

October 9, 2008

BENICIA PLANNING COMMISSION

CITY COUNCIL CHAMBERS

REGULAR MEETING AGENDA

Thursday, October 9, 2008

7:00 P.M.

I. OPENING OF MEETING

- A. Pledge of Allegiance
- B. Roll Call of Commissioners
- C. Reference to Fundamental Rights of Public - A plaque stating the Fundamental Rights of each member of the public is posted at the entrance to this meeting room per Section 4.04.030 of the City of Benicia's Open Government Ordinance.

II. AGENDA CHANGES AND DISCUSSION

III. ELECTION OF OFFICERS

IV. OPPORTUNITY FOR PUBLIC COMMENT

- A. WRITTEN
- B. PUBLIC COMMENT

V. CONSENT CALENDAR

Consent Calendar items are considered routine and will be enacted, approved or adopted by one motion unless a request for removal for discussion or explanation is received from the Planning Commission or a member of the public by submitting a speaker slip for that item.

*Any Item identified as a Public Hearing has been placed on the Consent Calendar because it has not generated any public interest or dissent. However, if any member of the public wishes to comment on a Public Hearing item, or would like the item placed on the regular agenda, please notify the Community Development Staff either prior to, or at the Planning Commission meeting, prior to the reading of the Consent Calendar.

- A. Approval of Agenda
- B. [Approval of Minutes of September 11, 2008](#)
- C. [Approval of 2009 Meeting Schedule](#)

VI. PRESENTATION

A. CLIMATE ACTION PLAN – Cal Poly City and Regional Planning

Guest Speakers: Professor Zeljka Howard, Dr. Adrienne Greve, and Blake Hudelson, student presenter

The Climate Action Plan is the implementation strategy to achieve the greenhouse gas (GHG) reduction target adopted by the City Council on September 16, 2008. The City's project consultant is the Cal Poly, San Luis Obispo City and Regional Planning Department community design lab.

The City encourages everyone to attend. A question and answer segment will immediately follow the presentation.

VII. COMMUNICATIONS FROM STAFF

VIII. COMMUNICATIONS FROM COMMISSIONERS

IX. ADJOURNMENT

Public Participation

The Benicia Planning Commission welcomes public participation.

Pursuant to the Brown Act, each public agency must provide the public with an opportunity to speak on any matter within the subject matter jurisdiction of the agency and which is not on the agency's agenda for that meeting. The Planning Commission allows speakers to speak on non-agendized matters under public comments, and on agendized items at the time the agenda item is addressed at the meeting. Comments are limited to no more than five minutes per speaker. By law, no action may be taken on any item raised during the public comment period although informational answers to questions may be given and matters may be referred to staff for placement on a future agenda of the Planning Commission.

Should you have material you wish to enter into the record, please submit it to the Commission Secretary.

Disabled Access

In compliance with the Americans with Disabilities Act (ADA), if you need special assistance to participate in this meeting, please contact Dan Pincetich, the ADA Coordinator, at (707) 746-4211. Notification 48 hours prior to the meeting will enable the City to make reasonable arrangements to ensure accessibility to this meeting.

Meeting Procedures

All items listed on this agenda are for Commission discussion and/or action. In accordance with the Brown Act, each item is listed and includes, where appropriate, further description of the item and/or a recommended action. The posting of a recommended action does not limit, or necessarily indicate, what action may be taken by the Planning Commission.

The Planning Commission may not begin new public hearing items after 11 p.m. Public hearing items which remain on the agenda may be continued to the next regular meeting of the Commission, or to a special meeting.

Pursuant to Government Code Section 65009; if you challenge a decision of the Planning Commission in court, you may be limited to raising only those issues you or someone else raised at the Public Hearing described in this notice, or in written correspondence delivered to the Planning Commission at, or prior to, the Public Hearing. You may also be limited by the ninety (90) day statute of limitations in which to file and serve a petition for administrative writ of mandate challenging any final City decisions regarding planning or zoning.

Appeals of Planning Commission decisions which are final actions, not recommendations, are considered by the City Council. Appeals must be filed in the Community Development Department in writing, stating the basis of appeal with the appeal fee within 10 business days of the date of action.

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Public Records

The agenda packet for this meeting is available at the City Clerk's Office, the Benicia Public Library and the Community Development Department during regular working hours. To the extent feasible, the packet is also available on the City's web page at www.ci.benicia.ca.us under the heading "Agendas and Minutes." Public records related to an open session agenda item that are distributed after the agenda packet is prepared are available before the meeting at the Community Development Department's office located at 250 East L Street, Benicia, or at the meeting held in the City Hall Council Chambers. If you wish to submit written information on an agenda item, please submit to Gina Eleccion, Management Analyst, as soon as possible so that it may be distributed to the Planning Commission.

 [September 11, 2008 minutes \(pdf\)](#)

 [2009 Meeting Schedule \(pdf\)](#)

 [Climate Action Plan \(pdf\)](#)



**BENICIA PLANNING COMMISSION
CITY COUNCIL CHAMBERS**

REGULAR MEETING MINUTES

Thursday, September 11, 2008

7:00 P.M.

I. OPENING OF MEETING

- A. Pledge of Allegiance**
- B. Roll Call of Commissioners**

Present: Commissioners Rick Ernst, Dan Healy, Rod Sherry, Lee Syracuse, and Brad Thomas

Absent: Commissioner Bortolazzo and Chair Railsback (excused)

Staff Present: Damon Golubics, Principal Planner
Lisa Porras, Senior Planner
Gina Eleccion, Management Analyst
Mike Roberts, Senior Civil Engineer
Kat Wellman, Contract Attorney

- C. Reference to Fundamental Rights of Public -** A plaque stating the Fundamental Rights of each member of the public is posted at the entrance to this meeting room per Section 4.04.030 of the City of Benicia's Open Government Ordinance.

II. AGENDA CHANGES AND DISCUSSION

None.

III. OPPORTUNITY FOR PUBLIC COMMENT

- A. WRITTEN**

None.

- B. PUBLIC COMMENT**

None.

IV. CONSENT CALENDAR

On motion of Commissioner Syracuse, seconded by Commissioner Ernst, the Consent Calendar was approved by the following vote:

Ayes: Commissioners Ernst, Healy, Sherry, Syracuse and Thomas
Noes: None
Absent: Commissioner Bortolazzo and Chair Railsback
Abstain: None

- A. Approval of Agenda**
- B. Approval of Minutes of August 14, 2008**

V. REGULAR AGENDA ITEMS

- A. 1280 WEST 11th STREET – KING SOLOMON CHURCH EXPANSION**
08PLN-36 Use Permit & 08PLN-45 Variance
1280 West 11th Street, APN: 86-062-010

PROPOSAL:

The applicant requests approval of a Use Permit and Variance to expand a pre-existing church from 3,949 to 8,943 square feet. The applicant proposes to construct an additional 4,994 square feet to enlarge an existing sanctuary, kitchen, restrooms, and social hall and to add new classroom and office space. Improvements to the site also call for development of an at-grade parking area and site landscaping throughout.

To carry out the applicant’s request, three permits are required: Use Permit (church expansion), Variance (setbacks and landscaping), and Design Review. The permitting process involves two-steps: (1) Use Permit and Variance approval subject to the discretion of the Planning Commission, and (2) Design Review approval subject to the discretion of the Historic Preservation Review Commission.

Recommendation: Approve a Use Permit and Variance request to expand the existing King Solomon Church located at 1280 West 11th Street, based on the findings and subject to the conditions in the proposed resolution.

Damon Golubics, Principal Planner, noted that a letter had been submitted from a neighbor at 1029 West L Street.

Lisa Porras, Senior Planner, gave an overview of the project. She highlighted existing operations and siting, as well as proposed modifications. The staff report includes an overview of all regulations that the project must comply with. The applicant is requesting variances on the front setback, the sideyard setback, and on the landscaping requirements. The Commission must find that there are special circumstances that warrant granting these variances. She noted the need for a Use Permit in addition to the variances requested.

Commissioners commented on the City right-of-way between the church and the first residential property to the south. In addition, the setback regulations were commented on. Lisa Porras noted that the setback requirement is 15' along the alley. She further noted that the applicant would be responsible for maintaining the landscaping in the public right-of-way.

Commissioners questioned the City's requirement of stormwater management. Mike Roberts, Senior Civil Engineer, noted that there are conditions of approval that address this. Onsite detention and treatment are requirements.

Kat Wellman, Contract Attorney, noted that the final design of sewer tie-ins and landscaping will be addressed by the Historic Preservation Review Commission and the Building Department prior to issuance of a permit.

Commissioners commented on the green building in relation to this project. Damon Golubics noted that this would be the appropriate time to discuss that, however, often green building requirements are costly, and churches cannot afford these costs.

Marv Kinney, Engineer – He thanked staff for working with the applicant. There are issues with the economics of “green building” requirements. He noted that there is current work related to a sewer back-up that is unrelated to the project proposed. He disagrees with adding 2 additional palm trees. This is a costly project and is not economically feasible.

Commissioners questioned if there was consideration of LEED Certification. Marv Kinney stated that this has been considered, and an architect advised them that the redesign would cost 35% more to design a “green building”. They are planning to use green materials during construction.

Lisa Porras commented on the tree requirement by the Parks Department. Originally, the applicant informed staff that they desired to remove the existing palm tree to make the existing landscaping more coherent. Since the palm tree will not be removed, the details on the type of additional trees required can be worked out with the Parks and Community Services Department.

Commissioners commented on Condition #4 regarding the palm tree. Mike Roberts noted that 2 half-size palm trees would be consistent with the Benicia Traffic Calming approved trees.

Marv Kinney stated for the record that they do not agree with the tree requirement. Damon Golubics commented that condition 4 can be deleted, with all landscaping details to be worked out with the Historic Preservation Review Commission. Lisa Porras noted that the original plans show only one palm tree. Lisa Porras suggested a revision to Condition #4 as follows:

4) A revised landscape plan shall be submitted to the CDD, with existing palm tree remaining.

The public hearing was opened.

Gretchen Filer and Scott Johnson, 1059 West L Street – They submitted a letter to the Commission. They support the church, but have concerns with privacy issues due to the parking lot. They noted there are issues with high school students hanging out in the parking lot. They also noted that they have not had any personal conversations with the church regarding this issue, but are confident they can work this out.

The public hearing was closed.

Commissioners commented on the issue with high school students hanging out and would like to see more enforcement.

Mike Roberts noted that the sidewalk was replaced on West 11th as part of the High School Traffic Signal project that is going on. In addition, he noted that the sewer line issues are being reviewed and addressed by Public Works. There will be a permanent physical solution to the problem.

Issues regarding lighting were discussed. Lisa Porrás stated that there are fifteen 10' light pole proposed. The zoning requires that a light source shall not shine onto the adjacent properties.

Marv Kinney noted that Benicia High School has a security person that patrols the area.

Commissioner Syracuse commented on the history of this congregation. He noted that the church members have been good neighbors.

RESOLUTION NO. 08-9 (PC) - A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF BENICIA APPROVING A USE PERMIT AND VARIANCE RELATED TO THE EXPANSION OF KING SOLOMON CHURCH LOCATED AT 1280 WEST 11TH STREET

On motion of Commissioner Thomas, seconded by Commissioner Ernst, the above Resolution was approved by the following vote:

Ayes: Commissioners Ernst, Healy, Sherry, Syracuse and Thomas
Noes: None
Absent: Commissioner Bortolazzo and Chair Railsback
Abstain: None

VI. COMMUNICATIONS FROM STAFF

Lisa Porras stated that the City has upcoming dates scheduled for the Housing Element update. A Housing Expo will be held on October 3rd and 4th at the Veteran's Hall. A representative from the State will be in attendance.

In addition, she noted that there will be a workshop on the Climate Action Plan on Thursday, October 9th. There will be a workshop held at the Senior Center on November 13th.

Gina Eleccion noted that the update to the historic resource inventory is being brought back to the Historic Preservation Review Commission on September 25th.

VII. COMMUNICATIONS FROM COMMISSIONERS

Commissioner Ernst commented on the Housing Element update.

VIII. ADJOURNMENT

Vice Chair Healy adjourned the meeting at 8:17 p.m.



Community Development Department
MEMORANDUM

Date: October 1, 2008
To: Planning Commission
From: Gina Eleccion, Management Analyst
Re: 2009 Planning Commission Meeting Schedule

The Planning Commission meeting schedule is listed below for your reference and approval.

January 8, 2009

****February 11, 2009**

March 12, 2009

April 9, 2009

May 14, 2009

June 11, 2009

July 9, 2009

August 13, 2009

September 10, 2009

October 8, 2009

November 12, 2009

December 10, 2009

**** Alternate date due to statutory holiday.**

**AGENDA ITEM
PLANNING COMMISSION MEETING: OCTOBER 9, 2008
PRESENTATIONS**

DATE : October 2, 2008
TO : Planning Commission
FROM : Mike Marcus, Assistant Planner
SUBJECT : **CLIMATE ACTION PLAN PRESENTATION**

RECOMMENDATION:

None, this is a presentation, no action is necessary.

SUMMARY:

The City of Benicia is proud to be the first city in Solano County to address climate change through a comprehensive planning process, funded by a grant from the Bay Area Air Quality Management District (BAAQMD). This process includes the recently completed greenhouse gas emission inventory, the establishment of reduction targets and the development of a Climate Action Plan (CAP). The Planning Commission will be the body to advise the City Council regarding the CAP.

The City has hired with the Cal Poly, San Luis Obispo City and Regional Planning (CRP) Department to write a CAP that will achieve the reduction goals set by the City Council. Climate Action Plans analyze greenhouse gas inventories and provide municipalities with specific emission reduction strategies and recommended actions. The analysis looks at everything from industrial operations and manufacturing to resident commute patterns to green building standards to City operations. As its final product, the consultant team will provide a draft CAP in April 2009 to carry forward for adoption.

Community Involvement and Outreach

The success of the CAP process depends on public participation. The Cal Poly consultant team will lead a community involvement and outreach strategy as part of their work. This will include an interactive website currently under construction (www.BeniciaClimateActionPlan.com), print materials, workshops and a Farmer's Market information booth.

On Thursday, November 13th, the date of the regularly scheduled Planning Commission meeting, the Commission will host a public workshop at 6:30PM at the Senior Center (167 East L Street, Benicia). Public outreach efforts will include:

- Postcard mailing to every household in the city
- Utility bill advertisement inserts
- Inside Benicia ad and article

- Public Access TV coverage
- Local newspaper interviews

Planning Process

The project will occur in two phases:

- Phase One: Background Report – The draft background report will include findings from the community workshop, vision and goals and a policy audit. Deliverables include a draft to be submitted for City review and comment in December 2008 and a final background report in January 2009.
- Phase Two: Draft Climate Action Plan – The draft climate action plan will build from the background report to identify definitive focus areas and specific emission reduction strategies, develop indicators to track each strategy, and provide policy recommendations for implementation. Deliverables include a preliminary draft to be presented at a community meeting sometime in March and a final draft that incorporates subsequent comments due April 30, 2009.

City staff will then take the final draft to the Planning Commission and Council for adoption. In accordance with the terms of the BAAQMD grant, the CAP must be adopted by June 30, 2009.

Cal Poly Involvement

On an annual basis, the Cal Poly CRP Department partners with a municipality to author a planning document as both a community service project and an educational tool for the students. This year Benicia is benefiting from the service – for seven months, the Cal Poly team will be working closely with City staff, the public and decision makers to put together one of the first Climate Action Plans in the State for a city of our size.

The team is comprised of two professors, Professor Zeljka Howard and Dr. Adrienne Greve, along with two graduate students and twenty undergraduate seniors. Combined, the two professors bring over forty five years of experience in teaching and practicing community planning, architecture, environmental engineering and urban ecology; projects under their leadership have been awarded dozens of local, state and national awards.

Attachments:

- September 16, 2008 City Council Staff Report: Emissions Inventory Report and Greenhouse Gas Reduction Targets

**SEPTEMBER 16, 2008 CITY COUNCIL REPORT
EMISSIONS INVENTORY**

**AGENDA ITEM
CITY COUNCIL MEETING: SEPTEMBER 16, 2008
ACTION ITEM**

DATE : September 9, 2008
TO : City Manager
FROM : Economic Development Manager
SUBJECT : **ADOPTION OF A RESOLUTION ACCEPTING THE EMISSIONS
INVENTORY REPORT AND APPROVING GREENHOUSE GAS
REDUCTION TARGETS**

RECOMMENDATION:

Adopt a resolution accepting the Greenhouse Gas Emissions Inventory Report and approving its greenhouse gas reduction targets, to be re-evaluated after the Climate Action Plan's completion in Spring 2009.

EXECUTIVE SUMMARY:

Benicia's communitywide greenhouse gas emissions in 2000 were about four million metric tonnes, of which just .2% was attributable to the City's municipal operations. While the community emissions grew to 4.2 million tonnes in 2005, the City's declined almost 20%, to 7400 tonnes. Under a business as usual scenario, the community's emissions in 2010 will increase by 9% from 2005 (to 4.6 million tonnes), and in 2020, the forecasted increase is 21% (to 5.1 million tonnes). To prevent this growth, the recommended reduction targets are:

- 25% below 2000 level in 2010 for City Operations;
- Maintain 2005 level in 2010 for the Community;
- 33% below 2000 level in 2020 for City Operations;
- 10% below 2000 levels by 2020 for the Community.

BUDGET INFORMATION:

There is no budget impact at this stage.

DISCUSSION:

The State of California has placed itself in the forefront of the issue of greenhouse gas (GHG) reduction and climate change prevention, and as a result, awareness has been raised. State Assembly Bill 32 (AB 32) is the omnibus legislation from 2006 establishing formal reduction targets for the state, setting the stage for changing the way California does "business as usual".

“Reducing our carbon footprint” is one of the City’s 2007-09 Strategic Plan goals. In 2007, Benicia adopted a resolution to act on climate protection and officially joined ICLEI’s Cities for Climate Protection Campaign. The City received a Climate Change Protection Grant award for 2008-09 from the Bay Area Air Quality Management District (BAAQMD) to fund an emissions inventory, among other activities. Benicia’s emissions inventory was conducted by City staff using Clean Air Climate Protection (CACP) software provided by ICLEI.

The attached full report details the inventory, forecasts, and reduction targets. ICLEI’s “Five Milestones” process (attached), which Benicia is following, states that communities should (in this order): do the emissions inventory, set the reduction targets, develop a Climate Action Plan, implement the plan’s measures, and finally, monitor results. This approval completes the first and second Milestones and sets the stage for the third to begin.

City Inventory

The inventory examined the City’s GHG impact in the areas of vehicle fleet, waste, buildings, streetlights, employee commute, water/wastewater systems, and other. The “Other” category covers permitted emissions through BAAQMD for certain operations at the Corporation Yard, etc. In 2000, the City’s total emissions were 9209 carbon dioxide equivalent metric tonnes (CO2EMT), dropping almost 20% to 7423 CO2EMT in 2005, likely due to energy-efficient equipment upgrades.

Community Inventory

The community emissions inventory surveyed the sectors of Transportation, Waste, Residential, and Commercial/Industrial/Other activities. (The City data is contained within some of these different sectors within Community Activities, and is not a mutually exclusive data set.) The community inventory showed a total of 4,022,702 CO2EMT in 2000, rising to 4,247,875 in 2005 (a 5.6% increase). Most of the emissions were in the Commercial/Industrial/Other (business) sector, at 95% of total emissions in 2005.

Reduction Targets

In setting the recommended reduction targets, the City is primarily guided by existing agreements (Kyoto Protocol/U.S. Mayors Climate Protection Agreement¹) and the state target (AB 32). These two guidelines applied to the unique makeup of Benicia’s emissions profile lead to a community target in line with AB 32, and a City target exceeding both Kyoto and AB 32. Kyoto recommends deeper reductions than AB 32. Kyoto calls for a 7% reduction in 1990 levels by 2012, and AB 32 calls for a reduction to 1990 levels by 2020. The guidelines are applied, translating the targets into tonnes of emissions, in the following chart.

¹ Mayor Patterson signed the U.S. Mayors Climate Protection Agreement, which recommends cities meet or beat the Kyoto Protocol, in April 2008.

Benicia Emissions Reduction Scenarios Compared to Kyoto Protocol and AB 32

	Business As Usual (tonnes)	Under Kyoto ² (tonnes)	Under AB 32 (tonnes)	Recommendation (tonnes)	Reason
City 2010	8300	7700 (by 2012)	9200	6900	Can be deeper because 2005 level dropped from 2000, already beating both Kyoto and AB 32
City 2020	9400	7700 (by 2012)	8300	6100	Can be deeper because 2005 level dropped from 2000, already beating both Kyoto and AB 32
Community 2010	4,600,000	3,348,000 (by 2012)	4,000,000	4,200,000	Can't be deeper so soon without more state regulation of key industries
Community 2020	5,100,000	3,348,000 (by 2012)	3,600,000	3,600,000	State regulation will have ramped up sufficiently for key industries to meet AB 32

Since the City's emissions dropped 20% between 2000 and 2005, its proposed reduction targets are able to go deeper than both Kyoto and AB 32, to 25% below 2000 levels by 2010, and 33% reduction by 2020. The recommended targets place the City in a leadership role for the community.

The community target is less deep, due to the lack of regulatory control at the local level over the majority of the community's emissions sources. The proposed community goal is to maintain the 2005 level in 2010, and drop 10% below 2000 levels by 2020. This is intended to approximate the State's AB 32 target for itself of achieving 1990 levels by 2020. This is achievable because the refinery, source of much of the community emissions, is going to be required by the State to meet AB 32 requirements. However, the AB 32 Scoping Plan, which will lay out how that will occur, has yet to be finalized, so meeting a deeper goal as early as 2010 is unlikely.

Attachments:

- Resolution
- ICLEI's Five Milestones for Climate Protection
- Greenhouse Gas Emissions Inventory Report, September 2008

² For the purposes of applying Kyoto and AB 32 standards, 1990 emissions levels are assumed to be 10% below 2000 levels, based on state-level analysis. See: State of California Air Resources Board, "California Climate Change Scoping Plan" (June 2008 draft), p. 8.

ATTACHMENTS

RESOLUTION NO. 08-

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BENICIA
ACCEPTING THE EMISSIONS INVENTORY REPORT AND APPROVING
GREENHOUSE GAS REDUCTION TARGETS**

WHEREAS, in 2006, the State of California adopted Assembly Bill 32, the global warming omnibus bill, establishing climate change prevention as a priority and setting a statewide target of reducing emissions to 1990 levels by 2020; and

WHEREAS, in November 2007, the City Council authorized membership in ICLEI-Local Governments for Sustainability to indicate the City's commitment to climate change prevention; and

WHEREAS, the first two Milestones in ICLEI's Five Milestones process directs members to complete an emissions inventory and then adopt greenhouse gas reduction targets; and

WHEREAS, an emissions inventory report was completed in September 2008 covering both City Operations and the Community overall; and

WHEREAS, the inventory's findings suggest the following reduction targets, which meet or exceed those established by State Assembly Bill 32 for 2020:

- 25% below 2000 level in 2010 for City Operations;
- Maintain 2005 level in 2010 for the Community;
- 33% below 2000 level in 2020 for City Operations;
- 10% below 2000 level by 2020 for the Community; and

WHEREAS, these targets provide a preliminary framework for the upcoming Climate Action Plan process but can and should be re-evaluated following the completion of the plan to verify their appropriateness for Benicia;

NOW, THEREFORE, BE IT RESOLVED, that the City Council of the City of Benicia accepts the emissions inventory report.

BE IT FURTHER RESOLVED, that the City Council of the City of Benicia approves the above-stated reduction targets as a sign of its commitment to climate change prevention.

On motion of Council Member _____, seconded by Council Member _____, the above Resolution was introduced and passed by the City Council of the City of Benicia at a regular meeting of said Council held on the 16th day of September, 2008 and adopted by the following vote:

Ayes: Council Members

Noes:

Absent:

Elizabeth Patterson, Mayor

Attest:

Lisa Wolfe, City Clerk

ICLEI's Five Milestones for Climate Protection

The Five Milestones provide a simple, standardized means of calculating greenhouse gas emissions, of establishing targets to lower emissions, of reducing greenhouse gas emissions and of monitoring, measuring and reporting performance.

The methodology underlying the Five Milestones provides a simple, standardized means of calculating greenhouse gas emissions, of establishing targets to lower emissions, of reducing greenhouse gas emissions and of monitoring, measuring and reporting performance. ICLEI has developed a software tool, Clean Air Climate Protection (CACP), that helps cities comply with the methodology.

ICLEI's Five Milestone Methodology for setting and meeting your climate mitigation goals:

1. Conduct a baseline emissions inventory and forecast

The city first calculates greenhouse gas emissions for a base year (e.g., 2000) and for a forecast year (e.g., 2015). The calculations capture emissions levels from all municipal operations (e.g., city owned and/or operated buildings, streetlights, transit systems, wastewater treatment facilities) and from all community-related activities (e.g., residential and commercial buildings, motor vehicles, waste streams, industry). This inventory and forecast provide a benchmark for planning and monitoring progress.

2. Adopt an emissions reduction target for the forecast year

The city passes a resolution establishing an emission reduction target for the city. The target is essential. It both fosters political will and creates a framework that guides the planning and implementation of measures.

3. Develop a Local Climate Action Plan

The local government then develops a Local Climate Action Plan, ideally with robust public input from all stakeholders. The plan details the policies and measures that the local government will take to reduce greenhouse gas emissions and achieve its emissions reduction target. Most plans include a timeline, a description of financing mechanisms, and an assignment of responsibility to departments and staff. In addition to direct greenhouse gas reduction measures, most plans also incorporate public awareness and education efforts.

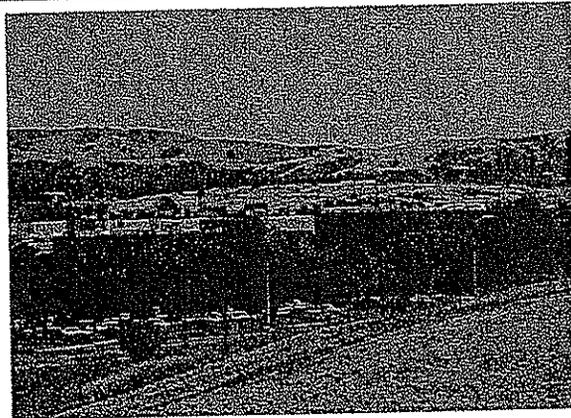
4. Implement policies and measures

The city implements the policies and measures contained in their Local Climate Action Plan. Typical policies and measures include energy efficiency improvements to municipal buildings and water treatment facilities, streetlight retrofits, public transit improvements, installation of renewable power applications, and methane recovery from waste management.

5. Monitor and verify results

Monitoring and verifying progress on the implementation of measures to reduce or avoid greenhouse gas emissions is an ongoing process. Monitoring begins once measures are implemented and continues for the life of the measures, providing important feedback that can be used to improve the measures over time. ICLEI's software provides a uniform methodology for cities to report on measures.

City of Benicia Greenhouse Gas Emissions Inventory Report



Mayor Elizabeth Patterson
Vice Mayor Tom Campbell
Council Member Mark Hughes
Council Member Mike Ioakimedes
Council Member Alan Schwartzman

City Manager Jim Erickson

September 2008



Funded by the Bay Area Air Quality Management District's Climate Protection Grant Program

City of Benicia Emissions Inventory Report

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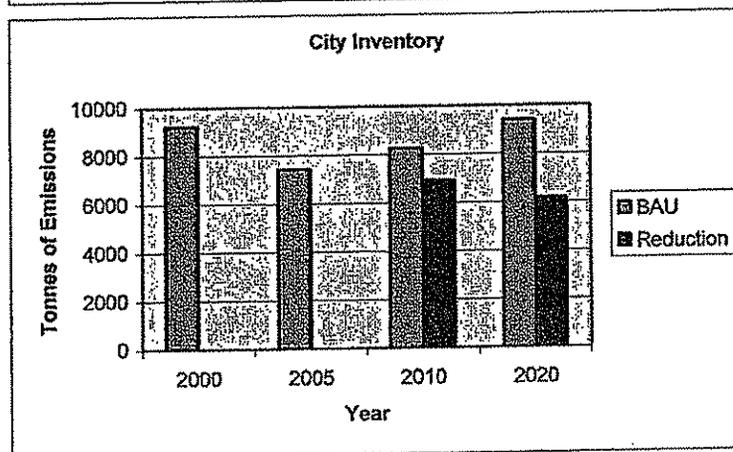
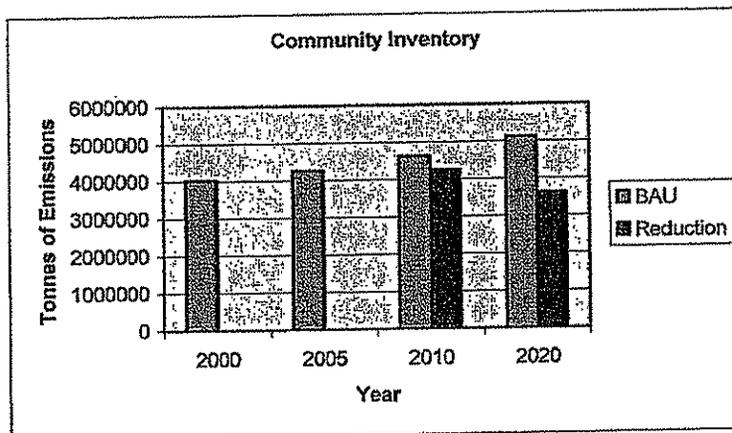
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Executive Summary

Benicia's communitywide greenhouse gas emissions total in 2000, the baseline year, was about four million metric tonnes of carbon dioxide-equivalent emissions. Of that, only .23% was attributable to the City's own municipal operations, which totaled about 9200 tonnes¹. In 2005, the City's emissions dropped almost 20% to about 7400 tonnes, while the community emissions increased to about 4.2 million tonnes. These numbers reflect an extremely thorough approach to calculating emissions, including many that other cities our size have omitted in their inventories.

Under a forecasted business as usual scenario, the Community's emissions in 2010 will increase by 9% from 2005 (to 4.6 million tonnes), and in 2020, the forecasted increase is 21% (to 5.1 million tonnes). For the City, business as usual (BAU) would create about 8300 tonnes of emissions in 2010 and 9400 tonnes in 2020. However, the City is proactively designating reduction targets that meet or exceed the State of California's goals for itself:

- 25% below 2000 level in 2010 for City Operations;
- Maintain 2005 level in 2010 for the Community;
- 33% below 2000 level in 2020 for City Operations;
- 10% below 2000 level by 2020 for the Community.



¹ "Tonnes" are metric tons, the measurement of greenhouse gas emissions in the software program used by Benicia.

Introduction to Benicia, the Inventory, and This Report

From its creation as a ranching land grant, through iterations as a military compound, waterfront tanneries and canneries, a factory town, and a suburban hamlet – the community of Benicia has evolved since its founding over 150 years ago, and will certainly continue to change. Today’s seven million square foot industrial park, anchored by a petroleum refinery and a deep-water port, hosts a number of corporate headquarters, while the charming downtown offers boutiques, salons, and dining where rough-and-tumble saloons once stood. It’s also a town with a preponderance of middle-income and high-income households, very low crime by Bay Area standards, and a strong affinity for the “small town” lifestyle, with big parades, festivals, and neighborly greetings in the street.

Also part of the Benicia lifestyle, as everywhere else in the industrialized world – high per capita levels of greenhouse gas emissions. The State of California has placed itself in the forefront of the issue of greenhouse gas (GHG) reduction and climate change prevention, and as a result, awareness has been raised. California is the fifteenth largest emitter of greenhouse gases on the planet, representing about 2% of worldwide emissions.² State Assembly Bill 32 (AB 32) is the omnibus legislation from 2006 establishing formal reduction targets for the state, setting the stage for changing the way California does business as usual.

Locally, awareness is also on the rise. “Reducing our carbon footprint” is one of the City’s 2007-09 Strategic Plan goals. In 2007, Benicia adopted a resolution to act on climate protection and officially joined ICLEI’s Cities for Climate Protection Campaign. (ICLEI-Local Governments for Sustainability is an international climate change prevention non-profit organization.) The City was fortunate to receive a Climate Change Protection Grant award for 2008-09 from the Bay Area Air Quality Management District (BAAQMD) to fund: 1) an emissions inventory, 2) a subsequent Climate Action Plan, and 3) concurrent staff training in climate change prevention and greenhouse gas reduction.

Benicia’s emissions inventory was conducted by City staff using the Clean Air Climate Protection (CACP) software provided by ICLEI. There are actually two inventories, one for City Operations and one for the Community; both survey a range of activity sectors. The inventory data itself is in a database format accessible using the software.

AB 32, CACP, and this inventory report address the main greenhouse gas, carbon dioxide (CO₂), along with methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs), all expressed as CO₂-equivalent (CO₂E) metric tonnes (CO₂EMT) in the inventory and report. “A metric tonne is equivalent to 2,205 pounds and one pound of CO₂ can fill

The inventory calculations are based on estimates from a variety of sources (around 20 different data sources were researched although not all were ultimately used), thus it must be emphasized that the figures are approximations based on the best data available during spring and summer 2008, when the inventory was researched. In most cases, the figures are best estimates and should not be read as exact.

² State of California Air Resources Board, “California Climate Change Scoping Plan” (June 2008 draft), p. 6.

about 120 party balloons. This means that one CO₂EMT could fill over 264,500 party balloons.”³

This report covers Benicia’s emissions in a narrative format, providing the total emissions for baseline year 2000 (the earliest year for which enough reliable data was available) and interim year 2005. The purpose of inventorying two separate years is to identify trends over the five-year period.

Reduction Targets

The inventory then projects emissions under “business-as-usual” (BAU) scenarios for interim target year 2010 and target year 2020. Following ICLEI’s “Five Milestones” process⁴, the inventory’s estimates and forecasts lead to reduction goals for both the City and the Community, which the subsequent Climate Action Plan will break down into implementation measures. The recommended reduction targets are:

- 25% below 2000 level in 2010 for City Operations;
- Maintain 2005 level in 2010 for the Community;
- 33% below 2000 level in 2020 for City Operations;
- 10% below 2000 levels by 2020 for the Community (this approximates 1990 levels).

These targets are inspired by a constellation of earlier targets set by pacesetting agreements, including: a 7% reduction in 1990 levels by 2012 (Kyoto Protocol), 2000 levels by 2010 (AB 32), 1990 levels by 2020 (AB 32), and an 80% reduction in 1990 levels by 2050 (California Executive Order S-3-05). **Benicia’s reduction targets are intended to meet the AB 32 2020 goal for the Community and exceed it for City Operations.**

The recommended targets don’t go beyond 2020 because “10-15 years is about the longest timeframe over which defensible assumptions can be made about the impact on future emissions of things like technological change, future growth in population and housing, and future local, state, and federal legislation.”⁵ However, the targets may be re-evaluated following the completion of the Climate Action Plan in Spring 2009, to verify their feasibility.

Further discussion of the targets is contained in the City and Community sections.

³ City of Fort Bragg, California, “Greenhouse Gas Emissions Inventory” (August 2007), p. 7.

⁴ See <http://www.iclei-usa.org/action-center/getting-started/iclei2019s-five-milestones-for-climate-protection>.

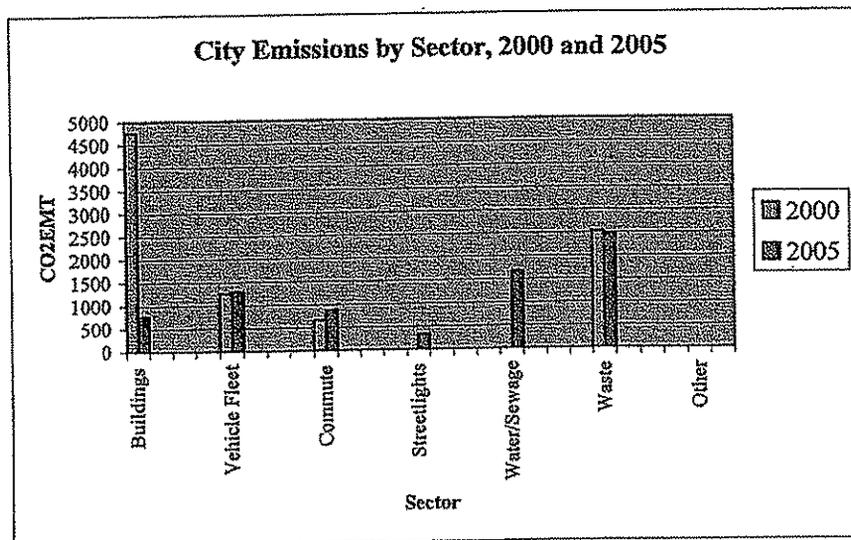
⁵ City of Berkeley, California, “Climate Action Plan” (January 2008 draft), p. 18.

City Government Operations Inventory and Analysis

Benicia is a full-service City with over 200 full-time employees. As home to a wastewater treatment plant and a water treatment plant, with the full range of City departments, many parks and facilities, plus an intercity bus system, the City's own emissions were thoroughly surveyed for this inventory. The inventory examined the City's GHG impact in the sectors of vehicle fleet, waste, buildings, streetlights, employee commute, water/wastewater systems, and other. The City's total emissions were 9229 CO₂EMT in 2000, dropping almost 20% to 7423 CO₂EMT in 2005.

Of the surveyed areas, the greatest GHG sectors were Buildings in 2000, responsible for 52% of the City's emissions, and Waste (solely wastewater treatment plant sludge) in 2005, at 33%.⁶

Because of difficulty in obtaining the data, the City inventory does not include many indirect emissions resulting from municipal activities (such as employee and contractor travel on City business outside of City limits, employee and contractor travel within City limits in private vehicles, and supply chains of purchased products, among other emission-generating activities).



Buildings

For 2000, this sector includes aggregated gas and electric usage from all the City-owned buildings and facilities, which included a few residential properties, and some miscellaneous parks facility-related items like irrigation and ballfield lights. One City department, Parks and Community Services Department provides building maintenance services for most civic buildings as well as maintains the parks and other recreational facilities.

Data available for 2005 was received in a different, non-aggregated format; as a result, certain facilities could be attributed to their appropriate sector in CACP, most notably, streetlights and the water and wastewater treatment plants. The two plants use the most energy of all the City facilities.

⁶ Throughout this report, all estimates of GHG emissions for 2000 and 2005 for the City and Community inventories, and forecasts for the City in 2010 and 2020, are derived from CACP outputs generated by City staff. Forecast estimates for the Community in 2010 and 2020 are derived from a separate set of formulas provided by ICLEI as applied by City staff. See Appendix B for more information on the software and calculations.

However, even accounting for that change in classifications between 2000 and 2005, this sector realized a more significant decrease in emissions, which staff attributes to older equipment like boilers, air conditioning units, and irrigation systems being replaced by newer, more energy-efficient equipment. With the classification changes and efficiency improvements, Buildings' share of the total City emissions dropped to 10% of the total City emissions in 2005, down from 52% in 2000.

Employee Commute

Employees' home cities were used to estimate commute mileage. A six-mile round trip commute was assumed for the many employees who live within Benicia. Commutes for both full-time employees, at an estimated five round trips per week, and part-time employees, at an estimated three round trips per week, were calculated for 47 weeks per year (accounting for holidays and leave). This number increased 33% between 2000 (658 tonnes) and 2005 (876 tonnes); the number of employees also increased. The commute was 7% of the City emissions total in 2000 and 12% in 2005.

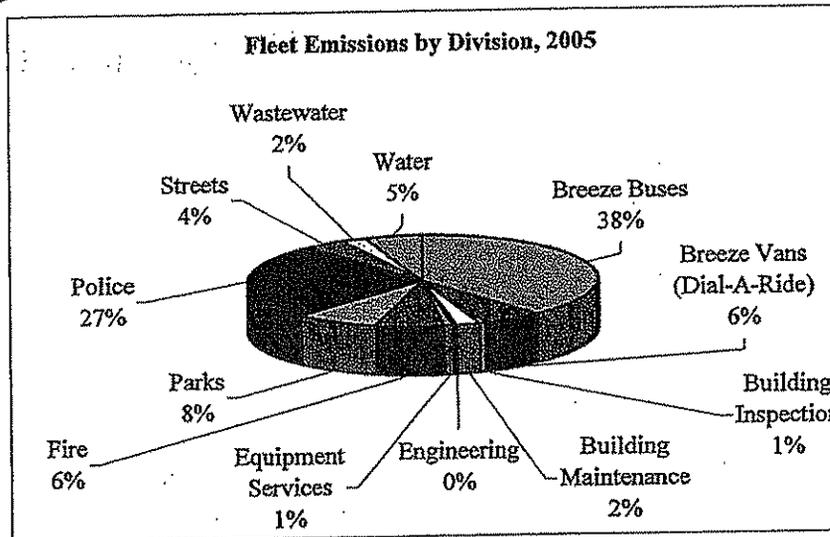
Streetlights

Streetlight electricity usage is aggregated under Buildings for 2000, but available as a stand-alone total for 2005. Streetlights were 4% of the government emissions total in 2005.

Vehicle Fleet

Emissions from this sector increased slightly from 1258 CO₂EMT in 2000 (14% of the Citywide total) to 1298 CO₂EMT (18% of the total) in 2005. Data was available by department, and included the City's bus system, Benicia Breeze, which has intercity routes.

The Breeze was the largest contributor in this sector, with the buses and vans comprising almost half the fleet's emissions in 2005. Police vehicles were the next highest emitters, followed by the other divisions at lower percentages.



Waste

For waste, only wastewater sludge (sludge, a.k.a. biosolids, is residual material left over after processing) is included in Benicia's inventory, because municipal solid waste data was not available as a stand-alone account. The sludge made Waste the largest contributor in the government inventory for 2005 at 33%, although the emissions in this sector decreased from 2525 CO₂EMT in 2000 to 2483 CO₂EMT in 2005.

Water/Sewage

The water and wastewater treatment plants, along with their lift stations and pumps (including the few located outside City limits), were aggregated under Buildings for 2000, but available as a stand-alone category for 2005. As a result, Water/Sewage was 23% of the government emissions total in 2005.

Other

This category reflects 1 tonne of GHG-generating activity (paint shop, generators, etc.) by various departments in the regular course of business under the terms of permits from BAAQMD in 2005. The same figure was also used for 2000, with the assumption that there were no major changes in the City operations that generated these emissions. This sector had a negligible GHG impact, just above 0% of the City emissions.

Benicia in Context

The City's impact overall in 2000 was 53 CO₂EMT per full-time employee. By 2005, this had fallen to 34 tonnes per employee. Of communities in our size range (30,000 or less population) in Northern California that have completed emissions inventories (a small pool, none of which are equivalent to Benicia in both population and service level), this falls on the high end of the spectrum.

The emissions total illustrates that as a truly full-service city, Benicia's emissions reflect the range of services provided to the community in a way that other small cities do not. For example, in 2005, Benicia's bus system alone generated more CO₂EMT than did Albany's entire vehicle fleet.

Given that the inventories were conducted in various years, estimates are used by necessity in many cases, and differences in interpretation of data are unavoidable, these are not perfect comparisons. Instead, they are presented for context and to show the wide scope of Benicia's inventory.

Municipal Emissions Comparison Among Selected California Cities Under 30,000 Population

City	Year	Pop.	Employees (full time)	Municipal Emissions (CO2EMT)	CO2EMT per Employee	Notes
Benicia	2000	26,895	173	9229	53	Incl. employee commute, two plants, City bus system; did not include gov't solid waste
	2005	26,459	217	7423	34	
Albany ⁷	2004	16,877	95	966	10	Only fleet, buildings, and waste; did not incl. employee commute, streetlights; no plants, no transit, etc.
Arcata ⁸	2000	17,558	118	2064	17	Did not incl. employee commute; no transit; incl. small sewage plant and offsets from managed forest
El Cerrito ⁹	2005	25,000	100	2300	23	Incl. employee commute (largest sector); no transit or plants
Fort Bragg ¹⁰	FY 02-3	6890	67	1059	16	Incl. employee commute; no transit, smaller plants
	FY 05-6	6877	67	1181	18	
Menlo Park ¹¹	2005	30,000	240	2183	9	Did not incl. employee commute or Fire Dept. (contract); no plants or transit

Benicia's bus system, water treatment plant, and wastewater treatment plant are unusual features for a small city. If those three elements were removed from the 2005 total, the City of Benicia would have generated only 2699 CO2EMT, or 12 tonnes per employee, ranking it at the low end in the basket of comparison cities.

Again, due to the various methods by which inventories are prepared, these should not be interpreted as perfectly controlled comparisons. For example, one obvious variable is in the accounting of employee commutes. For those communities that are willing and able to document it, employee commute is clearly a significant source of GHG emissions. Fort Bragg even conducted an employee commute survey as part of its inventory, which revealed that while the average commute distance was only three miles, 84% of employees drove to work.

City Efforts Underway

Since 2000 and particularly in the years since an energy audit was conducted in 2003, City staff has started implementing facility improvements designed to improve performance and energy efficiency.

⁷ City of Albany, California "Baseline Greenhouse Gas Emissions Inventory Report" (December 2006). See also e-mail from Aaron Walker, City of Albany, to Teri Davena, August 25, 2008 (on file).

⁸ City of Arcata, California "Community Greenhouse Gas Inventory and Forecast" (August 2002).

⁹ E-mails from Garth Schultz, City of El Cerrito, to Amalia Lorentz, August 7, 2008 (on file).

¹⁰ City of Fort Bragg, California "Greenhouse Gas Emissions Inventory" (August 2007).

¹¹ City of Menlo Park, California "Greenhouse Gas Emissions Analysis" (rev. February 2008). See also message from Glen Cramer, City of Menlo Park, to Teri Davena, August 27, 2008 (on file).

A lighting retrofit was completed in early 2008, encompassing almost all the main City buildings. Motion sensors are being installed on an ongoing basis. Staff has replaced about 75% of old air conditioning units on failure with high efficiency units. The Parks and Community Services Department (PCS), which handles building maintenance, has been installing vending misers on the vending machines in City buildings. At James Lemos Pool, staff replaced two inefficient boilers, and replaced all the pool blankets. In the parks, PCS installed solar irrigation clocks; in restrooms, more environmentally friendly paper products are being stocked.

The Public Works Department has improved its facilities' energy performance in a variety of arenas. They include pumps and motors (switching to 70% more efficient variable frequency drives and solid state soft starts, replacing less efficient motors, using gravity flow at the Wastewater Treatment Plant instead of pumps at low tide, and adjusting pumping schedules to non-peak hours when possible), lighting (switched to all fluorescent lighting), traffic signals (switched to 20-watt light emitting diodes compared to 100-watt conventional), and Wastewater Treatment Plant operations. Those changes include taking one aeration basin out of service when possible, using methane to operate the boilers as a means of cogeneration, and using the 1,000-kilowatt (kW) natural gas generator to get off the grid when needed.

The California Air Resources Board's "Fleet Rule" requires the City to reduce diesel particulate matter emissions from fleet vehicles beginning in 2007. The Fleet Rule applies to on-road, heavy-duty, diesel-fueled vehicles, like dump trucks and utility service trucks, although fire trucks and low usage vehicles are exempt from the regulations. The vehicles must have their engines re-powered with compliant engines, be retrofitted with best available emission control technology, be replaced with 2007 (or later) vehicle models, or be retired from the fleet and sold or scrapped out of state. The first deadline was December 31, 2007 when at least two (or 20%) of our diesel fleet had to be in compliance, which was achieved. The FY 2007-2009 budget included \$32,000 for retrofitting two vehicles, a patch truck and a bucket truck, which both got emissions controls. Public Works staff estimates an average of \$16,800 per vehicle retrofit. The entire fleet must be compliant by December 31, 2011.

Public Works is developing a fuel efficiency and emissions plan for gasoline vehicles (to be completed in late 2008). In the meantime as opportunity arises, fuel-efficient vehicles such as gasoline-electric hybrids are purchased when non-police sedans are replaced. Two additional vehicles were retired from the diesel fleet and replaced by high-efficiency gasoline trucks this budget cycle.

These types of changes undoubtedly contributed to the City's almost 20% drop in emissions between 2000 and 2005. The City formed an interdepartmental Green Team that began meeting in March 2008 to provide support for further sustainable practices. Team members also have access to training funds through the BAAQMD grant for climate change prevention-related workshops in 2008-09.

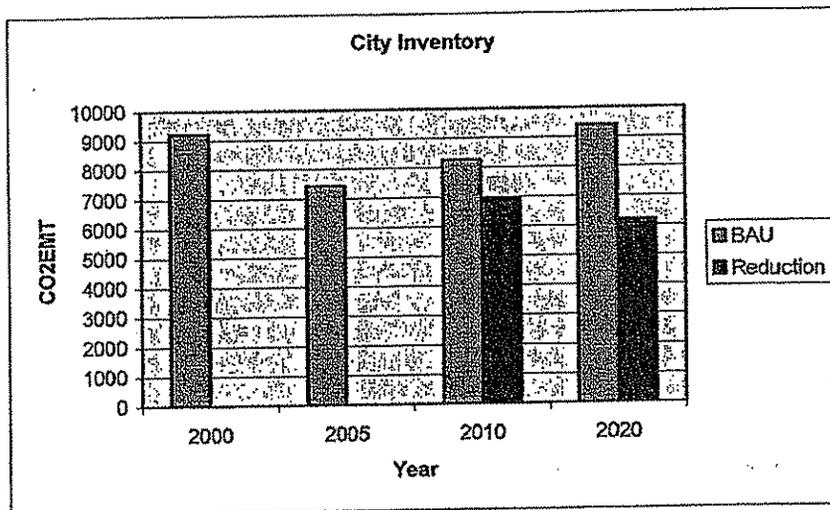
Forecasts and Goals for the City Organization

The forecasts for the City's emissions in 2010 and 2020 used the 2005 emissions estimates as a starting point. Under the BAU 2010 scenario, the City emissions will increase by 11% from

2005 to 8255 CO₂E_{MT}. From there, it would rise by another 14% in 2020, to 9402 CO₂E_{MT}. The forecast incorporates adding Mills Community Center as a heavily-used City facility. Otherwise, the forecast assumes most 2000-05 trends remain steady, with one exception. Buildings' downward trend was not assumed to continue. Because some "low-hanging fruit" was already picked in the area of energy efficiency by 2005, this sector had a modest increase applied.

Given all these improvements completed or underway, as well as the recent formation of the Green Team committed to developing new initiatives, a reasonably assertive target for the short-term is to **decrease 25% from the City's 2000 emissions level in 2010**. This number is based on the fact that, despite having already achieved a 20% reduction from the 2000 level in 2005, the City should strive for a greater impact. This target is a 16% reduction from BAU, and a more aggressive goal than that proposed for the Community sector (as the next section will detail). However, it is achievable if the organization maintains a commitment to change in normal operations, beyond the "low-hanging fruit", to prioritize greenhouse gas reductions. It is appropriate for the City to lead the effort, and exercise all possible ways to make change in everything under its control.

The proposed 2020 reduction target for the City is to reduce emissions by 33% from the 2000 level, which would also be about a 33% reduction from 2020's forecasted BAU emissions. (Although the City decreased emissions between 2000 and 2005, the BAU forecast shows emissions rising back to the 2000 level by 2020.) According to the State of California's calculations of its own emissions, a 10% decrease in emissions from 2000 would roughly approximate 1990 levels¹², which is the AB 32 goal. Thus this target exceeds AB 32's target reduction. Meeting this goal is also estimated to exceed the target reduction proposed by the U.S. Mayors Climate Protection Agreement, which the City's Mayor signed in April 2008¹³.



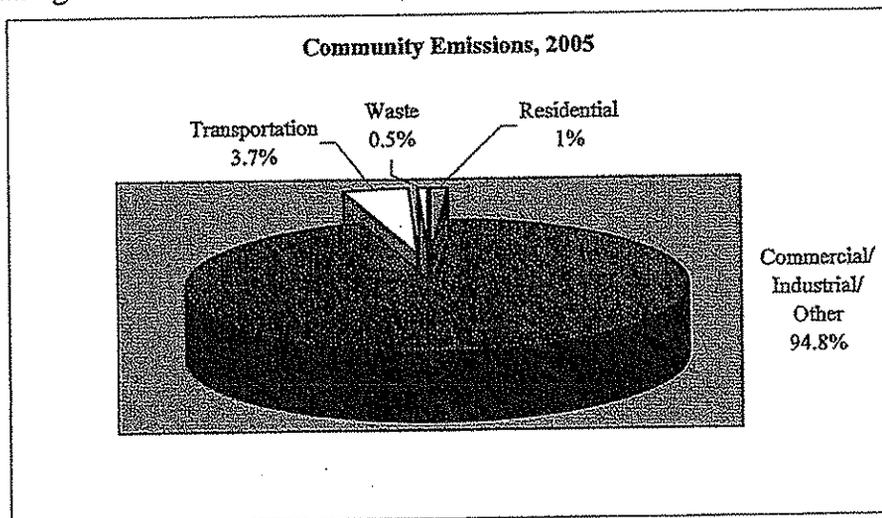
¹² The State estimated its 1990 emissions as almost 10% less than 2002-04's estimated levels. State of California Air Resources Board, "California Climate Change Scoping Plan" (June 2008 draft), p. 8.

¹³ That target reduction was a 7% decrease in 1990 levels by 2012, the Kyoto Protocol standard.

Community Activities Inventory and Analysis

The Community emissions inventory surveyed the sectors of Transportation, Waste, Residential, and Commercial/Industrial/Other¹⁴ activities. The Community inventory showed a total of 4,022,702 CO₂EMT in 2000, rising to 4,247,875 in 2005, a 5.6% increase in emissions.

The greatest GHG sector in both years was Commercial/Industrial/Other (businesses), at more



than 94%, although in absolute numbers, Transportation, Residential, and Waste all slightly decreased in 2005. The City Operations data is contained within these different sectors within the Community estimates, and is not a mutually exclusive data set.

What is and isn't Included in the Community Analysis

Data availability limited to a small extent the breadth of the Community Analysis, particularly relating to individual businesses and non-vehicle transportation.

Benicia has hundreds of industrial businesses, engaging in a variety of activities from pipe organ manufacturing to nuclear power plant inspection. Surveying them all individually to determine what emissions they may generate was not possible within the scope of this project. Data provided by the BAAQMD identified CO₂E emissions from Benicia sources with an air district permit. These emissions are included in the Commercial/Industrial/Other sector. However, emissions resulting from business activities without a permit (because one is not required or not obtained) are not.

Supplemental data estimates received from two of the largest industrial businesses holding air district permits, Valero Refining Company and Amports, which operates the Port of Benicia, are included in the aggregated inventory under Commercial/Industrial/Other. However, there were data limitations for the information on each operation. For Valero, data was unavailable on the indirect emissions related to its PG&E usage. For the Port, which has a variety of activities on its property on land and sea, fuel type and use information was not available for ships, tugs, and

¹⁴ The format of the data received in these sectors led to the decision to join them for reporting purposes, although they are separate categories in CACP. PG&E supplied aggregate data for Commercial/Industrial that was not possible to separate, while the Other data was almost all related to self-reported or air district-permitted emissions by various businesses.

barges, but was for the majority of its trucks and cars. Without fuel information, it isn't possible to accurately determine the amount of GHGs produced. Cargo handling and maintenance equipment was also not included for the Port.

Rail transportation isn't included in the inventory, although given the main line and many spurs in Benicia, there are undoubtedly rail-related emissions in the community. Marine transportation emissions, from both small craft at the Benicia Marina and large ships at the Port of Benicia (as noted above), are excluded. Emissions from activities very near but not within the City limits are excluded (reserve fleet, Syar facility, etc.). Air transportation overhead is not included. Any emissions resulting from underground activities, like pipelines through the City, are not included. Activities by citizens beyond City limits is not included, although the impact of driving the community's waste to landfills outside the City limits is included for 2005 (for which year the data was available).

One important inclusion to note is that emissions from power production sources, wherever they are located, are included where power usage data was provided by PG&E.

Business Emissions (Commercial/Industrial/Other)

This sector measures business and government's emissions from natural gas and electricity use, and from industrial and commercial processes generating CO₂E emissions within the purview of BAAQMD.

Given Benicia's large industrial park, it is perhaps not surprising that business-generated emissions are by far the greatest sector in the inventory. Businesses, including the Valero Refinery, generated 3,785,114 CO₂EMT in 2000, increasing 6% to 4,026,460 CO₂EMT in 2005. In both years, this was about 94-95% of the Community total emissions.

Residential Emissions

Although the business sector is the largest contributor to communitywide emissions, the residential sector (emissions from home energy use) played a small role too, accounting for about 1% of the total Community emissions. This sector is comprised of emissions from residential gas and electric use.

It dropped 11% to 41,071 CO₂EMT in 2005, from 45,984 CO₂EMT in 2000, probably due to the rise in energy-efficient home appliances.

Transportation

Transportation was responsible for 167,954 CO₂EMT in 2000 and 158,346 CO₂EMT in 2005. This data includes estimates of all trips on public roadways within the City, including I-680, I-780, City streets, and roads within the Benicia State Recreation Area, plus vehicle trips on Port of Benicia property and Allied Waste Services' mileage associated with residential and commercial garbage and recycling (the latter for 2005 only). The emissions from this sector were about 4% of the Community total in both years. The slight drop of 6% between 2000 and

2005 is mainly due to Caltrans reporting a decrease in freeway vehicle miles traveled in Solano County.¹⁵

Waste

Waste was responsible for 23,650 CO₂EMT in 2000, falling to 21,998 CO₂EMT in 2005. This data includes all Benicia's residential and commercial/industrial waste picked up and hauled by franchise holder Allied Waste Services, the City's refuse hauler in both years, as well as an estimate of the Benicia Unified School District's waste. The City's own waste, as well as the wastewater treatment plant sludge, are included in this amount. Composted green waste is an offset against these waste subtotals. The 8% drop could be related to increases in both recycling, which removes tonnage from the waste stream, and green waste.

Waste comprised about .5% of the Community total emissions in 2005, slightly down from almost .6% in 2000.

Forecasts and Goals for the Community

The community is unquestionably a larger challenge than the City in terms of making reductions. The City is directed by one body, the City Council, who ultimately has authority over all its actions, although they only generated .23% of the community's total emissions in 2000 and even less in 2005. Conversely, the community's other 99%+ of emissions are generated by almost 28,000 individuals and about a thousand businesses, going about their daily activities which are regulated by a variety of sources. From making a profit to graduating from high school, community goals are diverse – and while not necessarily incompatible with climate change prevention, not oriented to that either. Besides leading by example, the City has an obligation to regulate GHG reductions to the extent possible, and provide encouragement for additional reductions. The forthcoming Climate Action Plan will delve into those reductions strategies.

Under a BAU scenario, the Community emissions in 2010 will increase by 9% from 2005, to 4,617,756 CO₂EMT. In 2020, the forecasted increase from 2005 is 21%, to 5,120,184 CO₂EMT.

The forecast incorporates holding most 2000-05 trends steady, with in some cases available 2006 data used to project forward. The forecast also assumes that the Benicia Business Park project is approved and fully built out by 2020, under current standard building practices – that is, without any green building or special energy-efficient features.

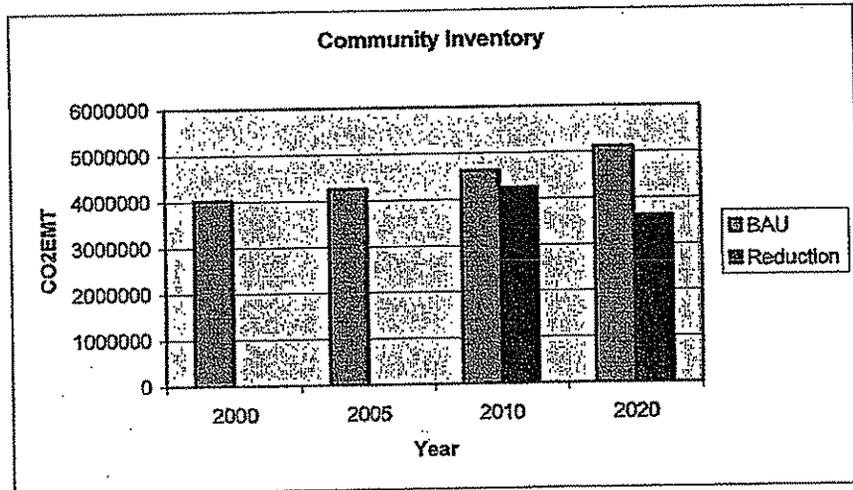
In setting the Community's reduction targets, AB 32's goals are the guiding spirit. The expectation for the interim communitywide target is to **maintain the 2005 emissions level in 2010 - 4,247,875 CO₂EMT**. This is less assertive than the City's goal of decreasing 25% below its 2000 emissions level, because of the lack of local control over most of the business activities

¹⁵ While there were likely more fuel-efficient cars on the road in 2005 than 2000, it was unable to be quantified for the inventory.

that generate emissions, and those are the majority of Benicia's communitywide total. This is also less aggressive than AB 32's 2010 goal of decreasing to the 2000 level.

However, by 2020, AB 32's goal is more achievable. That lack of local control should be offset not only by higher cultural awareness about GHGs among both residents and businesses, but technological solutions for industrial processes should be far more advanced and accessible. Just one example of a new market-driven industrial solution: Within five years, Nippon Oil Corporation will commercialize a solar power system for cargo ships - like those servicing the Port of Benicia - which will cut their CO₂ emissions by 1-2% annually.¹⁶ As a result of that sort of innovation and awareness, it should be possible for the community to reach the same approximate target as AB 32: **10% below 2000 levels in 2020 – 3,620,432 CO₂E_{MT}**.

This goal is within reach because, in the coming decade, there will be change in everybody's BAU practices, thanks to California's aggressive reduction goals. In particular, the State will have imposed further regulations on all refineries, including the Valero Benicia facility, to meet AB 32 requirements – a reduction to 1990 levels by 2020. This by itself has the potential to address much of the Community's reduction target.



To meet that same AB 32 goal, BAAQMD and the California Air Resources Board are already working on requirements for port inventories and marine emissions standards. The State also appears poised to encourage more regional cooperation for vehicle trip reduction and land use planning¹⁷, which should ultimately result in fewer single occupancy vehicles on the freeways and fewer car trips overall. These large-scale policy changes should directly affect local emissions for the better.

Thus, the BAU scenario is somewhat misleading in that the State has already provided direction that there will be required reductions in high GHG-generating businesses, like the largest of those in Benicia's Commercial/Industrial sector. In other words, the BAU scenario is extremely unlikely. However, it is provided to illustrate the need for the emissions-reductions directives, especially on the state level, that are underway or appear to be forthcoming.

¹⁶ *Wired*, "Toyota's Solar Car Carrier", Keith Barry, Sept. 3, 2008. <http://blog.wired.com/cars/2008/09/boatopia-toyota.html>.

¹⁷ Namely through Senate Bill 375, awaiting the Governor's signature as of the time of writing of this report.

Of the five cities in our size range in Northern California that have completed inventories as discussed earlier, only three have adopted reduction goals so far, and each of the three is different in terms of the reduction, the baseline year, and the target year. Their three different reduction goals are 15%, 20%, and 25%. As before, it is not practical to make direct comparisons among communities whose only commonality may be population; this information is provided for context and to illustrate that there are no “right” or “wrong” reduction targets.

**Community Emissions Reduction Targets
Among Selected California Cities Under 30,000 Population**

City	Pop.	Year Target Adopted	Baseline Year	Target Year	Percentage Reduction	Notes
Benicia	26,895	2008 (proposed)	2000	2020	10%	Aligned with AB 32; separate (greater) goal of 33% reduction for City emissions; refinery and port
Albany ¹⁸	16,877	2007	2004	2020	25%	Approval cites recommendation from ICLEI (which conducted Albany’s inventory)
Arcata ¹⁹	17,558	2002	2000	2010	20%	Previously adopted a “7% (reduction in 1990 levels) by ‘07” target
Fort Bragg ²⁰	6877	2007	2006	2015	15%	Separate (greater) goal of 30% reduction for City emissions

¹⁸ City of Albany, California Council Agenda Report and Minutes, Meeting of March 19, 2007.

¹⁹ City of Arcata, California “Community Greenhouse Gas Inventory and Forecast” (August 2002).

²⁰ City of Fort Bragg, http://city.fortbragg.com/pdf/Community_Workshop_Presentation_7-31-2008.pdf.

Action From This Point Forward

The City has already contracted with Cal Poly-San Luis Obispo to develop a Climate Action Plan (CAP) that will recommend implementing measures to meet the reduction targets in the Inventory. Preparation of the CAP is another BAAQMD grant-funded activity. The CAP process is anticipated to begin following the Council's review of this inventory and adoption of the reduction targets. Development of the CAP will be almost like an audit of the reduction targets – if the measures that are supported by the CAP do not align with the reduction targets from the inventory, amending the targets is always an option at that time.

The CAP will be completed by June 2009, and its implementation will proceed quickly thereafter because of funding availability - in addition to the possibility of including funding in the City's 2009-11 budget, an agreement with Valero, which operates the petroleum refinery and asphalt plant in Benicia, will provide up to \$200,000 annually for three years of CAP-related projects.

Meanwhile, the City should plan to conduct an updated inventory in 2011-12 to assess performance for interim year 2010. A thorough five-year inventory is a significant commitment to staff and resources, but is the best way to assess comprehensive progress. Depending on those results, at that time a decision can be made about selecting a new interim year like 2015, thus committing to another interim inventory in 2016-17. This leads up to 2020, the target year of reckoning for California, for which an inventory should be done in 2021-22. The City will need to budget and plan for these inventories, but they are essential to keeping the City and community on track with the reduction targets.

Appendix A. Acknowledgements

Completing the greenhouse gas emissions inventory was a significant project that required a large team effort. The emissions inventory was conducted in-house by the City Manager's Office, led by City Manager Jim Erickson. The project was managed and the report written by Economic Development Manager Amalia Lorentz, researched, shaped, and assisted in every way by Senior Administrative Clerk Kathleen Hart, and supported by Administrative Secretary Teri Davena.

This project was funded from a Climate Protection Grant from the Bay Area Air Quality Management District. Grant program manager Abby Young was helpful throughout the process.

Completing the inventory was greatly assisted by the support of many staff members at ICLEI-Local Governments for Sustainability, especially Ayrin Zahner, Micah Lang, Xico Manarolla, and Jonathan Strunin.

Staff from City departments Public Works, Parks and Community Services, City Manager's Office/Human Resources, Community Development, Fire, and Finance helpfully contributed data and other information to the inventory. Garage Supervisor Bernie LuVisi and IT Manager Bill Guggemos were particularly helpful.

Of the many outside agencies and companies that provided data and assistance to the inventory, Susan Hurl from Allied Waste Services, Jim Triplett from Amports (Port of Benicia), and Chris Howe from Valero were notably generous with information.

Appendix B. Calculations

About the Clean Air and Climate Protection Software

“The Clean Air and Climate Protection (CACP) Software ... [was] developed by the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials (STAPPA/ALAPCO), the International Council for Local Environmental Initiatives (ICLEI), and Torrie Smith Associates...

The Clean Air and Climate Protection (CACP) Software calculates the greenhouse gases and criteria air pollutants produced by energy use and solid waste disposal, and helps you quantify measures designed to reduce these emissions. While the software can help you complete an emissions inventory, you may also enter inventory data from another source directly into the software... The software takes data you provide on energy use and energy use reductions and converts it to emissions using specific emission factors (coefficients) that relate the emissions of a particular pollutant (e.g., carbon dioxide) to the quantity of the fuel used (e.g., kilograms of coal).

For electricity, the emission factors are based on end-use energy consumption, meaning that emissions per kilowatt hour (kWh) are based on kWh consumed, not produced. This way a jurisdiction can account for emissions resulting from its consumption patterns and therefore be in a better position to design effective strategies to alter or reduce these emissions.”

From “Clean Air and Climate Protection (CACP) Software User’s Guide” (June 2003), available through ICLEI. (p. 5)

“The emissions coefficients and methodology employed by the software are consistent with national and international inventory standards established by the Intergovernmental Panel on Climate Change (1996 Revised IPCC Guidelines for the Preparation of National GHG Emissions Inventories), the U.S. Voluntary Greenhouse Gas Reporting Guidelines (EIA form 1605), and, for emissions generated from solid waste, the U.S. EPA’s Waste Reduction Model (WARM).

The CACP software has been and continues to be used by over 200 U.S. cities and counties to quantify the reduction in their greenhouse gas emissions. However, it is worth noting that, although the software provides cities/counties with a sophisticated and useful tool, calculating emissions from energy use with precision is difficult. The model depends upon numerous assumptions, and it is limited by the quantity and quality of available data. With this in mind, it is useful to think of any specific number generated by the model as an approximation, rather than an exact value.”

From the City of Albany, California’s “Baseline Greenhouse Gas Emissions Inventory Report” (December 2006), ICLEI. (p. 6)

About the Community Forecasts for 2010 and 2020

Based on a recommendation from ICLEI staff, the business as usual Community Forecasts for 2010 and 2020 were not generated through CACP directly, but through Excel-based formulas provided by ICLEI, starting from Benicia’s 2005 estimates generated in CACP. A compounded

annual growth rate formula was applied to each sector using inputs on population, household, and job growth from the Association of Bay Area Governments' "Projections 2007" document. (The job growth estimate corresponds with the staff estimate of employment at the Benicia Business Park, assuming full buildout in 2020.) The exception to this calculation method is that, for the purposes of establishing the business as usual forecast, the refinery was assumed to have a 1% annual growth rate in emissions, based on the percentage change between 2005's non-certified estimate and 2006's certified estimate.

Appendix C. Data Collection Notes and Sources

Government 2000

Buildings

This includes all the City's commercial and residential accounts. The Association of Bay Area Governments (ABAG) reported therm use for 2000. KWh is estimate based on the assumption that the ratio of electricity use to gas use remains similar year-to-year. Ratio was taken for the two uses for 2003, 2004, and 2005, averaged and applied to 2000. All PG&E data from detailed reports for Benicia, 2003 and 2005, sent by Lynn Galal, Project Manager, Customer Energy Efficiency Third Party and Partnership Implementation.

Vehicle Fleet

Fleet data diesel totals are from a fuel report for 2000 provided by Bernie LuVisi, Garage Supervisor, Public Works Dept. Earliest available figures for gasoline totals are from 2003 fuel report. These figures are being used for 2000 because there were no significant changes to the fleet between 2000 and 2003 and use of vehicles remained at a constant level. Total gasoline and diesel gallons in fleet are each entered by department under one vehicle type per department. The type chosen is based on the predominant vehicle type for the department group (Bernie LuVisi, Garage Supervisor). Approximately 4176 gallons of diesel was used for off road equipment such as mowers, backhoes, or pressure pumps (Equipment Services, 20 gal.; Streets, 1321 gal.; Parks, 1724 gal.; Wastewater, 493 gal.; Water, 618 gal.) Specific emissions coefficients for each type of equipment were not used. The coefficient for the predominant vehicle type in that department (for instance, light trucks for Parks) was used to estimate GHG emissions.

Employee Commute

Assumptions: All 173 full-time employees drove gasoline vehicles, none carpooled, and each employee drove five round trips per week for 47 weeks. All 89 part-time employees drove gasoline vehicles, none carpooled, and each employee drove three round trips per week for 47 weeks. Employee counts and home cities provided by Kim Imboden, Human Resources.

Waste

City waste data is not available as a stand-alone account, per Fire Chief Gene Gantt (solid waste contract manager); it is included with Community Analysis. Carrie Wenslawski, Management Analyst, Public Works, provided information on sludge from the Water and Wastewater Treatment plants. No methane recovery was done on this waste. All Benicia waste goes to Keller Canyon Landfill, built in 1992. It is the last landfill built in California. Enough methane has now been generated so that Allied Waste can begin methane recovery. Beginning in November 2008 the gas will be recovered and used by the cities of Palo Alto and Alameda (Susan Hurl, Allied Waste, 8/19/2008).

Other

These are small emissions from the Fire Station, Police, Corporation Yard and the Water Treatment plant. These facilities all have power generators and the Corporation Yard has a paint

booth for painting vehicles. 2005 emissions (earliest available) reported from Bay Area Air Quality Management District are being used as estimates for 2000 emissions.

Government 2005

Buildings

This includes the City's total commercial gas account, and for electricity, it includes primarily buildings, misc. park facilities, unclassified pumps, the pistol range and other miscellaneous. PG&E is further broken out into residential, streetlights, traffic signals, water and wastewater facilities and irrigation and sprinkler use. All PG&E data from detailed reports for Benicia, 2003 and 2005, sent by Lynn Galal, Project Manager, Customer Energy Efficiency Third Party and Partnership Implementation.

Vehicle Fleet

Fleet data gasoline and diesel totals are from a fuel report for 2005 provided by Bernie LuVisi, Garage Supervisor, Public Works Dept. Total gasoline and diesel gallons in fleet are each entered by department under one vehicle type per department. The type chosen is based on the predominant vehicle type for the department group (Bernie LuVisi, Garage Supervisor). Approximately 2749 gallons of diesel was used for off road equipment such as mowers, backhoes, or pressure pumps (Equipment Services, 44 gal.; Streets, 489 gal.; Parks, 1690 gal.; Wastewater, not reported; Water, 526 gal.). Specific emissions coefficients for each type of equipment were not used. The coefficient for the predominant vehicle type in that department (for instance, light trucks for Parks) was used to estimate GHG emissions.

Employee Commute

Assumptions: All 217 full-time employees drove gasoline vehicles, none carpooled, and each employee drove five round trips per week for 47 weeks. All 211 part-time employees drove gasoline vehicles, none carpooled, and each employee drove three round trips per week for 47 weeks. There was a large increase in the number of employees between 2000 and 2005 because the Parks Dept. greatly expanded its program (Kim Imboden, Human Resources).

Waste

City waste data is not available as a stand-alone account, per Fire Chief Gene Gantt (solid waste contract manager). City data is included with Community Analysis. Carrie Wenslawski, Management Analyst, provided information on sludge from the Water and Wastewater Treatment plants. No methane recovery was done on this waste. All Benicia waste goes to Keller Canyon Landfill, built in 1992. It is the last landfill built in California. Enough methane has now been generated so that Allied Waste can begin methane recovery at Keller Canyon. Beginning in November 2008 the gas will be recovered and used by the cities of Palo Alto and Alameda (Susan Hurl, Allied Waste, 8/19/2008).

Other

These are small emissions from the Fire Station, Police, Corporation Yard and the Water Treatment plant reported from Bay Area Air Quality Management District. These facilities all have power generators and the Corporation Yard has a paint booth for painting vehicles.

Government 2010

Emissions estimates from 2005 were used as the starting point for all forecasts unless otherwise noted.

Buildings

For 2010, a 5% growth rate to account for additional employees and an estimated 76480 kWh and 5593 therms to account for the new Mills Center were added. This includes the City's total commercial gas account, and for electricity it includes primarily buildings, miscellaneous park facilities, unclassified pumps, the pistol range, and other miscellaneous facilities. PG&E is further broken out into residential (0% increase expected), streetlights (0.3% increase), traffic signals (2% increase), water and wastewater facilities, and irrigation and sprinkler use (6.6% increase). Commercial and industrial square footage will increase by about 6.6%, resulting in more street trees and landscaping districts, so this percentage was applied to growth in irrigation/sprinkler electricity use.

Vehicle Fleet

Based on a 1% fuel increase between 2000 and 2005, a 1% increase in fuel use from 2005 is expected for 2010. Benicia Breeze route changes begun in 2008 were not accounted for.

Employee Commute

Assumptions: All 235 full-time employees (number of employees is the approved positions in the 2007-09 Budget) will drive gasoline vehicles, none will carpool, and each employee will drive five round trips per week for 47 weeks. The additional 18 employees (from 2005) will add an estimated 116,060 annual vehicle miles traveled to the commute. All 211 part-time employees (no increase expected) will drive gasoline vehicles, none will carpool, and each employee will drive three round trips per week for 47 weeks.

Waste

A 5% increase is estimated to account for population growth and increase in the number of households and commercial/industrial activities.

Other

These are small emissions from the Fire Station, Police, Corporation Yard and the Water Treatment plant. No increase is expected.

Government 2020

Buildings

For 2020 unless otherwise noted, a 13% growth rate to account for additional employees and the estimated 76480 kWh and 5593 therms to account for the new Mills Center were added to the 2005 numbers. This includes the City's total commercial gas account, and for electricity it includes primarily buildings, miscellaneous park facilities, unclassified pumps, the pistol range and other miscellaneous. PG&E is further broken out into residential (no increase expected), streetlights (2% increase), traffic signals (100% increase), water and wastewater facilities (15% increase), and irrigation and sprinkler use (34% increase). Commercial and industrial square

footage will increase by about 34% (assuming full build-out of the Benicia Industrial Park), resulting in more street trees and landscaping districts; this percentage was applied to growth in irrigation/sprinkler electricity use.

Vehicle Fleet

A 2% increase in fuel use from 2005 is assumed for 2020 as City vehicles travel the Benicia Business Park roadways. Benicia Breeze route changes begun in 2008 were not accounted for.

Employee Commute

Assumptions: All 245 full-time employees (staff estimate of number of employees) will drive gasoline vehicles, none will carpool, and each employee will drive five round trips per week for 47 weeks. The additional 28 employees (from 2005) will add an estimated 180,490 annual vehicle miles traveled to the commute total. Part-time employees will drive gasoline vehicles, none will carpool, and each employee will drive three round trips per week for 47 weeks. The number of additional part-time employees is unknown, so 5% was added to the 2005 figure.

Waste

A 15% increase is estimated to account for population growth and increase in the number of households and new commercial/industrial activities.

Other

These are small emissions from the Fire Station, Police, Corporation Yard and the Water Treatment plant. No increase is expected.

Community 2000

Residential

2003 PG&E numbers were used for 2000 residential because there was 0% population growth rate in Benicia between 2000 and 2003. All PG&E data is from a detailed report for Benicia 2003 sent by Lynn Galal, Project Manager, Customer Energy Efficiency Third Party and Partnership Implementation.

Indicators: 10328 households, population 26,865, per Census 2000.

Commercial/Industrial

Contains all commercial and industrial PG&E use that was not from direct access accounts. The earliest figures available for gas and electric use were for 2003. The 2003 figures were multiplied by 93% to account for fewer commercial and industrial establishments in Benicia in 2000 (per 2005 U.S. Census Business Patterns) to estimate use in 2000.

Therm use is estimated commercial share from ABAG total reported for 2000 (commercial and residential = 122,893 therms). To estimate electricity, the ratio of therms to kWh was averaged for 2003, 2004, and 2005, and then the ratio was applied to the 2000 therms. This method assumes that the rate of gas-to-electricity use for the City's commercial accounts is similar, year-to-year.

Commercial Indicators: Number of establishments (543) from 2005 U.S. Census Business Patterns. Floor space: ABAG 1998 estimate for Benicia in 2000 was 1,258,000 square feet. Breakdown of employees between industrial (6000) and commercial (6733) is staff estimate.

Industrial Indicators: Number of establishments (285) from 2005 U.S. Census Business Patterns. Floor space: ABAG 1998 estimate for Benicia in 2000 was 9,407,000 square feet.

City air district-permitted emissions: BAAQMD data for 2005 emissions (earliest available) are being used as estimates for 2000 emissions. These are small emissions from Fire Station, Police, Corporation Yard and the Water Treatment plant. These facilities all have power generators and the Corporation Yard has a paint booth for painting vehicles.

Commercial and Industrial air district-permitted emissions: BAAQMD data for 2005 emissions (earliest available) are being used as estimates for 2000 emissions, minus businesses that did not exist in 2000. The asphalt plant, purchased in 2001 by Valero, is included in the 2000 industrial total.

Valero: Estimates provided by Chris Howe, Valero, 8/19/08. (Valero did not own the asphalt plant in 2000, so those emissions are not counted in the Valero total but are included in the total for industrial/commercial air district permits in this section.) This is a non-certified estimate; only data from 2006 forward have been certified by a third party and conform to California Climate Action Registry (CCAR) General Reporting Protocol 2.2, March 2007. Note: CO₂E estimated at 0.15% CO₂. Indirects resulting from direct purchase of PG&E gas/electricity are excluded (data not available). However, that number likely dropped between 2000 and 2005 as the refinery began some co-generation processes, which are included in the 2005 estimate.

Transportation

City streets: Daily vehicle miles (times 330, to account for lower traffic on weekends) from 2000 CA Public Road Data, CA Department of Transportation, Division of Transportation System Information, Sept. 2001. Figure is total annual vehicle miles traveled (VMT) broken down into passenger vehicle (gasoline) and heavy truck (diesel). The Metropolitan Transportation Commission uses a breakdown of 84.4% passenger cars and 15.6% heavy trucks for vehicles on the road in the Bay Area.

Port Transportation: Data reports were provided by Jim Triplett, Port of Benicia, August 14, 2008. Traffic was primarily within port facility. There is very little overlap with city street mileage (per Ron Chamberlain, Port, August 20, 2008). Data includes movement of imported cars around the facility.

State Highways: Benicia highway miles provided by Michael Throne, City Engineer. DVMT for Solano County highways provided by 2005 California Public Road Data, Dept. of Transportation, Sept. 2006. 7.3 miles is 4.6% of the 158.27 highway miles in Solano County. This percentage was multiplied times the DVMT figures given, then 365, then times 84.4% for passenger vehicles and 15.6% for heavy trucks (diesel).

State Park Roads: Daily vehicle miles (times 365) from 2000 California Public Road Data, California Department of Transportation, Division of Transportation System Information, Sept. 2001. State Park 109.5 annual VMT.

Waste

Benicia Unified School District: 224 tons of cardboard and 185.46 tons of mixed paper were recycled. Data from Allied Waste Services report "Benicia Unified School District Solid Waste and Recycle Service Levels 2000," provided by Susan Hurl, Allied Waste.

Sludge tonnage from Wastewater and Water treatment plants from Carrie Wenslawski, Management Analyst, Public Works.

Residential greenwaste: Data from Allied Waste Services reports "Residential and Commercial Summary of Recycling Statistics 2000" and "Benicia Summary Solid Waste and Recycle Service Levels 1992 - 2005," provided by Susan Hurl.

Commercial waste, including City: 306.88 tons recycled of 15,666.88 tons collected. Data from Allied Waste Services reports "Residential and Commercial Summary of Recycling Statistics 2000" and "Benicia Summary Solid Waste and Recycle Service Levels 1992 - 2005," Susan Hurl.

Residential: Percentage by materials in Benicia waste stream taken from California Integrated Waste Management Board Solid Waste Characterization Database, which includes 1999 estimates on composition. 2024.29 tons recyclables collected of 8515.48 total tons collected. Data from Allied Waste Services reports "Residential and Commercial Summary of Recycling Statistics 2000" and "Benicia Summary Solid Waste and Recycle Service Levels 1992 - 2005," provided by Susan Hurl.

Community 2005

Residential

All PG&E data from detailed report for Benicia, 2005 sent by Lynn Galal, Project Manager, Customer Energy Efficiency Third Party and Partnership Implementation.

Indicators: Association of Bay Area Governments (ABAG) "Projections 2007" for number of households (10,640).

Commercial/Industrial/Other

Contains all commercial and industrial PG&E use that was not from direct access accounts.

Commercial Indicators: Floor area: Data from City Building Division staff. New building permits 2000-2005 added to ABAG estimate for 2000 for a total of 1,269,840 SF of commercial space. (1,920 SF added to commercial was for non-profit (church) floor space.) City economic development staff estimate for number of commercial sector employees (6436). 2005 U.S. Census Business Patterns data for number of commercial establishments (568).

Industrial Indicators: 2005 U.S. Census Business Patterns data for number of industrial establishments (324). Floor area: New building permits 2000-2005 added to ABAG estimate for

2000 for total of 10,460,610 SF. (Approximately 52,425 SF of industrial space is storage/warehouse.) City economic development staff estimate for number of industrial employees (6,335).

City air district-permitted emissions: 2005 BAAQMD permits. These are small emissions from Fire Station, Police, Corporation Yard and the Water Treatment plant. These facilities all have power generators and the Corporation Yard has a paint booth for painting vehicles.

Commercial and Industrial air district-permitted emissions: 2005 BAAQMD permits.

Valero: Estimates provided by Chris Howe, Valero, 8/19/08; estimate includes emissions from asphalt plant. This is a non-certified estimate; only data from 2006 forward have been certified by a third party and conform to CCAR General Reporting Protocol 2.2, March 2007. Note: CO₂E estimated at ~ 0.15% CO₂. Indirects resulting from direct purchase of PG&E gas and electricity are excluded (data not available). However, that number likely dropped between 2000 and 2005 as the refinery began some co-generation processes, which are included in the 2005 estimate.

Transportation

State Parks: Daily vehicle miles (times 365) from CA Public Road Data, CA Dept. Transportation, Div. Transportation System Information. Figure is total annual vehicle miles traveled (VMT) broken down into passenger vehicle (gasoline) and heavy truck (diesel).

City Streets: Daily VMT Figures (times 330, to account for lower weekend traffic) from 2005 CA Public Road Data, CA Dept. Transportation, Div. Transportation System Information Sept. 2006. Figure is total annual VMT broken into 15.6% for trucks/diesel and 84.4% for passenger vehicles/gasoline (Metropolitan Transportation Commission percentages for Bay Area).

Port transportation, including imported car movements: Data reports were provided by Jim Triplett, Port of Benicia, August 14, 2008. Traffic was primarily within port facility. There is very little overlap with city street mileage (Ron Chamberlain, Port, August 20, 2008).

State Highways: Benicia centerline highway miles provided by Michael Throne, Benicia City Engineer. 2005 California Public Road Data, Dept. of Transportation includes figures for 158.27 state highway miles in Solano County. 7.3 miles is 4.6% of 158.27 miles. This percentage was multiplied times the DVMT figures given, then 365, then times 84.4% for passenger vehicles and 15.6% for heavy trucks (diesel).

Waste disposal trucks: Miles per year is based upon round trips to Contra Costa Transfer Station in Martinez for garbage, recycle, and yard waste and to various disposal sites for other commodities (dirt, construction, concrete, etc.). 2005 data from Allied Waste, Susan Hurl. (There is likely some duplication of emissions already accounted for under heavy trucks on city streets.)

Waste

Benicia Unified School District: Ruthie Gomez, Benicia Unified School District (BUSD), reported waste dumped at Contra Costa Transfer Station, Acme Fill Corporation and Potrero Hills Landfill, Inc. CCL Organics reported 40 tons from BUSD in 2005.

Information for City Water and Wastewater treatment plants came from Carrie Wenslawski, Management Analyst, Public Works, Benicia.

Commercial, including City: 1390.02 tons recyclables collected of total 14,960 tons collected. Data from Allied Waste Services reports "Recyclable Materials Breakdown 2005" and "Benicia Summary Solid Waste and Recycle Service Levels 1992 - 2005," provided by Susan Hurl. To date, there has been no methane recovery. All Benicia waste goes to Keller Canyon Landfill, built in 1992. It is the last landfill built in California. Enough methane has now been generated so that Allied Waste can sell the gas rights to a third party, Ameresco. Beginning in November 2008 the gas will be recovered and used by the cities of Palo Alto and Alameda (Susan Hurl, Allied Waste, 8/19/2008).

Residential: 2561.40 tons of recycling collected of total 6444 tons collected. Data from Allied Waste Services reports "Recyclable Materials Breakdown 2005" and "Benicia Summary Solid Waste and Recycle Service Levels 1992 - 2005," provided by Susan Hurl.

Community 2010 and 2020

Emissions estimates from 2005 were used as the starting point for all forecasts unless otherwise noted. A compounded annual growth rate formula was applied to each sector using inputs on population, household, and job growth from the Association of Bay Area Governments' "Projections 2007" document. (The job growth estimate corresponds with the staff estimate of employment at the Benicia Business Park, assuming full buildout in 2020.) The exception to this calculation method is that, for the purposes of establishing the business as usual forecast, the refinery was assumed to have a 1% annual growth rate in emissions, based on the percentage change between 2005's non-certified estimate and 2006's certified estimate.

Community 2010

Residential

The annual growth rate generated was 0.336%, with a 1.7% change by 2010.

Commercial/Industrial/Other

The annual growth rate generated was 4.936%, with a 27.2% change by 2010. For Valero, a 1% annual growth rate was used, based on Valero figures for 2006, with a 5.1% change by 2010.

Transportation

The annual growth rate generated was 1.552%, with an 8.0% change by 2010.

Waste

The annual growth rate generated was 1.073%, with a 5.5% change by 2010.

Community 2020

Residential

The annual growth rate generated was 0.402%, with a 6.2% change by 2020 from 2005.

Commercial/Industrial/Other

The annual growth rate generated was 2.393%, with a 42.6% change by 2020 from 2005. For Valero, a 1% annual growth rate was used, based on Valero figures for 2006, with a 16.1% change by 2020 from 2005.

Transportation

The annual growth rate generated was 1.509%, with a 25.2% change by 2020 from 2005.

Waste

The annual growth rate generated was 0.685%, with a 10.8% change by 2020 from 2005.

Appendix D. Definitions

AB 32	Assembly Bill 32, approved in 2006, which set GHG reduction goals for California in 2010 and 2020
ABAG	Association of Bay Area Governments, the regional planning agency
BAAQMD	Bay Area Air Quality Management District
BAU	Business as usual; for forecasting purposes, an assumption that GHG-reducing strategies are not taken
BTU	British thermal unit, a measurement of energy often used for natural gas 3412 BTUs = 1 kWh; 100,000 BTUs = 1 therm
CACP	Clean Air Climate Protection, the name of the software provided by ICLEI that was used throughout the inventory
CARB	California Air Resources Board
CO2EMT	Carbon dioxide-equivalent metric tonnes, used to measure GHGs
DVMT	Daily vehicle miles traveled
GHG	Greenhouse gases
ICLEI	Local Governments for Sustainability (formerly International Council for Local Environmental Initiatives), an international non-profit organization
KWh	Kilowatt hour, a unit of energy often used for electricity
Metric tonnes	Unit of measurement equal to 2,205 pounds
Mbtu/MMBtu	One million British thermal units, equivalent to 1000 cubic feet of natural gas
MTC	Metropolitan Transportation Commission, the Bay Area's regional transportation planning agency
PCS	Parks and Community Services Department, City of Benicia
Therm	Unit of energy equivalent to 100 cubic feet of natural gas.
VMT	Vehicle miles traveled