technology when replacing fleet vehicles. Zero-emissions vehicles are now becoming staples of alternative fueled vehicle fleets, in addition to



conventional hybrid and natural gas vehicles. These zero-emissions vehicles have environmental and operating advantages over other alternative fuel vehicles. Plug-in hybrid electric vehicles, fuel-cell electric vehicles, and battery-electric vehicles are now available in most vehicle classes. To keep up with the fast-changing California market for alternative fuel vehicles through comparison of price, performance, and environmental qualities of specific vehicles, Hermosa Beach should consult the California Air Resource Board's [Drive Clean Buying Guide](#) and the guidance provided in Zero-Emission Vehicles in California: Community Readiness Guidebook created by the State of [California Governor's](#) Office of Planning and Research.

California's Low Carbon Fuel Standard

The Low Carbon Fuel Standard (LCFS) is a California regulation adopted by the Air Resources Board (ARB) that requires petroleum suppliers to reduce the life-cycle carbon intensity of transportation fuels sold in the state. The regulation provides additional opportunities for Hermosa Beach to reduce gross greenhouse gas emissions and additionally neutralize net emissions from the transportation sector.

The regulation establishes a declining schedule for the average adjusted carbon intensity, in grams of CO₂/MegaJoule (g/MJ), of fuel sold in the state. In 2014, the required adjusted carbon intensity is 94.41 g/MJ. To reduce the greenhouse gas intensity of gasoline sold in California 10% by 2020, the average adjusted carbon intensity of fuels sold must decrease to 86.27 g/MJ. Producers, refiners, blenders, and distributors of transportation fuels must acquire and surrender LCFS credits, denominated in metric tonnes of CO₂-equivalent, to demonstrate compliance with the regulation.

Hermosa Beach does not generate LCFS credits when using electricity or natural gas as vehicle fuels, as these credits are retained by the respective utilities. However, Hermosa Beach's use of low-carbon fuels reduces the City's gross greenhouse gas emissions.

Adjusted carbon intensity values compensate for differences in the energy economy of a vehicle. According to the ARB, an electric-powered vehicle travels 3.0 times further on a unit of energy than a gasoline-powered vehicle.



Adjusted Carbon Intensity of California Vehicle Fuels

Fuel Type	Adjusted Carbon Intensity (grams CO ₂ e/MJ)
California Gasoline (CARBOB)	95.86
California Reformulated Gasoline (CaRFG)	95.85
Midwestern Corn Ethanol	99.40
California Low-CI Ethanol	80.70
California-Sourced Compressed Natural Gas	75.22
California-Sourced Landfill Gas	12.51
Cellulosic Ethanol	20.40
Electricity (California average electricity mix)	41.37
Electricity (California marginal electricity mix)	34.90
Electricity (Zero Emissions Generating)	0.00
Hydrogen	33.09

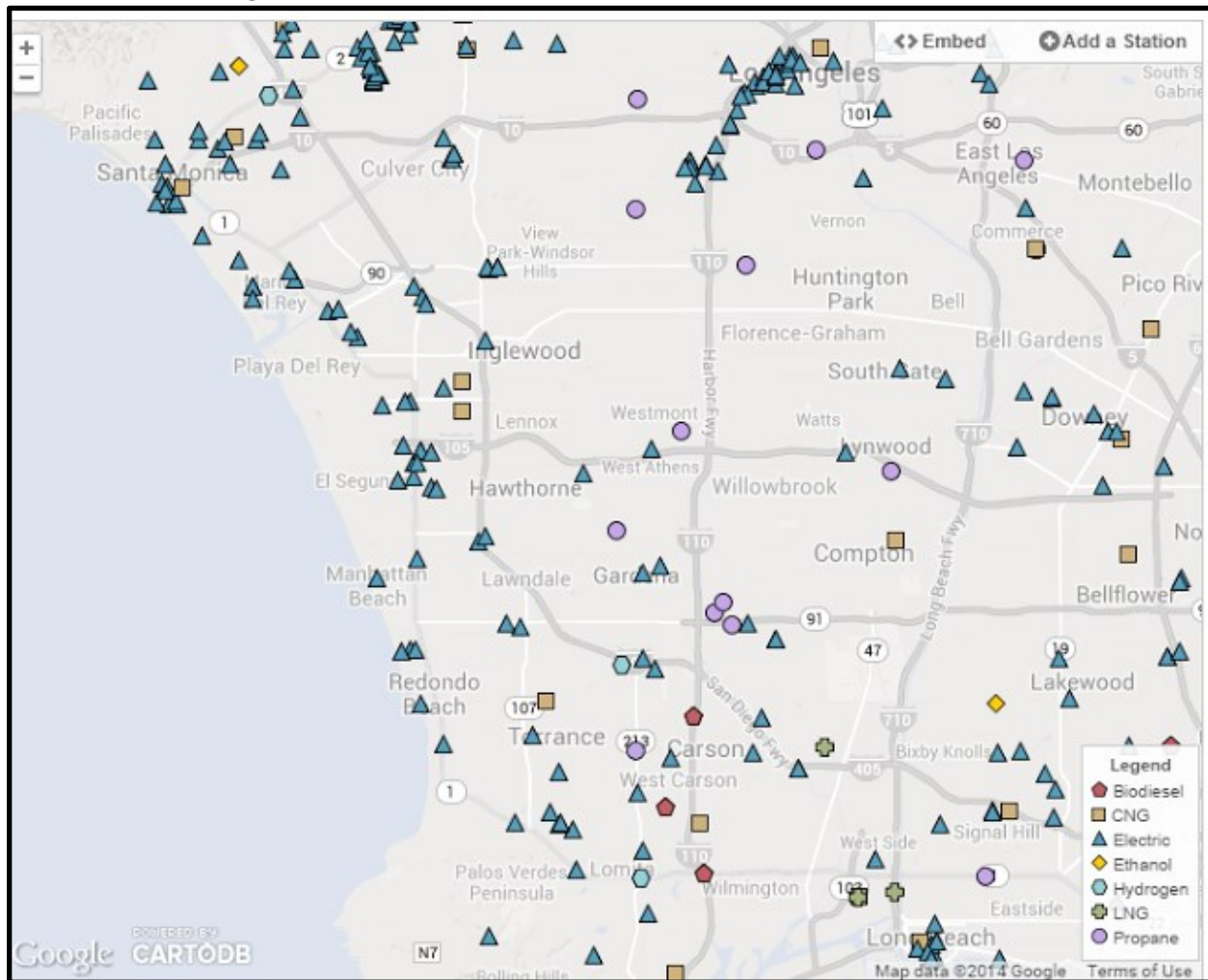
Source: ARB [Low Carbon Fuel Standard Staff Report Volume 1](#) Table IV-1

Electricity, landfill gas, and hydrogen are attractive options for reducing life-cycle emissions from transportation. Electricity is an especially attractive option, as the carbon intensity is a function of the mix of sources used to produce the electricity. For zero-emissions renewable energy, the carbon intensity value is zero.

According to the U.S. Department of Energy's [Alternative Fuels Data Center](#), electric vehicle infrastructure is most prevalent near Hermosa Beach, with 3 stations and 7 chargers, including 2 DC fast chargers, listed within the city. Three compressed natural gas (CNG) fueling stations are available in Torrance and near the Los Angeles Airport. Two of Southern California's 9 hydrogen stations are located in the South Bay. Three biodiesel (B20+) and ethanol (E85) facilities are located in the Harbor Gateway corridor.



Alternative Fueling Stations near Hermosa Beach



Source: U.S. Department of Energy

Hermosa Beach should continue to prioritize plug-in electric vehicle purchases where they are practical. The convenience and future expansion potential of electric vehicle supply infrastructure and the low carbon intensity of electricity for vehicles makes plug-in electric vehicles an ideal choice for reducing gross emissions. Hermosa Beach should invest \$50,000 in electric vehicle service equipment (chargers) and an additional \$250,000 to accelerate its Clean Fleet Policy and Master Plan.

Public Safety Vehicles

As identified in the City's [Clean Fleet Policy](#), some fleets, particularly public safety, have limited or no alternative fuel options that meet their requirements. Where electric, natural gas, or hydrogen-fueled vehicles are not practical, Hermosa Beach could look to acquire Flex-Fuel vehicles, which can run on fuel blends of up to 85% ethanol ("E85").



Ethanol has been criticized due to its high energy requirement to refine blends from certain feedstocks, and the indirect greenhouse gas emissions that result from additional land required to farm fuel crops. The California Low Carbon Fuel Standard takes a life-cycle perspective on environmental impacts in order to mitigate potential upstream environmental degradation due to use of ethanols and other fuels.

American automobile manufacturers offer a number of E85-capable Police Pursuit Vehicles, including the Chevrolet Impala, Dodge Charger, and Ford Police Interceptor Utility. The Hermosa Beach City Council recently [authorized the purchase](#) of four police vehicles. The 2014 Ford Police Interceptor Utility vehicle offers both a standard E85-capable 3.7-L V6 model and an upgraded 3.5-L V6 EcoBoost model that Hermosa Beach selected. The EcoBoost model offers higher performance, but is not E85-capable. The three 2015 Ford Fusion Hybrid vehicles the City authorized offer improved fuel economy but are not E85 capable.

Cellulosic Ethanol has a carbon intensity of 20.40, but is not widely available for use in California. The more commonly available California Low-CI Ethanol has a carbon intensity of 80.70. As of September 2014, [220 flex-fuel capable models are available](#) in the U.S. for general use.

Alternatively, the City could look to purchase and retire greenhouse gas emissions credits produced under the Low Carbon Fuel Standard. Transportation-specific offset options and procedures are discussed [later in this section](#).

Financing Options and Considerations

As consistent with the City Fleet Policy guideline stating “Research available grants, dealer incentives, and organization incentives” within the City’s purchasing, maintenance and environmental considerations, the City of Hermosa Beach should continue to consider all available financing options when purchasing or leasing (or considering the purchase or lease of) an alternative fuel vehicle. A review of best practices identified the following financing options for consideration:

- **Municipal Lease Financing:** Although local governments do not benefit from tax credits offered for the purchase of zero emission vehicles, many lenders offer municipal lease financing options. Municipal lease financing programs allow municipalities to capture a portion of the \$7,500 tax credit that they would not capture in a direct purchase. The Nissan Municipal Lease Financing program and the Ford Municipal Financing program are two examples in which auto dealers provide financing options to local government agencies. Riverside County; the City of Loveland, Colorado; the City of Houston, Texas; and the City of Olympia, Washington have all utilized municipal lease financing programs to acquire electric vehicles for their municipal fleet.



- **State Procurement Contracts:** Local governments are eligible to purchase vehicles using the California Department of General Services' (DGS) state procurement contracts. Although many local government agencies prefer procuring fleet vehicles from local dealers, using the negotiated prices for alternative fuel vehicles listed with the state procurement contracts can serve as a baseline price for comparison purposes.
- **Consider Total Cost of Ownership:** The City should consider how capital and operating expenditures are allocated when making fleet procurement decisions. Since fuel costs will be lower in alternative fuel vehicles, the City may find that future operating savings justify higher initial procurement costs for alternative fuel vehicles.
- **Include Co-Benefits in Cost Analysis:** Hermosa Beach should explicitly assess other co-benefits and values that arise from the use of alternative vehicles, such as environmental health and the marketing of low emission vehicles to the community when comparing costs of alternative fuel vehicles to those of conventional vehicles.

Potential Partnerships and Resources

Instead of managing its municipal fleet internally, the City of Hermosa Beach could utilize local fleet management service companies to determine the best way to green their municipal fleet while maintaining fleet quality and cost-effectiveness.

- [Vision Fleet Capital](#): Vision Fleet Capital strives to implement clean vehicles within fleets, cutting total cost of ownership, reliance on foreign oil, and enhancing service levels. Vision Fleet Capital also helps finance and manage fleets by offering low-cost financing, strategic operational advice, telematics tools, and asset management. Based locally in Venice Beach, California, Vision Fleet Capital could be a potential partner for Hermosa Beach to help the City electrify their vehicle fleet in the most cost-effective manner.

Fleet Management Regulations

The City Fleet Policy states that the City aims to “Reduce vehicle emissions through efficient fleet management and operations.” Best practices for efficient fleet management from the [Institute for Local Government](#) can assist Hermosa Beach in implementing this policy:

- Use Global Positioning Systems (GPS) and integrated software to control fleet vehicles, reduce misuse and increase efficiency through trip planning and location information.
- Provide fuel saving tips to drivers of fleet vehicles. These can include prohibiting idling, rapid acceleration, etc.
- Install battery systems for vehicles with onboard equipment to reduce truck idling when equipment is in use.
- Use technology options, such as requests via mobile device, for field personnel to prevent unnecessary trips back to the office.



Carsharing

Instead of replacing old or under-utilized vehicles, the City of Hermosa Beach can also consider using carsharing to meet its fleet needs. Carsharing is a model of car rental where people rent cars by the hour or fraction of an hour. Local governments throughout the U.S. have used carsharing to lower fleet costs, reduce carbon emissions, and support sustainable transportation in their communities. Municipalities that have utilized car sharing to supplement their fleet include Berkeley, San Francisco, Austin, New York City, Seattle, and Washington DC. Local governmental support for carsharing services usually involves either the direct contracting of service and/or provision of parking spaces. These municipalities experienced many benefits using carsharing within their operations, including lower fleet replacement, maintenance, fuel, insurance and staffing costs; newer, cleaner, and lower emission vehicles; more efficient vehicle allocation; increased vehicle access for employees; more available parking; and better data on vehicle use and mileage. As each municipality's program varied in scope, the following provides more detail on the experiences of a few municipalities who have utilized carsharing.

- **The City of Berkeley:** The first city to replace municipal fleet vehicles with carsharing, Berkeley has had considerable success reducing vehicle emissions, costs, and inefficient fleet use through an innovative partnership with [City Carshare](#), the San Francisco Bay Area's carsharing service. Berkeley's partnership with City Carshare not only uses carsharing to replace municipal fleet vehicles, but also includes carsharing in the planning and development process and supports carsharing for citizens and businesses. Berkeley also contracted City Carshare to develop specialized vehicle reservation software that dedicates vehicles for City employee use during normal work hours, and allows any member of City Carshare to use the vehicles on evenings or weekends. In the first year of the program, 4-5 carshare vehicles replaced 10-15 fleet vehicles. The use of carsharing has resulted in an annual financial savings of about \$8,000 per year, most of which results from not having to use the City's vehicle replacement funds to replace fleet vehicles. These savings do not include air quality, parking, or public health benefits.
- **The City and County of San Francisco:** As the City and County of San Francisco retires its older vehicles, City Carshare's fleet provides vehicles for City employee use so the City does not have to purchase new fleet vehicles. This partnership reduces San Francisco's vehicle fleet size, lowers purchase and maintenance costs, and [reduces carbon emissions](#).
- **Washington DC:** In 2008, Washington DC replaced 360 vehicles with a shared fleet of 71 passenger vehicles operated by Zipcar technology through the ["FastFleet"](#) program. FastFleet is Zipcar's fleet management model that helps fleet managers right-size current fleets, enables self-service reservations and keyless access, develops analytics on driver and vehicle history, leverages software and support services, and transitions fleets to energy-efficient hybrid and electric vehicles where sensible. In Washington DC, employees use an intuitive web-based reservation system, phone, or mobile device to select and reserve vehicles and a wallet size access card to unlock the reserved car.



FastFleet varies from Zipcar's conventional carsharing model in that it does not supply the vehicles. Instead, the City's existing vehicles are equipped with FastFleet's in-vehicle technology. After the first year of the pilot program, Washington DC [projected a savings](#) of greater than \$6 million over five years.

- **The City of Portland:** Flexcar (now Zipcar) partnered with the City of Portland to provide fleet management services. In the pilot, Flexcar managed 12 out of 25 motor pool vehicles. Employees signed up for Flexcar individually, and then each department was charged for vehicle use. This partnership saved Portland approximately 25% in the motor pool's annual operating, maintenance, and fuel costs. After the pilot, Portland contracted all 25 motor pool vehicles to Flexcar, and Flexcar's tracking technology [helped Portland identify underutilized cars](#).
- **The City of Austin:** The City of Austin, Texas entered a revenue-neutral barter agreement with the carsharing organization [Car2Go](#). Municipal employees could use vehicles for free during a six-month pilot phase, allowing Car2Go to gather consumer testing data and receive dedicated parking spaces avoiding parking fees. This partnership was innovative in that the City did not directly subsidize Car2Go, but the parking benefits were valued at about \$85,000. After the successful pilot, Austin extended the partnership and numerous Texas state agencies have signed up for the Car2Go program.

Potential Carsharing Partnerships for Hermosa Beach

A few different organizations that offer carsharing services in L.A. County may serve as potential partners for Hermosa Beach. Each carsharing service listed below has experience working with a municipality and varies in its fleet composition, services offered, and other program components.

- **Car2Go:** In June 2014, Car2Go launched its pay-by-the-minute carsharing service in several South Bay Cities of LA County, including Hermosa Beach. Car2Go members use a smartphone application to find a vehicle, drive it, and then are able to park it in any public parking space identified as 2-hour parking or longer. This model differs from conventional round-trip services such as those provided by Zipcar. Hermosa Beach could contact Car2Go about the possibility of extending carsharing services for municipal fleet use, similar to Car2Go's arrangement with the City of Austin, Texas.
- **Zipcar:** Now owned by Avis and operating in over 20 cities across North America, Zipcar is the world's largest carsharing service and is an alternative to traditional car rental and ownership. Members use a Zipcard to unlock their car, pay a \$6 per month membership fee and a driving rate of \$8-10 per hour. Zipcar is a round-trip service, meaning members must return vehicles to the same parking space from which they obtained it. Beginning in 2009, the City of Los Angeles partnered with Zipcar to dedicate 40 on-street parking spots near USC and UCLA campuses to Zipcar. Washington DC partnered with Zipcar to utilize Zipcar's FastFleet program to help them more efficiently



manage their municipal fleet. Hermosa Beach could partner with Zipcar either through the provision of parking spaces or by using Zipcar's FastFleet as a tool to manage Hermosa Beach's municipal fleet.

Recommendations for Other Vehicles

To achieve Carbon Neutrality for municipal operations, the City of Hermosa Beach must consider ambitious and innovative strategies. A review of the programs implemented by other municipalities identified the following strategies for consideration for Hermosa Beach:

Neighborhood Electric Vehicles (NEVs)

Hermosa Beach should also consider utilizing Neighborhood Electric Vehicles (NEVs) within its vehicle fleet. Falling under the U.S. classification for low-speed vehicles, NEVs are battery electric vehicles have a maximum speed of 25 mph and are legally limited to roads with speed limits of 45 mph or less. Although NEVs are not included in vehicle sales forecasts and passenger fleet projects, these short-range, low-speed vehicles designed for local use could become a key component of the electric vehicle mix, especially in mature suburban areas like the South Bay that will likely not attract transit investments in the near future.

Beginning in 2004, the South Bay Cities Council of Governments (SBCCOG) began to research a land use and transportation strategy that would reduce greenhouse gas emissions, pollution, and gasoline use without focusing on transit investments or increased residential density. This led to the adoption of the Sustainable South Bay Strategy (SSBS) in 2010, which proposes that cities create compact destinations in neighborhood centers to encourage walking, cycling, and the use of NEVs for travel between these centers. As part of this strategy, the SBCCOG launched a [NEV Demonstration Project](#) which loaned a fleet of NEVs to South Bay households for an 18-month period.

This project was highly successful, finding that of those who participated, NEV mode share averaged 46% of the roundtrips. The average round-trip travel distance ranged from 2-5 miles. Due to Hermosa Beach's compact size, NEVs could also be an effective component of travel for municipal employees, whose average work trip or personal errand is likely only a few miles. Global Electric Motorcars (GEMs), a type of Neighborhood Electric Vehicle by Polaris, are small vehicles which serve as an alternative to golf carts. GEMs have served municipal fleets as utility, parking and security, and even landscaping and construction vehicles. Municipalities who have employed NEVs within their fleet include the City of Palm Springs, the City of Cypress, and the City of Santa Monica.

Hermosa Beach should purchase two neighborhood electric vehicles for municipal fleet use and later determine whether these vehicles are a suitable replacement for other fleet needs.



Bicycle Fleet

The Institute for Local Government's Sustainability Best Practices Framework [recommends](#) establishing a pool of shared bicycles to allow employees to borrow a bicycle for use during the workday. Providing bikes to employees reduces vehicle trips made during the day for business and personal errands, therefore reducing emissions. Municipalities all over California have adopted employee bike share programs, including Long Beach, Santa Monica, Cupertino, San Jose, and San Francisco. Municipal bike fleet programs typically provide bicycles, secure bicycle storage, and showers and lockers. They usually require employees to complete a bicycle safety training program to participate. Traveling by bike especially makes sense in the City of Hermosa Beach due to its compact size.

Although most cities provide regular bicycles, Hermosa Beach can also consider adding electric bicycles to its fleet program. Electric bicycles make it easier to travel on hilly terrain but still emit zero tailpipe emissions. An electric bike can achieve over 2,000 mpg-equivalent, making them a highly energy and cost-efficient option for Hermosa Beach. Hermosa Beach could be one of the very first cities to utilize electric bikes within their bike fleet. Purchasing regular or electric-assist bicycles also provides Hermosa Beach with an opportunity to support local businesses. See the following for a list of several local bike shops:

- [Hermosa Cyclery, Inc.](#): Located on the Strand at 20 13th Street in Hermosa Beach, Hermosa Cyclery specializes in strand cruisers that are easy to ride around the city and is regarded as a trusted bicycle service center.
- [The Old Bike Shop](#): Located at 430 Pier Ave. in Hermosa Beach, the Old Bike Shop is an owner-operated bike shop that specializes in custom-built high end bikes.
- Beach Cities Cycle: This bike shop is located at 219 Pacific Coast Hwy in Hermosa Beach.
- [Motion Bicycle Establishment](#): Motion Bicycle Establishment sells, rents, services, and repairs all types of bikes and is located at 914 Aviation Blvd in Hermosa Beach.
- [Electric Bikes LA](#): Located at 433 Main Street in El Segundo, Electric Bikes LA is the first bicycle store in the region dedicated to the sale and repair of electric and folding bikes.

Offsetting Emissions from Vehicles

Implementation of California's Low Carbon Fuel Standard (LCFS) is leading to the availability of low greenhouse gas transportation fuels in California. However, costs to transport these fuels from their production location to Hermosa Beach can be high. Additionally, many vehicles are not designed to use low-carbon fuels.

The LCFS credits generated under the program are tradable. LCFS credits [trade for \\$24 to \\$85 per credit](#), which, like allowances and offsets, are denominated in units of metric tonnes of carbon dioxide equivalent (CO₂-e). Compared with the \$11.50 cost of California allowances,



LCFS credits are an expensive means of offsetting emissions. However, in the future their use could allow for sector-specific neutrality claims. Instead of offsetting transportation emissions with forest or livestock projects, retiring LCFS credits will allow Hermosa Beach to claim that it is subsidizing low carbon fuels consumed by others on Hermosa Beach's behalf.

Whether entities without compliance obligations like Hermosa Beach can acquire and voluntarily retire LCFS credits for climate action goals has not been tested as of this writing. Additionally, no greenhouse gas accounting method currently exists to adjust fuel purchases for LCFS credits.

If a commonly accepted method to account for LCFS credit emerges, one specific LCFS credit opportunity may aid the City's climate action outreach and education campaign. Digester gas is not currently a common transportation fuel, but the Climate Trust [believes](#) LCFS could change that. Many livestock farms in California are looking to capture methane in order to generate ARB offset credits. If the biogas is then consumed as transportation fuel in California, LCFS credits can be generated above and beyond these offsets, which are for avoided methane emissions. If Hermosa Beach decides to establish a direct relationship with a livestock project for purposes of acquiring greenhouse gas offsets, the City may be able to negotiate receiving any LCFS credits produced by the project.

The Low Carbon Fuel Standard is not to be confused with Federal renewable fuel regulations, which are based on the quantity of renewable stocks blended into transportation fuel, not the resulting change in greenhouse gas emissions. [Federal regulations](#) require fuel suppliers to blend renewable fuels into gasoline and diesel. In a manner similar to the Renewable Portfolio Standard, each refiner or importer of fuel must meet a Renewable Volume Obligation by surrendering a series of Renewable Identification Numbers to the U.S. EPA. The Renewable Identification Numbers can be separated and traded. When renewable fuel with a Renewable Identification Number is produced in or imported to California, that fuel may also generate LCFS credits for California's program, which is a separate regulation.





Hermosa Beach Municipal Carbon Neutral Plan

Employee Commutes

Introduction

The City's Sustainability Plan calls for a 20% reduction in greenhouse gas emissions from employee commutes relative to 2005 levels by 2020, which were 348 metric tonnes of CO₂-equivalent². The 2012 draft inventory shows 218 metric tonnes, a 37.4% reduction in greenhouse gas emissions versus 2005. However, it is important to note that the number of full-time equivalent City employees decreased 33.8% during this period.

In pursuit of attaining the greenhouse gas reduction goal for employee commutes, the City's Sustainability Plan recommends revising Hermosa Beach's existing rideshare program to better incentivize employees to substitute more environmentally conscious alternatives to single occupant vehicle (SOV) trips for commuting. Launched in 1990 to comply with the South Coast Air Quality Management District's Regulation XV, the City's existing rideshare program provides employees who use alternative transportation modes 3 out of 4 days per week with \$30 per month. Despite the incentive in place, the program had no participants as of July 2013. Just 11% of employees biked, walked, used transit, or a combination of these modes at least once a week. An employee commute survey conducted in 2013 on 108 out of 142 employees found that about 31% of employees were interested in participating in a rideshare program, and 50% of employees would be influenced by tax savings or other monetary incentives.

Using data gathered from the 2013 City of Hermosa Beach Employee Commute Survey, information regarding other cities' employee commute reduction programs, and best practices in transportation demand management, Kaizenergy has outlined a strategy and plan the City of Hermosa Beach could use to overhaul its employee commute reduction program thus increasing participation and reducing resultant municipal carbon emissions.

Hermosa's Employee Commute Reduction Challenge

Traditional commuter rideshare programs rely on matching employees with similar schedules, origins, and destinations. Creating successful carpool or vanpool matches is mostly a numbers game. Successful traditional rideshare matches rely on a large pool of people who are eligible

² The Energy Efficiency & Climate Action Plan Draft Inventory, Forecasting and Target-Setting Report shows employee commutes at 348 metric tonnes in 2005. However, the [City's previous inventory](#) reports employee commutes at 399 metric tonnes for 2005. The more recent document is presented to show change over time.



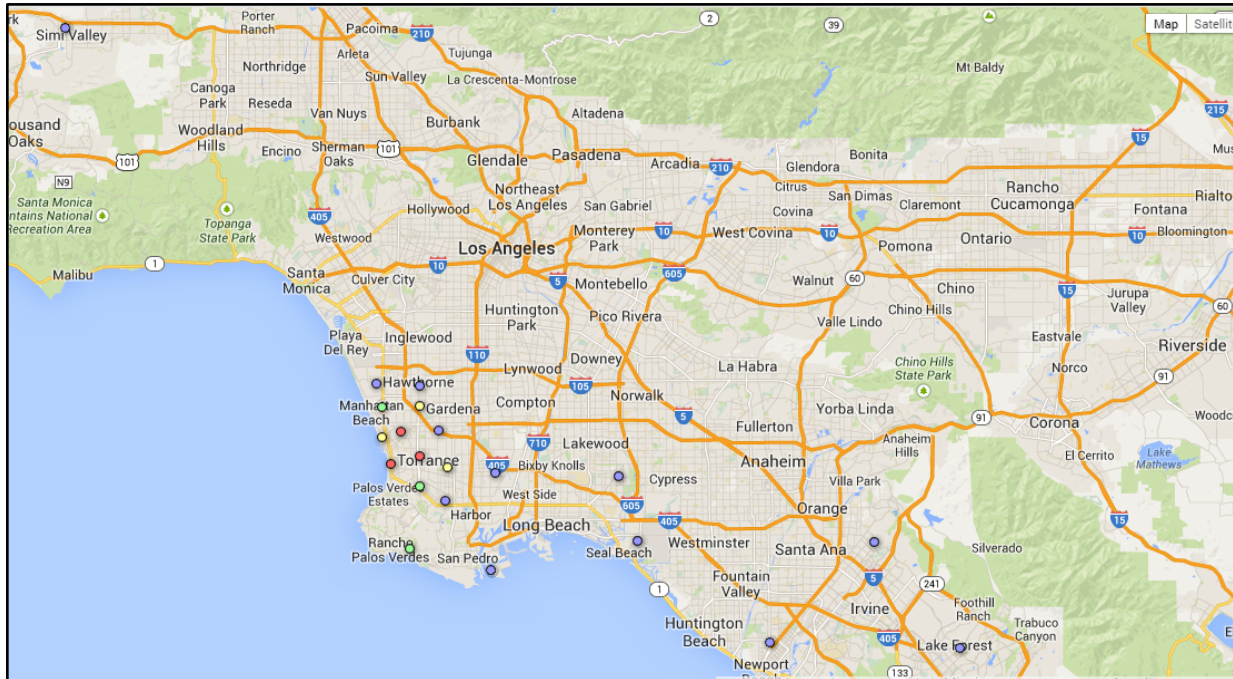
to match, a subset of whom are interested in ridesharing. Strategies to match more carpools or vanpools include increasing the size of the pool of potential ride-sharers and/or improving and increasing incentives to motivate more people to share rides.

The City of Hermosa Beach's current employee commute reduction challenges are twofold. First, Hermosa Beach is a relatively small employer, with only 142 employees across multiple sites. This limits the potential for rideshare matching. Second, the City's 2013 Employee Commute Survey indicated that, due to the structure of existing incentives, their effectiveness is limited.

As seen below, many potential carpool matches live in or near the City. While matching employees who live nearby into carpools will reduce vehicle trips and the need for on-site car parking, these consolidated short-distance trips will not cause substantial reduction in greenhouse gas emissions from employee commutes. However, successful matches could provide an example of the program's benefits for other employees who live farther away. Hermosa Beach could also incentivize employees who live nearby to commute using neighborhood electric vehicles or electric-assist bicycles if these vehicles are added to the City's fleet.



Map of Zip Codes with 2 or more employees



Legend: Number of employees per zip code:

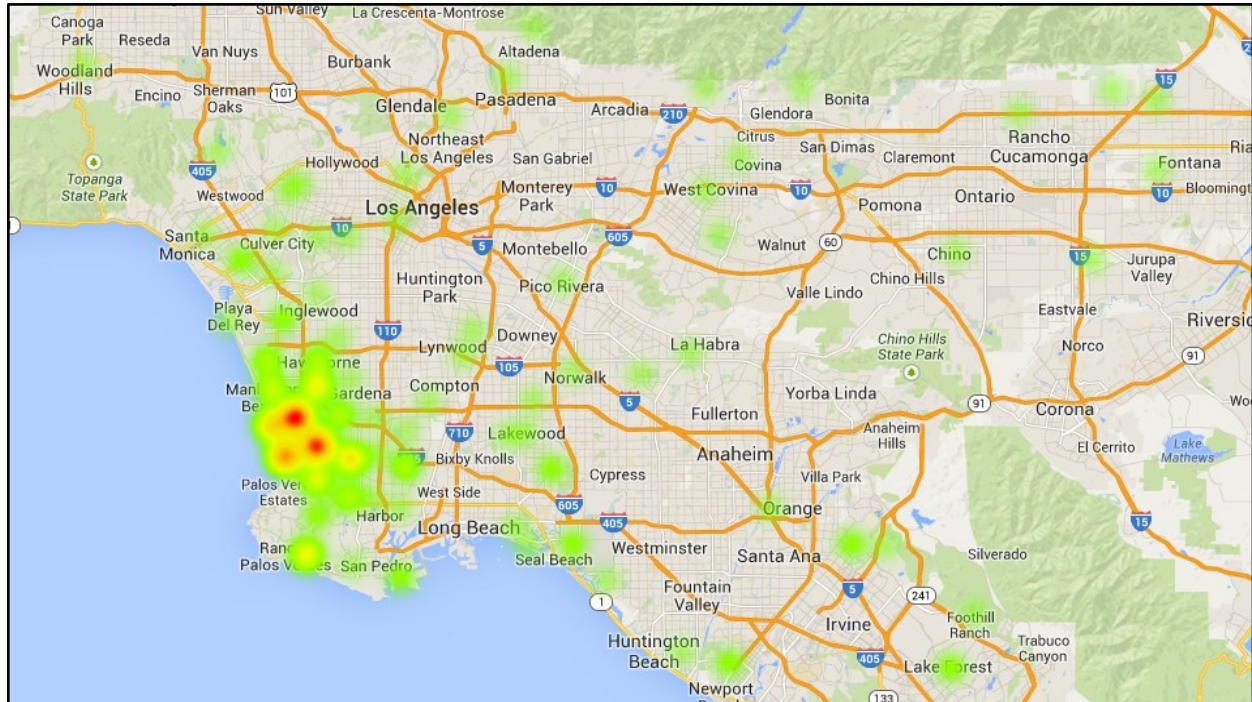
● 1 to 3 ● 4 to 5 ● 6 to 9 ● 10 to 20

Top Zip Codes

Zip Code	Place	Number of Employees	Distance from Hermosa Beach (miles)
90278	North Redondo Beach	20	2.0
90277	South Redondo Beach	14	2.3
90254	Hermosa Beach	9	0
90260	Lawndale	6	4.7
90275	Rancho Palos Verdes	6	13.3



Heatmap of All Employees Responding to 2013 Commute Survey



Best Practices in Local Government Commute Trip Reduction Programs

To reduce their municipal carbon footprint and to comply with regional regulatory agency trip reduction requirements, many municipalities have begun implementing employee commute reduction programs. Reviewing best practices in local government transportation demand management programs as well as the practices of neighboring cities and other successful local programs can help Hermosa Beach identify most effective methods to decarbonize its employee commutes.

Statewide Best Practices

The [Institute for Local Government](#) identifies several best practices for municipalities developing programs to reduce employee commutes via SOV. These best practices focus on using effective incentives and acquiring the necessary infrastructure to encourage employees to bike, walk, take public transit, or carpool to work. Hermosa Beach's existing program is in line with the incentive best practices identified by Institute for Local Governments, but the City could enhance the attractiveness of these incentives and ensure the City provides the necessary



infrastructure for employees to feel comfortable walking or biking to work. The best practices described by the Institute for Local Government are summarized below³:

Create an Incentive Program

The Institute for Local Government states that a municipality should “offer agency employees incentives to use alternatives to single-occupant commuting.” Incentives could include parking cash-out, flexible schedules, public transit incentives, bike share and rideshare services and subsidies, transit subsidies, and telecommuting. Rideshare programs should incorporate a “Guaranteed Ride Home” program and utilize smartphone technology.

Provide Infrastructure

As mentioned in the employee fleet recommendations, the Institute for Local Government suggests municipalities “establish a ‘bike barn’ to enable agency employees to borrow a bicycle to use for local meetings.” The bikes purchased for the bike barn could also be rented to employees for commute purposes. The Institute for Local Government also suggests municipalities “construct bicycle stations for employees that include bicycle storage, showers, and bicycle repair space” and provide locker and shower facilities for employees who bike or walk to work.

Review of Other Programs in Nearby Cities

The City of Hermosa Beach and neighboring South Bay cities face a unique set of challenges in motivating employees to cut SOV commutes: they are already mature, built-out suburbs without the robust public transit service found elsewhere in L.A. County. Nonetheless, we found that adjacent cities have ascertained more effective commuter incentive programs. The following discussion describes employee commute reduction strategies employed in the South Bay cities that neighbor Hermosa Beach as well as the successful approach taken by the City of Santa Monica, a municipality recognized statewide for its environmental leadership.

Manhattan Beach

The City of Manhattan Beach offers an incentive of \$60 per month to employees who carpool, bike, walk, take public transit, or use a combination of these modes to get to work. The City currently has about 12 employees who participate (6 carpool, 2 bike, 2 walk, 1 public transit, and 1 combination of modes). The program costs the City about \$8,500 per year. Information about the program is posted on the City’s employee “intranet” with all necessary instructions and forms. The City does not currently have a bike fleet or share program. In Manhattan Beach, only one staff member administers the program.

³ <http://www.ca-ilg.org/sustainability-best-practice-area/efficient-transportation#agency-employee-programs>



Redondo Beach

The City of Redondo Beach launched its “[Employee Rideshare Program](#)” in 2008. Employees who carpool, walk, bike, use public transit, vanpool, or drive alternative fuel vehicles earn incentive points on a daily basis that can be traded in for Sears gift certificates. Redondo Beach offers guaranteed return trip services, ride matching services, free CNG fueling, and an annual prize drawing for all employees who participate.

Torrance

The City of Torrance launched its “Catch a Ride” program to comply with the South Coast Air Quality Management District’s (SCAQMD) rule 2202. Rule 2202 requires employers with 250 or more employees to reduce mobile source emissions generated from employee commutes. In the Catch a Ride program, employees who carpool, walk, bike, use public transit, or vanpool earn points on a daily basis that can be traded in for time off, gas vouchers, gift cards, and discounts on public transit. Program participants are eligible for emergency rides home, preferential parking, free car washes, and ride matching services.

Santa Monica

The City of Santa Monica reduced emissions from employee commutes through its Rideshare Club. The Rideshare Club consists of three sub-categories, the Commute Club, the Transit Club, and the Vanpool Subsidy Club. The Commute Club provides incentive points to employees who bike, carpool, drive an electric scooter, walk, ride the bus, and more. Participants can drive as part of their commute or mix these options. A carpool consists of two or more people (they do not need to be coworkers at the City, but children without driver’s licenses do not count) who ride together at least 51% of round trip travel. Employees earn incentive points for each day they rideshare, and they exchange these points quarterly for a bonus on their paychecks. Commute Club participants must earn a minimum of 4 incentive points per month and a maximum of 40 points per month. Transit Club provides riders of mass transit fare reimbursement for travel costs to and from work. Mass transit includes bus, light rail, and train. To qualify, employees must use transit for at least 15 roundtrips per month. They are provided up to \$84 for bus and \$100 for rail. The Vanpool Subsidy Club provides employees who participate in a vanpool with up to \$100 per month. To provide alternative mode commuters with mobility options at work, the City allows staff to borrow a bike from its “Bikes At Work” fleet to run errands, exercise, or attend meetings.

Recommendations

To reduce gross greenhouse gas emissions attributed to employee commutes, the City of Hermosa Beach should revise its Employee Commute Reduction Program (ECRP) to better incentivize employees to adopt alternative modes of commute and to generate lasting program participation. This section provides a brief description of the strategies the City could employ.



1. **Appoint an Employee Transportation Coordinator**

The City should institutionalize its commuter program by designating a staff member to serve as the citywide Employee Transportation Coordinator (ETC). This staff person's work plan would include launching a revamped program and tracking the success of the program through annual surveys. Typically, ETCs are staff members in human resources, but Hermosa Beach might find it is more successful in recruiting staff who are already involved in promoting other sustainability-related initiatives. At an employer of Hermosa Beach's size, the ETC role would not be a full-time position. This person would also serve as the go-to peer to answer questions, administer incentives, and disseminate informational materials to educate and inform fellow staff members about their options. Finally, this role would include investigating resources the City could access from Metro's Commute Services, in order to further strengthen the program.

2. **Form Partnerships**

In concert with the newly-appointed ETC, Hermosa Beach should form partnerships with nearby employers to increase the likelihood of a carpool or vanpool match. The options are limited, but they include:

- The Hermosa Beach Chamber of Commerce's 300 members, who represent firms that employ many private sector workers in Hermosa Beach.
- The Hermosa Beach City School District. School District offices are a short walk from Hermosa Beach City Hall, on the campus of Hermosa Valley School. However, as 55% of commute survey respondents work a 4/10 schedule, from 7AM to 6PM Monday through Thursday, and school district employees may have different work schedules than City employees.

Hermosa Beach could also promote online ride matching through services already provided by Metro (www.ridematch.info). Unfortunately, no existing vanpool routes terminate in Hermosa Beach; many terminate in El Segundo.

3. **Restructure Incentives**

A common theme among successful local employee commute reduction programs is the provision of incentives to participants. These programs typically provide a monetary incentive to employees who participate a certain number of times per month, or employees earn incentive points on a daily basis that can be traded in for monetary incentives or other prizes. Of the 64 employees who answered the question, "What is the minimum monthly cash reward that would entice you to carpool, bike, walk, or take public transit to and from work at least 50% of the time?" in the 2013 Employee Commute Survey, 42% answered \$30-50, and 37.5% answered greater than \$50. Based on these results and the programs of neighboring cities, here are some future considerations:



- Create a tiered incentive system: Although as of July 2013 no employees were participating in the City's rideshare program, about 11% were biking, carpooling, walking or taking transit to work at least one day a week. This gap in participation could reflect the program's stringent requirement, enforcing 3 days participation each week to qualify for incentives. To encourage more employee participation, the City could create a tiered incentive system in which participants utilizing the program more receive a larger incentive. For instance, employees who participate 5 days per month receive \$20, and those who participate 10 days per month receive \$50.
- Create a "points based" incentive system: Like the Cities of Redondo Beach, Torrance, and Santa Monica, Hermosa Beach could create a system based upon incentive points that are earned on a daily basis. This system also encourages employees to participate who are not ready for the existing program's stringent requirement of 3 days per week. At the end of the month or the quarter, employees can trade in their incentive points for cash or prizes.
- Incorporate alternative fuel vehicle commuters: Some municipalities, like Manhattan Beach, offer incentives to employees who commute in 100% alternative fuel vehicles (100% electric, CNG, LNG, hydrogen fuel cell). Hermosa Beach could even look to subsidize alternative fuel vehicle purchases and leases as a component of planned compensation increases. If the employee saves money on vehicle operation costs, the alternative fuel vehicle incentive could put additional money in the employee's pocket above and beyond the City's contribution.

The City of Hermosa Beach may also consider providing direct subsidies or a pre-tax set-aside for workers who use transit and vanpool.

- Direct subsidies: Employers can provide up to \$230 per month tax-free to employees who use transit or vanpools. The employer therefore pays the benefit and receives equivalent deduction from business income taxes. The employer pays directly for vanpool expenses or purchases transit passes for employees.
- Set aside pre-tax dollars: Employees are allowed to set aside up to \$230 per month of their pretax income to pay for transit or vanpools. Employees save on payroll and income taxes since it is not reported as a taxable salary. The amount set aside is a benefit and therefore reduces employer payroll costs.
- Partially subsidize costs: The employer subsidizes a portion of vanpool or transit costs in addition to salary, and allows employees to pay the rest.

Finally, if it is eligible to do so, Hermosa Beach should submit a Rideshare Service Agreement with Metro's Commute Services division in order to make its employees eligible for Metro Rewards. Metro Rewards is an incentive program available at no cost



to participating employers. In 2014, the Metro Rewards program provided workers who commuted using an environmentally-friendly mode with a coupon discount book to purveyors of goods and services throughout Los Angeles County worth \$1,000 in immediate savings. The eligibility threshold is much lower: Employees must rideshare at least 8 work days a month during three consecutive months.

4. Add Bike Accommodations

To support bicycle commuting and the use of bicycles for mid-day trips, the City of Hermosa Beach should investigate:

- Ensuring there is adequate and safe bicycle parking at all work sites.
- Including building showers and lockers with bicycle commuters in facility renovation plans.
- Launching a bike barn at City Hall and the City Yard to allow for use of shared bicycles, including electric-assist bicycles.
- Initiating a Take Home Bike Program, which allows nearby employees to take home bicycles or neighborhood electric vehicles for use in commutes.

5. Determine a Telecommuting Policy

Instituting a telecommuting policy could help the City significantly lower vehicle emissions attributed to employee commuting, especially if initiated as an option for long-distance commuters. This would be both effective in reducing emissions and attractive to employees with significant commutes. Thirty-four percent of employees surveyed expressed interest in this option in the 2013 Employee Commute Survey. These employees indicated their ability to use such a policy 3 to 4 times a month; however 46% stated their work would not be compatible with telecommuting, and 17% were not interested. Several cities had success. A few strategies the City of Hermosa Beach should include when determining a telecommuting policy are listed below:

- Establish an eligibility list of suitable job categories, employment status, and prior performance ratings for telecommuting.
- Create a performance agreement for those employees eligible to telecommute, specifying a minimum for office-based hours, accessibility during regular work hours, methods of communication with supervisor, and necessary requirements for alternative worksites including computer specification and special equipment, desk size and configuration.





Hermosa Beach Municipal Carbon Neutral Plan

Other Emissions

Natural Gas

Hermosa Beach uses natural gas for both building energy and some vehicles in the City's fleet. Increasing the energy efficiency of the City's natural gas vehicles and equipment is key to gross emissions reductions. However, even with efficiency improvements, the [2013 Hermosa Beach Carbon Neutral Scoping Plan](#) found that gross reductions in natural gas emissions are limited by the fuel's inherent greenhouse gas intensity. This is in contrast to gross greenhouse gas emissions from electricity, which can be eliminated through use of renewable generation. Efforts to reduce greenhouse gas emissions have generated interest in low-carbon sources of natural gas. The [section on the City's vehicle fleet](#) details an option for transferable credits when renewable natural gas is used as a transportation fuel. Biogas Transfer Credits may be a future option for other uses of natural gas.

Biogas Transfer Credits

Biogas Transfer Credits are a concept to separate the renewable qualities and emissions benefits from physical biogas, in a manner similar to RECs and LCFS credits. Biogas (or biomethane) is natural gas that is produced from the breakdown of organic material in the absence of oxygen. Biogas can be produced through anaerobic digestion at facilities that handle green waste, manure, municipal solid waste, and sewage. Biogas must typically be cleaned in order to improved quality, but can then be compressed into Biogas CNG or liquefied into Biogas LNG. Biogas combustion is considered a biogenic source of greenhouse gas emissions, and is not included in gross emissions totals in greenhouse gas inventories.

Historically, most biogas used for energy in California has been combusted on-site or nearby a landfill, dairy, or sewage treatment plant. A new law may bring new opportunities for pipeline biogas use in California. In 2014, the California Public Utilities Commission adopted [regulations](#) to implement AB 1900 (2012) enabling biogas injections into natural gas pipelines. The implementing regulations pertain to safety requirements and recordkeeping for biogas injections, including a facility's annual biomethane production rate. The law does not establish Biogas Transfer Credits in California, but future laws or regulations could do so.

If Biogas Transfer Credits (or conceptually similar units with a different name) become available in the U.S. or California, Hermosa Beach could look to acquire credits to offset its natural gas consumption. For Hermosa Beach to take credit in its inventory, greenhouse gas accounting guidance would need to incorporate a method to adjust for the credits.



Contract Vehicles

Hermosa Beach contracts its street cleaning, landscaping, and refuse & recycling services. The City has already included stipulations that some of these contractors use cleaner, natural gas vehicles. The City's street cleaning provider and refuse/recycling service use natural gas vehicles.

The City's [Clean Fleet Policy and Action Plan](#) establishes several goals for contracted vehicles:

- Interim:
 - Determine feasibility of 50% emissions reduction for City fleet and 20% emissions reduction for contractor service vehicles (implemented with new contracts, or with amendments when feasible).
- Long-term:
 - Net zero greenhouse gas emissions for City fleet.
 - Alternative fuel used for 100% of contracted City service vehicles. This is a lesser goal in that it is not a net carbon neutral goal.

In the future, Hermosa Beach can specify contract terms that require the service provider to neutralize greenhouse gas emissions from the services they perform on behalf of Hermosa Beach. Alternatively Hermosa Beach could require that the contracted service provider disclose the volume and carbon intensity of fuels and amount of electricity used to service the contract, and Hermosa Beach can then take additional steps to offset those emissions.

Solid Waste

The City's 2007 inventory reported 167 metric tonnes from waste in landfills. Hermosa Beach does not have operational or financial control over a landfill. However, emissions from waste sent to landfills are considered to be Scope 3 emissions under the Air Resources Board's Local Government Operations Protocol. The City should include these emissions within its offset program.

The City's 2007 inventory reported 85 metric tonnes from all contract service vehicles. Because Hermosa Beach can exercise operational control over its waste service provider, compressed natural gas combustion emissions from Athens Services' collection of waste and transfer to landfills would be considered Scope 3 transportation emissions from contracted services. Hermosa Beach's current contract with Athens Services ends in 2021. Before Hermosa Beach considers a new waste hauling contract, it can include Athens Services' GHG emissions in the city's annual purchases of GHG emissions offsets. Hermosa Beach can also seek to include contract terms that Athens offset their emissions, if the City amends the contract before 2021.



Water

According to the 2007 Municipal Inventory, Hermosa Beach has operational control over limited sprinkler and irrigation systems and lift stations. These emissions, derived from electricity, may be addressed through electricity procurement strategies. Hermosa Beach may wish to consider upstream emissions related to water treatment and distribution. In the 2013 Hermosa Beach Carbon Neutral Scoping Plan, West Basin Water District's emissions factors for imported and recycled water were found to be 0.00414 and 0.00388 kgCO₂e/gallon, respectively. Hermosa Beach could elect to track and offset upstream emissions from water use, but it is not necessary for the City to claim carbon neutral status under the Local Government Operations Protocol.





Hermosa Beach Municipal Carbon Neutral Plan

Use of Greenhouse Gas Offsets

The Role of Offsets in Climate Commitments

Greenhouse gas offsets, typically denominated in metric tonnes of carbon dioxide equivalent (CO₂-e), represent avoided greenhouse gas emissions produced from a monetary investment in a specific project. Offset projects range from those that capture and destroy methane and other potent greenhouse gases to those that sequester emissions in soil, plants, and trees.

All aggressive (80% reduction or more) entity and community climate commitments referenced in this document either explicitly permit offsets or are silent on their use in achieving their goal. Some commitments include separate goals for gross reductions - those achieved without the use of offsets - in addition to a goal for net emissions.

Commitments from organizations that plan to use offsets differ in the types of offsets that they will use. Some local governments and entities prefer to use offsets that are in some way connected to the city or entity. For instance, Austin Texas has its own boutique offset program, and the University of California plans to develop its own as well. Others have prescribed standards for the types of offsets they will pursue. Offsets range in quality: the ability to demonstrate that the offset is real, measurable, verifiable, additional, and permanent. Offsets of lower quality and those that are not connected to a particular sector or geography are typically cheaper. Various registries and protocols have been established to guarantee offset quality.

Defining Offsets

Real	The offset has produced an actual reduction in GHG emissions, rather than shifting emissions to some other source.
Measurable	The offset can be quantified, typically in metric tonnes of CO ₂ -equivalent.
Verifiable	An outside auditor can determine the existence of a single offset unit, which is then tracked using an offset registry.
Additional	The offset was produced as a result of its value. The offset would not have occurred in the absence of an offset payment.
Permanent	The offset cannot be reversed. If there is risk of reversal (e.g. the risk that forestry carbon stocks will be destroyed by wildfire), the offset protocol typically requires some portion of offsets be set aside.



Cities and Offsets

Guidance on the Use of Offsets

Accounting guidance for local governments doesn't allow cities to replace gross emissions with offsets. Instead, local governments report their use of offsets – and resulting net emissions – as an informational item.

Local Government Operations Protocol (section 13.1.2.5)

“Carbon offsets retired/generated and sold.

Local governments should account for and report all carbon offsets which they purchase and retire. These offsets may not be deducted from Scope 1 or Scope 2 emissions due to the fact that a complete accounting framework which accurately and credibly tracks the ownership and retirement of these credits has not yet been established.

Local governments should also report any offsets that they both generate and sell as part of a climate mitigation project.”

U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions

“The ICLEI community protocol requires the community to report gross GHG emissions without the impact of carbon offset projects, stocks, sinks, sequestration projects, purchases of carbon credits, or renewable energy certificates. The community may optionally, and separately, report the emissions reductions associated with any of the above activities.”

City Standards for Offset Quality

Few cities have specified the level of quality, types of projects, and project locations that they expect from offsets used to meet climate commitments.

British Columbia does have requirements for offsets used to meet that province's goal for carbon neutral municipalities for 2012 and beyond. Offsets must be generated in British Columbia and meet the requirements set by the Pacific Carbon Trust, a boutique offset program established as a joint venture of the provincial government and a League of Cities equivalent. Many local governments achieved carbon neutral municipal operations in 2012 or earlier, but the entire province is now readjusting its Carbon Neutral pursuits as a result of an offset scandal. The local offset registry, the Pacific Carbon Trust, has been absorbed by the provincial government after a [scandal](#) caused attempts to repeal the requirement that local governments neutralize their emissions. Local government were purchasing offsets at a cost of more than double the amount of their wholesale cost, and some of the offsets the Trust purchased and sold to local governments were ineligible under the provincial rules.



British Columbia's experience highlights the potential trade-off of establishing a new, boutique offset program. Establishing the Trust allowed British Columbia greater control over the locations and types of offset projects that would be funded. However, costs of the boutique offset program may be higher than under an established, multisectoral offset program, and as with any new entity, oversight is important to ensure that actions are within the public interest.

One alternative to establishing a boutique offset program is to invest in a narrow range of projects offered by an existing offset registry. Hermosa Beach could, for example, seek out forestry projects in the Western United States.

Municipal Utilities

Several municipal utilities make use of both offsets and renewable energy certificates (RECs) in order to make climate-related claims. Palo Alto Utilities uses RECs that are eligible under California's Renewable Portfolio Standard. The Sacramento Municipal Utilities District invests in its own projects as well as RECs eligible in California. Outside of California, Austin Energy makes direct contracts with wind generators. Seattle Power & Light uses offsets from the Climate Action Reserve and other third-party organizations.

Universities and Colleges

The few colleges that have already achieved carbon neutral status have chosen to be transparent about their use of offsets and the projects in which they invest. As educational institutions, these entities can incorporate a discussion of climate commitments and the use of offsets within their curriculum. That offsets are required to meet Carbon Neutrality commitments can highlight the vast challenge in decarbonizing organizations and places.

The College of the Atlantic in Maine claims to be the first Carbon Neutral educational institution. It [chose to use offsets](#) from specific projects from two carbon project developers: the Carbon Fund and the Climate Trust. These developers invested in a [traffic signal optimization project in Portland, OR](#) and a [truck stop electrification project in Oregon and Washington](#). These two projects are verified to the Oregon Standard, an offset standard created by the state legislature.

Colby College, also in Maine, first invested on-campus: in a biomass project and energy retrofits. For the remaining emissions, Colby [purchased and retired carbon offsets](#) from three projects: two landfills in [Maine](#) and [Connecticut](#) and [one farm in Michigan](#). The offsets are registered with the Climate Action Reserve and meet the Reserve's verification requirements. However, the offsets are not eligible for conversion to California Compliance Offsets because they were not verified to the more stringent California standard.

Green Mountain College, another Carbon Neutral educational institution, invested in a [farm methane project](#) in Vermont.



Corporations

[Microsoft](#) is one of the few companies which [details its use of offsets](#). Microsoft looks to use offsets that are credible, verifiable, and additional. Through the Gold Standard and Verified Carbon Standard offset registries, Microsoft has invested in reforestation in Kenya, home fuel switching in Mongolia, wind farms in China, and alternatives to deforestation in Brazil.

Consumers

TerraPass is a consumer service that retires offsets from the Verified Carbon Standard and Climate Action Reserve on behalf of consumers. One project registered on the Climate Action Reserve, the [Arcata Community Forest](#), expanded an existing forest to protect adjacent land from logging.

Offset Programs Available to Hermosa Beach

Both California Compliance Offsets and voluntary offsets are available to Hermosa Beach.

California Compliance Offsets

California Compliance Offsets are admissible to the state's Cap-and-Trade program. They are issued by the Air Resources Board. In certain cases, California Compliance Offsets can be converted from offsets generated by the Climate Action Reserve, Verified Carbon Standard, and American Carbon Registry.

California Cap-and-Trade

California's Climate Change Scoping Plan outlines the state's strategy for reducing greenhouse gas emissions to 1990 levels by 2020, as required by AB 32 (2006). The Scoping Plan relies heavily on a cap on greenhouse gas emissions that come from electricity, natural gas, transportation fuels, and certain other industries like cement production. Entities in these sectors must acquire and surrender an amount of emissions allowances equivalent to their greenhouse gas emissions. Greenhouse gas emissions from other sectors, like agriculture and landfills, are uncapped and will likely remain uncapped due to monitoring and verification challenges in enforcing compliance. Emissions reductions projects from uncapped sectors can produce compliance offsets.

California Greenhouse Gas Allowances

The California Air Resources Board issues both California Greenhouse Gas Allowances and ARB Offset Credits, which together serve as compliance instruments for sources subject to state's Cap-and-Trade program. Up to 8% of the total compliance obligations for a year can be met using ARB Offset Credits. The Air Resources Board issues ARB Offset Credits for projects that meet certain criteria contained in an approved offset protocol. Registry Offsets from projects meeting the same criteria but registered with the American Carbon Registry, Climate Action Reserve, or Verified Carbon Standard can be converted to ARB Offset Credits.



California Greenhouse Gas Allowances and ARB Offset Credits are both denominated in metric tonnes of CO₂-equivalent, and are identical aside from the ARB Offset Credits being limited to 8% of the overall compliance obligation. Hermosa Beach can acquire and retire either California Greenhouse Gas Allowances or ARB Offset Credits to offset its greenhouse gas emissions within California's Cap-and-Trade program.

Allowances are available in vintages corresponding to the three established compliance periods, 2013-14, 2015-17, and 2018-20. When retiring allowances to offset the City's emissions from municipal operations, the City should retire offsets of the same vintage as the year to be offset. For example, if the City wishes to offset its 2015 emissions, it should retire 2017 vintage offsets.

Acquiring California Allowances to Offset Hermosa Beach's Emissions

Hermosa Beach is not a covered entity and does not have a compliance obligation under California's Cap-and-Trade Program. Hermosa Beach does indirectly participate in California's Cap-and-Trade system. Southern California Edison, Southern California Gas, and transportation fuels distributors who sell products and services to Hermosa Beach and their contractors do have a compliance obligation, and these entities must surrender allowances to the Air Resources Board for each compliance period.

Hermosa Beach has several options to retire California Greenhouse Gas Emissions Allowances.

The City can register on the California Air Resources Board's Compliance Instrument Tracking System Service (CITSS) to purchase allowances at auction and transfer compliance instruments to the Retirement Account. The City can register as a Voluntary Associated Entity pursuant to California Code of Regulations [Section 95814](#). Under this scenario, the City could acquire allowances:

- Directly from the Air Resources Board at quarterly auctions. The City must register as an auction participant after establishing a CITSS Account and submitting a bid guarantee prior to each auction.
- From a third party via an exchange. The [Intercontinental Exchange](#) and [CME Group](#) offer futures contracts for California Carbon Allowances (CCA). Futures contracts provide for delivery of a tangible or intangible asset at a future date. For instance, between now and December 24, 2015, Hermosa Beach could purchase and retire 2017 Vintage California Carbon Allowances to be delivered to Hermosa Beach's CITSS account at the end of December 2015.
- From a third party via an over-the-counter transaction. The third party must maintain a CITSS Account and the transaction must be registered on CITSS to guarantee legitimacy.



Hermosa Beach can also work with a registered Voluntarily Associated Entity to purchase and retire offsets on behalf of the City. A Voluntarily Associated Entity would conduct transactions on Hermosa Beach's behalf. Several brokers hold CITSS accounts and provide carbon offsetting (or "balancing") services on behalf of third parties, like Hermosa Beach. These include:

- [3Degrees](#) - offers Carbon Balancing Services
- [Element Markets](#) - developer and supplier of GHG credits, including [California](#)
- [Evolution Markets](#) - Kyoto, EU-ETS, RGGI, & California

Hermosa Beach should expect to pay a slight price premium or service fee when working with an exchange or Voluntary Associated Entity to purchase and retire allowances. For instance, contracts for 2014 allowances delivered at the end of September 2014 [traded for \\$12.00](#) on the Intercontinental Exchange, while allowances from the August 2014 Air Resources Board auction settled at \$11.50.

Retiring California Allowances to Offset Hermosa Beach's Emissions

Retiring California Compliance Instruments is simple. Hermosa Beach, a broker, or a third party can access CITSS and [process a transfer](#) from the General Account to the Retirement Account. Instruments transferred to a compliance account will result in real offsets to Hermosa Beach's emissions.

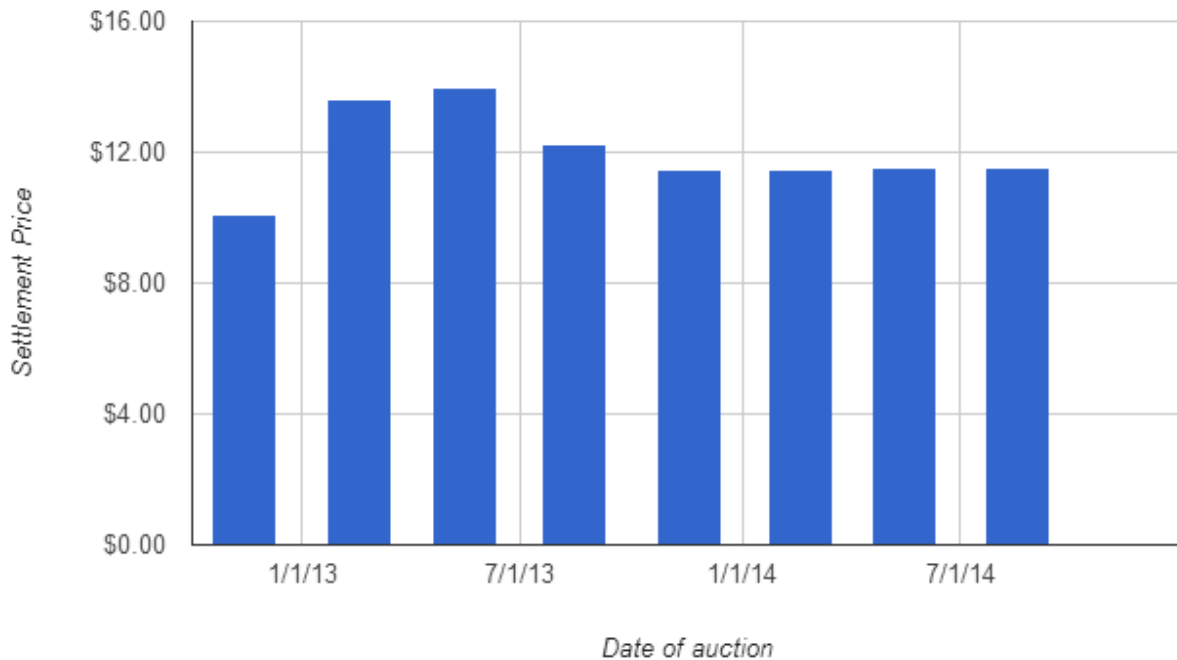
Analysis of California Allowance Prices

California allowances are of the highest quality, as they are used for compliance in a legally-binding Cap-and-Trade program. As such, California allowances are more expensive than offsets for voluntary programs.

The California Air Resources Board has sold allowances at auction since the fall of 2012. Allowance prices peaked at \$14.00 in May of 2013. The settlement price at 2014 auctions (as of August) has concentrated between \$11.48 and \$11.50.



California Air Resources Board Allowance Auction Prices



In the 2010 Economic Analysis, the [Air Resources Board](#) projected a 7% annual price increase from 2012 through 2020, which is roughly what a company could earn on invested capital. The reasoning behind that is because entities with a compliance obligation can hold onto allowances for a future compliance period, and allowances are subject to a rate of return similar to what allowance holders can achieve from asset classes of a similar risk. If allowance holders expected allowances to appreciate at a higher rate (say 10%), they would buy and bank allowances in pursuit of an extraordinary profit opportunity. This would bid up the price of allowances to a price level where the extraordinary profit opportunity vanishes (back to 7%).

The 2010 Economic Analysis projected an allowance price of \$25 per metric tonne in 2020. At a 7% annual price increase, expected 2014 values would be \$16.66 per tonne, \$5.16 higher than the latest auction. Because of this price discrepancy, an updated analysis is needed to forecast allowance prices through 2020. The analysis below projects a 5.8% (low-case), 7% (mid-case), or 11% (high case) annual increase in allowance prices after 2014.



Projected California Air Resources Board Allowance Prices

Cost Projection	Annual % Increase	2014	2015	2016	2017	2018	2019	2020
Low	5.8%	\$11.50	\$12.17	\$12.87	\$13.62	\$14.41	\$15.24	\$16.13
Middle	7.0%	\$11.50	\$12.31	\$13.17	\$14.09	\$15.07	\$16.13	\$17.26
High	11.0%	\$11.50	\$12.77	\$14.17	\$15.73	\$17.46	\$19.38	\$21.51

Analysis by Kaizenenergy

The California State Legislature must amend state law for the state's Cap-and-Trade program to continue beyond 2020. Two factors point towards continuation of the Cap-and-Trade program. First, the legislature and public's support for addressing climate change through carbon pricing [remains strong](#). Second, allowing the program to end would mean a significant loss of revenue from allowance sales. With future Cap-and-Trade auction revenues already committed to the California High Speed Rail project, abandoning carbon pricing would leave the project partially-finished or in search of another multi-billion dollar source of funds.

Voluntary Offset Registries

Voluntary greenhouse gas emissions offsets have been available for two decades. Most climate commitments have used voluntary offsets to validate emissions reductions claims. Outside of California, Quebec, and a handful of other places subject to Cap-and-Trade programs, voluntary offsets are the standard instruments of making carbon claims.

Voluntary offsets are available at a fraction of the price of compliance offsets. A 2013 study of voluntary offsets found an average price of \$4.90 per metric tonne of CO₂-equivalent, 42% of the California ARB allowance price.

A system of registries and independent verifiers are responsible for assuring the quality of voluntary offsets. Registries determine policy related to offset production through protocols, work with the offset project developer to verify the project, issue offset units based on the metric tonnes of reductions produced, and track the transfer offset units between parties. Some projects on these registries can also be certified to produce California Compliance Offsets, if the projects meet certain protocol and verification requirements



Voluntary Offset Registries

Offset Registry	Share of Global Market	Convertible to ARB Offsets?	Notes
Verified Carbon Standard	47%	Some projects	70 U.S.-based projects (of 1,200+). VCS has the most methodologies of any offset registry.
The Gold Standard	15%	No	Focuses on offsets produced outside of the United States, primarily in developing countries.
Climate Action Reserve	5%	Some projects	California-based organization (Los Angeles) focused on offsets produced in the U.S. (360 projects), Mexico (8 projects), and Canada. 51 projects are in California.
American Carbon Registry	1%	Some	95 U.S.-based projects (of 105). Staff trained on ARB protocols.

Market shares based on 2013 data in Forest Trends [State of the Voluntary Carbon Markets 2014](#)

Voluntary Offset Project Types

Offset projects must adhere to an approved protocol or methodology. While the California Air Resources Board has approved protocols for five project types, the various voluntary registries have approved dozens of protocols and methodologies.

The table below presents the range of offset projects, which are classified by their Kyoto Protocol greenhouse gas emissions sector.



Types of Offset Projects, by Emissions Sector

Sectoral Scope	Registries with approved method/protocol	Types of projects
1 - Energy Generation	ACR, VCS, TGS	Cogeneration facilities, fuel use in cooking stoves
2 - Energy Distribution	ACR	Recycling of transformer oil
3 - Energy Demand	ACR, VCS	Building weatherization, campus energy efficiency
4 - Manufacturing Industries	None	None yet
5 - Chemical Industries	VCS	Chemical production processes
6 - Construction		None yet
7 - Transport	ACR, VCS	Vehicle fuel switching, truck stop electrification
8 - Mining/Mineral Production	ARB, CAR	Coal mine methane
9 - Metal Production	None	None
10 - Fugitive Emissions from Fuels	None	None
11 - Fugitive Emissions from Gases	CAR, VCS	Destruction of ozone depleting substances, leak detection
12 - Solvents Use	None	None
13 - Waste Handling and Disposal	CAR, VCS	Landfill methane capture, organic waste composting
14 - Agriculture, Forestry, Land Use	ACR, ARB, CAR, VCS, TGS	Rice cultivation, forestry, urban forest, prevention of deforestation, fertilizer management, soil management,
15 - Livestock and Manure Management	ARB, CAR	Manure management, grazing management

ACR = American Carbon Registry, ARB = California Air Resources Board, CAR = Climate Action Reserve, TGS = The Gold Standard, VCS = Verified Carbon Standard,



Recommendations on Use of Offsets

Offsets are an important part of an aggressive climate commitment, as demonstrated by other cities, corporations, and colleges that have claimed or plan to achieve Carbon Neutrality status.

Offsets put a price signal on carbon emissions. By purchasing offsets, Hermosa Beach acknowledges the real environmental cost of greenhouse gases emissions from municipal operations. Offsets also signal that the City is looking for other ways to reduce its emissions as any investments to reduce gross emissions will, in turn, reduce future offset expenditures. As such, the sustained use of offsets can be seen as a commitment device for achieving gross emissions reductions: the City cannot simply ignore the cost of its gross greenhouse gas emissions. As a climate commitment device, offset retirements are not limited to a certain percentage of a City's emissions — the City pledges to neutralize gross emissions at any level.

However, offsets are not a free pass to emit; they are only effectively utilized as part of a larger climate action strategy. Hermosa Beach stakeholders may have a negative perception of the City's use of offsets, especially if they feel the City's efforts to reduce gross emissions are inadequate. Use of offsets alone will not accomplish the City's other objectives or lead to the desired co-benefits from the City's climate action efforts.

Transparency is exceedingly important in climate action, especially when offsets are used. Hermosa Beach should establish a performance monitoring program that includes regular reporting of the City's climate action efforts, along with publishing greenhouse gas emissions inventories. Offsets utilized within a public education and outreach campaign that focuses on the City's efforts to reduce its gross greenhouse gas emissions from municipal operations. The offsets should tell a story that people can connect to when understanding the City's climate actions and considering their own.

The experience of existing cities and entities, particularly the three educational institutions, highlights the possibility to connect offsets with a community as part of a public education program about a city's climate action efforts. By investing in certain projects — projects whose stories resonate with residents — Hermosa Beach can communicate the climate action challenges that it is seeking while connecting the community with specific projects they can also invest in to offset their own emissions.

While a wide range of offset project types exist, Hermosa Beach may find some more suitable than others if the City wishes to include its own offset retirements as part of a public education and outreach program. The public may feel more of a connection with offsets generated within the United States, especially those from projects in California.



Should Hermosa Beach Use Compliance or Voluntary Offsets?

Hermosa Beach must decide whether to use the cheaper voluntary emissions offsets or the more expensive California Compliance Offsets. The annual price of offsets to cover the City's 2007 municipal inventory in all cost projection scenarios is less than 0.1% of the City's general fund budget.

Range of Annual Costs to Offset 1,552 Metric Tonnes of CO₂-e

Scenario	Offset Price per Metric Tonne	Annual Cost to Offset 1,552 MT
ARB - Current	\$11.50 (August 2014 auction price)	\$17,848
ARB - Future High	\$21.51 (high-case projection for 2020)	\$33,383
Voluntary - Current	\$5.00	\$7,760
Voluntary - Future High	\$7.50	\$11,640

Under this range of prices, the City will find that many of its opportunities to reduce gross greenhouse gas emissions are not cost competitive with offsets or allowances. For example, for \$99.84, the City could retire the more expensive ARB-eligible allowances (at \$11.50/metric tonne) to offset the tailpipe greenhouse gas emissions of a 2002 Ford Expedition traveling 60 miles round trip, 4 days per week, 48 weeks per year. The annual cost of ARB-eligible offsets to neutralize for a Prius traveling 15 miles per day is approximately \$7.74. Incidentally, the Expedition driver would save \$2,051.30 per year in fuel costs (at \$4.00/gallon) by switching to a Prius. This example illustrates both how inexpensive greenhouse gas emissions are, even within California's Cap-and-Trade system, and also the need for strategic climate action policies that are well-integrated within the City's existing municipal operations. It also illustrates that use of offsets can be the most cost-effective option to achieve a given level of reductions.

The price of allowances will increase in the future as California's cap on emissions decreases and early actions are exhausted, but even a seven-fold increase in allowance price would only yield a \$60 per-month incentive for the Ford Expedition driver to switch to a carpool. The City has found this level of incentive too low for many employees.



Advantages and Disadvantages of ARB and Voluntary Offsets

	Advantages	Disadvantages
Voluntary	• Are 50% cheaper than California Compliance Offsets. • Offers a greater variety of projects.	• Most projects are located outside of California. • Voluntary offsets can be perceived to be lower quality than compliance offsets.
California Compliance	• California offsets are perceived as the highest quality offsets. • There exists a strong connection between Hermosa Beach and statewide actions: these offsets can help the City explain statewide actions including cap and trade program. • Their use creates additional emissions reductions within California; effectively reducing the cap. • Their use shows Hermosa Beach is willing to put a higher price on greenhouse gas emissions.	• California offsets are more expensive; and these additional expenditures could be used to reduce gross emissions. • It may be more difficult for consumers to acquire and retire offsets if households and businesses within Hermosa Beach want to invest in the same offset project as the City.

➤ Hermosa Beach should primarily rely on California Compliance Offsets to validate its emissions claims. Although California Offsets are slightly more expensive, their higher perceived quality and the connection they provide to statewide climate actions will make Hermosa Beach's climate commitment more robust.

Selecting Among ARB-Approved California Compliance Offsets

Up to 10% of allowances in California's Cap-and-Trade system can come from offsets. While, purchasing and retiring California Emissions Allowances has the same effect on emissions as purchasing and retiring California Compliance Offsets, Emissions Allowances have a number of limitations that make them less ideal for Hermosa Beach. For instance, it is difficult to explain within a public education campaign, that, as a result of Hermosa Beach's offset purchases, a petroleum refinery or a natural gas power plant had to pay a slightly higher price to comply with California's greenhouse gas regulations. Emissions allowances are intangible, and the only distinguishing characteristic is their ARB-assigned serial number.

Offsets have a story: a project location, emissions removal process, and organization associated with their production. As of September 2014, Hermosa Beach can choose from



projects among the five ARB-approved offset protocols. Offsets from each type of project are functionally equivalent in mitigating climate change as they are denominated in metric tonnes of CO₂-equivalent. However, each individual project can tell a different story. In choosing among project types, Hermosa Beach should consider how stakeholders can relate to the project's location, the type of project, and the organization that produces the offset and receives payment. In addition, attractive photographs of the project itself would aid in any public education and outreach efforts the city conducts.

U.S. Forest Projects

The link between trees and carbon dioxide emissions is well-established in middle school biology classes. Trees are tangible, beautiful, and provide a range of ecosystem services besides converting carbon dioxide into oxygen. Projects certified under the U.S. Forest Protocol provide for the preservation of large, contiguous forest lands in the United States, including some locations in California. These forests will provide for attractive photographs, and the sites could even be visited by Hermosa Beach stakeholders. The offsets are produced by non-profit conservation organizations or private landowners.



U.S. Forest Project



[Harvego Bear River Preserve Project](#) / Photo by Placer Land Trust

Urban Forest Offsets

Urban forests, including street trees, parks, and wildlands within city limits, are highly sought-after amenities that provide shade, mitigate the urban heat island effect, and give character to streets and parks. Under current Air Resources Board guidance, planned tree planting and maintenance activities within the urban forest and qualify for offsets. Few projects have used this approach thus far, but a possible protocol update could expand the volume of offsets that come from urban forest projects.

The Climate Action Reserve approved two Urban Forest protocols in June 2014. The [Urban Forest Management Protocol](#) offers a programmatic approach to the updated [Urban Tree Planting](#) protocol. The California Air Resources Board previously adopted the Climate Action Reserve's Urban Forest Protocol and will need to adopt the Urban Forest Management protocol for the programmatic approach to create California Compliance Offsets. The Reserve hopes that these new protocols facilitate implementation of more urban forest projects.



Municipalities and counties can aggregate projects within an urban area boundary, as established by the U.S. Census Bureau. Projects must be a minimum of 50 acres. Projects are issued credits that are for renewable 25-year periods. Projects are subject to monitoring, reporting, and verification for 100 years to ensure permanent removal of greenhouse gases from the atmosphere. Carbon offsets are generated annually based on the difference in standing live carbon stocks in trees that results from an urban forest management plan (versus the area's baseline).

The City of Santa Monica's Urban Forest Protocol Project was the first submitted to the Climate Action Reserve. The 1,000 new trees planted under the City's [Urban Forest Master Plan](#) are estimated to produce 5,000 metric tonnes in CO₂ reductions over 100 years, or an average of roughly 50 metric tons per year. The fact that this is roughly 4% of Hermosa Beach's emissions from municipal operations illustrates the sheer number of trees needed to offset emissions. To date, the Santa Monica project hasn't produced any offsets.

Boulder [estimates](#) that its urban forest of approximately 330,000 trees sequesters 2,000 tons of CO₂ annually.

Because the annual amount of emissions sequestered from an urban forest in a 1.4 square mile city would be low relative to the municipality's emissions from operations, Hermosa Beach may wish to express interest in participating in any potential future South Bay Cities Council of Governments-wide or county-wide urban forest management protocol effort. A larger effort could be more efficient for cities that wish to participate.

[Livestock Projects](#)

The ARB's livestock projects involve biogas control systems to manage manure on cattle and pig farms. Manure is processed into biogas in a digester, then typically combusted to produce electricity and heat. Livestock projects provide a connection to the familiar topics of farms and food, though this could be perceived as negative as many of the livestock projects are sited at concentrated animal feeding operations. Offsets are typically produced by companies that specialize in biogas control systems and complying with the offset protocols.



Livestock Project



[New Hope Dairy Livestock Biogas Digester Project in Galt, CA](#) / Photo American Biogas Council

Ozone Depleting Substances

Some substances which deplete the ozone layer also have a high global warming potential, as measured in carbon dioxide equivalent. Ozone depleting substances that also have a high global warming potential are used as refrigerants, solvents, and fire suppressants. Destroying these substances provides both ozone protection and greenhouse gas reduction.

Chemical companies typically produce greenhouse gas offsets from the destruction of ozone depleting substances, and photos of the project locations appear to be a chemical plant.

Mine Methane Capture

In a mine methane project, methane is combusted and used to make energy.

The ARB recently approved the Mine Methane Capture Protocol. The Climate Action Reserve has existing projects registered in Alabama, Colorado, West Virginia, and Wyoming.

Coal mine methane projects may be challenging to explain in a public education and outreach campaign that highlights Hermosa Beach's actions and use of offsets. The projects may evoke a negative association with dirty coal mining and burning coal in power plants, both environmentally harmful activities. In addition, payments to the mining companies or energy/environmental service companies that produce the offsets are unlikely to be viewed as positively compared with payments to forest conservation non-profits.



Photos of projects depend on mine location; the project in Colorado is on a scenic mountainside.

Mine Methane Capture Project



[Vessels Coal Gas project in Colorado](#) / photo by Vessels Coal Gas

- Hermosa Beach should prioritize U.S. Forest and Urban Forest offset projects, but may
- consider other projects within an offset portfolio. Other important considerations are
- whether Hermosa Beach stakeholders can invest in the same project as the City and
- how the specific project would fit within the City's outreach and education efforts.





Hermosa Beach Municipal Carbon Neutral Plan

Performance Monitoring, Costs, Transparency, and Outreach

Performance Monitoring

In committing to neutralize greenhouse gas emissions from municipal operations, the City of Hermosa Beach is assuming responsibility for its own emissions. It will track and neutralize its contributions to global emissions. Thus, greenhouse gas emissions are now seen as a liability to the City, and the City should take steps to continuously account for emissions with processes similar to how the City accounts for cash, indebtedness, and other assets and liabilities. After the City sets a greenhouse gas reduction target for local government operations, Hermosa Beach should conduct an annual greenhouse gas emissions inventory within 9 months of the close of each calendar year. Meeting this timeline necessitates that the City implement systems to track the following at a minimum of a calendar-year resolution:

- Amount (kWh) of electricity used for each service account, by year. If electric vehicle chargers used exclusively for municipal operations are submetered, this electricity may be broken out into vehicle fleet.
- Volume of gasoline, diesel, natural gas, and other fuels loaded into City-owned vehicles and equipment.
- Volume of gasoline, diesel, natural gas, and other fuels attributable to Hermosa Beach from contracted waste, landscaping, and street sweeping services.
- Miles traveled by vehicle type for employee commutes and business travel.
- City pairs and number of City passengers for any business travel flights taken.
- Weight and composition of waste generated by the City's municipal operations.
- Recharge volume of high-global warming potential gases into vehicle or facility air conditioning units, fire extinguishers, or other equipment.

Performance Monitoring Tools

Much of this data can be tracked in [ICLEI's Master Data Workbook](#)⁴, an Excel spreadsheet-based tool that can be compiled by multiple individuals or shared on a networked hard drive. Two web-based tools will assist Hermosa Beach in tracking activity data and conducting an annual emissions inventory. These are described below.

⁴ ICLEI's Master Data Workbook is recommended for Hermosa Beach's purposes over The Climate Registry's Local Government Operations Protocol [Activity Data Entry Workbook](#), developed by Juan Matute in 2009



ClearPath Tool for Online Greenhouse Gas Performance Monitoring

[ClearPath](#) is a web-based tool that allows local governments to perform community-scale and government operations GHG inventories in the cloud. Multiple users can collaborate to enter data from different departments, and the data can be exported in the common .csv format for sharing outside of the web-based tool. ClearPath includes modules for forecasting business-as-usual emissions changes (adjusting for state-level actions like renewable electricity and fuel economy standards) and forecasting the effectiveness of various emissions mitigation strategies.

ClearPath offers two tracks: a Government Track and a Community-Scale Track. Using the Government Track, a user can create an inventory following the guidelines of the Local Government Operations Protocol. Using ClearPath, a local government can translate its activity data, like fuel or electricity use, into greenhouse gas emissions by using emissions factors. ClearPath contains default emission factors, including some that are California-specific. Users can also add their own emissions factors, for instance a utility-specific value for kg CO₂e from electricity. ClearPath allows users to compare between inventory years, tracking progress over time. An [inventory module user guide](#) contains additional information about ClearPath's features.

With data tracking, emissions calculation, and forecasting in the same web-based tool, Hermosa Beach can close the loop between climate target setting, performance monitoring, and iterative policymaking.

Hermosa Beach has access to ICLEI ClearPath as an ICLEI member and a California Local Government through the Statewide Energy Efficiency Collaborative California (SEEC). SEEC is a collaboration between investor-owned gas and electric utilities, ICLEI, the Institute for Local Government, and the Local Government Commission. The SEEC program website [offers live and recorded training materials](#) on ClearPath and other resources.

Enterprise Energy Management Information System

In the summer of 2014, an analyst at the South Bay Environmental Service Center began using McKinstry's Enterprise Energy Management Information System (EEMIS), a web-based tool, to access and analyze the Hermosa Beach's account data from Southern California Edison. This tool will be used to track changes in energy use over time, particularly those that follow efficiency and retrofit projects. The EEMIS tool can report monthly, quarterly, and annual consumption data, streamlined for greenhouse gas reporting and other uses.

Hermosa Beach should budget to maintain an account on the McKinstry EEMIS, approximately \$900 per year. Additionally, the City should train staff to access the data in order to monitor the progress of energy retrofit projects, assess the City's opportunities for power purchase agreements, and produce annual reports for use in greenhouse gas emissions inventories.



Municipal Climate Action Indicators

Many intermediate indicators will help the City better understand its progress versus annual greenhouse gas emissions totals or subtotals. For instance, a draft 2012 inventory indicates that commute emissions fell by 37.4% between 2005 and 2012. At first, this may seem to indicate that the City achieved its goal of a 20% reduction in 2005 commute emissions by 2020. However, the number of full-time equivalent employees (FTE) decreased 33.8% during the 2005 to 2012 period. Commute greenhouse gas emissions per FTE during that same period decreased by only 5.3%. Indicators like metric tonnes of CO₂-e per FTE can give a clearer picture of the City's climate action performance than can aggregate totals or subtotals. Activity data, such as miles traveled by employees or kWh of electricity used by facility, can also elucidate the City's climate action position in greater detail.

The Local Government Operations Protocol and other guidance for municipal operations recommend several indicators for municipal operations. The following indicators and metrics are applicable to Hermosa Beach's annual Greenhouse Gas Emissions Inventory:



Indicators and Metrics for Municipal Climate Action Performance

Indicator	Metrics	What it Means
Vehicle Miles Traveled (VMT)	Fleet GHG/VMT	A measure of GHG intensity of each mile traveled by the City's vehicle fleet. As the City's fleet procurement policies take effect, this metric will show progress.
Number of vehicles (#Vehicles)	VMT/#Vehicles	The utilization rate for vehicles as the City considers shared-use fleet
Equipment Operating Hours (EOH)	Equipment GHG/EOH	The GHG intensity of equipment operations
Number of Pieces of Equipment (#Equipment)	EOH/#Equipment	GHG intensity per unit of equipment
Solid Waste Tonnage Disposed (Waste)	Waste GHG/Waste	The GHG intensity of the waste the municipal government sends to landfills; varies based on a landfill's methane control practices
Refuse & Recycling Vehicle Service Hours (WasteVehHours)	Waste Vehicle GHG/ WasteVehHours	Indicates the GHG intensity of the contractor's refuse and recycling operations
Kilo-watt Hours (kWh)	Electricity GHG/kWh	The GHG intensity of electricity used by Hermosa Beach. As Hermosa Beach begins to blend its energy procurement, the effects will show in this metric.
Number of FTE Employees (#Employees)	Commute GHG/#Employees	The GHG intensity of employee commutes. This metric allows the City to monitor the effectiveness of its commute reduction program
Volume of Water Pumped (Water)	Water Pumped GHG/Water	The GHG intensity of water pumping at the City's water pumping lift stations.

Transparency

Transparency is exceedingly important in climate action. Greenhouse gases are invisible, and the activity that leads to their emission is difficult to track. Thus, interested stakeholders must



rely on the City's recordkeeping of activity data, indicators, and annual emissions in order to assess the City's climate action progress.

Transparency is even more important when instruments such as RECs or offsets are used to neutralize all or a portion of emissions. Most stakeholders cannot verify the off-site RECs or offsets. When claiming offsets in its annual greenhouse gas inventory, Hermosa Beach should list the serial numbers (or ranges) of offsets retired for the year. When using unbundled RECs to claim renewable energy and reduce the scope 2 emissions, the City should follow guidelines in The Climate Registry's General Reporting Protocol and "disclose additional activity data such as MWh consumed, purchased, generated or sold as supplemental information." Hermosa Beach should also disclose the serial numbers of RECs credited to the City's electricity consumption.

Carbounn Cities Climate Registry

An emerging global standard for reporting municipal and community climate action provides a venue for Hermosa Beach to register its targets, document its actions, and publish its annual greenhouse gas inventory.

The [Carbounn Cities Climate Registry](#) is a new partnership of C40, R20, and other global groups focused on sub-national climate action. The Carbounn registry will help local governments to achieve transparency and accountability for their local climate actions. In reporting its targets, inventories, and actions on Carbounn, Hermosa Beach will be on the same platform as other cities seen as national or global climate action leaders.

In September 2014, ICLEI USA's Resilient Cities for America Initiative [named Carbounn as their official reporting platform](#). As of October 2014, 465 cities are reporting to Carbounn, including [Manhattan Beach](#) and [Hawthorne](#). The two South Bay cities have reported their greenhouse gas emissions targets, performance, and mitigation actions.

Verification & Reporting of Greenhouse Gas Inventories

Some entities have a third-party verify their greenhouse gas inventory prior to reporting the results. The process for verifying greenhouse gas emissions inventories is similar to auditing corporate accounting records, and the intention is to enhance the credibility of the results. Because the cost to verify emissions can be substantial, few local governments and other entities contract with a third-party verifier before reporting their emissions. Credible verification can be obtained through an ISO 14064 compliant procedure, such as through The Climate Registry.

Hermosa Beach can increase the credibility of its municipal GHG claims by obtaining third-party verification for a greenhouse gas inventory. However, because the cost of verification, Hermosa Beach should only audit certain inventories (for instance, the first year it sets a carbon neutrality



goal). As Hermosa Beach develops new systems to monitor emissions, its annual emissions inventories will become more accurate and precise, reducing the need for third-party verification.

Outreach and Education

Building external awareness of the city's climate action programs necessitates an effective public outreach and education plan. Effective implementation can be challenging - especially because most greenhouse gas reduction efforts produce intangible results. Unlike some other air pollutants, greenhouse gases are undetectable by human senses at typical concentrations. Furthermore, greenhouse gas reductions represent the absence of these undetectable gasses. This creates an environmental communications challenge versus tangible efforts like cleaning water in a river or reducing urban smog.

The City should lead its climate action messaging with the city's goal to be a climate action leader: that its municipal actions will show both the community and other cities what can be possible. The City should support this message by detailing specific actions that have been implemented, and those that are planned for the future. Visualizations of alternative fuel vehicles or solar photovoltaic panels on City facilities can be the most salient demonstrations of climate actions. When explaining less salient actions, the City should tie examples to actions that that community members can take. For example:

- When explaining specific energy retrofit actions, include information on the various options for residential and commercial energy retrofits, especially property-assessed financing
- Connect the City's actions to procure zero-emissions electricity with options available to residents and business owners, especially the emerging option of Community Choice power
- make the City's employee commute program an example of implementing GHG reductions in transportation sector called for in the City's General Plan update

Tying municipal efforts to community action will also strengthen the perception of the City as a climate action leader. As, greenhouse gas emissions from municipal operations make up only about 1% of community-wide emissions, connecting the City's municipal actions with other emissions reductions will demonstrate the city's ability to leverage its position as a climate action leader. Outside resources, such as [ICLEI's education and outreach guidance](#) and reports from the [Yale Project on Climate Change Communications](#), will help the City determine effective messaging for its outreach and education program.

Rather than relying on a limited number of City staff to communicate the City's climate action program, Hermosa Beach should train municipal employees and community members to be climate action ambassadors. By holding regular information sessions that describe the City's



climate action commitment, existing actions, and future plans, Hermosa Beach can empower City employees and community members to tell the City's story – and connect it with community-wide actions. This training problem would follow the model popularized by *An Inconvenient Truth*, the film version of a presentation Al Gore had taught thousands of others to deliver. This model of empowering others to tell climate-related stories has showed great success in connecting individual action with an overwhelming problem.

Information sessions specific to municipal employees could first highlight all municipal actions and then highlight efficiency and greenhouse gas emissions reductions opportunities within an employee's area of responsibility. The training sessions can also highlight how some highly-visible municipal programs (such as the employee commute reduction program and bicycles at work) serve as examples for community-wide actions.

The City should publish regularly-updated presentations on the its website, so that ambassadors can obtain and deliver the most up-to-date information, which stakeholders can also access on the Carbonn Cities' Climate Registry. A version of the climate ambassador information session could also be delivered within the Hermosa Beach Unified School District, combined with materials from California's [Education and the Environment Initiative](#).

Costs of Municipal Climate Action

After accounting for savings from projects which reduce energy cost or vehicle operating costs, the 30-year estimated cost of recommended municipal carbon neutral programs is \$59,130, or \$1,971 per year. This low cost is made possible because many of the municipal climate action opportunities available to the City have a payback period of less than 5 years. In addition to the projects listed above, the recommended municipal climate action programs will fund and Employee Commute Coordinator (20% FTE Assistant), a Climate Programs Analyst (25% FTE Analyst), and annual Greenhouse Gas Offsets required to make carbon neutral claims. The recommended plan is cash-flow positive by 2019.

The added cost of a "first-to" position, in which the city would achieve carbon neutrality in 2017 rather than 2020, would be approximately \$52,475.



Municipal GHG Reduction Project Options - Cost Summary

<u>Implementation Measure</u>	<u>Range in Cost per MTCO₂e</u>	<u>Recommended</u>
<u>Electricity</u>		
Community Choice Aggregation	\$10 to \$18	Yes
Solar Photovoltaic Projects (ASE Solar Solutions Proposal)	-\$5 to \$20	Yes
GSE Solutions "Project 1"	-\$125 to -\$175	Yes
GSE Solutions "Project 2"	-\$225 to -\$275	Yes
GSE Solutions - Hot Water, HVAC	\$20 to \$35	Yes
<u>Municipal Fleet</u>		
Bicycle Parking		Yes
Employee Bicycles		Yes
Mode Switching		Yes
Bicycle Fleet Program (Summary)	\$0 to -\$200	Yes (Bundle)
EV Service Equipment		Yes
Accelerate Clean Fleet Master Plan		Yes
Fuel Switching		Yes
EV Fleet Program (Summary)	-\$50 to -\$150	Yes (Bundle)
<u>Employee Commutes</u>		
Employee Commute - Carpool Incentive	\$100 to \$200	Yes
Employee Commute - EV Incentive	\$500 to \$1,000	No



Recommended Municipal Climate Actions: Cost Details and Timeline

Implementation Measure	Cost Assigned	2014	2015	2016	2017	2018	2019	2020	2021 to 2044	Total
Electricity										
Community Choice Aggregation	Additional Costs of Procurement Max upfront buydown of PPA Rate to Cost-Neutral			\$0	\$18,309	\$14,119	\$9,193	\$4,501	\$90,024	\$136,147
Solar Photovoltaic Projects				\$30,000	0	0	0	0	0	\$30,000
GSE Solutions "Project 1"	Outlay and annual savings	\$89,262	\$72,087	\$54,912	-\$51,524	-\$51,524	-\$51,524	-\$51,524	\$1,236,576	\$1,315,673
GSE Solutions "Project 2"	Outlay and annual savings		\$63,029	\$126,059	-\$23,792	-\$23,792	-\$23,792	-\$23,792	-\$571,008	-\$477,088
GSE Solutions - Hot Water, HVAC	Outlay and annual savings				\$53,785	\$107,571	-\$5,056	-\$5,056	-121344	\$29,900
Municipal Fleet										
Bicycle Parking	Infrastructure at City Facilities 5 regular bicycles; 5 electric-assist bicycles		\$7,500							\$7,500
Employee Bicycles	Vehicle Operating Savings from Car -> Bike			\$18,500					\$46,250	\$64,750
Mode Switching Bicycle Fleet Program (Summary)				-\$2,750	-\$2,750	-\$2,750	-\$2,750	-\$2,750	-\$66,000	-\$79,750
EV Service Equipment				\$50,000						\$50,000
Accelerate Clean Fleet Master Plan	Additional Costs for Procurement (versus BAU) - \$7,500 per vehicle			\$100,000	\$75,000	\$75,000			\$0	\$250,000
Fuel Switching EV Fleet Program (Summary)	Operating Savings from \$3 to \$4 Gasoline -> Electricity	mi/year		-\$3,817	-\$9,860	-\$18,568	-\$23,124	-\$21,733	-\$521,593	-\$598,695
Employee Commutes										
Carpool Incentive	Add'l Costs for \$50 Incentive			\$1,200	\$2,400	\$3,600	\$4,800	\$6,000	\$144,000	\$162,000
EV Incentive	Costs for \$125 Incentive			\$7,500	\$15,000	\$22,500	\$30,000	\$37,500	\$900,000	\$1,012,500
Employee Commute Coordinator - Staffing	Additional Costs for Incentive			\$20,000	\$21,000	\$22,050	\$23,153	\$24,310	583443	\$693,956
Climate Programs										
Staffing - Analyst	Additional Cost of Managing All Climate Programs			\$30,000	\$31,500	\$33,075	\$34,729	\$36,465	729303.75	\$895,073
Total Costs										
Total Cost of All Projects		\$89,262	\$142,616	\$424,104	\$114,068	\$158,781	-\$34,371	-\$33,579	-\$923,500	-\$151,880
Estimated Advance from Equipment Replacement Fund		\$142,026	\$142,026	\$142,026						\$426,077
Outlay Before Offsets, Net of Advance		-\$52,764	\$591	\$282,079	\$114,068	\$158,781	-\$34,371	-\$33,579	-\$923,500	-\$577,957
CARB (High Quality) GHG Offsets	2021 - 2044 costs assume further reductions in gross GHG emissions	\$0	\$0	\$0	\$0	\$0	\$0	\$20,442	\$490,609	\$511,051
Total Cost After Offsets		-\$52,764	\$591	\$282,079	\$114,068	\$158,441	-\$34,837	-\$13,736	-\$447,279	\$59,130



Recommended Municipal Climate Actions: Cost Details and Timeline

Implementation Measures	Implementation Period Begins	Duration	2015				2016				2017				2018				2019				2020							
			1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q				
<u>Electricity</u>																														
Community Choice Aggregation	1Q2015	8	implementation period												active															
Solar PV Procurement	3Q2015	6																												
GSE Solutions "Project 1"	1Q2014	12																												
GSE Solutions "Project 2"	3Q2015	8																												
GSE Solutions - Hot Water, HVAC	3Q2017	6																												
Municipal High Efficiency Procurement Policy	1Q2014	ongoing																												
<u>Municipal Fleet</u>																														
Municipal Facility - Bicycle Parking	4Q2014	1																												
Bike Barn @ Work	1Q2016	1																												
Municipal Facility - EV Service Equip.	3Q2015	4																												
Electric Vehicle Procurement	1Q2016	10																												
NEV Procurement	2Q2016																													
<u>Employee Commute</u>																														
Carpool Incentive	1Q2016	ongoing																												
EV Incentive	1Q2016	ongoing																												
<u>Municipal Service Contracts</u>																														
Amendment with Athens Services																														
<u>Other</u>																														
Purchase Offsets	1Q2017	ongoing																												
Climate & Commute Programs Staffing	1Q2016	ongoing																												



Revenues for Climate Action

Climate Action leaders are often expected to “put their money where their goals are” in order to fund climate action measures and programs. For instance, Boulder’s Climate Action Plan tax generates about \$1.8 million per year for the City. Voters renewed that measure in 2012.

One possible source of dedicated, local funds for climate action is Hermosa Beach’s Utility User Tax, which currently generates approximately \$2.5 million per year. At current prices for California Emissions Allowances (\$11.50), the community’s 134,000 metric tonnes of CO₂-e would cost about \$1.54 million to offset. This represents an approximately 61% increase above existing rates of 6% on electricity, gas, and water and 5.5% on communications services, bringing the total Utility User Tax would be 10%, comparable to Santa Monica’s. Utility User Tax rates in California [range from 1% to 11%](#), except in [Arcata](#), which levies a 45% tax on residential customers that use greater than 600% of the baseline electricity usage. Currently, it appears that Albany is the only California city [looking to use the Utility User Tax](#) to fund climate action.

Hermosa Beach could try an alternate approach to funding aggressive reductions in community-wide emissions. The City could declare its interest in implementing innovative demonstration projects and programs in order to achieve aggressive reductions in community-wide greenhouse gas emissions, provided they are available at no additional expense to the City. The City’s national-leading commitment to neutralize emissions from government operations could attract attention from companies looking for such an opportunity. However, as more cities dedicate funding to climate action, Hermosa Beach may lose out on some promising demonstration projects to cities that can dedicate some local funding to assisting these companies.

Hermosa Beach will likely find itself in a more competitive position for state and federal grants as a result of its aggressive climate commitment. The state and federal government have a vested interest in the success of leaders, so that they may lead the path for others to follow. If Hermosa Beach maintains a climate leadership position into the future, it will likely find success in attracting government grants and government-sponsored pilot projects.

