



2021

Green Energy Element



Untapped potential.
Unrivalled opportunity.

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Statement of Purpose

In the last 260 years, fossil fuels and industrialized agriculture have helped humans conquer the globe and feed the masses, but the emissions created (CO₂, methane, and nitrous oxide) trap heat in our atmosphere, and this excess heat has the power to alter the climate that produced, and sustains, our success. Additionally, the fossil fuels that produced this remarkable success are no longer being created by geological processes, and their rapid and inevitable depletion will create global economic and political disasters beyond those of global warming, if sustainable sources of power are not utilized.

Over the same time-period, human ingenuity and invention has created a transportation industry that is the circulatory system of our global body. It endlessly pumps all the necessary materials that keep our societies and economies functioning. Due to its critical role, transportation, including aviation, is the second-highest contributor of CO₂ after fossil-fuel fired power production. Curtailing emissions and producing green energy at airports, therefore, provides a two-fold benefit to combating climate change. San Bernardino International Airport, located in sunny Southern California, is optimally poised to do its part in this fight.

California is the first state in America to embrace the challenge of global warming, with legislation and a comprehensive cap-and-trade program. In 2006, the California legislature passed Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006. This law establishes a limit on greenhouse gas (GHG) emissions for the state of California, mandating reduction of state-wide emissions to 1990 levels by 2020. In 2016, California met this goal, so the California Assembly and Senate expanded upon AB 32 with Senate Bill (SB) 32, which mandates a further 40% reduction in GHG emissions from 1990 levels by 2030 (California Legislative Information, 2016).

The cap-and-trade program was also extended through 2030 with AB 398. In January 2017, the California Air Resources Board (CARB) developed a plan (SB 32 Scoping Plan¹) that charted a path towards the GHG reduction goal using all technologically feasible and cost-effective means (CARB, 2017). In addition, SB 100 and SB 350 required the state to increase procurement of clean energy, with a renewable portfolio standard of 30% renewable energy by 2020 and 60% renewable by 2045. To effectively use renewable energy, the state passed AB 2514, requiring all utilities to install minimum levels of grid-scale energy storage infrastructure. Vulnerable and disadvantaged communities were singled out for support and protection from the effects of pollution and climate change by AB 617 and SB 535. Meeting these ambitious goals will require all stakeholders in a sustainable future to actively participate in these efforts.

In response to these initiatives, San Bernardino International Airport compiled a GHG emissions inventory and an evaluation of reduction measures that could be adopted. The airport has committed to



undertake the following actions that will reduce GHG emissions associated with its regional (or county-wide) activities:

- Prepare a baseline (2020) GHG emissions inventory for the airport.
- Prepare future (2021, and 2030) GHG emissions forecasts.
- Develop general GHG reduction plans.
- Develop consistent baseline information for use in development of Green Energy Element plan (GEE) for identifying and meeting GHG reduction goals.

By working in a collaborative manner on these goals, with our government and industry partners, the airport can implement specific GHG reduction measures. GHG reduction measures for this report are non-binding unless the decision-making body, The San Bernardino International Airport Authority, decides to formally adopt them. This Green Energy Element is designed to complement the San Bernardino International Airport Authority Draft Environmental Assessment dated February 2021.

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Section 1: Executive Summary

1.1. Airport Profile

Conveniently located in the heart of the Inland Empire, close to major freeways, and just 60 miles from Los Angeles, SBD International Airport is strategically positioned to meet growing aviation needs including: cargo, business, general, and commercial aviation by providing competitive rates for aviation companies and local businesses looking to stretch their wings and expand their horizons. With extensive stretches of pristine runway and acres of prime land available for aviation development, SBD International Airport is ready to help our community and region reach new destinations.

1.2. Purpose of the Green Energy Element

To address global climate change, the Airport has prepared this Green Energy Element (GEE) plan, which provides a framework for reducing our greenhouse gas (GHG) emissions.

The GEE recommends GHG emissions targets that are consistent with the reduction targets of the State of California and presents a strategy that would make it possible for the airport to meet the recommended targets. The GEE also suggests best practices for implementation and makes recommendations for measuring progress.

The GEE implements policies that have been identified in the SBD's strategic Plan, in sections concerning the Built Environment and Natural Environment Master Elements, including the Mobility, Bicycle, Water, Air Quality and Climate Change, and Integrated Waste Management Chapters. The SBD Plan includes specific goals and policies that guide the airport's approach to climate change, including guidelines for preparing inventories or plans and general reduction strategies. As climate change is a cross-cutting issue, addressed by many elements of airport Plan, the GEE is considered an implementation measure for the relevant policies discussed in the overall SBD Strategic Plan. This structure allows the airport to update the GEE on an on-going, as-needed basis, to ensure that the airport's climate protection efforts reflect both current legislation and emerging best practices. The following graphic shows the basic sequence of implementing the GEE:



1.3. State Mandates Local GHG Emissions Target and Guidelines

The GEE reflects guidelines established in the 2017 Scoping Plan prepared by the California Air Resources Board (CARB). The Scoping Plan, designed to implement the State’s GHG emission targets set in Executive Order S-3-05 and Senate Bill 32, recommends that local governments target a cap of 6 MTCO₂e (metric tons carbon dioxide equivalent) per capita per year in 2030 and 2 MTCO₂e per capita per year in 2050 in their CAPs (climate action plans), or in this case our GEE. For perspective, the average per capita CO₂e for America in 2018 was 16.6 metric tons.

1.4. Emissions Inventory and Forecast

The 2016 emissions inventory, and 2030 emissions forecasts in the table below cover direct GHG emissions from sources within the boundaries of SBD and the City of San Bernardino. Indirect emissions associated with the consumption of energy (such as electricity, with no endpoint emissions) that is generated outside the borders of the airport are also included in the table.

The airport’s Business Plan includes closely integrated land use and transportation systems’ policies, designed to foster a more sustainable community. The table below shows the 2015 emissions inventory and 2030 emissions forecasts, reflecting pre-planned State actions and incorporating results of the traffic forecasts conducted for the Business Plan, as well additional reductions from other policies contained in the Business Plan.

The table shows that SBD will work towards its targets for 2030 without any additional measures beyond those already included in the Business Plan.

Table 3-9 San Bernardino 2016 Community Greenhouse Gas Inventory and 2030 and 2045 Forecasts (MTCO₂e)

Sector	2016 Inventory		2030 Forecast		2045 Forecast	
	Emissions	Percent	Emissions	Percent	Emissions	Percent
Residential Natural Gas	108,920	8%	116,900	8%	125,450	7%
Non-Residential Natural Gas	82,966	6%	92,545	6%	102,809	6%
Light-Medium Duty Vehicles	607,035	42%	631,826	41%	661,044	39%
Heavy-Duty Vehicles	172,153	12%	207,931	13%	237,131	14%
Off-Road Equipment	27,788	2%	33,744	2%	45,595	3%
Agriculture	1,096	<1%	617	<1%	334	<1%
Residential Electricity	104,756	7%	106,809	7%	111,635	7%
Non-Residential Electricity	211,906	15%	237,285	15%	264,244	16%
Solid Waste Management	110,556	8%	112,723	7%	117,697	7%
Wastewater Treatment	6,777	<1%	6,910	<1%	7,222	<1%
Water Transport, Distribution, and Treatment	6,573	<1%	6,430	<1%	6,720	<1%
Total Emissions	1,440,525	100%	1,553,719	100%	1,679,882	100%

SOURCE: [San Bernardino Regional GHG Reduction Plan Appendices Mar 2021.pdf](http://gobcta.com/San_Bernardino_Regional_GHG_Reduction_Plan_Appendices_Mar_2021.pdf) (gobcta.com)

1.5. Monitoring and Reporting Progress

The airport periodically monitors and reports emissions as a matter of State and Federal requirements. This monitoring report includes information on the status of the Federal- and State-Level emissions reductions measures.

1.6. Our Green Model

The GEE is intended to address the main sources of SBD's emissions that cause climate change, which include emissions from the energy consumed in buildings and for transportation, as well as the solid waste sent to landfills. The purpose of the GEE is to guide the development, enhancement, and ultimately the implementation of actions that will reduce the Airport's GHG emissions 20% below existing levels by 2030. The GEE has been designed to support the following functions:

- ➔ Identify & describe SBD's emissions sources.
- ➔ Provide projections of future emissions, based on growth.
- ➔ Provide clear guidance to airport staff regarding when and how to implement key provisions of the plan.
- ➔ Recommend strategies, measures, and actions to achieve GHG reductions.
- ➔ Demonstrate SBD's commitment to comply with State GHG reduction efforts.
- ➔ Define a strategy for turning this plan into action and transparently tracking and reporting progress toward the GHG reduction goals.
- ➔ Convert all airport vehicles to zero-emission vehicles, including maintenance, passenger, fuel, and support vehicles. Review all on-site generators of GHGs for alternate, less-polluting fuels.
- ➔ Review all real-estate at the airport that will accommodate solar installation (and battery & hydrogen storage where possible).
- ➔ Review landscaping plans to offset carbon output by installing plants, shrubs, and trees.

1.7. Updating The GHG Inventory and the GEE

The Airport will update the GHG inventory periodically. If an updated inventory reveals that SBD is not making adequate progress toward meeting the GHG target, or that new technologies and programs emerge that warrant inclusion in the GEE, the Airport will adjust the GEE by modifying, adding, and/or replacing policies in the Business Plan or elsewhere, or incorporating optional measure(s) to further reduce emissions.

1.8. Financial Model

As we strive to do our part in being good stewards of our planet, we must do this in a fiscally reasonable and responsible manner. SBD will seek out grant opportunities from Southern

California Air Quality Management District (AQMD) as well as other State and federal agencies including SCE to help offset the cost of building such solutions that meet our aggressive goals. Long term savings and meeting the goal of reducing ongoing airport operation costs, will further our enthusiasm for “greening” our operations.

1.9. Communication Strategy

Residents and business leaders may participate in the GEE through participation in the airport’s workshops or through comments at publicly held meetings. Community members can provide valuable input that may be used in selecting methods for GHG reductions. Outreach efforts may include online surveys, community open houses, community workshops, presentations, group activities, and online comments. Information about the GEE Plan is available on the airport’s website to provide the public with information on past and upcoming events, as well as links to documents and reports. The information gathered from these meetings and surveys may be used to formulate the GEE Plan policies upon which the GHG reduction strategies and actions are derived. As the airport shares information, community members will provide feedback, both positive and constructive. By committing to a continuous dialogue, sharing up-to-date information, and increasing opportunities for well-paying jobs, this program will ensure that the SBD International Airport remains a good neighbor and community partner

1.10. Management and Operations



1.11. Summary

SBD is confident in our plans moving forward to meet the objectives and goals laid out within this “Green Element” plan.

Section 2: Emissions Inventory

2.1. Emissions Overview

The SBD Emissions Inventory identifies the major sources and the overall magnitude of greenhouse gas (GHG) emissions in and around the airport, pursuant to Sections 15183.5(b)(1)(A) and 15183.5(b)(1)(C) of the state CEQA Guidelines. As part of the Green Energy Element (GEE) preparation effort, this 2020 GHG inventory was prepared to provide a recent measure of emissions and is summarized in this chapter.

The inventory follows the standards developed by the International Council for Local Environmental Initiatives (ICLEI) for community GHG inventories. The inventory methodology is described first, followed by inputs and results.

2.2. Methodology

The emissions inventory covers direct GHG emissions from sources within the boundaries of the City of San Bernardino and to an extent the San Bernardino International Airport, including fuel combusted and solid waste generated within the city. Indirect emissions associated with the consumption of energy (such as electricity, with no end point emissions) that is generated outside the borders of the city and the airport are also included. The emissions inventory tallies emissions from ten sectors:

-  Residential (adjacent to the Airport).
-  Commercial.
-  Industrial.
-  Transportation.
 - Solid waste.
-  Water.
-  Wastewater.
-  Off-Road Equipment.
-  Public Lighting; and
-  Agriculture.

2.3. Emissions Inventory

The closest air pollutant monitoring stations to the general study area are identified in the table below, along with a tabulation of recent monitoring data for O₃, PM_{2.5}, and oxides of nitrogen (NO_x) from the California Air Resources Board (CARB) and the U.S. EPA.

Local Monitoring Station data

CARB Site Number	U.S. EPA Site Number	Monitoring Site Name (Agency)	Location	Distance from Project Study Area	Pollutant	Arithmetic Mean		
						2017	2018	2019
36204	6-71-4003	Redlands	500 N. Dearborn Street, Redlands	5.6 miles southeast	O ₃ (ppm)	0.06	0.06	0.06
36203	6-71-9004	San Bernardino	24302 E. 4 th Street, San Bernardino	2.7 miles west	PM _{2.5} (µg/m ³)	11.5	11.2	11.0
					NO _x (ppb)	21.9	23.1	20.2
					O ₃ (ppm)	0.06	0.06	0.06

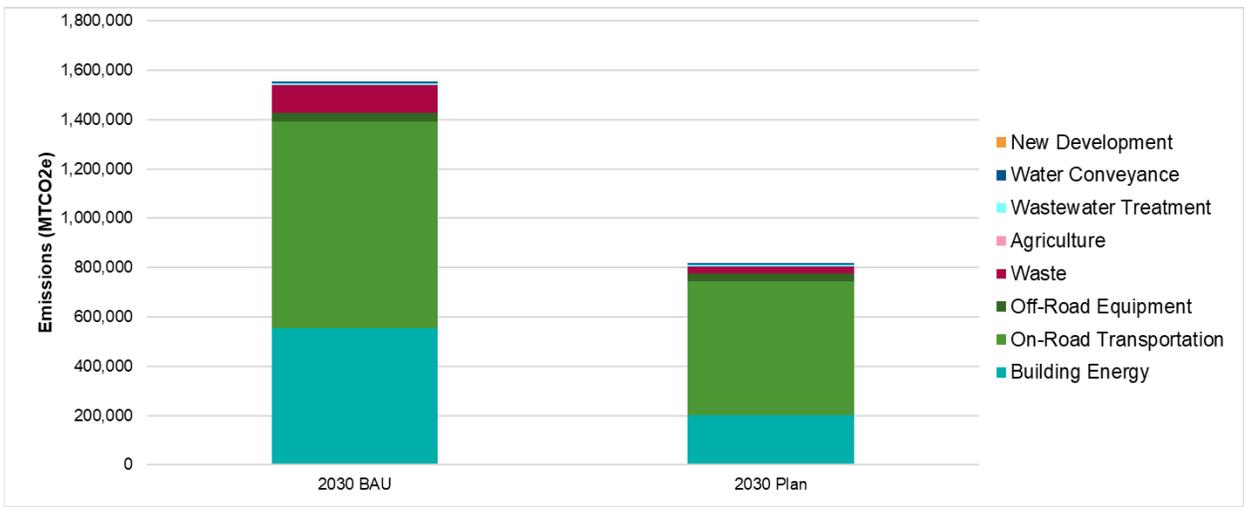
Sources: U.S. EPA 2017, 2018, 2019; CARB website 2020.

ppm = parts per million; µg/m³ = micrograms/cubic meter; ppb = parts per billion

NOTE: O₃ metric used is the "daily maximum of 8-hour running average" of the 2015 8-hour ozone pollutant standard. PM_{2.5} metric used is the "daily mean" of the PM_{2.5} 24-hour 2012 pollutant standard.

SOURCE: [Air Quality Monitoring | California Air Resources Board](#)

2.4. Emissions Sector for the City of San Bernardino



SOURCE: <https://www.gosbcta.com/wp-content/uploads/2019/10/Final-Plan.pdf>

2.5. Current Airport Vehicle and Equipment Proposed to be Converted to Zero Emissions

Year	Make	Model
Administration		
2005	Ford	Starcraft E-450 Mini Bus
2008	Ford	Dodge Sprinter 12 Passenger Van
2008	Ford	Escape
2008	Ford	Escape

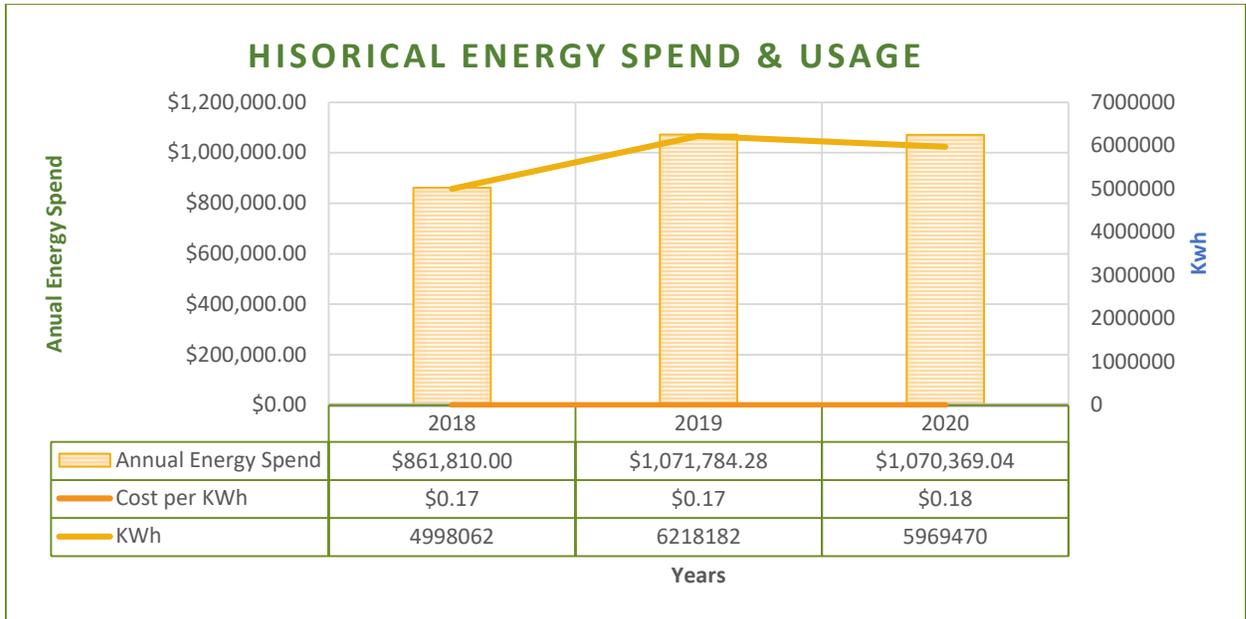


Airport Maintenance - Maintenance, Fleet, Grounds		
1978	GMC	Sierra Flatbed/Rail Truck
1982	Green	Green Forklift
1983	John	John Deere Road Grader
1985	GMC	Water Truck
Airport Maintenance - Maintenance, Fleet, Grounds, continued		
1985	International	1-1/2 Ton Truck s1600 Flatbed
1988	Chevrolet	350 Tommy/Lift
1989	Bobcat	Bobcat
1990	Case	Case Frontend Loader
2001	Ford	F-450 Heavy Duty Dump Truck
2001	GMC	C250 Utility Irrigation Truck
2005	Chevrolet	2500HD Utility Truck
2005	Ford	F-150 4X4 Truck
2006	Chevrolet	Silverado (Fueller)
2007	Ford	F-150 Pickup Truck
2007	Ford	F-150 Pickup Truck
2007	Ford	F-150 Pickup Truck
2007	NPR	Nite- Hawk (Isuzu) Sweeper
2008	Ford	F-250 Utility Truck
2008	Ford	F-250 Utility Truck
2009	Ford	Escape MAINT1
2009	Ford	Escape SCH1
2009	Ford	Ford Escape
2016	Ford	Ford Transit #31
2017	Ford	F-150 Pickup truck
2018	Ford	Ford Transit #32
2018	Ford	Ford Transit #33
	John Deere	Tractor/Backhoe/Loader
ARFF Vehicle		
1975	Oshkosh	ARFF Vehicle
1975	Oshkosh	ARFF Vehicle
1989	Ford	F-350 Fire Truck
2000		ARFF Airport Crash Truck R9
Airport Generators		
	Emergency Gen	Emergency Gen. 40HP, 120/208,104AMP
	Emergency Gen	Emergency Gen. 200HP, 120/208,520AMP
	Emergency Gen	Emergency Gen. 1000HP, 277/480,1127AMP
	Emergency Gen	Emergency Gen.600HP, 2400, 183AMP
	Emergency Gen	Emergency Gen. 30HP, 120/240,87AMP
	Emergency Gen	Emergency Gen. 40HP, 120/208,104AMP



Airport Security		
2009	Ford	Crown Victoria
2010	Ford	Crown Victoria
2015	Ford	Taurus
2015	Ford	Taurus
2015	Ford	Taurus
2017	Ford	Explorer
2017	Ford	Explorer
2018	Ford	Explorer
2018	Ford	Explorer
Luxivair SBD		
1979	Wollard	Stair Truck
1981	GMC	Red Dye Diesel 1100 Gal Fuel Truck
1982	Mark	Lift
1988	Ford	Fuel Truck 2,500 Avgas
1992	Ford	F-350 White Stair truck
1999	Chevrolet	Suburban
2003	Chevy	Silverado C1500
2007	American LaFrance	American LaFrance Fueler 10,000 Jet A
2007	American LaFrance	Fueller Truck 10,000 Jet A
2008	International	5705 2008 International 4000 Series Fueler 3,000 Jet A
2008	Isuzu	NPR Fueler Avgas 1000k
2009	International	7000 Series Fueler 5,000 Jet A
2015	Volkswagen	2015 Volkswagen Crew Car Executive
2021	Lincoln	2021 Lincoln Aviator
Luxivair SBD, continued		
2021	Lincoln	2021 Lincoln Navigator
	Gem Cart	Gem Cart (6 pax)
2018	SkyMark	SkyMark Jet A Fueler 10K
2018	SkyMark	SkyMark Jet Fueler 10k
2020	SkyMark	SkyMark Jet A Fueler 7K
		K-Loader 40000 lbs. capacity

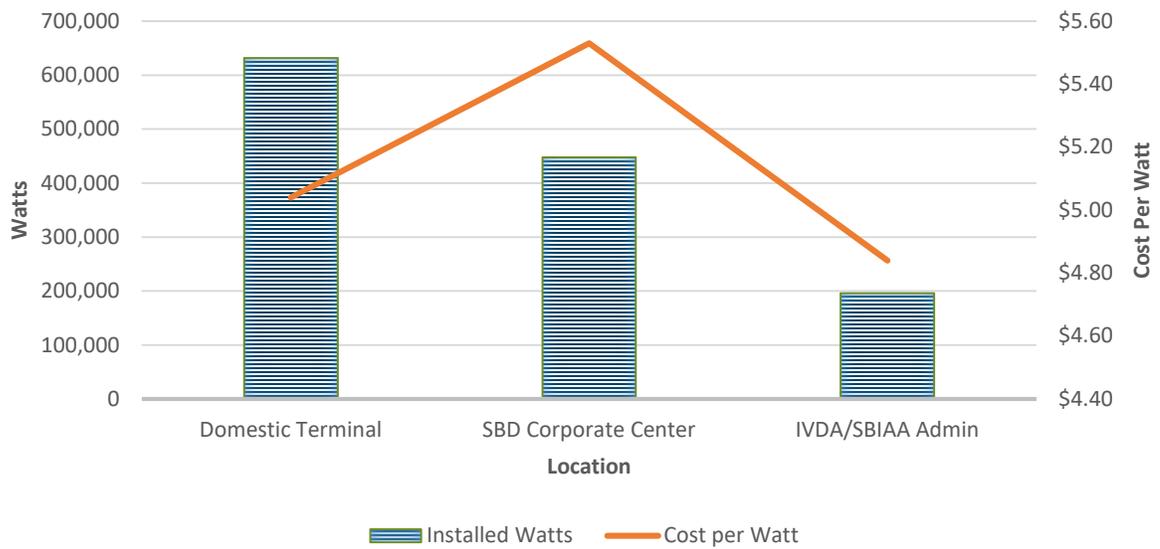
2.6. Current Power Usage at the Airport



	2018	2019	2020
Annual Energy Spend	\$861,810.00	\$1,071,784.28	\$1,070,369.04
KWh	4,998,062	6,218,182	5,969,470
Cost per KWh	\$0.17	\$0.17	\$0.18

2.7. Renewable Energy Installed

CURRENT INSTALLED RENEWABLE

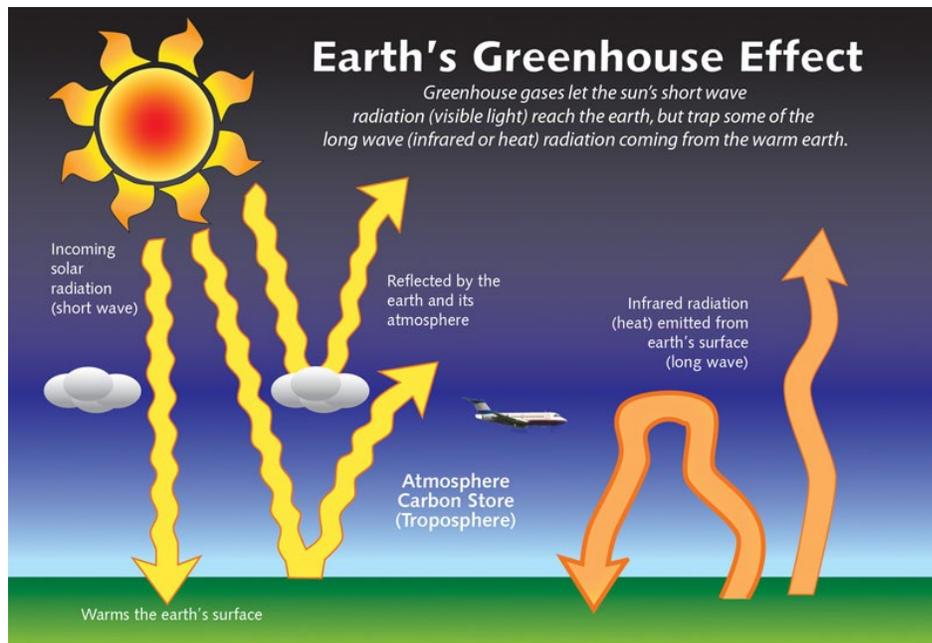


Locations	Installed Watts	Cost Per Watt	Install Date
Domestic Terminal	632,000	\$5.04	2010
SBD Corporate Center	448,000	\$5.53	2011
IVDA/SBIAA Admin	196,000	\$4.84	2010

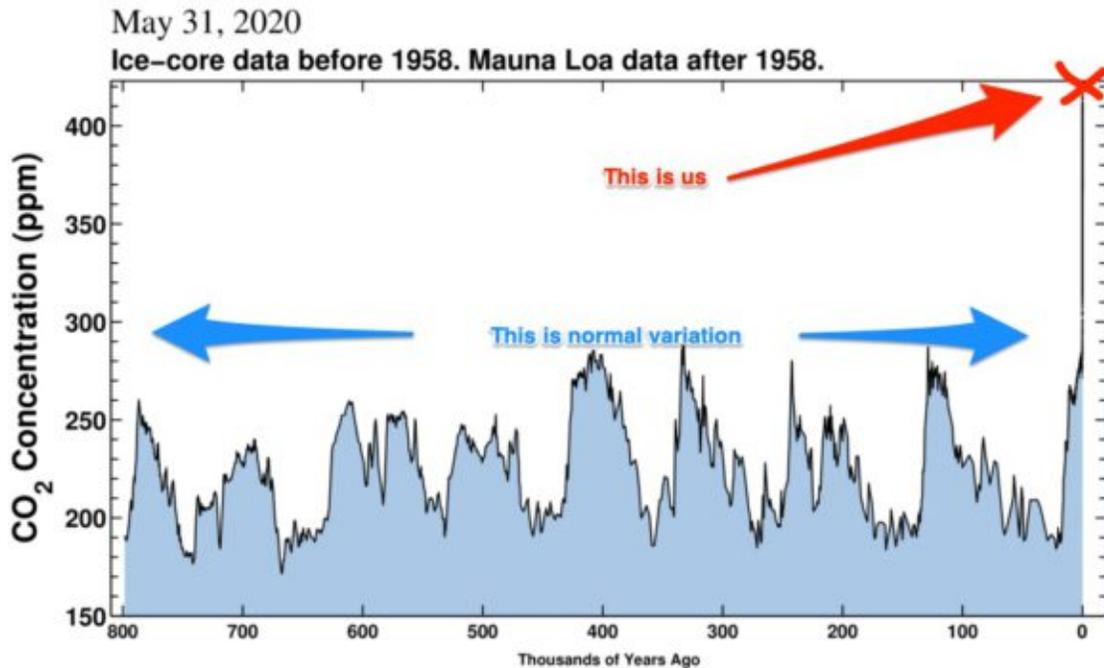
Section 3: Climate Action Strategies

3.1 Greenhouse Effect and GHGs

Gases that trap heat in the atmosphere are often called “greenhouse gases” or GHGs. Principal GHGs include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone (O₃), and water vapor (H₂O). Some GHGs, such as CO₂, CH₄, and N₂O, occur naturally and are emitted to the atmosphere through natural processes. Since different gases contribute to the greenhouse effect in different proportions, the term CO₂e (carbon dioxide equivalent) provides the reference frame based on comparison to CO₂'s contribution. The greenhouse effect is a natural process that contributes to regulating the earth's temperature. Without it, the average temperature of the earth would be about 0°F (-18°C) instead of its present 57°F (14°C) and would be unlikely to support human life as we know it.



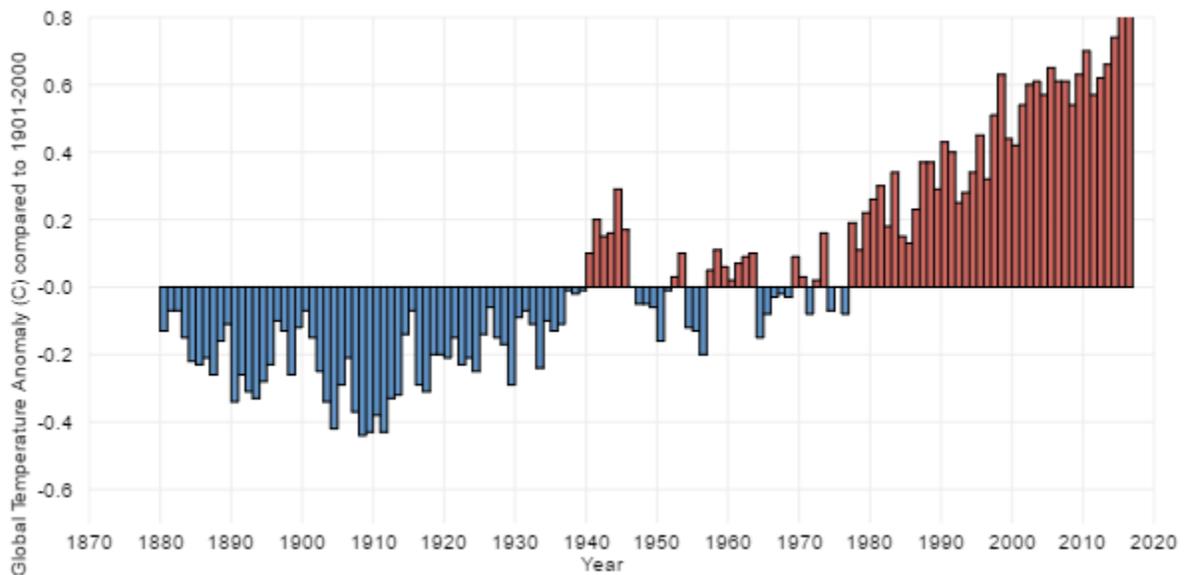
The global carbon cycle is complex and incorporates various natural sources of atmospheric carbon dioxide, including respiration of aerobic organisms, wildfires, and volcanic outgassing, and various carbon “sinks” that remove CO₂, such as respiration by land plants for photosynthesis, and absorption by the ocean. Data collected from gasses trapped in ancient and modern ice cores can be used to visualize global GHG concentrations over the past 800,000 years (NOAA.gov). This graph demonstrates both the natural fluctuations in CO₂, and the fact that the concentration of CO₂, the principal GHG, has increased dramatically since the Industrial Revolution, from consistently below 300 parts per million (ppm) in the 800,000 years before 1800, to 419 ppm in 2021.



SOURCE:

https://keelingcurve.ucsd.edu/wp-content/plugins/sio-blumoon/graphs/co2_800k.pdf

Increased atmospheric concentrations of GHGs from the burning of fossil fuels have led to a rise in average global temperatures by greatly magnifying the natural greenhouse effect. The figure below shows the increase in global temperatures from 1880 to 2016. While average global temperatures fluctuate on a yearly basis, the general trend shows a long-term temperature increase. Since 1976, every year has been warmer than the long-term average. In 2015, the average temperature across global land and ocean surfaces was 1.62°F (0.90°C) above the twentieth-century average—the hottest year in the 136-year record. The consensus among climate scientists is that earth's climate system is unequivocally warming, and rigorous scientific research demonstrates that anthropogenic greenhouse gases are the primary driver.



SOURCE: <https://www.climate.gov/news-features/climate-qa/what-evidence-exists-earth-warming-and-humans-are-main-cause>

Anthropogenic (man-made) GHG's and Climate Change

Global climate change concerns are focused on the potential effects of climate change resulting from excessive GHGs in the atmosphere magnifying the greenhouse effect. Determining how communities can mitigate these effects and adapt to climate change in the short and long term is of paramount importance.

Numerous observations document the impacts of global climate change, including increases in global average air and ocean temperatures, the widespread melting of snow and ice, more intense heat waves, and rising global average sea level. Scientists have high confidence that global temperatures will continue to rise in the foreseeable future, largely due to anthropogenic GHG emissions. In addition to the physical impacts to the environment from increased temperatures, sea level rise, and more frequent extreme weather events, global climate change is predicted to continue to cause ecological and social impacts. Ecological impacts of climate change include greater risk of extinction of species, loss of species diversity, and alteration of global biogeochemical cycles, which play an essential role in nutrient distribution. The social impacts of climate change include impacts on human health, agriculture, fisheries, energy, water resources, forestry, construction, insurance, financial services, tourism, and recreation.

According to the International Panel on Climate Change (IPCC) in North America, the regional impacts of climate change are: A decreased snowpack in the western mountains, a 5% - 20% decrease in the yields of rain-fed agriculture in some regions, and increased frequency, intensity, and duration of heat waves in cities that currently experience them.

In California, the Climate Action Team (CAT)—a group of state agency secretaries and the heads of agency, boards, and departments, led by the Secretary of the California Environmental Protection Agency—synthesized current research on the environmental and economic impacts of climate change. The CAT found that climate changes are poised to affect virtually every sector of the state’s economy and most of its ecosystems. Key findings of the CAT include predicted decreases in water supply that could cause revenue losses of up to \$3 billion in the agricultural sector by 2050, increases in statewide electricity demand of up to 55 percent by the end of the century, increased wildfire risk that may cause monetary impacts of up to \$2 billion by 2050, and ecosystem impacts affecting California’s historic ranching culture.

3.2 Climate Action Strategies

This section summarizes key general plan policies that support SBD’s GHG reduction measures or would contribute to GHG reductions and sustainable practices at the airport. All policies listed below are from the SBD’s business plan, unless otherwise noted. In addition to state level measures, the airport selected a variety of measures across nearly all sectors, including a GHG Performance Standard for new development. The airport’s business plan includes policies and programs that broadly support energy efficiency and sustainability, even if it is not closely tied to a specific measure as part of this Reduction Plan. Relevant business plan policies, for the specific reduction measures the airport selected, are listed under the measure name (e.g., Wastewater-1). Policies not tied to a specific GHG reduction measure are listed only by sector (e.g., Off-Road).

3.3 Building Energy Efficiency

✎ Conserve Energy:

✎ Reduce electricity use by 10% as an example for other businesses to follow.

✎ Consider enrollment in:

- Community Energy Efficiency Program (CEEP), which provides incentives for builders who attain energy savings 30% above the National Model Energy Code.
- Energy Star Program, which is sponsored by the United States Department of Energy and the Environmental Protection Agency and encourages superior energy efficiency by residents and businesses.
- CA State’s Energy Efficiency and Demand Reduction Program, which offer rebates and incentives to agencies and developers who reduce energy consumption and use energy efficient fixtures and energy-saving design elements.

✎ Require energy audits of existing public structures and encourage audits of private structures, identifying levels of existing energy use and potential conservation measures.

- ✎ Investigate energy-efficient retrofitting of existing buildings throughout the airport.
- ✎ Consider programs that award incentives to projects that install energy conservation measures, including technical assistance and possible low-interest loans for surrounding business.
- ✎ Educate staff and surrounding partners regarding the need for energy conservation, environmental stewardship, and sustainability techniques, and about systems and standards that are currently available for achieving greater energy and resource efficiency, such as the U.S. Green Building Council's LEED standards for buildings.
- ☀ Lighting Efficiency: Encourage and promote the use of energy-efficient (U.S. Department of Energy "Energy Star®" or equivalent) lighting fixtures, light bulbs, and compact fluorescent bulbs in residences, commercial, and public buildings, as well as in traffic signals and signs where feasible.
- ✎ All Electric Buildings: Encourage energy-efficient retrofitting of existing buildings throughout the Airport.
- 🕒 Renewable Energy: Encourage increased use of passive and active solar design in existing and new developments: (e.g., orienting buildings to maximize exposure to cooling effects of prevailing winds, day lighting design, natural ventilation, space planning, thermal massing and locating landscaping and landscape structures to shade buildings).
- ☀ Solar Energy for Warehouse Space: Encourage increased use of passive and active solar design in existing and new development (e.g., orienting buildings to maximize exposure to cooling effects of prevailing winds, day lighting design, natural ventilation, space planning, thermal massing and locating landscaping and landscape structures to shade buildings).
- 🕒 Renewable Energy - Existing Commercial/Industrial: Encourage increased use of passive and active solar design in existing and new development (e.g., orienting buildings to maximize exposure to cooling effects of prevailing winds, day lighting design, natural ventilation, space planning, thermal massing and locating landscaping and landscape structures to shade buildings).
- ♻ Rooftop Gardens: Consider planting gardens on rooftops to add cooling shade, to capture and recycle rainwater and to provide additional ecosystems for wildlife and/or food for people.

3.4 Open Space Solar Solutions

- ☀ Open space identification: Encourage and identify open space locations that will support the use of solar energy capture and conversion with the appropriate battery or other means of storage for use by the airport or other related entities of the airport.



3.5 EV Charging Stations

- ⚡ Charging station locations: Encourage and identify convenient locations for EV charging stations in and around airport facilities. These charging stations may be used for all vehicles owned by or in support of the airport.



3.6 Urban Tree, Shrub Planting for Shade and Energy Saving, Carbon Offset

- ♻ Conserve scarce energy resources: Encourage increased use of landscaping to offset carbon emissions with the planting of drought tolerant trees and shrubs designs in existing and new development.

3.7 On Road

- 🚌 Alternately-Fueled Transit Fleets: Replace all GHG-producing vehicles (eg passenger, maintenance, busses, waste, and re-fueling) with electric.



3.8 Solid Waste

Waste Diversion: Continue to reduce the amount of solid waste that must be disposed of in area landfills and be consistent with the County Solid Waste Management Plan and State law.



Section 4: Implementation

4.1 Implementation

In addition to the potential programmatic measures contained in this Green Energy Element, the following is a non-exclusive list of potential additional measures that can be applied at the project level to reduce greenhouse gas emissions. It should be noted that these measures are not essential for the airport to meet its GHG reduction targets but are presented here for information purposes. Sources for additional potential measures include those listed in CAPCOA's "CEQA and Climate Change, Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act (January 2008)"; the Attorney General's "Addressing Climate Change at the Project Level"; OPR's "CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA)"; and SANBAG's "Regional Greenhouse Gas Reduction Plan (2014)".

4.2 Renewable Energy

- ☺ Provide onsite renewable energy system(s). Nonpolluting, renewable energy sources include solar with onsite storage, through battery, hydrogen, or other means.
- ✓ Include in new buildings, facilities to support the use of low/zero carbon fueled vehicles, such as the charging of electric vehicles from green electricity sources.
- ☺ Provide solar water heaters.

4.3 Green Building

- ✓ Meet recognized green building and energy efficiency standards such as LEED and ENERGY STAR.
- ☺ Incorporate materials which are resource efficient, recycled, with long life cycles and manufactured in an environmentally friendly way.

4.4 Energy Efficiency

- ☺ Exceed Building Code (Title 24) mandatory efficiency requirements by 15% or more.
- ☺ Install light colored "cool" roofs (e.g., Energy Star roofing) or other highly efficient roofing materials.
- ☺ Install a vegetated ("green") roof that covers at least 50% of roof area.
- ☺ Design projects to maximize solar orientation (i.e., 75% or more building face north or south; include roof overhangs that block high summer sun, but not lower winter sun, from penetrating south-facing windows.
- ☺ Plant trees and vegetation near structures to shade buildings and reduce energy requirements for heating/cooling.
- ☺ Install energy-reducing ceiling/whole-house fans.

- ✦ Install energy efficient lighting (e.g., light emitting diodes (LEDs)), heating and cooling systems, appliances, equipment, and control systems. (e.g., Energy Star)
- ✦ Install energy-reducing programmable thermostats that automatically adjust temperature.

4.5 Transportation

- 🚗 Develop commuting reduction plans that encourage employees who commute alone to consider alternative transportation modes.
- 🚗 Explore creating an online ridesharing program that matches potential carpoolers immediately through email.
- 🚗 Provide Zero-Emission shuttle service or public transit incentives such as transit passes to decrease work-related auto trips as well as passenger trips.
- 🚗 Provide “end-of-trip” facilities including showers, lockers, and changing space (nonresidential projects).
- 🚗 Incorporate public transit into project design.
- 🚲 Incorporate bicycle lanes, routes and facilities into street systems, new subdivisions, and large developments.
- 🚲 Provide amenities for non-motorized transportation, such as secure and convenient bicycle parking.
- 🚲 Provide plentiful short- and long-term bicycle parking facilities (nonresidential projects).
- 🚶 Create pedestrian (and/or bicycle) access network that internally links all uses and connects to all existing/planned external streets and pedestrian (and/or bicycle) facilities contiguous with the project site.
- 🚶 Provide a parking lot design that includes clearly marked and shaded pedestrian pathways between transit facilities and building entrances.
- 🚗 Convert all vehicles to Zero-Emission including but not limited, maintenance, shuttle, waste haulers, and fuel (electric and or Hydrogen).
- 🚗 Provide parking for EVs/CNG vehicles.
- ✦ Install EV charging facilities.
- ➔ UAS systems integration for airport and surrounding use will be incorporated to reduce miles traveled.

4.6 Water Conservation

- 💧 Install water-efficient fixtures and appliances such as low-flow fixtures, dual flush toilets, and other water-efficient appliances.
- 💧 Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls and use water-efficient irrigation methods.
- 💧 Implement low-impact development practices that maintain the existing hydrology of the site to manage storm water and protect the environment.

- 💧 Incorporate recycled/reclaimed water for landscape irrigation and other non-potable water use needs (purple pipe).
- 💧 Incorporate rain barrels (with the support of vector control) and gray water systems for landscape irrigation.

4.7 Landscaping

- 🌳 Install native and drought-tolerant plant materials into landscapes.
- 🌳 Incorporate into landscapes: drought resistant native trees, trees with low emissions (low carbon turnover), and high carbon sequestration potential.
- 🌳 Provide parking lot areas with 50% tree cover within 10 years of construction, in particular low emitting, low maintenance, native drought resistant trees. This greatly reduces the urban heat island effect.
- 🌳 Convert where possible all landscaping and facility maintenance equipment to zero-emissions.

4.8 Modified Mixed Use

- 🏢 Promote mixed-use development projects. These are predominantly characterized by properties on which various uses, such as office, commercial, institutional, but not residential, are combined in a single building or on a single site in an integrated development project with functional interrelationships and a coherent physical design; or projects that have at least two of the following on site and/or offsite within one-half mile, and retail development, office, transit, park, or open space.
- 🏢 Provide on-site shops, commercial, and services for employees, as permitted by zoning and development standards.

4.9 Solid Waste Measures

- Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).
- Provide interior and exterior storage areas for recyclables and green waste and adequate recycling containers located in public areas.
- Provide education and publicity about reducing waste and available recycling services.

4.10 Project Score Card

- ✓ INTERNAL USE: SBD will list and track all GEE projects that have been identified that meet the goals of this Green Energy Element plan with costs, estimated and actual completion dates, as well as responsible parties to complete the task(s).

Section 5: Financial Model

5.1 Overview of the Financial Model

This section provides an overview of the financial model, historical data, and capital required, for implementing the GEE, as well as forecast information and the cash investment plan. SBD is relying on historical project costs to provide a foundation to fiscally move forward from in a responsible manner.

SBD will focus its fundraising efforts for implementing our Green Energy Element on applying for grants at both at the Federal and State levels. Possible funding sources include: SCAQMD, CRC AB2766, CARB for CAP & Trade funds, and Clean Transportation Funding. Southern California Edison could also be a valuable partner for additional services and funding opportunities such as the “Charge Ready” and “Charge Ready Transport” programs that could pay for all the infrastructure for EV charging.



The goal is to eventually make our program(s) self-funded once certain infrastructure is put into place, creating positive cash flows for other green solutions, as well as ongoing maintenance.

5.2 Financial Performance Review (historical review)

- 📌 SBD has installed solar facilities at its airport offices and have found that over several years the system is now a net positive in cash flow, thus paying for its initial installation.



5.3 Cash Flow

As SBD rolls out the GEE, identifying site-specific plans as well as overall goals, we will have a better idea of the cash flow requirements to build and maintain these systems.



5.4 Financial Model (Breakeven Calculations)

Our financial model will take into account the revenue, minus cost of goods/mitigation efforts, and expenses, with a forecasted profit based on a “best-case scenario”. This will give us a good indication of how the financial model of the GEE will work. SBD’s goal is simply not too break-even, but to make this element a profit center, while reducing our carbon footprint.

5.5 Assumptions

Our assumptions are that SBD will be successful in raising the required funds needed to implement our Green Energy Element over time. It is also our assumption that this process will take time, since this is a government facility with many moving parts, and the grant process itself is labor intensive. Our collective decades of experience managing large projects will greatly aid this endeavor.

5.6 Capital Requirements

Currently SBD is moving through the RFQ process for selected projects in order to establish an updated base line requirement for capital. It is anticipated that the ongoing projects required to implement the Green Energy Element will need tens of millions of dollars in funding. Seed funding won from various governmental agencies, is expected to launch this Element into a self-funded plan.

Section 6: Management & Operations

6.1 Management and Operations

SBD is a lean operation, with highly qualified personnel that are motivated to provide the best service for their internal and external customers.

Please see an abbreviated listing of management and operational staff that will help implement this Green Energy Element below.

6.2 Management Team



6.3 Staffing

Staffing for the Green Energy Element plan will involve executive management, project management, purchasing, and our maintenance facilities personnel. All our staff are highly experienced in these, and similar types of activities.

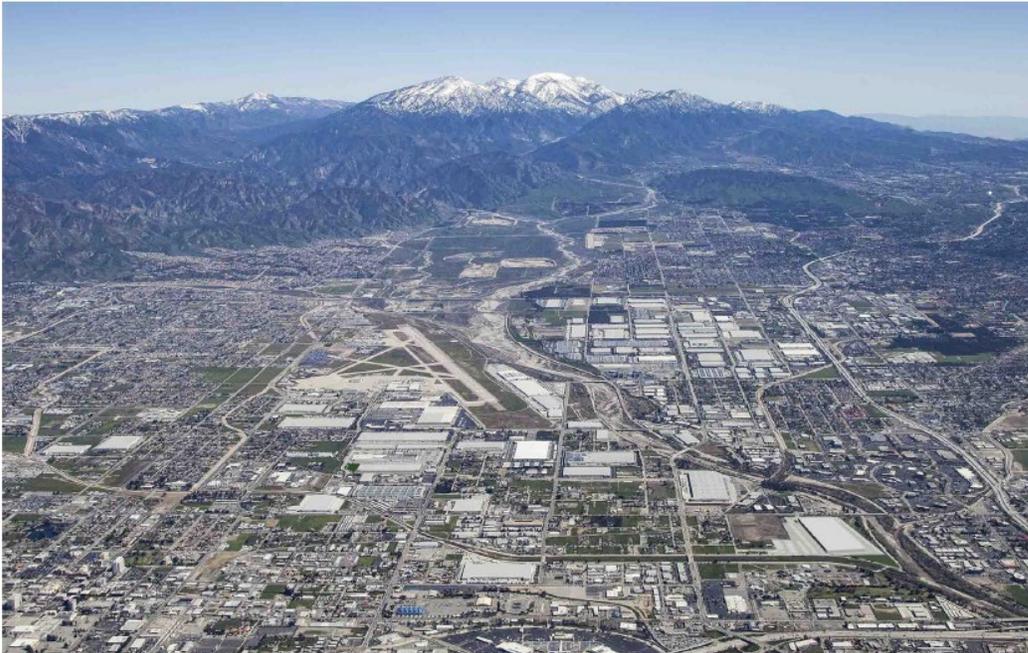
Most of the buildouts will be by means of outsourcing to independent contractors via the competitive bidding process, allowing staff to play the role of project oversight.

6.4 Supply Chain Management

Since most of the implementation of this Green Energy Element will be performed by independent contractors, our supply chain will be at a minimum. However, we will utilize the following major supply chains:

1. Raw material acquisition
2. Product Development, Design, Multi-phase pre-fabrication, etc.
3. Manufacturing
4. Tracking systems
5. Shipping
6. Brokerage/Jobber
7. Warehousing
8. Shipping to Wholesalers
9. Retail Broker
10. Retail Sales
11. Back-up suppliers

6.5 Location/Facilities



San Bernardino International Airport Authority
1601 E. Third Street
San Bernardino, CA 92408

6.6 Hours of Operation

As an international airport, we operate around the clock, 24/7.

6.7 Legal Issues

Legal issues concerning this Green Energy Element include, but are not limited to the following:

-  Licensing/bonding.
-  Business licensing for contractors and sub-contractor.
-  City, County, State, or Federal requirements.
-  Permits.
-  Environmental regulations.
-  Zoning or building codes.
-  Insurance coverage.
-  Unions.

Relationship to the California Environmental Quality Act.

The California Environmental Quality Act (CEQA) is a statute that requires local agencies to identify significant environmental impacts of their actions and avoid or mitigate those impacts, if feasible. In 2007, California's lawmakers enacted SB 97, which expressly recognizes the need to analyze GHG emissions as part of the CEQA process. SB 97 required the Governor's Office of Planning and Research (OPR) to develop recommended amendments to address GHG emissions as an environmental effect.

In 2010, OPR's amendments to the CEQA guidelines addressing GHG emissions became effective. Lead agencies are now obligated to describe, calculate, or estimate the amount of GHG emissions resulting from a project, by using a model or methodology to quantify GHG emissions resulting from a project or relying on a qualitative analysis or performance-based standards. The lead agency should determine whether a project's GHG emissions significantly affect the environment by considering whether the project's emissions, as compared to the existing environmental setting, exceeds a threshold of significance that the lead agency determines applies to the project, and the extent to which the project complies with the regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. In addition, the lead agency is required to impose feasible mitigation to eliminate or substantially reduce significant effects.

5 15183.5(b) of CEQA Guidelines states, “Plans for the Reduction of Greenhouse Gas Emissions. Public agencies may choose to analyze and mitigate significant greenhouse gas emissions in a plan for the reduction of greenhouse gas emissions or similar document. A plan to reduce greenhouse gas emissions may be used in a cumulative impacts analysis as set forth below. Pursuant to sections 15064(h)(3) and 15130(d), a lead agency may determine that a project’s incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements in a previously adopted plan or mitigation program under specified circumstances.”

The GEE will help the airport with compliance with CEQA Guidelines Section 15183.5(b): Tiering and Streamlining the Analysis of Greenhouse Gas Emissions⁵, which became effective in 2010.

The required elements of a CAP, or in our case GEE, as cited in the guidelines, state that a plan for the reduction of GHG emissions should:

- ➔ Quantify greenhouse gas emissions, both existing and projected over a specified time-period, resulting from activities within a defined geographic area.
- ➔ Establish a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable.
- ➔ Identify and analyze the greenhouse gas emissions resulting from specific actions or categories of actions anticipated within the geographic area.
- ➔ Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level.
- ➔ Establish a mechanism to monitor the plan’s progress toward achieving the level and to require amendment if the plan is not achieving specified levels; and
- ➔ Be adopted in a public process following environmental review.

The GEE is intended to fulfill these requirements. The GEE also contains a Project Review Score Card, which allows for streamlined review of GHG emissions for projects that demonstrate consistency with the GEE, as described in CEQA Guidelines Section 15183.5(b).



6.8 Professional/Advisory Team

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Section 7: Public Participation

7.1 Public Participation

Residents in and around the SBD have played an important role in our operations and in raising concerns over possible environmental issues. Through the Green Energy Element Plan (GEE), our community will continue help us progress into a cleaner future. Community members have and will continue to provide important input on points of change they would like to see at the airport. Community support is vital to the success of this GEE, and therefore community members will need to take an active role in providing input on the GEE and monitoring its success over time.

7.2 Community Outreach

A variety of outreach tools will allow residents and community members who wish to participate to do so in a comfortable manner. Outreach efforts include an ongoing online survey. Updates on the GEE can and will be shared with the public through roadshow presentations to the Chamber of Commerce, the partner Cities of the IVDA / SBDA, community-based service clubs, the Parks and Recreation for various Cities, and General Plan Educational Programs that will be made available. Community workshops may include presentations, surveys, group activities, and comments.

Online Survey(s)

Ongoing online survey(s) can be made accessible from the SBD website. The survey will garner input from those who would provide it by asking participants to list possible challenges, and their visions for the future.

Roadshow Presentations

Presentations may be made to several community groups and organizations, including the Chamber of Commerce, service clubs, the Parks and Recreation Commission, and various other community members.

Green Energy Educational Program

Community meetings may be organized to help acquaint community members with the Green Energy Element and to provide ongoing updates and receive community feed-back.

Innovation Center

San Bernardino International Airport is in the process of creating a world-renowned innovation center bring focused to energy, resources, and the environment.



The Innovation Center will be a repository for learning about the latest in energy management, conservation, resources, and efficient technologies through interactive displays, exhibits, technical consultations, classes, workshops, and events.

The innovation center will host top resource providers such as Southern California Edison, Sempra Energy, (Gas Company), State and local Water Districts and their technology providers, partners, and vendors. The Center will have breakout areas as well as private meeting rooms and offices.

SBA envisions this Center to be a hub for political and community gatherings for the inland empire, with a focus on energy and conservation efforts as well as to be seen and to see key political figures up and down the State but more focused on local legislators and governing bodies. If our legislators are well informed, they will create meaningful and realistic legislation that we call all get behind.

The Center will be open to the public to learn and take part in interactive displays and creative new ideas as well as ways that we can conserve, learn about new programs, and be part of the solution to protect our precious planet, resources, and perhaps even save money with new and innovative ways to conserve.

Section 8: List of Acronyms

8.1 List of Acronyms

AB	Assembly Bill
APS	Alternate Plan Strategy
BAU	Business as usual
BRT	Bus Rapid Transit
BTA	Bicycle Transportation Account
BTP	Bicycle Transportation Plan
CACP	Clean Air Climate Protection
CAFÉ	Corporate Average Fleet Fuel Economy
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCAP	Center for Clean Air Policy
CCAR	California Climate Action Registry
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFCs	Chlorofluorocarbons
CH ₄	Methane
CIWMB	California Integrated Waste Management Board
CO ₂	Carbon Dioxide
CPUC	California Public Utilities Commission
CSU	California State University
CWIB	California Workforce Investment Board
EIR	Environmental Impact Report
EMFAC2007	California Air Resource Board Emission Factors Model
EO	Executive Order
EPA	Environmental Protection Agency
FCAA	Federal Clean Air Act
FEMA	Federal Emergency Management Agency
GCJC	Green Collar Jobs Council
GHG	Greenhouse Gas
GVW	Gross vehicle weight
GWP	Global Warming Potential
H ₂ O	Water, or Water Vapor
HCFCs	Hydrochlorofluorocarbons

HFCs	Hydrofluorocarbons
ICLEI	International Council for Local Environmental Initiatives
IPCC	International Panel on Climate Change
LCFS	Low Carbon Fuel Standard
LEED	Leadership in Energy and Environmental Design
LVW	loaded vehicle weight
MMT	Million metric tons
MPOs	Metropolitan Planning Organizations
MPG	Miles per gallon
MRF	Material Recovery Facility
MSEP	Metrolink Service Expansion Program
MSL	Mean seal level
MT	Metric tons
MTCO ₂ eq	Metric tons of carbon dioxide equivalents
MWD	Metropolitan Water District
N ₂ O	Nitrous Oxide
NF ₃	nitrogen trifluoride
O ₃	Ozone
OAL	Office of Administrative Law
OPR	Office of Planning and Research
PFCs	Perfluorocarbons
PPM	Parts per million
PPT	Parts per trillion
RPS	Renewable Portfolio Standard
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SF ₆	Sulfur hexafluoride
SCS	Sustainable Communities Strategy
Tg	Teragram
UAS	Unmanned Aircraft Systems
UNFCCC	United Nations Framework Convention on Climate Change
VHFHSZ	Very High Fire Hazard Severity Zones
VMT	Vehicle miles traveled
VTI	Victoria Transport Institute

Section 9: References & Citations

The Intergovernmental Panel on Climate Change is the leading international body for the assessment of climate change:

- <http://www.ipcc.ch/>

The National Aeronautics and Space Administration (NASA) has documented recent impacts and future trends of climate change:

- <http://climate.nasa.gov/effects>

The U.S. Environmental Protection Agency (U.S. EPA) has information of climate change, and its effects:

- <https://www.epa.gov/climate-change>

Cal-Adapt, a product of the Public Interest Energy Research (PIER) program, funded by the California Energy Commission, provides California-specific climate change research, including interactive climate tools:

- <http://cal-adapt.org/>

U.S. Environmental Protection Agency (EPA)

- <https://www.epa.gov/climate-change>

Cool California – Calculator for Households & Individual

- <https://coolcalifornia.arb.ca.gov/choose-your-calculator>

NOAA Climate Data From Ice Cores

- <https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide>

Cool Climate Network

- <http://coolclimate.berkeley.edu/carboncalculator>

Nature Conservancy

- <http://www.nature.org/greenliving/carboncalculator/index.htm>

Carbon Footprint

- <http://www.carbonfootprint.com/calculator1.html>

Global Footprint Network

- <http://www.footprintnetwork.org/en/index.php/gfn/page/calculators/>

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