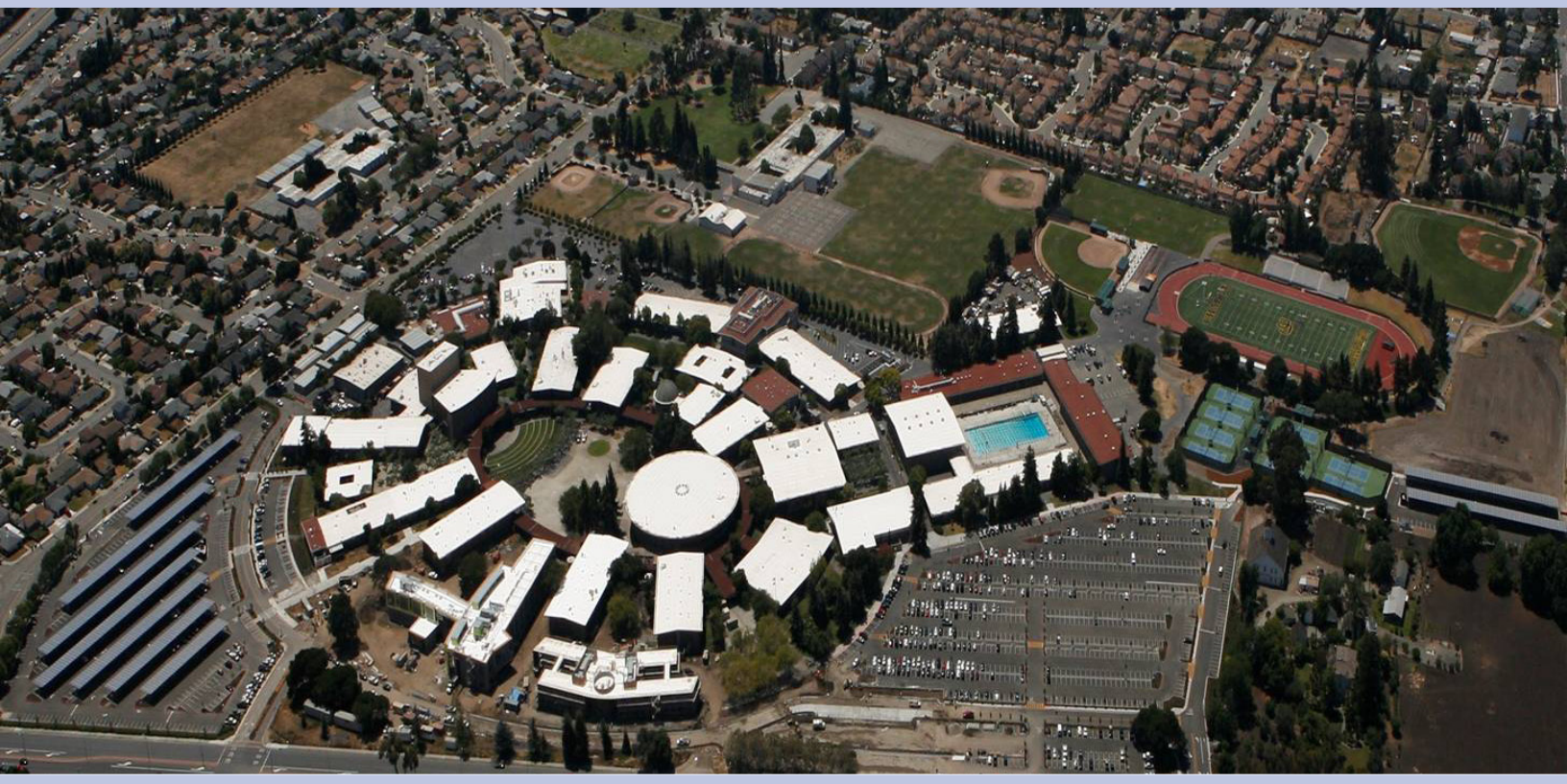
CHABOT
COLLEGE



# Chabot College

# Climate Action Plan 2010

# Acknowledgments

The members of the Facilities and Sustainability Committee at Chabot College and other individuals who volunteered their time were instrumental to the development of this College Climate Action Plan.

Members of the Sustainability Committee include:
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Dale Wagoner, Co-Chair, Health, PE and Athletics
Dr. Celia Barberena, College President
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CHABOT COLLEGE

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*Figures and Tables*

CHABOT
LAS POSITAS
COMMUNITY
COLLEGE
DISTRICT

June 7, 2010

Dear Students, Faculty, Staff and Community Members:

On August 21, 2007, Dr. Joel Kinnamon, Chancellor of the Chabot-Las Positas Community College District, became a signatory to the American College and University Presidents Climate Commitment (ACUPCC) committing to developing carbon neutral college campuses. This commitment not only helps to save our planet but helps the local communities of Hayward and Livermore where our colleges are located, along with the State of California, achieve their goals of dramatically reducing Green House Gas (GHG) emissions that have been put forth in local and statewide legislation.

As president, I appointed a Sustainability Committee to establish sustainability goals that reflect the college's core values and mission. The Sustainability Committee has established its mission to uphold the ACUPCC by greening our campus, both physically and educationally, serving as a sustainable model within the communities served by our colleges, and by encouraging like institutions to follow a similar commitment.

College Sustainability Goals follow two main guidelines:

1. Assess the operation of the college, finding ways to embed sustainability within the daily work routine to reduce our carbon footprint and the impact on the environment.
2. Address sustainability through the curriculum, serving the needs of the community by offering degrees and certifications in "green" technologies, which will help to fill the growing need for green job technical skills.

Following a comprehensive Greenhouse Gas Inventory completed in 2009, the Sustainability Committee has used the inventory to recommend strategies to reduce the college's greenhouse gas emissions, and establishing the pathway to meet the goal of a 15% reduction in emissions below 2008 levels by 2020, with consideration of the longer term vision of reaching carbon neutrality by 2050.

Our students, faculty, staff and the Board of Trustees are proud that the colleges have taken a leadership role in sustainability and carbon footprint reduction to demonstrate a commitment to our planet nationwide. We are proud of our constituents who have participated in this effort and who have continued to make sustainability an essential part of how they live their lives.

Sincerely,

**Celia Barberena, Ph.D.**
President
Chabot College

**Joel L. Kinnamon, Ed.D.**
Chancellor
Chabot Las Positas Community College District



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# 1 Executive Summary

The Chabot College community understands what it means to "think globally and act locally." Through its modernization efforts, and partnerships with the Workforce Investment Board and top manufacturing companies like BMW, Chabot College plays a key role in the community to enhance and sustain academic, economic, social and environmental vitality.

As a signatory to the American College and University President's Climate Commitment (ACUPCC), Chabot College has agreed to initiate actions designed to move the campus towards carbon neutrality. The college has completed a greenhouse gas (GHG) emissions inventory report for years 2005 to 2008, and it has taken proactive measures to reduce GHG emissions while planning for further, long-term reductions. Early actions include, but are not limited to:

- Minimum LEED Silver or equivalent rating for all new construction and renovations;
- Energy star procurement;
- Conversion from T-12 to T-8 bulbs;
- Solar panels on parking decks;
- Replace gas-powered vehicles with alternative fuel vehicles;
- Alternative fuel infrastructure development;
- Promotion of alternative transportation;
- Stormwater management;
- Comprehensive recycling and composting program;
- Paper reduction initiative;
- Reduced use of plastic water bottles; and
- Distance learning courses.

While specifically focused on reducing the carbon footprint of the College's activities, practices and operations, the strategies included in this plan also consider improvement to the local environment and neighboring communities

within the region. Mitigation strategies cover the following five major areas:

- Buildings and energy;
- Transportation;
- Waste and recycling;
- Water; and
- Research, Education and Community Outreach.

**Buildings and energy** – Electricity is Chabot College's second highest source of GHG emissions, making up 12% of total emissions in the baseline year 2008. Purchased natural gas and electricity are provided primarily through Pacific Gas & Electric with participation in the SPURR (School Project for Utility Rate Reduction) Gas Program. As of 2009, the college produced about 20% of its electricity needs with solar power. To become "grid neutral" by 2030, two additional megawatts of renewable energy would need to be produced on site. Further measures to increase energy efficiency will involve enhanced building energy management controls, such as improved building temperature controls in addition to the recently installed central utility plant.

**Transportation** – Transportation sources include fuel purchases for District-owned vehicles, directly financed travel (i.e. air mileage, vehicle mileage reimbursements, etc.), and student, staff and faculty commuting to and from campus. Transportation is the primary source of GHG emissions for the college, accounting for nearly

85% of the gross total in the baseline year 2008. Student commuting makes up about 78% of the 2008 total with about 74% of the 17,000 + students driving alone. Addressing this considerable emission source will involve innovative strategies, incentives for carbon reducing behavior and practices, working together with local transportation providers, and educating the campus community about alternative transportation options.

**Waste and Materials** – Most waste and materials (with the exception of fertilizers) are indirect emissions considered under scope 3, as defined by the GHG Protocol. Waste and materials account for the least amount of GHG emissions, with less than 2% of total emissions in 2008. Although this sector source is not a major contributor to the college's carbon footprint, the college administration is committed to further reducing paper consumption, conserving valuable drinking water, and reducing waste on campus through improved electronic document management systems, and reduced waste in food packaging, among other strategies.

While a continuing trend of reduced emissions per capita since the approval of the Measure B Bond is observed as a result of early sustainability actions taken, the District and Chabot College are committed to continually improve and sustain excellence in education, economic, social and environmental responsibility. This Campus Climate Action Plan provides a pathway to achieving the college's near term goal of meeting a 15% reduction in emissions below 2008 levels by 2020 with consideration of the longer term vision of reaching carbon neutrality by 2050. As the college and neighboring community grow, the climate action plan will be updated periodically to ensure continued movement towards academic, social, economic, and ecological sustainability.

# 2

# Baseline Emissions Inventory

In 2009, Chabot College developed a greenhouse gas emissions inventory report summarizing the campus's anthropogenic greenhouse gas emissions for fiscal years 2005 to 2008. The inventorying process was the first step in determining major sources of emissions and identifying reduction opportunities to help the campus move towards climate neutrality.

## Methodology

The Greenhouse Gas Emissions Inventory Report covers both direct sources ("scope 1" emissions), such as fuel combustion of District-owned vehicles and fertilizers, and indirect sources ("scope 2" – purchased electricity and "scope 3" – all other indirect emissions), such as purchased electricity, campus commuting, air travel, waste water, solid waste, and paper use for fiscal years 2005 to 2008. Calculations were based on generally accepted principles and guidelines as provided by the ACUPCC and Clean-Air Cool Planet, the Intergovernmental Panel on Climate Change (IPCC), the World Resources Institute Corporate Accounting and Reporting Standard (The GHG Protocol), and United States Environmental Protection Agency (US EPA) with adjustments, as necessary, utilizing campus-specific data and inputs when and where possible. Results are presented in metric tons of carbon dioxide equivalent (MtCO2e), using 100-year global warming potentials from the Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report (TAR).

**Table 2-1. Chabot College Historical GHG Emissions, by Scope**

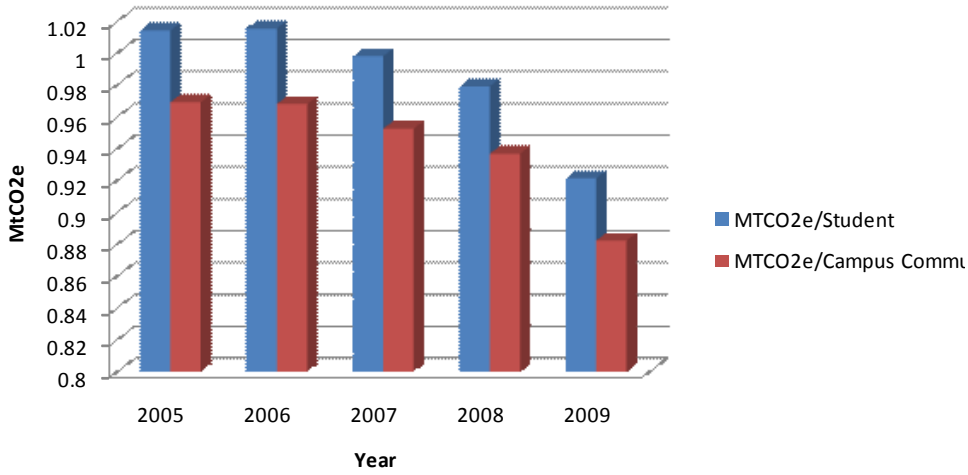
| | CHABOT COLLEGE | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|
| Scope 1 | Co-gen Electricity | 597.7 | 597.7 | 597.7 | 597.7 |
| | Direct Transportation | 130.9 | 116.4 | 111.3 | 125.1 |
| | Agriculture | 8.3 | 6.8 | 6.8 | 5.2 |
| Scope 2 | Purchased Electricity | 1,458.3 | 1,574.4 | 1,710.9 | 1,458.6 |
| Scope 3 | Faculty / Staff Commuting | 1,261.8 | 1,299.0 | 1,310.2 | 1,296.5 |
| | Student Commuting | 13,844.1 | 13,436.8 | 13,438.1 | 14,065.7 |
| | Directly Financed Air Travel | 48.3 | 49.1 | 63.5 | 77.1 |
| | Other Directly Financed Travel | 40.4 | 35.5 | 45.0 | 51.6 |
| | Solid Waste | 76.5 | 63.3 | 62.4 | 70.2 |
| | Wastewater | 7.7 | 5.1 | 5.4 | 5.9 |
| | Paper | 34.4 | 25.7 | 31.6 | 86.7 |
| | Scope 2 T&D Losses | 144.2 | 155.7 | 169.2 | 144.3 |
| Offsets | Additional | -13.5 | -15.4 | -14.8 | -15.4 |
| Totals | Scope 1 | 736.9 | 720.9 | 715.8 | 728.0 |
| | Scope 2 | 1,458.3 | 1,574.4 | 1,710.9 | 1,458.6 |
| | Scope 3 | 15,457.4 | 15,070.2 | 15,125.4 | 15,798.0 |
| | All Scopes | 17,652.6 | 17,365.5 | 17,552.1 | 17,984.6 |
| | All Offsets | -13.5 | -15.4 | -14.8 | -15.4 |
| | Net Emissions | 17,639.1 | 17,350.1 | 17,537.3 | 17,969.2 |
| Population | Students - ALL FTE | 17,405.0 | 17,100.0 | 17,583.0 | 18,365.0 |
| | Faculty and Staff | 808.0 | 838.0 | 842.0 | 831.0 |
| | TOTAL Campus Community | 18,213.0 | 17,938.0 | 18,425.0 | 19,196.0 |
| Emissions Per Capita | MTCO2e/Student | 1.01 | 1.02 | 1.00 | 0.98 |
| | MTCO2e/Campus Community | 0.97 | 0.97 | 0.95 | 0.94 |

# 2005-2008 Inventory Results

A detailed overview of gross and net emissions for years 2005 to 2008, is provided in Table 1-1. Over the four-year period, gross greenhouse gas (GHG) emissions steadily increased 17,652.6 $MtCO_2e$ in 2005 to 17,984.6 $MtCO_2e$ in 2008. Scope 3 emissions account for a majority of campus GHG emissions, with transportation (primarily from commuting) being the largest sector source, accounting for nearly 85% of all emissions.

Despite growth in total gross emission levels, student per capita emissions steadily declined over the same period from 1.01 $MtCO_2e$ in 2005 to 0.98 MtCO2e in 2008. Further decline in student per capita emissions is observed in the last year, reaching about 0.92 MtCO2e per student in 2009 as a result of new renewable energy sources and increased energy efficiencies on campus.

**Figure 2-1. Per Capita Emissions**




Source: Parsons Brinckerhoff, 2010

# Base Year Summary

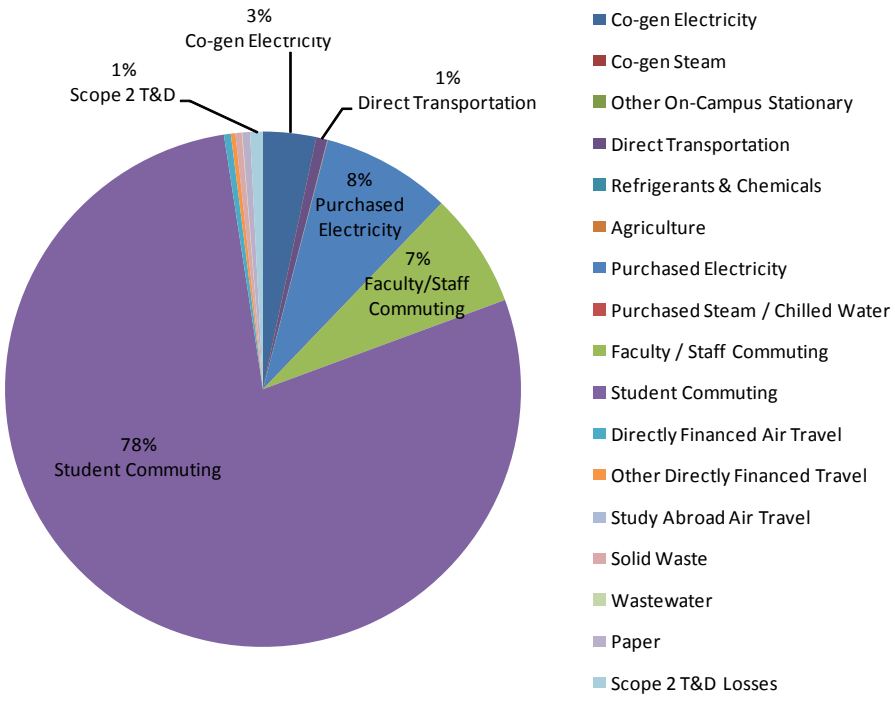
In 2008, the college was responsible for nearly 17,985 metric tons of carbon dioxide equivalent ($MtCO_2e$)[1]. Transportation, including fuel purchases, air travel and other directly financed travel, and daily commuting by students, staff and faculty, accounted for nearly 85% of all emissions. As anticipated for a two-year commuter college, nearly 78% (see Figure 2-2) of total emissions are derived from student commuting, with about 74% of the student population reporting as solo drivers.

# Emissions Forecast

To understand future baseline trends in GHG emissions under business as usual (BAU) assumptions, reference case projections were estimated from year 2009 through 2020. Figure 1-3 illustrates the historical and reference case gross GHG emissions through 2020 and the reduction trend line necessary to achieve a 15% reduction below 2008 levels by 2020 (a 2020 target equivalent to approximately 15,287 $MtCO_2e$). Without emissions reduction measures, gross GHG emission levels in year 2020 are projected to reach approximately 19,471 $MtCO_2e$. Chabot College, however, has taken proactive measures to implement early energy- and cost-saving strategies to reduce its current and future emissions. This is revealed through the declining emissions per student. Early action measures and further emissions reduction strategies are discussed in the following sections.

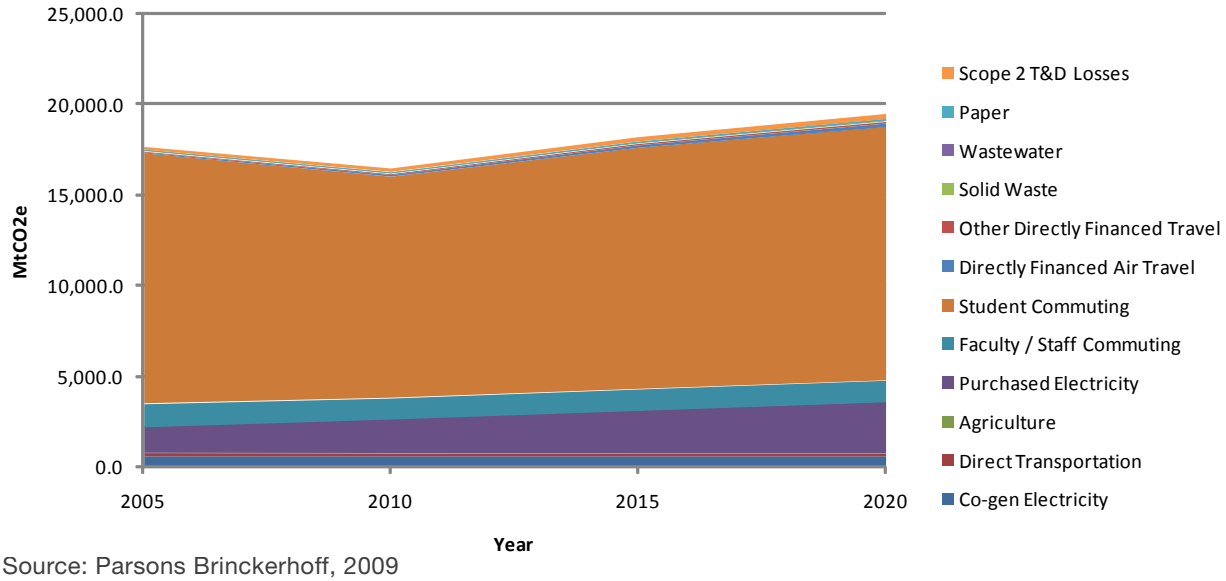
[1] A unit of carbon dioxide equivalent ($MtCO_2e$) represents a standard unit covering the total impact of the six major greenhouse gases: carbon dioxide ($CO_2$), nitrous oxide ($N_2O$), methane ($CH_4$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$).

**Figure 2-2. 2008 Gross GHG Emissions Summary (MtCO2e)**




Source: Parsons Brinckerhoff, 2009

**Figure 2-3. Chabot College Historical and Reference Case GHG Emissions (BAU 2005-2020)**




Source: Parsons Brinckerhoff, 2009

# 3

# Early Actions

Chabot College has taken early action measures to improve campus sustainability and reduce greenhouse gas emissions. A number of early, tangible actions taken in the areas of buildings and energy, transportation, water and waste, education and outreach are outlined below.

## Buildings and Energy

### 01 Minimum LEED silver or equivalent for all new construction and renovations

In 2005, the Chabot-Las Positas Community College District Board of Trustees adopted a Sustainability Design Policy that requires all new buildings constructed under the Measure B Bond issue to be a minimum Leadership in Energy and Environmental Design (LEED) Silver Certified and that all new renovations are LEED Silver equivalent. Sustainability guidelines can be found in the 2005 Chabot College Facilities Master Plan. Current LEED projects totaling $42 million include the instruction office building and community and student services center. Construction of this program is expected to be completed by 2015.

### 02 Energy star procurement

In 2006 the District Purchasing Office developed an RFP process that includes a request for Energy Star certified products.

### 03 Conversion from T-12 to T-8 fluorescent lighting[2]

All fluorescent bulbs and ballasts have been converted from T-12 to the more efficient T-8 lighting system. Older, linear fluorescent fixtures generally used T-12 type magnetic ballasts which operate at 60 Hz and require 15% more power beyond the lamp requirements to operate. Not only do the new bulbs save energy, but they promote health: studies have shown that although the light flicker generated at a 60 Hz cycle is undetectable to the human eye, over time it can affect performance, concentration, and the overall health of some individuals. Newer T-8 electronic ballasts operate at 20,000 Hz. T-8 bulbs are more efficient and save about $30 per year in energy use per light fixture over T-12.

### 04 Solar panels on parking decks

In 2009, more than 6,000 solar panels were installed with capacity of producing 1.1 megawatts of electricity, meeting more than 20% of the campus's current electricity needs. Although the recent GHG Emissions Inventory Report did not include the solar panels (as its installation occurred after 2008), the solar power is estimated to reduce annual CO2 emissions by approximately 529 metric tons, equivalent to planting about 130 acres of forest. Economic benefits of the solar panels also include about $3 million in California Solar Initiative Incentives and reduced electricity bills.

[2]The T figure describes the diameter of the bulbs in 1/8 inch increments (T8 = 8/8 = 1 inch and T12 = 12/8 = 1.5 inches)

# Transportation

### 05 Replace gas-powered vehicles with alternative fuels

The District replaced four of its security vehicle fleet with hybrid-electric security vehicles.

### 06 Alternative fuel infrastructure development

In 2010, applications for six plug-in chargers is anticipated within the next year and will be located near the photovoltaic arrays on campus.

### 07 Promotion of alternative transportation

Information on transportation alternatives such as carpooling, bicycling, or taking public transit to the campus is disseminated through the Office of Student Life and on the campus website at: http://www.chabotcollege.edu/safety/parking/PublicTransit.asp.

# Water and Waste

## 08 Stormwater management

As part of the bond program, a campus wide stormwater management plan has been implemented. The Stormwater management plan is designed with retention and filtration basins such that campus outflows will be at no greater rate and no less quality than outflows prior to the bond program.

## 09 Comprehensive recycling and composting program

The Chabot-Las Positas Community College District implemented an integrated waste management plan in 2003, including on-site composting of organic material, construction waste diversion, and single-stream recycling. To improve waste management through better separation of construction debris, trash and dirt fill generated during current and future construction activity, Chabot College requires construction bid documents to include a “Debris Recycling Statement.” Through this program, overall waste diversion rates have been as high as 83.9%.

## 10 Paper reduction initiative

Over the years, Chabot College has continuously reduced its consumption of paper through a number of efforts, including: online admission applications; registration, grades, and course materials through Blackboard and instructional websites; reduced number of hardcopy agendas and minutes for institutional meetings; electronic curriculum development; online book orders, and reduction of printed periodicals in the library from 300 to 100 in the last ten years.

# Education and Community Outreach

## 11 Facilities and Sustainability committee

The Chabot College Facilities and Sustainability Committee was instituted in 2005/2006 with the following charge:

- Recommend construction, modification, and allocation of facilities across campus;
- Recommend sequencing and priority of renovation and construction of projects;
- Coordinate with the Citizens' Oversight Committee;
- Review and adjust facilities planning documents;
- Coordinate with Institutional Planning and Budget Council in development of Chabot's Facilities Master Plan;
- Review facilities utilization to increase efficiency;
- Assign responsibility of space to divisions or individuals;
- Coordinate with District Maintenance and Operations College physical plant maintenance and upgrades; and
- Assist and support the College planning process as needed or requested.

Its membership consists of at least 19 core representatives from administration, academic senate, the faculty association, classified senate, classified union, and associated students.

## 12 Distance learning

Currently, Chabot College offers more than 185 online and hybrid courses combined. These courses, in combination with the three new distance learning classrooms help to reduce the number of vehicle trips to campus and its associated emissions.

# 4

# Mitigation Strategies (2010-2020)

## 01 Generate Renewable Energy On-Site

As noted above, in 2009, more than 6,000 solar panels were installed on campus with the capacity of producing 1.1 megawatts of electricity. As a result of the installation, annual electricity needs have been reduced and the installation has the potential to decrease annual emissions by an expected 528.5 MtCO2e, equivalent to planting about 130 acres of forest. Economic benefits of the solar panels also include about $3 million in California Solar Initiative Incentives, and additional cost savings on electricity bills. Additional renewable energy production on site is currently being explored to generate at least another megawatt of power, with future plans to become grid neutral. Additional renewable sources of energy under consideration by the District include the following or a combination of the following: additional solar photovoltaic panels, wind power, biogas, and fuel cell technology. The tables below (which will follow with each strategy) outline the potential for GHG reductions for years 2010, 2015, and 2020. The values are expressed in terms of metric tons of carbon dioxide equivalent (MtCO2e).

| Reduction Strategies ($MtCO_2e$) | 2010 | 2015 | 2020 |
|---|---|---|---|
| Solar Panels | -528.5 | -528.5 | -528.5 |
| Addt'l Renewable Energy Generation | 0.0 | -528.5 | -528.5 |

## 02 Expand Building Energy Management Controls

The college plans to expand its building energy management controls to aid in further energy efficiencies, reduce reliance on petroleum-based energy sources, and cut greenhouse gas emissions while saving on utility expenditures. Part of this effort involved the full connection


and operation of a central utility plant on campus within the last year. The plant is anticipated to heat and cool older, existing buildings about 40% more efficiently than the earlier decentralized HVAC systems.

Additional potential energy efficiencies include improved building temperature controls. It is recommended that seasonal thermostat ranges for buildings range from 70-76 degrees Fahrenheit in the summer and 68-72 degrees Fahrenheit in the winter. According to the U.S. EPA, a home saves 1% of its heating bills for each degree the thermostat is turned down. Applying this formula directly to institutional buildings, with an estimated 30% of energy use attributed to heating and cooling of buildings lowering the temperature in campus buildings by two degrees should also save up to 2% of heating costs for the college.

| Reduction Strategy ($MtCO_2e$) | 2015 | 2020 |
|---|---|---|
| Enhanced Building Energy Mgmt | -9.9 | -11.7 |

## 03 Reduce Vehicle Miles Traveled (VMT)

Like many other commuter colleges, reducing GHG emissions from transportation is one of the biggest challenges Chabot College faces. Commuter travel makes up nearly 85% of the college's total emissions. Key means to reducing transportation-related GHG emissions will involve a reduction in vehicle miles traveled, improvements in vehicle technology, fuels, and design and operations of transportation networks (both vehicular and non-vehicular). Using these strategies, the college can influence VMT reduction.

A campus-wide transportation survey conducted in summer and fall 2009 revealed that 74% of all respondents drive alone to campus, with about 9% carpooling. When choosing how to get to campus, survey responses showed that the most important factors were travel time and convenience. For those usually driving alone to campus, 30% of respondents would be willing to try online courses and about 32% of respondents also said they would be willing to try taking transit to campus or would be willing to carpool. One of the most common reasons why students, faculty, or staff don't currently carpool is because 44% have responded that other people do not match the same schedule or route, and 35% of respondents said they work irregular hours or attend late classes.

To address campus commuting needs, a number of transportation alternatives and strategies are being explored for the next three to ten years, including:

- SMS Text Pilot Project
- Participation in AC Transit's Easy Pass Program;
- Implementation of a bicycle-friendly express shuttle service to and from campus;
- Exploring partnerships with local car-sharing services to provide transportation alternatives to and from campus, and to accommodate for mid-day trips; and


CARPOOL
PARKING
ONLY

- Improved bicycle facilities and infrastructure.

### *SMS Text Pilot Project*

Communication methods outside of the internet are being explored to notify students of timely updates (i.e. when class is canceled) to reduce unnecessary trips to campus. One method currently being explored includes the SMS Text Pilot Project with a number of participating faculty on a volunteer basis.

### *Participation in AC Transit's EasyPass Program*

The Chabot College is accessible by BART and a number of bus routes with service provided by AC Transit. AC Transit offers an EasyPass program which provides a discounted bus pass, valid on all AC Transit local and transbay buses (except the Dumbarton Express), to qualified employers, colleges, and residential communities.

Using the EasyPass instead of driving alone can reduce parking demands, alleviate traffic congestion, encourage alternative transportation and reduce the college's carbon footprint.

By purchasing passes for an entire population, a significantly lower pass price is received compared to the price of regular fares. The District may also reduce its employees' taxable earnings by offering tax-deductible transit passes like EasyPass.

An EasyPass does not need to be used every day to see the benefits. Using an AC Transit EasyPass one day a week will not only help the environment, but will pay for itself within a few of months of use.

### *Ridesharing and Express Shuttle Service*

A robust ridesharing program would involve coordination at the regional level with 511 Rideshare and at the campus level through student organizations. Ridesharing can offer a fun and social alternative to driving alone. Sharing the ride also means sharing the costs, and it provides access to carpool lanes and reduced bridge tolls during peak commute hours. The program could be promoted through the campus green website, on-line listings, and forums for students, faculty, and staff and bulletin boards. To incentivize ridesharing, those who commute to campus as part of this program with occupancy of two or more people could have access to reserved, prime parking spaces on campus.

An express shuttle service could have a number of pick-up and drop-off points in areas with the highest student populations. The express shuttle service could provide access not only to the campus but to the downtown area and to the regional transit network. Details of shuttle operations are dependent upon further studies. An initial survey of peer shuttle operations revealed all-inclusive costs in the range of $90,000 to $400,000 per year.

| Reduction Strategies (MtCO2e) | 2015 | 2020 |
|---|---|---|
| Ridesharing + Express Shuttle | -435.1 | -914.6 |

### *Car-Sharing Services*

Partnering with car-sharing services like City Car Share or Zip Car will provide campus transit/ride share users with access to vehicles when needed for trips to and from campus during the day, thus removing an excuse for driving to campus and reducing the number of solo drivers and relieving parking spaces. Car-sharing vehicles also would be given preferred parking, like carpools and vanpools.

### *Improved Bicycle Facilities and Infrastructure*

Currently, there are five bike rack locations on campus including Student Lot B and Buildings 700, 1900, 2900, and 3800. Future improvements to bicycle facilities and infrastructure may include increasing the number of available bike rack spaces; ensuring express shuttles used for campus are bicycle friendly, and working with the community to develop safer bike paths to and from the campus. For interested campus community members, bicycle resource guides and bike buddy matching services can also be provided.

## 04 Increase Campus Average Fuel Economy

The campus-wide transportation survey conducted in the summer and fall of 2009 estimated the campus average fuel economy was 24.7 miles per gallon (mpg). One of the goals of the college is to increase the average fuel economy of its campus community to 30.5 mpg (about a 19% increase) over the next ten years through a combination of improved vehicle and fuel technologies, fleet turnover, alternative transportation modes as compared to driving alone, and eco-driving training. Eco-driving is a form of driving behavior that promotes fuel-savings, including simple ideas like avoiding rapid stops and starts, using cruise control, avoiding unnecessary idling, maintaining appropriate tire pressure, and removing unnecessary weight from a vehicle. The International Transport Forum states that eco-driving can reduce emissions by up to 15%, while a Ford eco-driving test found an improvement in fuel economy by an average 24%[3] and U.S. EPA states it has the potential to reduce emissions by up to 33.3%[4].

| Reduction Strategies (MtCO2e) | 2015 | 2020 |
|---|---|---|
| Increased Fuel Economy | -1,871.0 | -2,428.6 |

## 05 Sustainable Scheduling

Sustainable scheduling provides a new framework for how we look at using and coordinating resources, time, and energy more efficiently. This strategy will examine work, class, and meeting schedules for students, faculty, and staff, in coordination with transportation schedules and options. Examples of situations or questions this strategy would address include:

- If the last class gets out at 9:45pm, and the last transit bus departs campus at 8:37pm, can we work with the local transit provider to better match the transit schedule with the rider needs, or is there a “guaranteed ride home” option that can be explored to provide alternatives to driving alone to campus?
- If a faculty member or student has a 1-hour meeting on campus on a day he or she may not normally commute, are there other means of meeting participation, such as video conferencing like “CCC Confer”?

This strategy may also include options for alternate work schedules. There are multiple scheduling schemes that have been studied and implemented across the country that the college and District may consider. Within the next 2-year cycle, the college and District will further examine the feasibility of various alternate

[3] http://www.ford.com/about-ford/news-announcements/press-releases/press-releases-detail/pr-ford-tests-show-ecodriving-can-28948
[4] http://www.ecodrivingusa.com/files/EcoDriving_Manual.pdf

class and work schedules. Options for alternate work programs may include, but are not limited to, a 9/80 work schedule (if employee is eligible for program, all employees work 9 hours per day while half the employees may get the first Friday off in a pay period and the other half may get the second Friday off in a pay period), and a 4/10 summer schedule (all employees work 10 hours per day for 4 days a week during summer months). Alternate work schedules can improve work-life balance of employees, reduce vehicle miles traveled, and provide building energy cost savings. The potential GHG reduction for the college consists of an amalgam of various sustainable scheduling concepts used in other programs across the country considering emissions savings from both transportation and building energy.

| Reduction Strategies (MtCO2e) | 2015 | 2020 |
|---|---|---|
| Sustainable Scheduling (Transp) | -214.0 | -220.0 |
| Sustainable Scheduling (Energy) | -140.3 | -140.3 |

## 06 Research, Education and Community Outreach

Chabot College Leadership understands that research, education, and community outreach are essential to creating and maintaining a sustainable campus. As a result, a number of avenues for promoting awareness of sustainability have been identified:

- Enhanced distance learning;
- Development of "Green Course Concepts;"
- Sustainability events and workshops; and
- Web communications.

Chabot College currently offers more than 185 online and hybrid courses combined. To enhance the current online and hybrid course offerings, other distance learning options can be explored, such as podcasts and using CCC Confer, a desktop sharing and video conference technology for California community colleges.

"Green course concepts" will also be developed for incorporation in labs, courses, and certification programs for volunteering faculty members. Examples of green course concepts may include but are not limited to the following:

- Biology and/or Chemistry: Algae to Fuels;
- Automotive: Hybrid Technology;
- History: Origins of Earth Day or Evolution of Environmental Laws in California involving sustainability; and
- Engineering or Architecture: Green Technology and Green Building Design.

Sustainability events and workshops could include: a reusable office supply exchange program, a "Switch it Off" Campaign, regular E-recycling events, Earth Day events, Eco-driving training workshops, and a Sustainability Speaker Series. Promotion of and information on sustainability events, workshops, and initiatives should be disseminated through a variety of means, including the campus website.

## 07 Other Campus Actions

Other campus actions to mitigate GHG emissions in the near term include:

- Continue working with the Alameda Contra Costa County Transit District (AC Transit) to identify and implement bus service improvements for all commuting to and from Chabot College;
- Purchase and install water meters in all buildings and irrigation lines to track monthly usage;

- Install waterless urinals and/or low-flow, high efficiency toilets;
- Explore more energy-efficient heating options for pools;
- Conduct regular energy audits;
- Implement double-sided default printing; and
- Reduce waste in packaging and food services while supporting healthy and sustainable practices for growing, processing, marketing and distributing food. Focus on improving the variety and quality of food provided throughout the day on campus and improving gathering spaces across campus.

Table 4-1 below summarizes near-term quantifiable mitigation strategies with full implementation to be phased in over the course of the next ten years. Some strategies, like additional renewable energy generation and improved bicycle facilities and infrastructure are currently in early planning phases with potential implementation within the next 3-5 years.

Annual savings to the college is estimated for year 2020, with the greatest energy and cost savings from renewable energy generation and increased energy efficiency for all campus buildings and facilities. On the other hand, strategies like increased fuel economy and transportation savings from sustainable scheduling are not direct cost savings to the college, rather to the campus community through estimated annual fuel savings as a result of these strategies. Current average gasoline prices for the San Francisco Bay Area region were considered in this analysis, and as a result, the anticipated cost savings in future years may change depending on changes in future gasoline prices.

**Table 4-1 Summary of GHG Reduction Strategies and Impacts**

| Reduction Strategies | GHG Reductions (MtCO2e) | | Initial Cost (Current dollars) | Annual Savings (2020) |
|---|---|---|---|---|
| | 2015 | 2020 | | |
| Composting | -20.5 | -24.1 | N/A | N/A |
| Solar Panels | -528.5 | -528.5 | $7,000,000 | $224,880 |
| Addt'l Renewable Energy Generation | -528.5 | -528.5 | $7,000,000 | $224,880 |
| Enhanced Building Energy Mgmt | -9.9 | -11.7 | $150,000 | $340,105 |
| Increased Fuel Economy | -1,871.0 | -2,428.6 | $0 | TBD |
| Ridesharing + Express Shuttle | -435.1 | -914.6 | $250,000 | $250,000 |
| Sustainable Scheduling (Transp) | -214.0 | -220.0 | $0 | $7,719 |
| Sustainable Scheduling (Energy) | -140.3 | -140.3 | $0 | $27,357 |
| BAU Emissions Baseline | 18,190.8 | 19,470.8 | | |
| Total Offsets | -3,747.8 | -4,796.3 | | |
| Net Emissions Baseline | 14,443.0 | 14,674.5 | $14,440,000 | $1,074,941 |
| *Note: Emissions expressed in terms of metric tons of carbon dioxide equivalents (MtCO2e)* | | | | |

# 5

# Tracking and Measuring Progress

As part of the President's Climate Commitment, Chabot College will update its GHG emissions inventory annually, and provide an update to its Climate Action Plan every two years on the even years. In addition, brief progress reports on the status of Climate Action Plan implementation will be provided every other year, on the odd years. The timetable below illustrates the various check points to fulfill ACUPCC requirements.

**Table 5-1 ACUPCC Progress Reporting Schedule**

| ACUPCC Requirements | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GHG Emissions Inventory | • | • | • | • | • | • | • | • | • | • | • | • |
| Climate Action Plan | | • | | | | | | | | | | |
| Climate Action Plan Update | | | | • | | • | | • | | • | | • |
| Progress Report | | | • | | • | | • | | • | | • | |

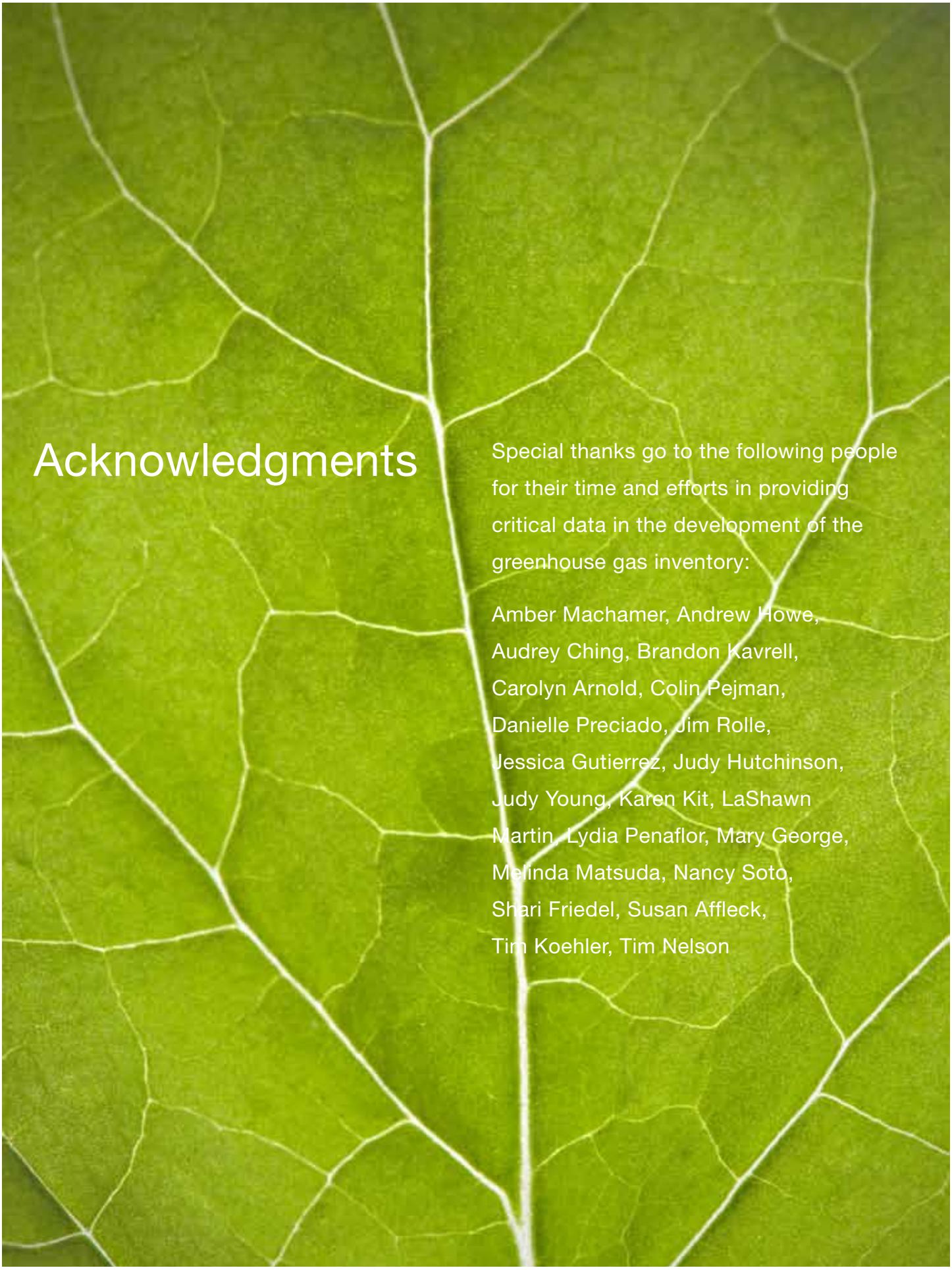
# 6

# Appendices

# Chabot College Greenhouse Gas Emissions Inventory 2005-2008

CHABOT COLLEGE

PB PARSONS BRINCKERHOFF 125 YEARS



# Acknowledgments

Special thanks go to the following people for their time and efforts in providing critical data in the development of the greenhouse gas inventory:

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# Table of Contents

# Executive Summary

Chabot College, a signatory of The American College and University Presidents Climate Commitment (ACUPCC), is committed to achieving campus carbon neutrality. The greenhouse gas (GHG) emissions inventory is the first step in identifying major sources of GHG emissions and a baseline to measure performance of reduction measures against. This report provides a historical and reference case baseline assessment of the college's GHG emissions for fiscal years 2005 to 2008 and estimates trends from 2009 to 2020. Measures to reduce GHG emissions and help set the college on the path to achieve carbon neutrality will be outlined in a subsequent document known as a Climate Action Plan.

The basic framework of the inventory approach is based on generally acceptable principles and guidelines as provided by the ACUPCC and Clean Air-Cool Planet, the Intergovernmental Panel on Climate Change, the World Resource Institute Corporate Accounting and Reporting Standard (The GHG Protocol), and the United States Environmental Protection Agency with adjustments, as necessary, utilizing campus-specific data and inputs when and where possible. As recommended in the ACUPCC implementation guidelines and for ease of comparison among peer institutions, the Clean Air-Cool Planet Campus Carbon Calculator was selected as the tool to conduct the emissions inventory.

Since the District owns and controls all of its operations, all campus GHG-emitting activities were accounted for and analyzed in terms of "scopes" (as defined by the GHG Protocol) as well as "sectors." The following outlines the two analytical perspectives:

## TABLE 1-1: ORGANIZATION OF EMISSION SOURCES

| Emissions by Scope | | Emissions by Sector | |
|---|---|---|---|
| **Scope 1 Emissions**<br>**(Direct Sources)** | • Co-generation Plant<br>• Direct Transportation (Fuel Purchases for District-owned Vehicles)<br>• Agriculture (Fertilizer) | **Transportation** | • Direct Transportation (Fuel Purchases for District-owned Vehicles)<br>• Commuting<br>• Directly Financed Travel (Conference travel, mileage reimbursement, etc.) |
| **Scope 2 Emissions**<br>**(Indirect Sources)** | Purchased Electricity and Natural Gas | **Buildings and Facilities** | • Co-generation Plant<br>• Purchased Electricity and Natural Gas<br>• Transmission and Distribution Losses from Electricity |
| **Scope 3 Emissions**<br>**(Other Indirect Sources)** | • Commuting<br>• Directly Financed Travel (Conference travel, mileage reimbursement, etc.)<br>• Solid Waste<br>• Wastewater<br>• Paper<br>• Transmission and Distribution Losses from Electricity | **Waste and Materials** | • Agriculture (Fertilizer)<br>• Solid Waste<br>• Wastewater<br>• Paper |

In addition to gross emissions analyzed, net emissions were also evaluated through on-campus offsetting activities, such as on-site composting of organic materials and installation of solar photovoltaic panels.

From 2005 to 2008, there was a modest increase in GHG emissions of about 1.9% with some fluctuation in annual gross emissions levels within the four-year span. In 2005, gross emissions were estimated at 17,652.6 MtCO2e and 17,984.6 MtCO2e in 2008. Scope 3 emissions account for a majority of campus GHG emissions, with transportation (primarily from commuting) being the largest sector source, accounting for nearly 85% of all emissions. Despite growth in total gross emission levels, student emissions per capita steadily declined over the same period from 1.01 MtCO2e in 2005 to 0.98 MtCO2e in 2008. Further decline in student emissions per capita is observed in the last year, reaching about 0.92 MtCO2e per student in 2009.

In efforts to understand future baseline trends in GHG emissions under business as usual (BAU) assumptions, reference case projections are estimated from year 2009 through 2020. Without emissions reductions measures, gross GHG emission levels in year 2020 are projected to increase by about six percent as compared to 2005 levels. Chabot College, however, has already taken proactive measures to implement early, energy and cost-saving strategies to reduce its emissions. Development and implementation of renewable energy sources like the 6,000+ solar photovoltaic panels recently installed, coupled with current composting efforts on campus will already help the college reduce its gross emissions by at least three percent in 2020. Further GHG reduction strategies for the near-term and mid- to long-term will be outlined in a campus climate action plan and will help set the college on the path to successfully achieving its carbon neutrality goals.

# Introduction

Chabot College signed The American College and University Presidents Climate Commitment (ACUPCC) on September 15, 2007.[1] As a signatory, Chabot College is publicly committed to achieving campus carbon neutrality. This ambitious goal will be achieved by developing and implementing a comprehensive plan that includes: annually auditing each college's greenhouse gas emissions, taking two or more immediate, tangible actions as identified under the ACUPCC, setting specific targets and timelines for achieving climate neutrality, and making their commitment plans and progress reports publicly available.

The greenhouse gas emission inventory summarizes Chabot College's anthropogenic greenhouse gas emissions for fiscal years 2005 to 2008 and estimates future emissions for the period 2009 to 2020. This inventorying process is the first step in identifying major sources of greenhouse gas emissions of the college and a baseline to measure performance of reduction measures against. A subsequent document, the campus Climate Action Plan, will outline near-term and mid- to long-term measures to reduce GHG emissions and help the college achieve its GHG reduction targets.

[1] American College and University Presidents Climate Commitment, 2008 Annual Report, http://www.presidentsclimatecommitment.org/html/documents/ACUPCC_AR2008_053109LR.pdf

# Developing the Greenhouse Gas Inventory

In May 2009, the Chabot-Las Positas Community College District (District), in consultation with Parsons Brinckerhoff, began preparing a preliminary draft greenhouse gas (GHG) emissions inventory and reference case projections covering years 2005 to 2020 for the Chabot College.

As recommended in the ACUPCC implementation guidelines and for ease of comparison among peer institutions, the Clean-Air Cool Planet (CA-CP) Campus Carbon Calculator was selected as the tool to conduct the emissions inventory.

The basic framework of the inventorying approach is based on generally accepted principles and guidelines as provided by the ACUPCC and Clean-Air Cool Planet, the Intergovernmental Panel on Climate Change (IPCC), the World Resources Institute Corporate Accounting and Reporting Protocol ("The GHG Protocol"), and United States Environmental Protection Agency (USEPA) with adjustments, as necessary, utilizing campus-specific data and inputs when and where possible.

Although there are naturally occurring greenhouse gas emissions, such as brush fires or plant decay, the inventory focuses on the six greenhouse gases as result of human activity. These six greenhouse gases are defined as carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6). For consistency purposes in reporting, results will be expressed in carbon dioxide equivalents (CO2e). Greenhouse gases expressed in units of CO2e calculates the impact of other greenhouse gases by their global warming potential (GWP). GWP is the ratio of the warming that would result from the emission of

one kilogram of a greenhouse gas to that from the emission of one kilogram of carbon dioxide over a fixed period of time, such as 100 years. For example, 1000 kilograms (one metric ton) of CO2 is equivalent to one metric ton of CO2e. One metric ton of CH4, however, is equivalent to 23 metric tons of CO2e.[2]

Consistent with The GHG Protocol, the goals and principles of the GHG inventorying effort are to:

- **Manage GHG risks and identify reduction opportunities.** Use inventory and data collected to identify risks associated with GHG constraints in the future and identify cost effective emissions reduction opportunities. Set GHG reduction targets that are ambitious yet achievable, in addition to measuring and reporting progress procedures.
- **Public reporting and participation in voluntary GHG programs.** Facilitate voluntary stakeholder reporting of GHG emissions and progress towards GHG targets, and reporting to appropriate government and non-governmental reporting programs, including GHG registries such as the Climate Registry.
- **Participate in mandatory reporting programs.** Facilitate participation in government reporting programs at the national, regional, or local level where appropriate.
- **Participate in GHG markets.** Support internal GHG trading programs, and participate in external cap and trade allowance trading programs where appropriate and facilitate in the calculation of carbon and applicable GHG fees or taxes.
- **Recognize early voluntary action.** Provide information to support baseline and enable credit for early actions.

[2] Intergovernmental Panel on Climate Change, Third Assessment Report, 2001.

## Accounting and Reporting Principles

**Relevance**
Ensure that the GHG inventory appropriately reflects the GHG emissions of the District and that the data collected is utilized to appropriately inform decision makers. Data collection should take place within one of the following boundaries: organizational structures, operational boundaries or business context of activities and people involved.

**Completeness**
All GHG emission sources and activities within the identified inventory boundary should be accounted for and reported on. A good faith effort must be made to provide a complete, accurate, and consistent accounting of emissions. Any specific exclusions should be clearly disclosed and justified.

**Consistency**
Use of consistent methodologies will allow for meaningful comparisons of emissions over time to track and identify any trends and assess District performance. Any changes to data, inventory boundary, methods or any other relevant data or factors should be clearly documented.

**Transparency**
All relevant issues, including assumptions, data, and appropriate references to the accounting and calculation methodologies should be documented in a factual and coherent manner.

**Accuracy**
Ensure that the quantification of GHG emissions is neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as much as possible. The data should be sufficiently precise to enable intended users to make decisions with reasonable assurance that the reported information is credible.

# Boundaries

## Organizational Boundaries

Chabot College, located in Hayward, California, primarily serves the residents of Alameda County in the East Bay area, including San Leandro, San Lorenzo, and Union City. Built around a central plaza and surrounded by trees, Chabot is a walkable campus with the majority of buildings centrally located and parking lots pushed to the outer edge of campus. Chabot College is accessible via public transportation including the Bay Area Rapid Transit District (BART) and the Alameda Contra Costa Transit District (AC Transit). The GHG-emitting activities at Chabot College were accounted for separately from Las Positas College and the District office. The aggregate of the emissions from the District office, Chabot College and Las Positas College comprise the total District emission budget.

## Operational Boundaries

GHG emission sources are analyzed in terms of "scopes" as defined by the GHG Protocol, and will also be described by sector, covering buildings, transportation and materials and waste. Energy and electricity will cross-cut these sectors and will be described throughout the following sections.

The three scopes of analysis cover direct and indirect emissions as follows:

### *Direct Emissions*

Direct emissions, also defined as "scope 1 emissions," are from sources directly owned or operated by the institution. Examples of such sources include combustion of fossil fuels in college-owned facilities like cogeneration plants, or from District-owned vehicles. Other direct sources may also include fugitive emissions from leakage of refrigeration or air conditioning equipment, on-campus agriculture including fertilizer applications, and livestock husbandry.

### *Indirect Emissions*

Indirect emission sources cover "scope 2 emissions" and "scope 3 emissions." Scope 2 emissions are defined as sources neither owned nor operated by the institution but whose products are directly linked to on-campus energy consumption. Examples of scope 2 emission sources include purchased electricity (i.e. from electricity retailers like Pacific Gas & Electric), steam and chilled water.

Scope 3 emissions cover all other indirect emissions from sources that are neither owned nor operated by the institution, but are either directly financed (i.e. air travel or rental car reimbursements from the District), or linked to the campus through influence or encouragement (i.e. air travel for international study program, or regular student, faculty, staff commuting to and from campus). Other scope 3 emission sources may include solid waste (off-campus incineration or landfill), waste water, upstream emissions from directly financed purchases like paper production, and transportation and distribution losses from purchased energy.

Scope 1 and 2 emissions are typically the minimum required and serve as the basis of many reporting protocols. The ACUPCC, however, requires that all scope 1 and 2 emissions are reported and scope 3 emissions from commuting and directly financed air travel “to the extent that the data is available” are also inventoried. Institutions are also encouraged to report all other scope 3 emissions where data is available and large enough to be reduced. In addition to direct and indirect emissions, on-campus carbon reduction projects have also been evaluated. These include on-site composting and waste reduction programs.

# Historical and Reference Case GHG Emissions

The college's anthropogenic GHG emissions and offsets were estimated for the period from 2009 to 2020. Figure 1-1 illustrates historical GHG emissions and reference case projections through year 2020. Historical GHG emissions from 2005 to 2008 were developed using a set of generally accepted principles and guidelines as set forth by the ACUPCC, the Intergovernmental Panel on Climate Change (IPCC), the World Resources Institute Corporate Accounting and Reporting Standard (The GHG Protocol), and United States Environmental Protection Agency (US EPA) with adjustments, as necessary, to provide campus-specific data and inputs when and where possible. The initial reference case projections (2009-2020) are based on historical trends and transparent assumptions in facility square footage, population, stationary source combustion activities, electricity consumption, fuel use, travel patterns and other GHG-emitting activities.

**Figure 1-1: Chabot College Historical and Reference Case Gross GHG Emissions, 2005-2020**

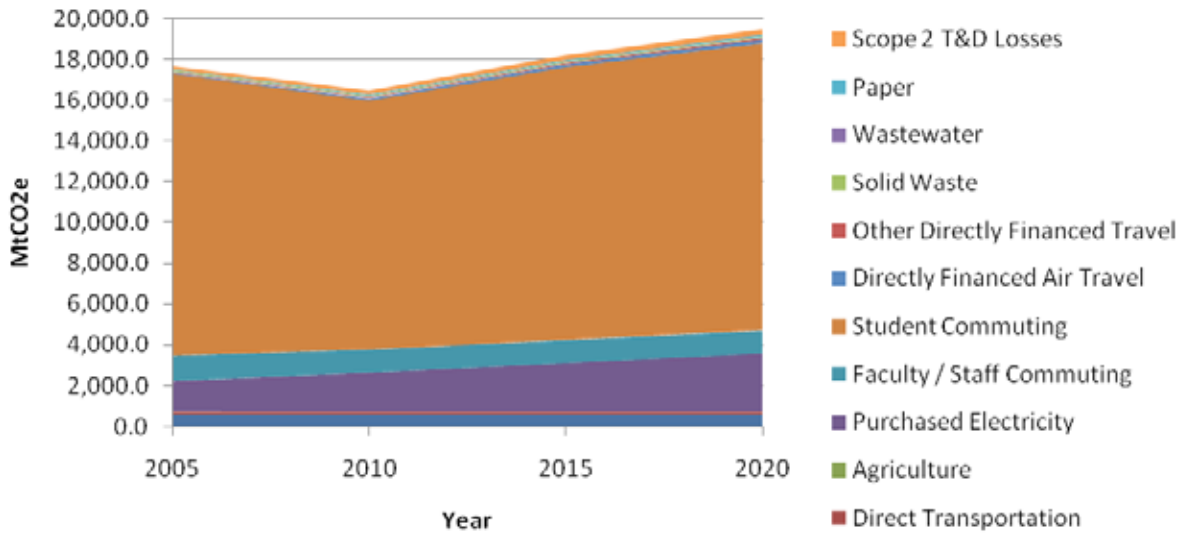


**Table 1-2 Chabot College Historical and Reference Case GHG Emissions, by Scope**

| (MTCO2e) | 2005 | 2006 | 2007 | 2008 | 2009 | 2015 | 2020 |
|---|---|---|---|---|---|---|---|
| **Scope 1 Emissions** | **736.9** | **720.9** | **715.8** | **728.0** | **728.2** | **717.8** | **716.3** |
| Co-Gen Electricity | 597.7 | 597.7 | 597.7 | 597.7 | 597.7 | 597.7 | 597.7 |
| Direct Transportation | 130.9 | 116.4 | 111.3 | 125.1 | 125.3 | 119.9 | 118.6 |
| Agriculture | 8.3 | 6.8 | 6.8 | 5.2 | 5.2 | 0.2 | 0.0 |
| **Scope 2 Emissions** | **1,458.3** | **1,574.4** | **1,710.9** | **1,458.6** | **1,946.6** | **2,374.2** | **2,846.6** |
| Purchased Electricity | 1,458.3 | 1,574.4 | 1,710.9 | 1,458.6 | 1,946.6 | 2,374.2 | 2,846.6 |
| **Scope 3 Emissions** | **15,457.4** | **15,070.2** | **15,125.4** | **15,798.0** | **14,138.8** | **15,098.8** | **15,907.9** |
| Commuting | 15,105.9 | 14,735.8 | 14,748.3 | 15,362.2 | 13,715.9 | 14,516.6 | 15,199.5 |
| Directly Financed Travel | 88.7 | 84.6 | 108.5 | 128.7 | 127.0 | 205.9 | 269.5 |
| Solid Waste | 76.5 | 63.3 | 62.4 | 70.2 | 70.2 | 59.1 | 53.0 |
| Wastewater | 7.7 | 5.1 | 5.4 | 5.9 | 5.6 | 3.3 | 1.6 |
| Paper | 34.4 | 25.7 | 31.6 | 86.7 | 27.6 | 79.1 | 102.8 |
| Scope 2 T&D Losses | 144.2 | 155.7 | 169.2 | 144.3 | 192.5 | 234.8 | 281.5 |
| **Total Gross Emissions** | **17,652.6** | **17,365.5** | **17,552.1** | **17,984.6** | **16,813.6** | **18,190.8** | **19,470.8** |
| Additional | -13.5 | -15.4 | -14.8 | -15.4 | -15.4 | -20.5 | -24.1 |
| Non-Additional | 0.0 | 0.0 | 0.0 | 0.0 | -528.5 | -528.5 | -528.5 |
| **Net Emissions** | **17,639.1** | **17,350.1** | **17,537.3** | **17,969.2** | **16,269.7** | **17,641.8** | **18,918.2** |

Table 1-2 provides a detailed summary of historical (2005-2008) and reference case projection (2009-2020) GHG emissions for the college. GHG-emitting activities are subdivided into three scopes. Scope 1 includes emissions from on-campus stationary sources like the co-generation plant, direct transportation which accounts for the fuel combustion of District-owned vehicles and agricultural sources (primarily fertilizer use) on campus. Scope 2 emissions include indirect sources like purchased electricity, and scope 3 emissions include student, faculty and staff commuting, other directly financed travel (i.e. conference reimbursements or international student exchange programs), solid waste, wastewater, paper and transmission and distribution losses from scope 2.

Principle sources of emissions are transportation (including commuting and direct and directly financed travel) and purchased electricity (including transmission and distribution losses) accounting for 85% and 14% of the Chabot College's gross GHG emissions, respectively.

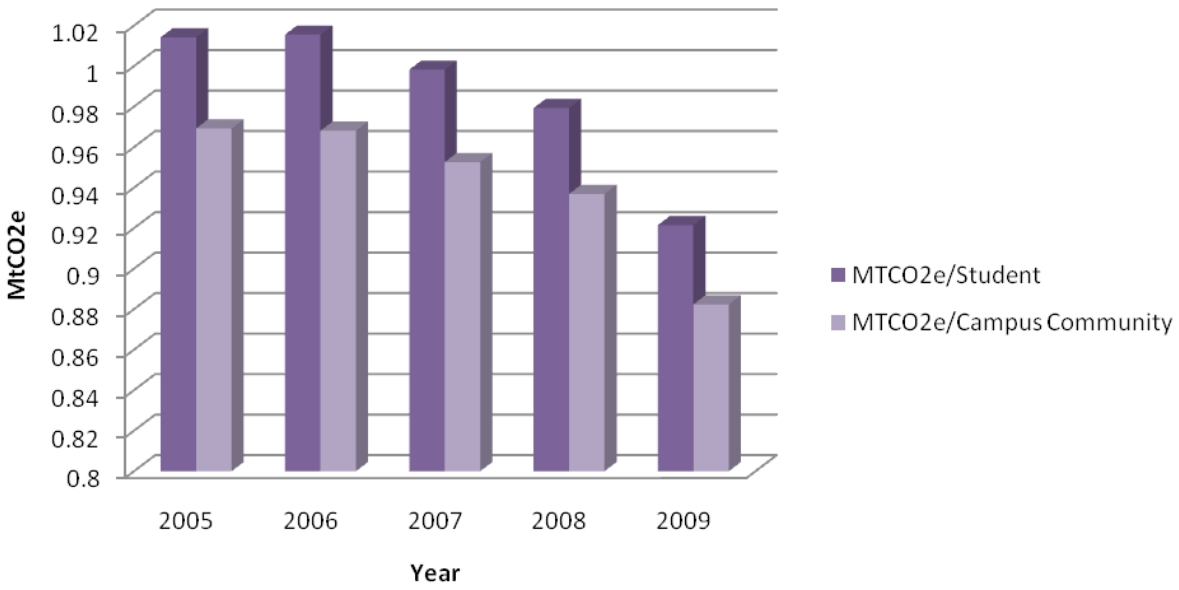
As outlined in Table 1-1, under the reference case projections, Chabot College's gross GHG emissions would continue to grow unless the college actively pursues reduction strategies. Without reduction strategies the GHG emissions are projected to increase to about 19,471 metric tons of carbon dioxide equivalent ($MtCO_2e$) by 2020, about 10% higher than 2005 levels. Despite the increase in the student population from 17,405 in 2005 to 18,365 in 2008 (including summer students) and gross total GHG emissions for the campus over the same period, per capita emissions have steadily declined. In 2005, the

emissions per student were estimated at about 1.01 $MtCO_2e$. In 2008, the emissions per student slightly decreased to about 0.98 $MtCO_2e$, and through 2009 continued to decrease, reaching 0.92 $MtCO_2e$ per student. When observing per capita emissions for the entire campus community, including faculty and staff, per capita emissions have also declined from 0.97 $MtCO_2e$ in 2005 to 0.93 $MtCO_2e$ in 2008, with further reductions in per capita emissions in 2009, estimated at about 0.88 $MtCO_2e$ per capita.

The decline in per capita emissions from 2005 to 2009 is attributed to a number of early action measures the College has taken to reduce energy consumption and GHG emissions. With current offsetting strategies such as on-site generation of renewable power with the installation of 1 megawatt of solar panels and on-site composting programs, net emissions are projected to be reduced by 3% in 2020, as compared to the business as usual 2020 reference case, without reduction strategies. Further reductions to achieve carbon neutrality would include, but would not be limited to:

- Building energy reduction measures;
- Providing information and access to ridesharing or car sharing programs;
- Developing additional renewable power generation systems;
- Parking pricing;
- Working with local transit agencies to develop park and ride lots and improve service that meets student and faculty schedules;
- Providing resources for at least one dedicated sustainable campus and carbon neutral coordinator for each college; and
- Ongoing tracking and recording of GHG emitting activities.

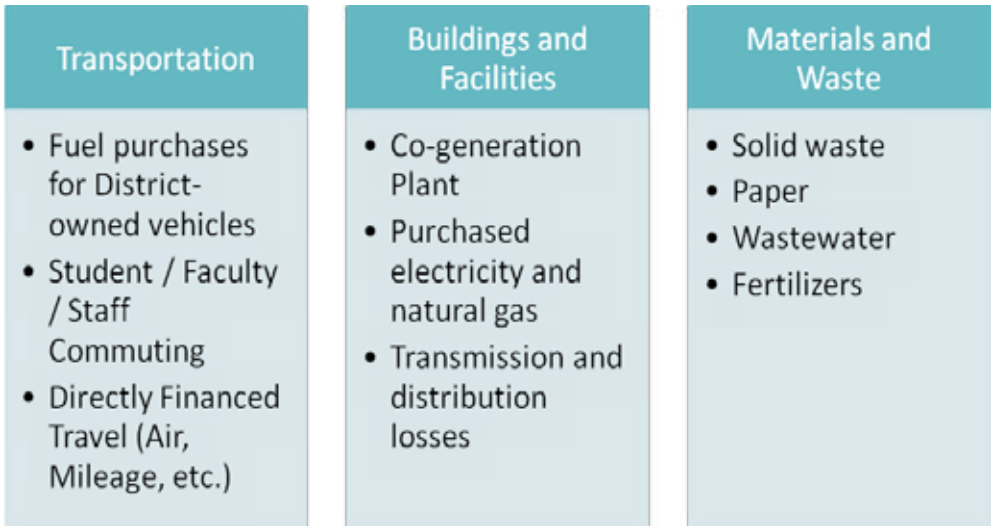
**Figure 1-2: Chabot College Per Capita Emissions, 2005-2009**



# Inventory Results by Sector

Inventory results below are presented by sector, with sources analyzed in the following three categories: transportation, buildings and facilities, and materials and waste.

Figure 1-3 illustrates gross GHG emissions by sector for Chabot College for years 2005 through 2008 and averages over the course of the four years. As a commuter campus, transportation is the largest source of emissions, followed by buildings and facilities, and materials and waste. Figure 1-4 depicts the average breakdown of emission sources over four-year period. On average, transportation accounted for nearly 85% of total gross GHG emissions from 2005 to 2008, with a majority of those emissions derived from student commuting. The remaining sources of emissions include buildings and facilities (about 14%) and materials and waste (about 1%).



# Buildings and Facilities

Buildings and facilities is one of the primary sources of greenhouse gas emissions at Chabot College after transportation. Major sources of emissions under the buildings and facilities sector include emissions from the on-campus co-generation plant, purchased electricity and its associated transmission and distribution losses. Waste from construction activities has also contributed to GHG emissions, and are covered under waste and materials.

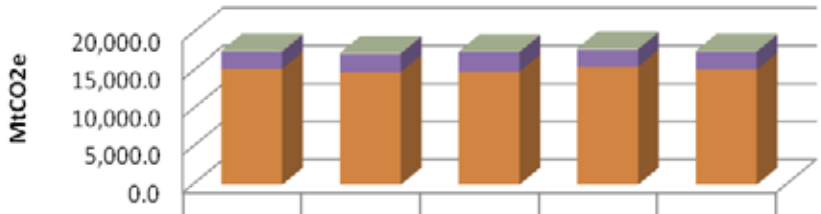
The co-generation plant on-site is equipped with four natural gas powered engines. Oil is changed once a month in each engine which generates about 432 gallons of waste oil annually. Waste heat produced from the co-generation plant is used to heat the College's Olympic size pool. Emissions generated from this on-campus stationary source equal nearly 600 $MtCO_2e$ per year.

From 2005 to 2007, emissions from electricity consumption on campus grew about 17% from 1,458.0 $MtCO_2e$ in 2005 to 1,710.9 $MtCO_2e$ as the campus also expanded from 630,856 square feet to 636,856 square feet in 2007. From 2007 to 2008, however, the electricity consumption decreased due to full installation and use of an on site co-generation plant. Future electricity demand from the grid is anticipated to further decrease with the recent installment of 1 megawatt of solar photovoltaic panels with the ability to satisfy approximately 20-25% of the current campus electricity needs. Additional renewable forms of energy, including wind power, will also be explored in the near future.

## Transportation

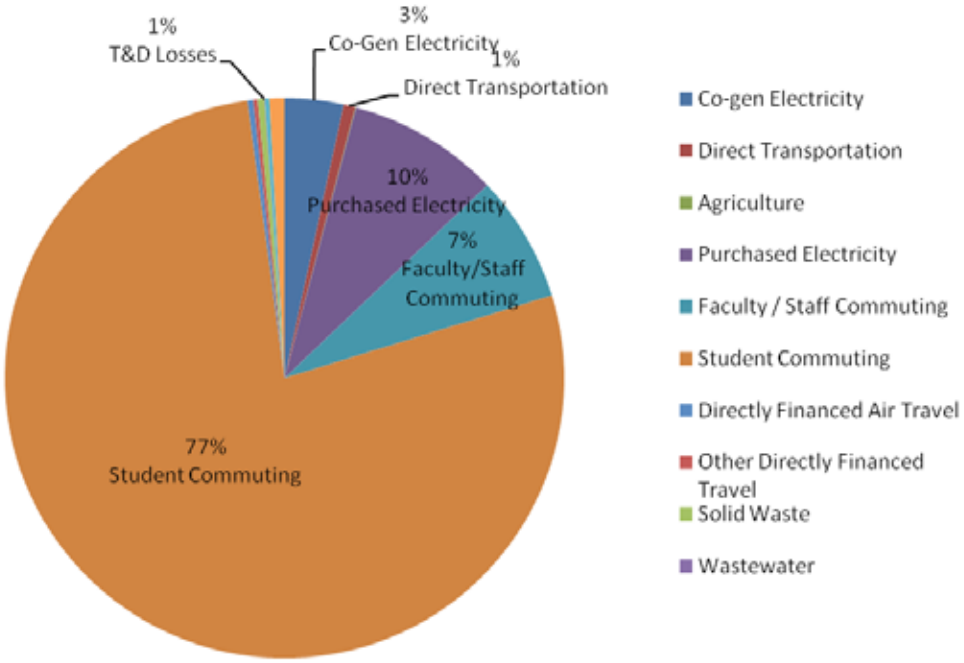
In the San Francisco Bay Area region, transportation is the largest single source of greenhouse gas emissions, accounting for about 41% of the region's total emissions. For the Chabot-Las Positas Community College District, transportation accounts for about 80% of total greenhouse gas emissions District-wide.

**Figure 1-3: Chabot College Gross Emissions, By Sector (2005-2008)**




| | 2005 | 2006 | 2007 | 2008 | 05-08 Ave |
|---|---|---|---|---|---|
| MATERIALS AND WASTE | 126.9 | 100.9 | 106.2 | 168.0 | 125.5 |
| BUILDINGS AND FACILITIES | 2,200.2 | 2,327.8 | 2,477.8 | 2,200.6 | 2,301.6 |
| TRANSPORTATION | 15,325.5 | 14,936.8 | 14,968.1 | 15,616.0 | 15,211.6 |

**Figure 1-4: Chabot College Gross GHG Emissions by Sector, 2005-2008 Average ($MtCO_2e$)**

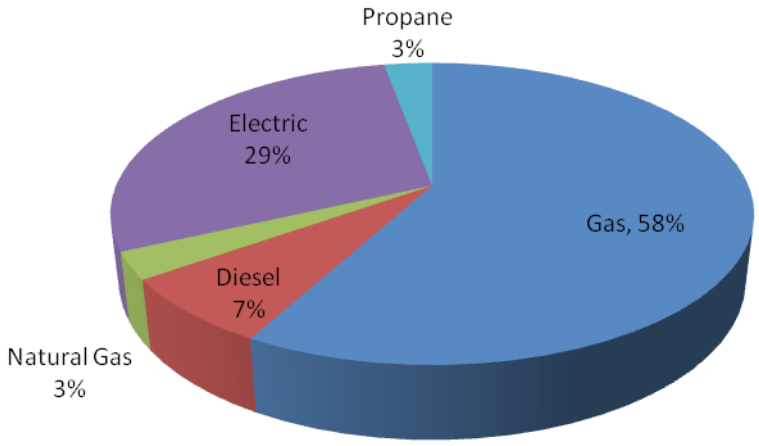



Comparatively, transportation emissions account for about 85% of total GHC emissions at Chabot College. Elements of the transportation footprint include fuel consumption for District-owned vehicles at Chabot College, directly financed travel (i.e., conference reimbursements covering mileage by air, personal vehicle, car rental, shuttle or taxi, and bus), and student, faculty and staff commuting information. Over the course of these four years, transportation emissions grew steadily from about 15,106 $MtCO_2e$ in 2005 to about 15,362 $MtCO_2e$ in 2008.

Diesel and gasoline fuel purchases in addition to a vehicle inventory by campus were provided by the Director of Maintenance and Operations covering all gasoline, diesel and natural gas vehicles. Chabot College's inventory consisted of 69 vehicles including: 40 gasoline fueled vehicles, 5 diesel powered vehicles, 2 natural gas power vehicles (campus garbage trucks), 20 electric powered vehicles and 2 propane powered vehicles. Fuel consumption data for the electric and propane powered vehicles were not available. However, gasoline, diesel and natural gas fuel purchasing reports showed modest changes from 2005 to 2008. Respectively, -776 gallons, +66 gallons, and +9 gallons over the course of the four-year period for gasoline, diesel and natural gas. With the decline in gallons of gasoline purchased, associated emissions from direct transportation also declined from 130.9 $MtCO_2e$ in 2005 to 125.1 $MtCO_2e$ in 2008.

Emissions from directly financed travel were determined through a detailed analysis of all travel-related expense reports by campus location, broken down by airfare, car rental, shuttle or taxi, bus/charter and mileage reimbursements. No data were available to determine mileage from public transportation. In determining airfare mileage, round trip airfare

**Figure 1-5: Chabot College Vehicle Inventory by Fuel Type**




was calculated utilizing airport codes and an air mileage calculator, WebFlyer.com. Miles from car rental assumed an average cost of $75 per day and an average of 100 miles driven per day. Total costs were divided by 75 to obtain the number of days and then multiplied by 100 to obtain total mileage by car rental. For shuttles and taxis, the average fare in the Bay Area ranges from $1.967/mile to $3.83/mile. An average rate of $2.50/mile was assumed and total costs were divided by this rate to estimate mileage from shuttles and taxis. Personal mileage reimbursements were estimated using the following average standard mileage rates provided by the U.S. Internal Revenue Service:

| | |
|---|---|
| FY04-05 | $0.39/mile |
| FY05-06 | $0.455/mile |
| FY06-07 | $0.465/mile |
| FY07-08 | $0.495/mile |
| FY08-09 | $0.5675/mile |

### *Chabot College Commuter Survey*

A campus-wide commuter survey for faculty, staff and students was conducted in the summer and fall of 2009. Based on weighted averages from both commuter surveys, about 74% of respondents drove alone to campus with 9% carpooling. The remaining responses traveled to and from the campus via AC Transit bus (about 12%), rail (less than 1%), motorcycle or walked. Out of those that drive to campus, the average one-way commute distance was 13.4 miles and average vehicle fuel economy is about 24.7 miles per gallon with about 62% of respondents driving small to midsized vehicles, not including hybrids. About 3% of respondents reported use of hybrid vehicles.

In addition to collecting information about the mode, distance, and frequency of travel, mode choice factors for campus commuters also were included in the survey. When choosing how to get to campus, the most important factors were travel time (73%) followed by convenience or flexibility (55%), reliability (32%) and cost (31%). Other factors included ability to make stops on the way to campus or home, comfort and safety, stress, and reducing pollution or conserving energy.

For those who usually drive alone to campus, 30% of respondents said they would be willing to try online courses. About 32% of respondents also said they would be willing to try taking transit to campus or would be willing to carpool. One of the most common reasons why students, faculty, or staff don't currently carpool is because 44% have responded that other people do not match the same schedule or route, and 35% of respondents said they work irregular hours or attend late classes.

# Materials and Waste

Materials and waste comprise less than 1% of total GHG emissions at Chabot College. From 2005 to 2008, materials and waste contributed about 127 $MtCO_2e$ to about 168 $MtCO_2e$, growing an average of 14.5% per year. Sources of emissions covered under materials and waste includes solid waste, water/waste water, paper consumption and fertilizer usage. Waste diversion is also covered under this category, such as recycling and on-site composting (which also contributes to emission offsets, or on-site emissions reduction measures).

## Solid Waste

Solid waste information was determined using annual reports to the California Integrated Waste Management Board provided by the Office of Maintenance and Operations. From 2003 to 2007, Chabot College's waste stream (materials disposed in landfills) has decreased since the original Integrated Waste Management Plan was submitted due to several factors including but not limited to:

- Expansion of several materials recovery programs has resulted in less disposed surplus equipment, cardboard, mixed paper, scrap metal and scrap wood. In addition to materials recovery and exchange, other waste diversion programs include business source reduction, beverage containers, grasscycling, and on-site composting;
- Implementation of a new inkjet reuse/refill program and new commingled recycling program in 2003 have resulted in less disposed inkjet cartridges; and
- More careful data tracking, more precise estimates, and more accurate data conversions have contributed to a decrease in the reported disposal tonnage.

**Table 1-3: Chabot College Waste Information, 2003-2007**

| (tons) | 2003 | 2005 | 2006 | 2007 | 2007 |
|---|---|---|---|---|---|
| Total Waste Diverted | 442.6 | 375.4 | 527.1 | 1,152.1 | 155.7 |
| Total Waste Disposed | 262.3 | 272.5 | 224.7 | 221.8 | 50.8 |
| Total Tonnage Generated | 704.9 | 647.9 | 751.8 | 1,373.9 | 206.5 |
| Overall Diversion Percentage | 62.8% | 57.9% | 70.1% | 83.9% | 75.4% |

Note: 2004 report was not available.

Over the course of the five-year reporting period, waste generation increased from 2003 to 2007 (with the exception of 2005), largely due to the construction of new or modernized facilities on campus. However, at the same time, waste diversion continually improved, remaining high above the state's requirement of 50%. Waste generated in 2005 is less than subsequent and following years due to less construction and therefore less debris. After completion of the construction program by 2015, total waste tonnage generated is expected to decrease significantly and return to normal levels.

In 2004, a food waste composting program was successfully launched, and in 2006, Chabot College began self-hauling material from the single stream recycling program and the District Purchasing Department devoted time and resources to organize a large sale of surplus district equipment and furniture, that had been in storage for several years. In 2007, the high diversion rate of 83.9% accounts for the large quantities of asphalt and concrete which were recycled from construction projects.

Other resources committed to implementing the Integrated Waste Management Plan include time and funds for a recycling coordinator, a waste management technical consultant to help analyze disposal and recovery data records, custodial staff to collect recyclable materials, and operations staff to collect and/or haul scrap metal, surplus equipment donated, polystyrene, wood, paint, tires and batteries.

Hazardous waste materials, such as electronic wastes, used oil or asbestos-laden materials were not included in the total tonnage generated but are covered under existing waste diversion programs for proper handling. Annual reports for 2008 and 2009 were not yet available during development of the GHC Study.

## Composting

On-site composting and mulching are part of Chabot College's waste diversion program, and have been a consistent part of the campus's sustainability efforts. From 2003 to 2007, composting efforts on the Chabot's campus have remained high, in the range of 29 to 40 tons per year.

## Fertilizer Usage

Fertilizer usage from 2005 to 2009 consisted of a spring application of 21-7-14 on all turf and subsequent applications of 21-0-0 through the summer and fall on athletic fields. Pounds of nitrogen decreased from 2005 to 2006 and then again in 2007 to 2008 due to the conversion of the natural turf football field to a synthetic material, and the conversion of the natural turf soccer field into a parking lot. At the same time, the football practice field was converted into a soccer field in which the turf required far less nitrogen. In addition to the use of synthetic fertilizers, organic fertilizers on the Chabot campus consist of topdressing athletic fields after aerating them. The pounds of nitrogen as a result of the organic fertilizer use also saw a decrease from 2005 to 2008 due to the field conversions mentioned above.

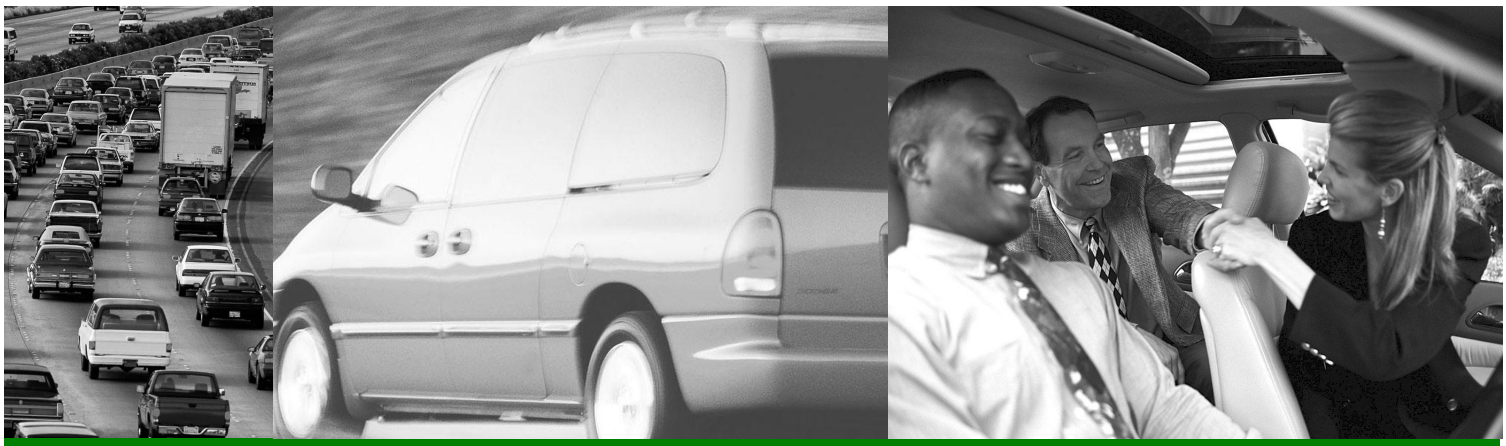
## Waste Water

Water and waste water information was collected through monthly utility bills provided by the Director of Maintenance and Operations. Water consumption covered commercial water use, irrigation and sewer. From 2005 to 2008, water usage decreased from about 15 million gallons to 11.5 million gallons. Reasons for this decrease are not known at this time but it is anticipated that the high levels of water consumption in 2005 were a result of filling and flushing out the pool on campus.

## Paper

Paper consumption at Chabot College was obtained through reports provided by Staples covering all paper purchases from 2005 to 2009 to date. Data were then sorted by year, paper classification, recycled content and weight to determine total pounds of paper purchased per year. Emissions from paper consumption increased from 34.4 $MtCO_2e$ in 2005 to 86.7 $MtCO_2e$ in 2008.

# CHABOT COLLEGE



## EMPLOYEE TRANSPORTATION SURVEY RESULTS / AUGUST 2009

This report was produced by

**511 Rideshare**
**70 Washington St, Suite 407**
**Oakland, CA 94607**
**(510) 273-3600**

# CHABOT COLLEGE

**Table of Contents**

**Chabot College**
**25555 Hesperian Boulevard, Hayward, CA**
**Employee Transportation Survey Results**
**August 2009**

This survey is designed to help you improve your employees' commute. Shorter, less stressful commutes benefit employees individually. They also benefit your organization, as your employees arrive more rested. And, evidence suggests that employers whose employees use ridesharing alternatives have reduced absenteeism and improved employee retention. Finally, improving your employees' commute benefits the community. Encouraging your employees to rideshare removes cars from the road, reducing congestion and improving air quality.

At Chabot College, 120 of the 7000 employees in your organization participated in the on-line survey for a response rate of 1.7 percent. This survey was conducted from July 13 through July 31, 2009.

In the following sections, boldface questions are taken verbatim from the survey that was given to employees. Unless otherwise specified, the wording within in the tables is also taken directly from the survey.

## Section 1: Work Schedule

Work schedules are a powerful way to influence mode choice. People who work compressed schedules eliminate trips completely on the days that they don't work, and often move their commutes out of the peak period on the days that they work. Part-time employees are less likely to carpool as the pool of available partners is smaller, and transit may be less convenient for them. Consider how your employees' schedules fit with those of nearby employers.

Are you full time or part time? (Table 1)

**Table 1 - Employment Status**

| | | Number | Percent |
|---|---|---|---|
| Status | Full time (30 hrs per week or more or 12 units or more) | 92 | 77% |
| | Part time (less than 30 hrs per week or less than 12 units) | 28 | 23% |
| | Total | 120 | 100% |

If employed full-time, what is your schedule? (Table 2)

**Table 2 - Work Schedule**

| | | Number | Percent |
|---|---|---|---|
| Schedule | Fixed work/class schedule (8 to 5; M-F; or equivalent) | 51 | 52% |
| | Compressed work week (9/80, 4/40, or equiv.) | 2 | 2% |
| | Work/class schedule changes (you choose when to start/stop class) | 28 | 28% |
| | Work/class schedule changes (employer chooses when you start/stop class) | 15 | 15% |
| | Shift work | 3 | 3% |
| | Total | 99 | 100% |

What time did you usually get to work this week? (Table 3)

For most types of business, the majority of employees start work between 6 a.m. and 10 a.m. There are two strategies related to work schedule that can reduce congestion. One is to move trips out of the peak period by allowing employees to flex their schedules toward the early or late end of the peak; the other is to concentrate arrival times to make shared rides more likely. Carpooling rates are normally higher during the "peak of the peak" (e.g., 7:30 to 8:30 am). A high concentration of employees arriving during the peak of the peak may increase carpool matching potential.

**Table 3 - Work Arrival Times**

| | | Number | Percent |
|---|---|---|---|
| Time | Before 6 AM | 3 | 3% |
| | 6:00 to 6:59 AM | 9 | 8% |
| | 7:00 to 7:59 AM | 28 | 24% |
| | 8:00 to 8:59 AM | 38 | 32% |
| | 9:00 to 9:59 AM | 21 | 18% |
| | 10:00 AM or later | 20 | 17% |
| | Total | 119 | 100% |

What time did you usually leave work this week? (Table 4)
Similarly, most employees leave work between 3 p.m. and 7 p.m., with the peak period between 5 p.m. and 6 p.m. However, departure times are often perceived as less regular than arrival times.

**Table 4 - Work Departure Times**

| | | Number | Percent |
|---|---|---|---|
| Time | Before 3 PM | 19 | 16% |
| | 3:00 to 3:59 PM | 7 | 6% |
| | 4:00 to 4:59 PM | 29 | 25% |
| | 5:00 to 5:59 PM | 27 | 23% |
| | 6:00 to 6:59 PM | 12 | 10% |
| | 7:00 PM or later | 24 | 20% |
| | Total | 118 | 100% |

**Section 2: How Employees Get To Work**

To develop effective strategies to encourage the use of commute alternatives, you need to understand how your employees currently commute.

How did you get to work each day this week?

- Table 5 shows the aggregated commute mode for Monday through Sunday of the survey week
- Table 6 provides a detailed breakdown of employee commute mode for each day of the survey week

Your goal is to reduce the drive-alone rate and increase the use of commute alternatives. Your impact on congestion, parking and pollution will be greatest by getting commuters into modes such as transit, walking and bicycling that do not involve bringing a vehicle.

Look for commute alternatives that seem to be under-used. Which commute alternatives are currently most popular? Employee commute distance (Table 11) and home location (Tables 23 and 24) may help to explain employee commute mode choices. What services and incentives can you offer to increase the use of each alternative mode? Does employee commute mode vary significantly from day to day? If so, consider how you can reduce the drive alone rate on days where it is higher than normal.

## Commute Mode Monday Through Sunday Combined (Table 5)

**Table 5 - Commute Mode Monday Through Sunday Combined**

| | | Percent |
|---|---|---|
| Mode | Drove alone | 78% |
| | Carpooled (2 to 6 people) | 8% |
| | Vanpooled (7 to 15 people) | - |
| | Took public transit - bus | 9% |
| | Took public transit - light rail | 1% |
| | Took public transit - commuter rail | 1% |
| | Took a shuttle | - |
| | Rode a motorcycle | 1% |
| | Biked | 0% |
| | Walked | 2% |
| | I had a compressed work week day off | 1% |
| | Total | 100% |

Note: This table excludes instances where respondents selected “I didn’t work (because of day off, vacation, sick, other)”

## Daily Commute Modes (Table 6)

**Table 6 - Daily Commute Modes**

| | Mon | Tue | Wed | Thu | Fri | Sat | Sun |
|---|---|---|---|---|---|---|---|
| Drove alone | 70% | 77% | 72% | 76% | 55% | 3% | - |
| Carpooled (2 to 6 people) | 10% | 5% | 9% | 5% | 5% | - | - |
| Vanpooled (7 to 15 people) | - | - | - | - | - | - | - |
| Took public transit - bus | 9% | 9% | 8% | 9% | 5% | - | - |
| Took public transit - light rail | - | 2% | 1% | 1% | - | - | - |
| Took public transit - commuter rail | 1% | 1% | 1% | - | - | - | - |
| Took a shuttle | - | - | - | - | - | - | - |
| Rode a motorcycle | 1% | 1% | 2% | 1% | 1% | - | - |
| Biked | 1% | - | - | 1% | - | - | - |
| Walked | 1% | 2% | 1% | 2% | 2% | - | - |
| I had a compressed work week day off | 2% | - | 1% | - | 1% | - | 1% |
| I worked from home for a regular work day | 1% | 1% | 1% | 1% | 2% | 1% | - |
| I worked at a different location than my usual place | - | - | 1% | - | - | - | - |
| I didn't work/go to school (because of day off, vacation, sick, other) | 5% | 3% | 4% | 4% | 30% | 97% | 99% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

Do you also use other ways to get to work for the short parts of your whole trip (for example, if you walk to a BART station, select "walk")? What are they? (select up to 3) (Table 7)

**Table 7 - Supplemental Commute Mode**

| | | Number | Percent |
|---|---|---|---|
| Mode | Drove alone | 41 | 69% |
| | Public transit - bus | 13 | 22% |
| | Carpool (2 to 6 people) | 8 | 14% |
| | Public transit - light rail | 5 | 8% |
| | Biked | 2 | 3% |
| | Public transit - commuter rail | 1 | 2% |
| | Rode a Motorcycle | 0 | 0% |
| | Shuttle | 0 | 0% |
| | Vanpool (7 to 15 people) | 0 | 0% |
| | Total Respondents (N)* | 59 | N/A |

*Note: Because respondents were invited to select more than one answer, the percentages for each factor add up to more than 100%.

If you get to work in a carpool or vanpool, how many people are in the vehicle (including yourself)? (Table 8)

This question makes the distinction between carpools, with 2-6 passengers, and vanpools, with 7-15 passengers (often in a leased or company owned 7-15 passenger van). Using this distinction, 4 people commuting together in a mini-van would be considered a carpool, not a vanpool.

**Table 8 - Rideshare Occupancy Rates**

| | |
|---|---|
| **Average Carpool Ridership**<br>Average number of people per vehicle in carpools (2 to 6 people) | 2.6 people per vehicle |
| **Number of employees commuting by vanpool**<br>Number of people who said that they vanpool at least once a week | None |
| **Average Vanpool Ridership**<br>Average number of people per vehicle in vanpools (7 to15 people) | N/A |
| **Combined Carpooling and Vanpooling Ridership**<br>Averages all responses to this question | 2.6 people per vehicle |

## If you drive to work, what kind of vehicle do you drive? (Table 9)

While using an alternate mode such as biking, carpooling, or transit is the best way to reduce the carbon footprint of your company, the type of vehicles and gas mileage of drive-alone commuters (and carpoolers, for that matter) can have a significant impact on the emissions being produced in getting to and from work.

It should be noted that if you are primarily concerned with impacts of transportation demand – such as parking availability and congestion on roads – they type of vehicle has less of an impact; this question is primarily useful for companies with an interest in the environmental impacts of commuting.

**Table 9 - Vehicle Type**

| | | Number | Percent |
|---|---|---|---|
| Vehicle Type | Small to Midsized car (not hybrid) | 78 | 76% |
| | Truck/SUV (not hybrid) | 20 | 20% |
| | Hybrid (all models) | 4 | 4% |
| | Electric (all models) | - | - |
| | Total | 102 | 100% |

**The average vehicle mileage is 24.6 miles per gallon.**

The following table shows the breakdown of average mileage reported by employees.

## Vehicle Mileage (Table 10)

**Table 10 - Vehicle Mileage**

| | | Number | Percent |
|---|---|---|---|
| Average Mileage | 30 MPG or more | 23 | 25% |
| | 21-29 MPG | 40 | 44% |
| | 16-20 MPG | 20 | 22% |
| | 12-15 MPG | 7 | 8% |
| | Less than 12 MPG | 1 | 1% |
| | Total | 91 | 100% |

## Section 3: Commute Distance and Time

What is the one-way distance (miles) between your home and the place where you work? (Table 11)

Commute distance often determines the types of commute alternatives that are most appropriate for your employees. Employees who live within 5 miles of the work site are good candidates for walking, bicycling, and transit. Medium distance commuters, who travel from 6 to 20 miles to work, are good candidates for transit and carpooling. Vanpooling, carpooling, and telecommuting may be good commute alternatives for long distance commuters who live more than 20 miles from the work site.

**Table 11 - Distance Traveled to Work**

| | | Number | Percent |
|---|---|---|---|
| Distance to Work | 0-5 mi | 28 | 24% |
| | 6-10 mi | 36 | 31% |
| | 11-20 mi | 34 | 29% |
| | 21+ mi | 18 | 16% |
| | Total | 116 | 100% |

**The average one way commute distance is 13.9 miles.**

Table 12 shows a breakdown of commute mode for each distance range. Look at the relationship between commute distance and commute mode for your work site. Do most employees live close to the work site? How does the drive-alone rate change at different distances? In planning your trip reduction program, focus on the distance ranges with the most employees (Table 11) and the highest drive-alone rates (Table 12). Once you identify target groups, consider which services and incentives would be most appropriate for the employees in these groups.

### Commute Mode by Distance (Table 12)

**Table 12 - Commute Mode by Distance**

| | | Distance to Work | | | |
|---|---|---|---|---|---|
| | | 0-5 mi | 6-10 mi | 11-20 mi | 21+ mi |
| Mode | Drove Alone | 84% | 74% | 74% | 93% |
| | Carpooled or Vanpooled | - | 18% | 8% | - |
| | Took a Shuttle or Public Transit | 8% | 4% | 17% | 7% |
| | Walked or Biked | 1% | 3% | - | - |
| | All other options* | 8% | 1% | 1% | - |
| | Total | 100% | 100% | 100% | 100% |

*Note: This table combines the responses shown in tables 1 and 2. “All Other Options” includes Telework/Telecommute and Compressed work week, and work at a different location.

On average, how long does it take you to get to work from your house? (Table 13)
On average, how long does it take you to get home from work? (Table 14)
Determining the time that commuters spend traveling can be an effective marketing tool. Tables 11 and 12 show the clustered trip lengths to and from work.

**Table 13 - Length of Trip to Work**

| | | Number | Percent |
|---|---|---|---|
| Travel time | 0-15 minutes | 34 | 29% |
| | 16-30 minutes | 52 | 44% |
| | 31-45 minutes | 14 | 12% |
| | 46-60 minutes | 11 | 9% |
| | More than one hour | 6 | 5% |
| | Total | 117 | 100% |

**The average trip to work is 28.9 minutes.**

**Table 14 - Length of Trip from Work**

| | | Number | Percent |
|---|---|---|---|
| Travel time | 0-15 minutes | 25 | 21% |
| | 16-30 minutes | 56 | 47% |
| | 31-45 minutes | 20 | 17% |
| | 46-60 minutes | 13 | 11% |
| | More than one hour | 5 | 4% |
| | Total | 119 | 100% |

**The average trip from work is 32.2 minutes.**

### Section 4: Factors That Influence Mode Choice

What is most important to you when you choose how you get to work? (Select up to 3) (Table 15)
This information can help you to understand the factors that motivate your employees' commute mode choices. You can use this to help develop your marketing and education efforts. Present commute alternatives with an emphasis on the factors that your employees consider important. For example, if travel time is important you could highlight the time saving advantages of carpool lanes. If cost is important, drive alone commuters may not understand what it actually costs to drive alone; educating employees about the true costs of driving is an appropriate and effective way to encourage carpooling and transit use.

## Mode Choice Factor (Table 15)

**Table 15 - Mode Choice Factors**

| | | Number | Percent |
|---|---|---|---|
| Factor | Travel time | 89 | 75% |
| | Convenience/Flexibility | 67 | 57% |
| | Reliability | 37 | 31% |
| | Cost | 33 | 28% |
| | Ability to make stops on the way to work or home | 24 | 20% |
| | Comfort & Safety | 16 | 14% |
| | Stress | 12 | 10% |
| | Reducing pollution, conserving energy | 12 | 10% |
| | Total Respondents (N)* | 118 | N/A |

*Note: Because respondents were invited to select more than one answer, the percentages for each factor add up to more than 100%.

## If you usually drive alone to work, what other ways would you be willing to try? (Select up to 3) (Table 16)

This question tells you which commute alternatives your employees are most willing to consider. Use this information to develop incentives and services to promote the most popular alternatives. For many employers, the most common answer is carpooling. Facilitating carpooling means matching employees and helping them to overcome obstacles to ridesharing. If transit use seems to have good potential, making route and schedule information available, selling passes on-site and/or subsidizing transit passes will encourage employees to use transit.

**Table 16 - Potential Commute Alternatives for Solo Drivers**

| | | Number | Percent |
|---|---|---|---|
| Mode | Work at home for a regular work day or utilize online courses | 41 | 46% |
| | Transit | 41 | 46% |
| | Carpool | 40 | 44% |
| | Vanpool | 17 | 19% |
| | Bike | 9 | 10% |
| | Walk | 7 | 8% |
| | Total Respondents (N)* | 90 | N/A |

*Note: Because respondents were invited to select more than one answer, the percentages for each factor add up to more than 100%.

The next questions ask solo drivers why they don't use specific commute alternatives like carpooling and vanpooling, public transit, and biking or walking. You could use this information to offer services that help to eliminate these obstacles. For example, if many employees are concerned that they will not be able to get home in an emergency, you can offer a guaranteed ride home service. If employees say that it is difficult to find others with whom to share a ride, think about how you can help them find carpool and vanpool matches among your own employees and those who work for nearby employers.

The second part of these sets of questions ask drive-alone commuters to reveal what it would take for them to consider a commute alternative. Since you will not be able to offer all incentives which interest employees, focus on those that will reduce the greatest number of drive alone trips. Match these responses with other information, such as commute distance and the modes individuals are most interested in trying.

If you usually drive alone to work, why don't you carpool or vanpool? (select up to 3) (Table 17)

**Table 17 - Reasons why Solo Drivers Don't Carpool or Vanpool**

| | | Number | Percent |
|---|---|---|---|
| Reason | Other people do not match my schedule or route | 55 | 54% |
| | Work/attend classes late or irregular hours | 47 | 47% |
| | Need to make stops on the way to work or home | 32 | 32% |
| | Dislike being dependent on others | 28 | 28% |
| | Cannot get home in an emergency | 27 | 27% |
| | Difficult to find others to carpool/vanpool | 25 | 25% |
| | Like the privacy when I'm in my own car | 20 | 20% |
| | Need my car on the job | 11 | 11% |
| | Other | 7 | 7% |
| | Makes my trip too long | 7 | 7% |
| | Never considered carpooling or vanpooling | 3 | 3% |
| | I don't know enough about carpooling or vanpooling | 2 | 2% |
| | Total Respondents (N)* | 101 | N/A |

*Note: Because respondents were invited to select more than one answer, the percentages for each factor add up to more than 100%.

If you usually drive alone to work, what would encourage you to carpool or vanpool? (select up to 3) (Table 18)

**Table 18 - Incentives to Carpool or Vanpool**

| | | Number | Percent |
|---|---|---|---|
| Reason | Help finding partners to carpool or vanpool | 34 | 34% |
| | Financial incentives | 31 | 31% |
| | I'm not interested in carpooling or vanpooling at this time | 29 | 29% |
| | Guaranteed ride home in an emergency | 23 | 23% |
| | Offer automotive care benefits to carpools and vanpools | 18 | 18% |
| | Use of company car during work day | 18 | 18% |
| | More information about carpooling and vanpooling | 14 | 14% |
| | Services at work (like ATM, dry cleaning, convenience store) | 13 | 13% |
| | 10 | 12 | 12% |
| | Special parking for carpools/vanpools | 12 | 12% |
| | Total Respondents (N)* | 100 | N/A |

*Note: Because respondents were invited to select more than one answer, the percentages for each factor add up to more than 100%.

If you usually drive alone to work, why don't you use Public Transit? (select up to 3) (Table 19)

Commuter perceptions of transit are often incorrect. Offering free transit tickets to try transit can be an effective way to encourage change. Some people think that transit is more expensive than driving alone, because when you ride transit, you pay directly. Especially in an era of relatively high gas prices, transit is likely to cost less than solo driving. Changing incorrect perceptions and focusing on the positive aspects of transit use can encourage commuters to switch modes. Tables 19 and 20 show the factors which most concern your employees related to transit.

**Table 19 - Reasons why Solo Drivers Don't use Public Transit**

| | | Number | Percent |
|---|---|---|---|
| Reason | It takes too long | 59 | 58% |
| | Transit service doesn't match my route or schedule | 42 | 42% |
| | I work/attend classes late or irregular hours | 29 | 29% |
| | Need to make stops on the way to campus or home | 28 | 28% |
| | May not be able to get home during emergency | 18 | 18% |
| | It costs too much | 18 | 18% |
| | Other | 12 | 12% |
| | Like the privacy when I'm in my own car | 11 | 11% |
| | Need my car on the job | 9 | 9% |
| | It is too far to walk to campus from the transit stop | 7 | 7% |
| | It is not safe or easy to walk to campus from the transit stop | 5 | 5% |
| | I don't know enough about taking transit | 1 | 1% |
| | Never considered using public transit | - | - |
| | Total Respondents (N)* | 101 | N/A |

*Note: Because respondents were invited to select more than one answer, the percentages for each factor add up to more than 100%.

If you usually drive alone to work, what would encourage you to use public transit? (select up to 3) (Table 20)

**Table 20 - Incentives to Use Public Transit**

| | | Number | Percent |
|---|---|---|---|
| Reason | Service that matched my route and schedule | 39 | 39% |
| | Don't want to use public transit at this time | 30 | 30% |
| | Bus, shuttle or van connecting the transit stop with campus | 30 | 30% |
| | Help paying for transit passes | 27 | 27% |
| | Guaranteed ride home in an emergency | 19 | 19% |
| | More reliable service | 18 | 18% |
| | Other | 7 | 7% |
| | Use of company car during work day | 7 | 7% |
| | Feel more safe waiting for or riding transit | 6 | 6% |
| | Transit passes sold at work | 5 | 5% |
| | More information about schedules and routes | 5 | 5% |
| | Prizes or contests | - | - |
| | Total Respondents (N)* | 99 | N/A |

*Note: Because respondents were invited to select more than one answer, the percentages for each factor add up to more than 100%.

If you usually drive alone to work, why don't you bike or walk? (select up to 3) (Table 21)

Typically, most people only consider bicycling or walking to work if they live very close to their worksite. However, these modes can also significantly reduce emissions if they are used in conjunction with transit or carpooling. Encourage your employees to bicycle or walk as their primary mode, but also as a secondary mode. Bay Area transit systems are bike-friendly, with most allowing commuters to bring their bikes with them, or to leave it in a safe location. Tables 17 and 18 show the factors that prevent and encourage bicycling and walking.

**Table 21 - Reasons why Solo Drivers Don't Walk or Bike**

| | | Number | Percent |
|---|---|---|---|
| Reason | I live too far away | 67 | 67% |
| | There isn't a safe or easy route for walking or biking | 24 | 24% |
| | It's not easy to look good for work/campus after walking or biking | 20 | 20% |
| | Other | 17 | 17% |
| | May not be able to get home in an emergency | 17 | 17% |
| | Need to make stops on the way to work or home | 16 | 16% |
| | Weather | 13 | 13% |
| | No place on campus to store bikes safely | 10 | 10% |
| | Never considered walking or biking to work | 6 | 6% |
| | Total Respondents (N)* | 100 | N/A |

*Note: Because respondents were invited to select more than one answer, the percentages for each factor add up to more than 100%.

If you usually drive alone to work, what would encourage you to bike or walk? (select up to 3) (Table 22)

**Table 22 - Incentives to Walk or Bike**

| | | Number | Percent |
|---|---|---|---|
| Reason | Financial Incentives for walking or biking | 51 | 55% |
| | Better paths or routes for walking and biking | 17 | 18% |
| | Other | 16 | 17% |
| | Shower/change rooms available on campus | 14 | 15% |
| | Secure and safe bike parking | 13 | 14% |
| | Don't want to bike or walk at this time | 8 | 9% |
| | Guaranteed ride home in an emergency | 6 | 7% |
| | Onsite bike tune ups | 5 | 5% |
| | Financial assistance for buying a bike | 4 | 4% |
| | Information on nearby bike and walking routes | 4 | 4% |
| | Services on campus (like ATM, dry cleaning, convenience store) | 2 | 2% |
| | More information about riding bikes safely with traffic | 2 | 2% |
| | Help finding partners for walking or biking | 2 | 2% |
| | I don't know enough about biking or walking to campus | 1 | 1% |
| | Prizes or Contests | 1 | 1% |
| | Total Respondents (N)* | 92 | |

*Note: Because respondents were invited to select more than one answer, the percentages for each factor add up to more than 100%.

## Section 5: Employee Home Locations

Home location obviously has a strong influence on employee commute mode. Table 23 shows the top ten home locations for your employees, and Table 24 shows employee home zip codes for all survey respondents. This information is useful for identifying clusters of employees who could form carpools and vanpools. You can also identify appropriate transit information based on where clusters of employees live (e.g., bus routes) and make that information available. You might want to plot the data on a zip code map (available from the 511 Regional Rideshare Program).

## Top Ten Home Locations (Table 23)

**Table 23 - Top Ten Home Locations**

| Home Cities of the Respondents | Number | Percent |
|---|---|---|
| Hayward | 31 | 26% |
| San Leandro | 17 | 14% |
| Oakland | 12 | 10% |
| Castro Valley | 9 | 8% |
| Union City | 5 | 4% |
| Newark | 5 | 4% |
| Fremont | 5 | 4% |
| Alameda | 4 | 3% |
| San Lorenzo | 3 | 3% |
| Dublin | 3 | 3% |
| Total | 94 | 79% |

*Top 10 locations only

## Home Zip Codes (Table 24)

**Table 24 - Home Zip Codes**

| | | Number | Percent |
|---|---|---|---|
| 94544 | Hayward | 12 | 10% |
| 94578 | San Leandro | 11 | 9% |
| 94541 | Hayward | 9 | 8% |
| 94546 | Castro Valley | 7 | 6% |
| 94587 | Union City | 5 | 4% |
| 94577 | San Leandro | 5 | 4% |
| 94560 | Newark | 5 | 4% |
| 94545 | Hayward | 5 | 4% |
| 94542 | Hayward | 5 | 4% |
| 94536 | Fremont | 4 | 3% |
| 94501 | Alameda | 4 | 3% |
| 94611 | Oakland | 3 | 3% |
| 94603 | Oakland | 3 | 3% |
| 94580 | San Lorenzo | 3 | 3% |

| | | | |
|---|---|---|---|
| 94568 | Dublin | 3 | 3% |
| 94583 | San Ramon | 2 | 2% |
| 94552 | Castro Valley | 2 | 2% |
| 95636 | Grizzly Flats | 1 | 1% |
| 95382 | Turlock | 1 | 1% |
| 95368 | Salida | 1 | 1% |
| 95206 | Stockton | 1 | 1% |
| 95130 | San Jose | 1 | 1% |
| 95035 | Milpitas | 1 | 1% |
| 94707 | Berkeley | 1 | 1% |
| 94706 | Albany | 1 | 1% |
| 94703 | Berkeley | 1 | 1% |
| 94619 | Oakland | 1 | 1% |
| 94618 | Oakland | 1 | 1% |
| 94610 | Oakland | 1 | 1% |
| 94609 | Oakland | 1 | 1% |
| 94608 | Emeryville | 1 | 1% |
| 94606 | Oakland | 1 | 1% |
| 94601 | Oakland | 1 | 1% |
| 94597 | Walnut Creek | 1 | 1% |
| 94588 | Pleasanton | 1 | 1% |
| 94579 | San Leandro | 1 | 1% |
| 94566 | Pleasanton | 1 | 1% |
| 94565 | Pittsburg | 1 | 1% |
| 94556 | Moraga | 1 | 1% |
| 94550 | Livermore | 1 | 1% |
| 94549 | Lafayette | 1 | 1% |
| 94538 | Fremont | 1 | 1% |
| 94531 | Antioch | 1 | 1% |
| 94526 | Danville | 1 | 1% |
| 94403 | San Mateo | 1 | 1% |
| 94402 | San Mateo | 1 | 1% |
| 94123 | San Francisco | 1 | 1% |
| 94110 | San Francisco | 1 | 1% |
| 94025 | Menlo Park | 1 | 1% |

## Section 6: Employee Comments

Your employees were provided with the opportunity to share additional comments about their trip to work.

- I drive 100 miles a week for work. Work schedule 7am to 5 or 6 or 7pm. It would take 3 different types of public transit: a bus to MacArthur Bart, Bart to Hayward, and an AC transit bus from Hayward Bart to Chabot. That takes too long!
- 6.4 miles round trip Work 2 P M to 10 P M M-F
- Bart does not go where I need it to be. If I have to drive all the way to Livermore to get on Bart I might as well drive all the way myself.
- BART is out of the question. I could be at work before I made it to the nearest BART station.
- Being a part-time teacher, I use a backpack with rollers to carry heavy staff. Putting it on and getting it out public transit would be harder. I would need an oversized coin locker on campus, too.
- For years, there has been the talk of a shuttle from BART directly to campus. I would sign on in a minute. The commute is one of the most stressful things about my job, and I hate it.
- from last two years i was taking bart & bus everyday.but because of increased fare it is not worth to wait for bus for 15 min and 30 min for bart.
- I am on a 6:00 to 2:30 schedule and on fridays 4:00 to 12:30 p.m.
- I am responsible for a developmentally delayed adult son and elderly parent so I must be able to get to either quickly in an emergency.
- I am unable to use anything other than my car due to daycare for my son. In the past, I have biked and used public transit. There is no quick transit from San Ramon to Hayward so I would drive to Castro Valley BART and take the M line, which worked great.
- I am very skeptical about trusting people I don't know so I wouldn't be inclined to carpooling with someone I don't know.
- I could take the TransBay Express bus, but the closest stop is Hillsdale which makes the ride take about 45 minutes when I could drive in 15-20 mintues. Cost for bus and driving is about the same.
- I did carpool with my husband before he retired a year ago, now carpool or vanpool is not an option for me.
- I do not carppol because I work in union city and pick my brother up from school.
- I have contact you before. I want to carpool. You never contacted me back.
- I love the travel time between 6:21am and 7:30am, Monday through Thursday.
- I must use a mobility scooter, so I must use my car to transport it.
- i take bart and bus-and or 2 bus to campus
- I take bus-BART-bus then walk cause og grnces om vampus
- I take my son to/from school and after school sports on way to/from work
- I would do transit if transit came to palomares hills. I can't get to the BART/bus from my home.
- I would love to take BART to work; however, it's very expensive from San Francisco and the lack of a direct connection makes the ride way too long. Busses not synched to arrive with the SF BART. Biking across freeway off ramps too dangerous (I've tried
- If I could find someone who doesn't mind making 1 stop on way to work I would be willing to do it.
- If we had a regular shuttle from BART and a safe bike route from BART, I would take BART on days that I don't have a long day (8am to 9:30pm). And, maybe if there was a direct connection, I would. We need to subsidize transit, not have a for-profit model.
- I'm on summer break this time, so I used info from last semester. Bad idea to give this during the summer and then ask questions about the survey week.
- Legal walking route from work to home 15+ min each way (illegal only 8-10 min). Generally eat lunch at home - time spent walking kills lunch break
- Responsible for two mothers (85 & 93) and must be available for the needs (pick up meds, shopping after work, emergencies).
- Since I pick up my granddaughter on my way home after work, I need to use my personal car to do so.

- Sometimes I take transit but the Bus, Bart, and then Bus takes so long and the timing of the schedules doesnt work well
- thanks for asking!
- The AC Transit bus from BART to campus is incredibly slow and inconvient. If there was a shuttle from Hayward BART to Chabot, I would probably BART to work at least once a week.
- The last time I participated in this survey, I learned that Agnello Braganza lived in my area. Once, when he had car trouble, I gave him a ride to the college for a few days, but he had to miss classes because of my schedule.
- The only public transit option I'm aware of from my neighborhood to Chabot involves taking a bus to (scary-neighborhood) BART to another bus. If there was a more direct bus between my home and Chabot, I might consider it.
- There is no bus go thorugh Newark Blvd -> Union City Blvd -> Hesperian Blvd. I have to drive.
- Why are you trying to take me out of my safe car and put me in a boisterous bus? Truly independent people will want none of this. I will bike alone if there is an incentive.
- Wish bart stopped at Chabot!

CHABOT
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