

Project Summary

The City of Brisbane seeks \$200,000 from the Bay Area Air Quality Management District for a two-year grant to develop and implement a Comprehensive Commercial Building Efficiency Program that will lead to substantial reductions in energy and water use and greenhouse gas emissions from the business sector. The centerpiece of the project will be an ordinance which requires existing commercial buildings, including multi-family buildings, to benchmark their energy and water use annually, and, for many, to audit or retro-commission their facility periodically. To facilitate the adoption and successful implementation of a strong local policy, the program will include significant outreach and resources aimed at making compliance and follow-up actions easy.

The Air District's support will accelerate development and implementation of a local GHG reduction policy and program that would be widely replicable to other communities. Funding sources for the development of local ordinances are extremely limited, making the Climate Protection Grant Program an ideal source to facilitate this work. The City of Brisbane will leverage existing staff resources, and local property owners can leverage existing program and funding sources for implementation of upgrades identified through the benchmarking, auditing and commissioning processes.

Strategic Approach

The City of Brisbane committed to addressing the carbon footprint of our buildings through our 2015 Climate Action Plan (CAP). In the years since, staff and the city's Open Space and Ecology Committee (a citizen advisory committee to the city council) have explored various policy and programmatic options, culminating in a recent discussion with City Council Liaisons to the Committee. Due to the significance of the commercial sector in Brisbane's overall emissions profile and the perceived challenges of residential mandates, an ordinance focused on reducing energy use in commercial buildings through benchmarking, auditing and retro-commissioning requirements was prioritized.

Through the background research already performed, the city recognized that strong educational resources, outreach, and support would be required for the policy to be a success. These well-documented challenges within the energy efficiency industry include those identified in this grant program's guidelines: that decision-making for building energy use is decentralized and that individual building owners responsible for these decisions often have limited access to information about the alternatives, financing and rebates available, lack clear understanding of the benefits and return on investment of participating, and don't know what questions to ask or where to turn for answers. By pairing a local requirement to participate with robust resources and support, including trainings for local business owners and contractors and information on financing options and rebates, Brisbane's comprehensive approach works to eliminate the obstacles to tackling this stubborn challenge. While we do not intend for the ordinance to apply to single-family residential, the resources provided will address residential buildings and voluntary programs focused on them.

Through research of numerous building energy ordinances around the country, city staff and CAP Subcommittee volunteers have identified the City of Los Angeles Existing Buildings Energy and Water Efficiency Ordinance as a model. As with many others, including the State's AB802, the ordinance uses the Energy Star Portfolio Manager tool for the initial step of benchmarking buildings. The city also intends to use this readily-available tool, ensuring consistency between state and local requirements and familiarity for building owners with compliance requirements in other jurisdictions. Conversation with staff responsible for implementation of LA's ordinance demonstrated the need for robust data and tools to manage the new program, which have been built into this grant application.

The City of Brisbane envisions a two-phase two-year project, with ordinance development and program implementation phases each requiring roughly one year. The Air District funds will support professional consultants, which will be managed and supplemented by staff resources provided by the City.

During the ordinance development phase, staff and consultants will work with the City's citizen advisory committee and other local stakeholders to: draft an ordinance; perform community outreach, particularly through the Brisbane Chamber of Commerce / to the local business community; facilitate public workshops; and shepherd the ordinance through Council approval. While the particular details of the ordinance will necessarily be determined through this development phase, staff envisions: extending benchmarking requirements to all commercial facilities, including most multi-family dwellings, and tiered auditing and retro-commissioning requirements that exclude the smallest buildings and high-performing facilities. Benchmarking, auditing and retro-commissioning would apply to both energy and water.

The program implementation phase will include consultants building technical resources as well as education and outreach.

- Consultants to build website/database for information-sharing, tracking compliance and public reporting. The web portal will either be integrated with the existing City of Brisbane website or a standalone site with strong linkages to the city's website and will include:
 - Information about the City's building energy ordinance
 - Clear and straightforward resources page(s) with local-specific & detailed information about:
 - Auditing & commissioning programs (i.e. PG&E's turnkey program, San Mateo County Energy Watch's free small & medium business audits, Energy Upgrade CA / Home Upgrade Advisor, etc.)
 - Rebates and incentives through PG&E, Bay Area Water Supply and Conservation Agency, Bay Area Regional Energy Network (BayREN), etc.
 - Financing options like Property Assessed Clean Energy (PACE) and on-bill financing

- On-site renewable energy generation (solar, etc., particularly programs like Bay Area SunShares) and storage (particularly how it can reduce demand charges)
 - Opportunities to reduce emissions from fuel-switching (converting natural gas equipment to electric) or choosing cleaner electricity by “opting up” to Peninsula Clean Energy’s ECO100 or PG&E’s Solar Choice (100% renewable energy rate plans)
 - Paybacks and other benefits of audits, retro-commissioning and energy-saving equipment
 - On-demand webinars and other training materials
 - Back-end database for staff management of compliance and outreach to ~250 buildings
 - Integration with Energy Star Portfolio Manager and data submitted from it
 - Map / visualization of public disclosure data
- Education/Outreach (consultant/staff)
 - Information on web portal (see above) and promoted through City communications channels
 - Portfolio Manager trainings and other education events for building owners and contractors, including on-demand webinars posted on the website
 - Compliance support for small businesses
 - Audit demonstration event with the Brisbane Chamber of Commerce

In addition, Brisbane recognizes the potential for a successful policy and program to provide a model other jurisdictions can follow and thus multiply the positive impact. Staff will facilitate the replication of the program by presenting to the San Mateo County RICAPS (Regionally Integrated Climate Action Planning Suite) Working Group, a countywide collaborate of local agency staff that meets monthly, and other venues as applicable/requested. In addition, a “toolkit” of lessons learned, templates and other materials will be created and posted online, and staff will be available for calls/meetings with other jurisdictions.

Deliverable	Estimated Completion
Contract with BAAQMD	July 2018
PHASE 1: ORDINANCE	
RFP/contract for Ordinance Consultant	September 2018
Kickoff meeting with project team	October 2018
Community/chamber workshop	December 2018
Draft ordinance	February 2019
Council Study Session	April 2019
Council Meeting / Ordinance Adoption	June 2019
PHASE 2: IMPLEMENTATION	
RFP/contract for Consultant(s)	July 2019
Kickoff meeting with project team	August 2019
Development review	November 2019

Web portal handover & staff training	January 2020
Portfolio Manager workshops	February-April 2020
Audit demonstration event w/ chamber	May 2020
Benchmarking Compliance Deadline (First)	June 2020

Connection with Air District’s goal and objectives

The City of Brisbane’s proposed program directly addresses the overarching goal of the Climate Protect Grant Program to achieve GHG reductions by accelerating implementation of the Air District’s 2017 Clean Air Plan, and objective 1 of supporting implementation of measures outlined in the plan. The Air District’s plan calls for reductions in direct and indirect emissions from buildings, specifically through control measure BL1: Green Buildings. Our proposal addresses the goal to increase the energy efficiency of existing buildings by creating mandatory requirements for commercial facilities to benchmark, audit and retro-commission their facilities. The program’s educational resources will also include information and guidance for onsite renewable energy and decarbonization through methods such as fuel-switching and selecting GHG-free electricity such as PCE ECO100, further addressing BL1 and touching on BL2: Decarbonize Buildings.

The Clean Air Plan’s BL1 Brief Summary notes that “[t]he measure includes policy assistance, incentives, diffusion of public information, and targeted engagement and facilitation of partnerships in order to increase energy efficiency and onsite renewable energy in the buildings sector” and this proposal requests funding for policy assistance, diffusion of public information and targeted engagement for these purposes. The Implementation Actions detail the Air District’s commitments to provide “Policy Assistance to Local Jurisdictions” including “requiring energy assessments, building benchmarking and/or upgrades” which is precisely what the City of Brisbane seeks to do. The Regulatory Context and Background notes various existing policies and programs, such as BayREN’s Home Upgrade Initiative, on-bill financing and Property Assessed Clean Energy (PACE); our proposal seeks to increase the participation in these voluntary programs by requiring building owners to investigate their energy (and water) use, and providing clear and comprehensive resources to take action on their findings.

The City’s proposal will also have air quality co-benefits, addressing the grant program’s Objective 2, because, as the Clean Air Plan notes, “saving energy will also reduce various criteria pollutants.” Since the proposed program will achieve significant energy savings it will therefore reduce criteria pollutants and have air quality co-benefits, particularly near power plants due to reduced production. (The table on page 7 includes estimates of reductions from auditing and retro-commissioning activities.) Other co-benefits include those associated with reduced power usage such as increased reliability of power supply and cost, reduced capital costs for utilities by avoiding upgrades and expansions, and financial savings over time for utility customers. The program will support green job creation due to the demand for qualified professionals to perform audits and retro-commissioning activities as well as the manufacturers, suppliers and contractors providing products or services for follow-up actions. Additional transparency and

certainty in the real estate market due to prospective buyers and lessees having information about facilities' energy and water performance, and increased property values due to the expected property improvements, are also likely co-benefits. As the benchmarking, auditing and retro-commissioning requirements also apply to water use, the City also expects to see reductions in water use that would increase the availability and reliability of the water supply under uncertain future conditions, as well as minor reductions in energy use associated with the movement of water.

Objective 3 of accelerating local implementation of GHG reduction policies and programs is inherent in this proposal. The City of Brisbane had identified a building energy savings ordinance, as well as improved education and outreach about existing voluntary programs, as priorities for reducing local GHG emissions. However, resources beyond existing staff, which has additional competing work priorities, have not been identified. Receiving this funding from BAAQMD would truly accelerate this project and ensure its timeliness and success by allowing the city to bring in expert consultants focused on the tasks at hand.

While most aspects of this proposal are not necessarily innovative in and of themselves, few jurisdictions have enacted ordinances that mandate energy and water auditing or retro-commissioning, or have benchmarking requirements that extend as far as those envisioned. The addition of a true "one-stop-shop" for comprehensive resources supporting local participation in energy- and water-saving programs and its pairing with the proposed ordinance takes this effort a step farther towards the "innovative approaches" sought by Objective 5.

Finally, as noted elsewhere in this application, this program systematically addresses a common problem in a comprehensive way and thus lends itself to replicability by other jurisdictions throughout the Bay Area, State and beyond. The City of Brisbane explicitly seeks to meet Objective 6 of creating replicable solutions by presenting our work to the countywide climate collaborative, RICAPS, which we already participate in as well as the creation of a toolkit. We stand ready to share our anticipated successes with other jurisdictions that hope to follow.

Potential for GHG Reduction

Emissions from the commercial sector are second only to transportation emissions in the City of Brisbane, and thus represent the greatest opportunity for the City to independently take action to reduce emissions.

Per the City's 2015 Community GHG Inventory (the latest available), Commercial/ Industrial and Direct Access Electricity in Brisbane accounts for 61,850 MWh and Commercial/Industrial Gas for 1,200,203 Therms.

The City of Brisbane is part of the Community Choice Energy program for San Mateo County, Peninsula Clean Energy (PCE). The emissions factor for PCE's launch/2016 is 0.107 MTCO₂e/MWh.

Per reporting (<http://aceee.org/local-policy/toolkit/savings-strategies-buildings>) from the American Council for an Energy-Efficient Economy (ACEEE), benchmarking buildings has been shown to lead to energy savings:

“The Lawrence Berkeley National Laboratory (LBNL) compiled the impact of policies from eight cities and found that, on average, benchmarking policies resulted in energy reductions of 3 to 8% over a two-to four-year period.²² LBNL indicates that these results should be considered preliminary due to the need for more rigorous and longer-term analyses. More rigorous analyses are needed to predict conclusive energy savings from B&T policies. In addition, ENERGY STAR Portfolio Manager[®] conducted a study of more than 35,000 buildings in its benchmarking system from 2008 to 2011 and found a total of 7% energy savings over the three-year period.²³”

[22] Mims, N., S. Schiller, E. Stuart, L. Schwartz, C. Kramer, and R. Faesy. 2017. *Evaluation of U.S. Building Energy Benchmarking and Transparency Programs: Attributes, Impacts, and Best Practices*. Lawrence Berkeley National Laboratory. emp.lbl.gov/sites/default/files/lbnl_benchmarking_final_050417_0.pdf.

[23] Energy Star Portfolio Manager. 2012. “Benchmarking and Energy Savings.” DataTrends. www.energystar.gov/sites/default/files/buildings/tools/DataTrends_Savings_20121002.pdf

Since the City intends to use Energy Star Portfolio Manager as the tool for mandatory benchmarking of all commercial facilities, we can reasonably assume that this report’s findings would apply. The report details 7% energy savings over three years, or 2.4% annually, and we will assume these figures apply equally to electricity and gas and continue over time.

However, we estimate that approximately 45 of Brisbane’s approximately 247 commercial buildings are greater than 50,000 square feet and thus subject to the state’s AB802 benchmarking requirement. Thus the impact of our policy extending benchmarking requirements to all commercial facilities will be decreased. Current estimates put the square footage of 50,000+ square foot buildings at approximately 60% of the total footprint, leaving 40% of the footprint newly subjected to benchmarking requirements due to the City’s proposed policy. We do not currently have details on the numbers or square footage of different building types (office, hotel, warehouse, etc.) readily available, and privacy laws currently limit our access to the actual energy usage from individual buildings, therefore we are left with directly correlating building square footage with energy usage. Since the first benchmarking compliance deadline is expected to be near the end of the grant term, these results can be considered “near term” (within 1-2 years post-contract per BAAQMD FAQ guidance, here 2 years).

Emissions Reductions from Benchmarking

	Annual Use	Units	Emissions Factor	% Buildings	Year 2 Reduction: 4.80%	Year 5 Reduction: 12%
Gas	1,200,203	Therms	0.005	40%	115.22	288.05
Electric	61,850	MWh	0.107	40%	127.06	317.66
Total near term savings					242.28	MTCO2e/year
Total long term savings					605.71	MTCO2e/year

The expected GHG reduction from energy and water auditing and retro-commissioning requirements are significantly more impactful, particularly over the long term. The following tables detail the calculations and assumptions made.

Emissions Reductions from Auditing

Emissions factors		
NOx	94.0	lbs/10 ⁶ scf
Lead	0.001	lbs/10 ⁶ scf
PM total	7.600	lbs/10 ⁶ scf
SOx	0.600	lbs/10 ⁶ scf
Natural gas emissions	0.005	(MTCO ₂ e/therm) BAAQMD guidance
Weighted emission factor	0.000107	(MT CO ₂ /kWh) ECOplus, PG&E, and ECO 100

Base Project Assumptions	ASHRAE Level 1 requirement: Buildings that are 10-49,999 square feet	ASHRAE Level 2 requirement: Buildings that are 50,000 square feet +	Units
Square footage	2,093,357	4,106,927	Square feet
Electricity EUI	13.48 *	16.77 **	kWh/ft ²
Natural Gas EUI	18.02 *	23.94 **	kBtu/ft ²
Natural Gas EUI	1.80	2.39	therms
Annual Electricity Use	28,218,452	68,873,166	kWh per year
Annual Natural Gas Use	3,772,229	9,831,983	therms per year

Emissions Estimates	ASHRAE Level 1 (assume low-cost/no-cost measures installed)		ASHRAE Level 2 (assume most cost-effective measures installed)	
Assumed savings	5%	DNV GL professional judgement	10%***	DNV GL professional judgement
Annual Electric Energy Savings (kWh/yr)	1,410,923	Savings for each measure individually summed - there will be a slight difference when measures implemented together	6,887,317	Combined savings for all measures
Annual Gas Energy Savings (therms/year)	188,611		983,198	
Annual Gas savings (scf/year)	18,861,147		98,319,832	
Annual GHG Reduction	1,093.63	MTCO₂e/year	5,650.98	MTCO₂e/year
NOx	1,772.95	lbs/year	9,242.06	lbs/year
Lead	0.103	lbs/year	0.531	lbs/year
PM total	0.167	lbs/year	0.869	lbs/year
SOx	0.000	lbs/year	0.000	lbs/year

Assumptions & Sources:

Energy consumption (EUI) for small office (*) and large office (**) is based on CEUS 2003 - <http://www.energy.ca.gov/2006publications/CEC-400-2006-005/CEC-400-2006-005.PDF>

Emissions factors for Nox, Lead, PM total, Sox:

<https://www3.epa.gov/ttnchie1/ap42/ch01/final/c01s04.pdf>

*** While we must assume that not all properties will act on their audit findings, others may take more extensive actions which can result in savings as high as 30% and balance the overall savings.

Due to the time delay of creating, passing and implementing the ordinance with reasonable compliance lead times, these estimates are considered to be “long term” (5 years, per BAAQMD FAQ guidance).

Combined Annual Long Term GHG Reductions from benchmarking and ASHRAE Audits:

$605.71 + 1093.63 + 5650.98 = 7350.32 \text{ MTCO}_2\text{e/year}$

In addition to the savings calculated above, the City expects additional reductions may be achieved through other aspects of the program, some of which may be seen in the shorter term, though these savings are more difficult to quantify. For instance, resources provided may increase: adoption rates of existing voluntary programs by residents, installation of renewables, fuel-switching, and/or “opt-ups” to PCE ECO100 or other cleaner energy sources. Water use reductions in commercial facilities due to benchmarking, auditing and commissioning requirements or among residents due to education and outreach may also result, providing further climate benefits. Increased availability of data through the benchmarking program will allow the City to better target outreach for specific programs, and sharing our results with RICAPS and others may have multiplier effects should the model be adopted in other jurisdictions.

Measuring Success

- An adopted ordinance which requires existing commercial buildings to benchmark their energy and water use annually, and, for many, to audit or retro-commission their facility periodically
- A comprehensive and easy-to-use web portal with details on the ordinance and resources on how and why to comply and take further actions to reduce energy and water use
- Have all existing commercial buildings in Brisbane benchmarked; for the purposes of this grant achieving 90% compliance within three years will be deemed success
- Present to the San Mateo County RICAPS (Regionally Integrated Climate Action Planning Suite) Working Group, and other venues as applicable/requested
- A “toolkit” of lessons learned and templates for other jurisdictions to replicate

Budget

The City of Brisbane is requesting support from the Air District for:

Item	Estimated Cost	Narrative
Consultants/sub-contractors		
<ul style="list-style-type: none">• Ordinance development consultant	\$100,000	Consultants will work with staff and the City's Open Space and Ecology Committee and other local stakeholders to: draft an ordinance; perform community outreach; facilitate public workshops; and shepherd the ordinance through Council approval. This cost estimate was provided by DNV GL, the City's partner through their RICAPS program contract.
<ul style="list-style-type: none">• Educational content research and development	\$25,000	Research and compilation of clear, detailed, local-specific information about: auditing and commissioning programs; rebates and incentives; financing options; on-site renewable energy generation and storage; opportunities to reduce emissions from fuel-switching or choosing cleaner electricity sources; paybacks and other benefits of audits, retro-commissioning and energy-saving equipment.
Meetings (convening of any public meetings, workshops, trainings, etc. NOT internal project meetings)	\$25,000	Includes the development and production of workshops and training during the program implementation phase. Public meetings and workshops for the development and approval of the ordinance are included in the above estimate for an ordinance development consultant.

Materials design & production (including web)	\$50,000	Consultants to build website/ database for information-sharing, tracking compliance and public reporting. This estimate is specifically for the technical work of building the back-end database for staff management of compliance and outreach, integration with Portfolio Manager, mapping/visualization of public disclosure, and posting of educational/ resource content. The research and development of that educational/resource content is listed separately; the consultant may or may not be the same.
Other expenses	in-kind	Sharing program development and what we've learned with the countywide collaborative, RICAPS (Regionally Integrated Climate Action Planning Suite)
TOTAL AIR DISTRICT FUNDING REQUESTED	\$200,000	

Salaries, benefits and overhead for City of Brisbane staff assigned to this project are not part of the grant request. Information provided below is estimated for consideration as an in-kind contribution from the City.

Name	Project Role	Estimated Hours	Hourly Rate	Benefits Rate	Overhead Rate	Total
Karen Kinser	Coordinator and committee liaison	120	\$77.19	52%	10%	\$15,006
Adrienne Etherton	Project Manager	600	\$39.95	44%	10%	\$36,914
Bob Sage	Engineering Technician	180	\$39.61	64%	10%	\$12,406
Caroline Cheung	Communications	70	\$47.79	63%	10%	\$5,787
ESTIMATED TOTAL IN-KIND CONTRIBUTION						\$70,113