DRAFT

FOOTHILL COLLEGE

SUSTAINABILITY MANAGEMENT PLAN

"On the Road to the Emerald Campus"

December 2009

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Acknowledgements

The Foothill College Sustainability Steering Committee would like to acknowledge and thank the authors of the following documents. Rather than recreating the wheel, utilizing already available information allowed us to build on existing ideas and principles. This enabled us to work in a more sustainable fashion and make the most efficient use of resources and time.

The Committee would also like to thank and acknowledge the efforts of Janice Carr, Foothill Faculty member. Ms. Carr has assisted everyone in the writing of individual sections, providing research, interviews, proof-reading and support.

Always Building, Jim Long, Jennifer Magnolfi, Lois Maassen

De Anza Sustainability Management Plan, June 2007

Foothill College 25 Years, The Anniversary Book Staff

Foothill College Sustainability Program, ES62B Final Project, Summer 2008,
Bob Cormia & Karen Smith

Santa Monica Green Building Program website; http://greenbuildings.santa-monica.org

The Brundtland Report, published 1987

Tufts University Website; http://www.tufts.edu

North American Green Purchasing Initiative (NAGPI)

Presidents' Climate Commitment Report, Sarah Snow, Foothill Student Trustee, 2008

Introduction

The Foothill College campus doors opened on September 5, 1961. The 122-acre site in Los Altos Hills, California was chosen for its potential to contribute to the development of a distinct and special institution. Foothill College (Foothill) is part of a two-college district, the Foothill-De Anza Community College District (District) along with its sister school, De Anza College (De Anza).

The architectural firm Kump, Masten and Hurd won two awards for the design before the first shovel hit the ground. Foothill became a model for junior college construction and development. Architectural Forum Magazine stated "Foothill's chief significance may not reside in its architecture, excellent as it is, but in it's underlying social premise . . . a community college which goes far beyond academic and vocational instruction in its functions. . . it is really a multipurpose cultural resource serving an entire Bay Region."

More than fifty years later, we hope to become known for an additional distinction, as a leader in sustainability and "green awareness," while continuing to practice our core values through our curriculum and everyday business practices.

Foothill-De Anza Community College District Chancellor, Foothill College and De Anza College Presidents signed the Presidents' Climate Commitment document in 2007 which focuses on reduction of green house gas emissions for our District.

During the summer of 2008, a formalized emissions inventory was undertaken using the Clean Air Cool Planet Methodology. These data were presented to the District in August, 2008 and to the District Board of Trustees in September, 2008. More information on this topic is included under the Transportation, Energy Conservation, Efficiency and CO_2 Reduction section.

Foothill College's Sustainability Committee was formed with the primary goal of developing campus-wide programs as part of an evolving and formalized environmental and sustainability emphasis. The initial group began with six members, engaging in various environmental activities, with documentation running 'ex post facto' to their activities.

The Foothill Sustainability Management Plan (SMP) addresses the charter and mission of the Sustainability Committee and forms a foundation for our areas of focus, developing goals, metrics, data collection procedures, analysis and reporting functions. Our progress will determine if or when to pursue the ISO14000 Environmental Management Systems and how we partner with the District, De Anza, local governmental agencies and organizations on future sustainability endeavors. The Mission Statement (Appendix A) and Sustainability Policy (Appendix B) represent input from a shared governance process involving staff, faculty, students and administrators.

The proposed actions identified in the SMP will require the involvement of many members of the college community to support activities that promote environmental stewardship, fiduciary responsibility and community engagement.

The core of the Plan addresses six categories:

- ❏ Community and Civic Engagement
- ❏ Hazardous and Solid Waste Reduction and Control
- ❏ Transportation, Energy Conservation, Efficiency and CO_2 Reduction
- ❏ Water Use Reduction and Control
- ❏ Green Procurement
- ❏ Green Building Design, Construction & Renovation

Specific information can be found within the category sections beginning on page 13.

It is critical that our initiatives intertwine with, and support, the overarching policy goals of the District. We will make every effort to coordinate our activities with both the District and De Anza to maximize potential, reduce duplication and provide a united sustainability pursuit.

We are excited about the opportunities for Foothill College to engage in meaningful activities that will promote our sustainability goals.

Your Steering Committee,

Brenda Davis-Visas, Chair
Mia Casey
Robert Cormia
Frank Nunez
Karen Smith
Charlotte Thunen

Sustainability Committee History and Philosophy

The Sustainability Steering Committee came together at the request of Foothill's President, Judy Miner, in 2008. President Miner was previously Vice President of Educational Resources and Instruction at De Anza College, which was at the forefront of sustainable initiatives for higher education. Likewise, the District facilities personnel have documented sustainable efforts in support of our previous Chancellor, Martha Kanter, who sat on the Board of the Presidents' Climate Commitment Committee. The Sustainability Steering Committee for Foothill is comprised of six members: Mia Casey, Robert Cormia, Frank Nunez, Karen Smith, Charlotte Thunen and Brenda Davis-Visas. As the committee began to discuss various items of interest, a plan was developed to present current sustainability efforts to the faculty and staff on Opening Day, September 19, 2008. Promotional items were given away and a sign-up sheet was available for interested participants.

Thirty new participants registered to be part of future endeavors of the Sustainability Committee. Each participant signed up for their area(s) of interest. Based on interests, and the six focus categories identified, sub-committees were formed.

Each member of the initial Sustainability Steering Committee is the sponsor for one of the six focus categories. As projects are developed by sub-committees under one of the categories, it is the responsibility of the sponsor to see that projects are initiated and incremental goals are met. In addition, it is the sponsor's responsibility to fill out a Project Log Sheet, monitor the progress and report quarterly results.

Category Sponsors:

- ❏ Community & Civic Engagement – Mia Casey
- ❏ Hazardous & Solid Waste Reduction and Control – Frank Nunez
- ❏ Transportation, Energy Conservation, Efficiency & CO_2 Reduction – Robert Cormia
- ❏ Water Use Reduction & Control - Karen Smith
- ❏ Green Procurement – Charlotte Thunen
- ❏ Green Building Design, Construction & Renovation – Brenda Davis-Visas

The Sustainability Committee has a 'bottom-up' approach rather than a 'top-down', meaning that our projects are generated by various members based on their individual interests and not necessarily mandated by senior management. Projects are documented and procedures implemented. This method allows us to try out many different ideas and/or approaches and determine what will be most effective.

Goals

Our goals for the SMP will document our current status (2009) with regards to a several initiatives selected from our six focus categories and set incremental goals. The SMP document will be reviewed every three years and allows the opportunity to review accomplishments or shortcomings and make adjustments as required.

1 Year Projection: 2010

Category: All **Initiative:** Review STARS tracking system for potential college use

4 Year Projection: 2011-2012-2013

Category: Civic Engagement

Initiatives:

1. Messaging: Develop themes and messages to encourage and promote sustainability practices across the campus, e.g. "The Emerald Campus" promotion, "Green Means Go" messaging.
2. Special Events: Participation in National and local events to raise awareness of specific sustainability issues and engage the campus and surrounding community, e.g. Focus the Nation and the Alternative Transportation Fair.
3. Website: Develop a Sustainability Website, to coordinate events and disseminate information, including collaborative tools and resources for the campus community.

Category: Hazardous & Solid Waste Reduction

Initiatives:

1. Establish waste baselines.
2. Maintain current 70% diversion of waste, and explore ways to increase diversion
3. Encourage/increase eco-friendly containers/utensils in food services.
4. Divert campus green waste to composting on-site.
5. Increase construction debris recycling through project specifications/construction practices.

Category: Transportation, Energy Conservation & CO_2 Reduction

Initiatives:

1. Establish baselines for transportation and energy use.
2. Develop a 10-point Climate Action Management Plan to reduce CO_2 levels.
3. Report on CO_2 reduction levels every two years in accordance with the Presidents' Climate Carbon Neutrality Commitment.

4. Interactive educational kiosk on campus for photovoltaic results to display real-time performance of the solar system.

5. Incentives for individuals utilizing alternate commuting systems rather than single-driver, single-vehicle.

Category: Water Use Reduction & Control

Initiatives:
1. Review landscaping/water requirements.
2. Establish a baseline for future reduction activities.

Category: Green Procurement

Initiatives:
1. Review process and procedures annually.
2. Promote sustainability awareness throughout the purchasing process.

Category: Green Building

Initiatives:
1. First silver LEED building on campus, the Physical Sciences & Engineering complex (PSEC).
2. Review of PSEC design standards against Foothill standards to incorporate new information utilized on PSEC.

7 Year Projection: 2014-2015-2016

Category: Civic Engagement

Initiatives: Incorporation of sustainable themes and issues into general curriculum as well as increase to number of sustainability focused courses.

Category: Hazardous & Solid Waste Reduction

Initiatives: Further reductions in landfill waste

Category: Transportation, Energy Conservation & CO_2 Reduction

Initiatives:
1. Select and utilize new Energy Management System on Standard Protocol.
2. Tracking CO_2 emission reduction via Presidents' Climate Commitment activities.

Category: Water Use Reduction & Control

Initiatives: Reduction in water use for campus landscape

Category: Green Procurement

Initiatives: Broaden and strengthen the sustainability knowledge base of all three entities, District, De Anza and Foothill, with a commonality and transparency of policies and overarching goals documented in the District Sustainability Master Plan.

Category: Green Building

Initiatives: Energy audits completed for all buildings and deficiencies identified for correction.

10 Year Projection: 2017-2018-2019

Category: Civic Engagement

Initiatives: Green collar workforce training on site, tied to President Obama's stimulus package, 2009.

Foothill College realizes its status as The Emerald Campus and recognized as a leader in sustainability initiatives/education.

Category: Hazardous & Solid Waste Reduction

Initiatives: 90% of waste diverted from landfill

Category: Transportation, Energy Conservation & CO_2 Reduction

Initiatives: Systems for measuring energy use per building in place and annual measurements being reported.

Category: Water Use Reduction & Control

Initiatives: Water District Audit and shared reduction strategies with Los Altos Hills town residents.

Category: Green Procurement

Initiatives: Efficiency improvements reviewed and documented.

Category: Green Building

Initiatives: Develop a plan incorporating the latest in sustainable practices, trends and information to make future buildings grid neutral.

Related Goals

As a campus we must look at "associated tasks and activities" and how they can assist us in achieving our overarching goals. Related goals focus on self-realization and self-improvement. For example, how can we know we are doing the best job possible of diverting landfill when we don't know what is being thrown into the waste receptacle? Analysis of the contents is important for developing the right process and procedures.

Beyond Being a Sustainable Campus, to Teaching Sustainability to Future Generations

Sustainability will be included as part of the Strategic Initiatives in the Educational Master Plan. Sustainable themes will be incorporated over time into general education courses. In addition, new courses on sustainability topics will be explored, along with the identification of possible vocational training for the 'green workforce'. In the near future, Biology 9 classes (Environmental Biology) will analyze waste and recyclables in garbage cans around campus and compare across sites how much waste could be diverted. Sites will be compared by usage (garbage cans in and around the Administration Building are more likely to be used by faculty and staff, whereas garbage cans in the Student Center are more likely to be used by students). After analysis, a strategy to improve recycling on campus will be developed.

Celebrating and Advertising Our Achievements with the Campus and Community

It is important to share with the campus and the community the current initiatives underway, their progress, and to celebrate our achievements. This is not only important for the committee, but to enhance and encourage public support and participation for our endeavors.

Challenging the Campus and Greater Community to Uncover Green Solutions

By modeling unique programs and ideas, and encouraging participation, the committee is reinforcing and inspiring the community to find ways that they can incorporate sustainability into their daily lives, as well as on campus. The "Trash to Cash Program" underway is a good example: The Trash to cash 'catch-phrase' is used when ordinary products are typically put into the trash and Foothill finds a second use for them. Foothill already has several ways in which we are using this program.

- ❏ Single-sided paper is being gathered and reused for scratch pads.
- ❏ Used inkjet cartridges are recycled for merchandise/coupons which are used as incentives for employees who carpool
- ❏ Surplus furniture goes to a third party for resale whenever possible.

Finding the Best Methods to Measure Our Progress.

What isn't measured, isn't monitored, and therefore cannot be addressed. Benchmarking the campus progress against baseline information will provide data on how well our initiatives are working, and measuring our results against other entities will provide an incentive and validate our efforts. The committee is continually researching and developing the best methods of tracking and measuring our efforts.

Guidelines

"Plan the work and work the plan."

Each of the six focus categories will follow a clear and measurable set of objectives and targets and will utilize the following:

Project Log Forms. Long before the Sustainability Management Plan document was on the horizon, committee members were individually engaged in various activities on our Campus, from diverting waste to recycling. The challenge was to document the results without curtailing the energy. A simple Project Log Form was initiated to explain the activity, identify the start date, validate the measurements, and weigh anticipated results with actual results. The Project Log Form remains a vital part of the new SMP.

Schedule. A schedule was compiled identifying all parts of the Sustainability Management Plan with time-frames for initial development, review, revisions, shared governance reviews and implementation to meet our final SMP completion date.

Procedures. It would be extremely difficult to set procedures in place without knowledge of all of the possible projects that might evolve. Therefore, each activity developed by a sub-committee and document-ed on a Project Log Form will identify procedures for the specific item or task.

Metrics. Metrics establishes baseline criteria, a starting point to successfully measure progress. Metrics ensure that the District is moving in the right direction, reinforces the process and allows validation of our information.

The final analysis of the STARS rating system was released in February 2010. The Sustainability Committee will review the final criteria and determine whether this is the rating system we should engage for our campus. A decision to adopt the STARS system will impact the Sustainability Management Plan. It is a metric-based system and would likely replace the current Project Logs being used.

Calendar. A listing of activities and events is included on the Sustainability Website.

Tactics and Rules for Projects

All projects will be a component of one of the six categories. To establish guidelines for initiatives or projects that are not known at this time would be impossible, and some projects will never require them. However, for those projects that are complex or anticipate participation by many individuals, guidelines will be written by the sponsor of each specific project. For example, the Organic Garden currently under development has many components; the initial start-up of the garden, who will manage and use the garden, associated fees if any, agreements as to how the end product will be distributed, what is acceptable participation (hours), garden maintenance (fence repair, weeding, etc), as well as any associated activities such as composting, requesting donations, etc. The rules must be developed on a case by case basis and documented through the Project Log or an accepted tracking system.

Project Log Form

Basic information for each project is documented on the Project Log Form. The form is comprised of the project name, a control number (indicates which of the six focus categories the project falls under and the number of the project within the category), an area for explanation of the proposed project, start date, metrics (how will measurements for the project be captured), expected results and actual results. Actual results must be documented with third party information where appropriate. For example, if carpet is being removed and recycled, the flooring vendor will provide the quantity and a statement that the carpet is being recycled on company letter head.

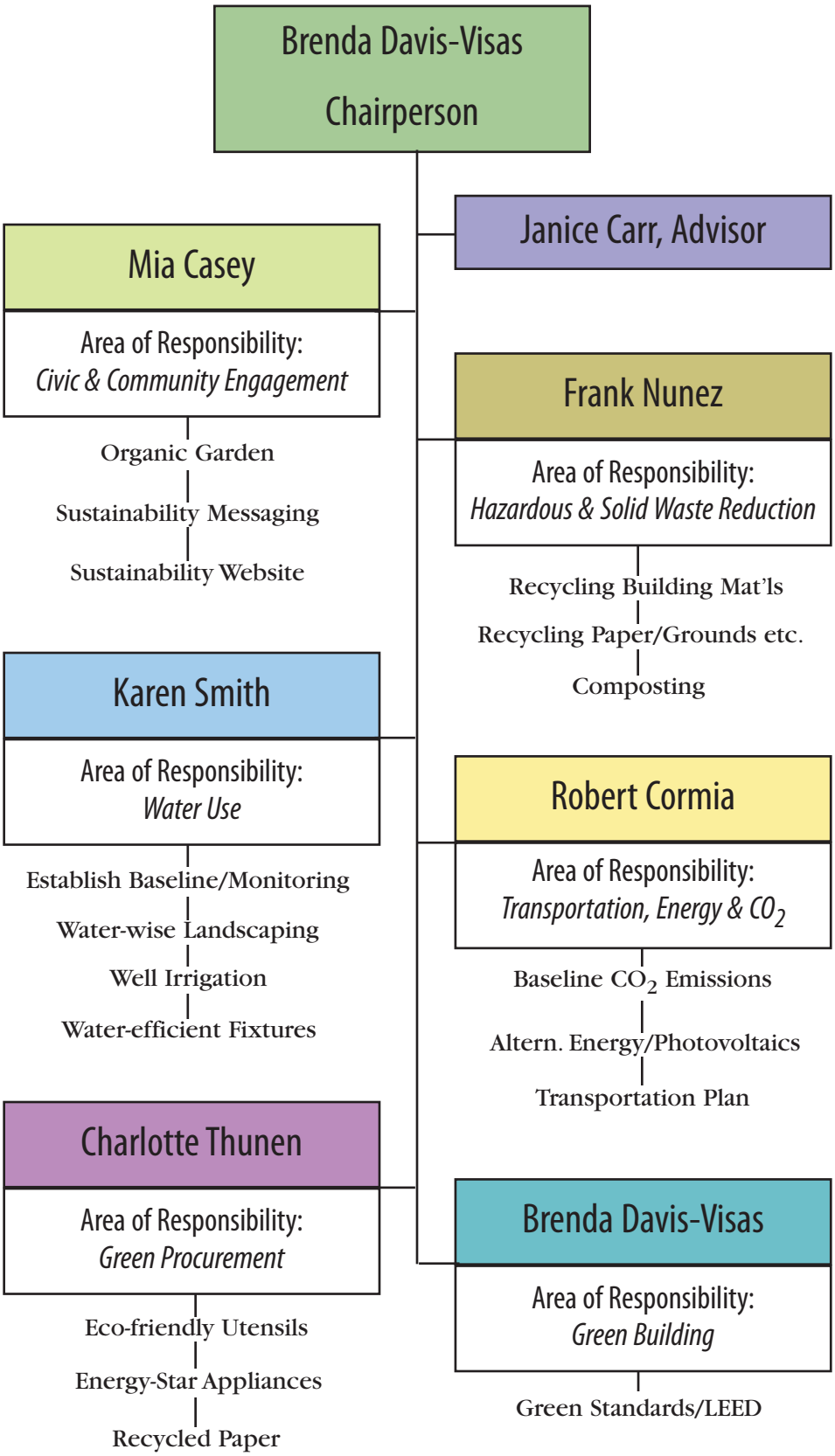
Approval Process

Projects/guidelines are first presented to the Sustainability Committee, and then to the appropriate College committee(s) (Classified and Academic Senates, Administrative Council, Buildings & Grounds and Planning and Resource Council) to meet shared governance criteria, request feedback and ultimately gain approval for implementation.

It is not the Sustainability Committee's intent to put restraints on the entrepreneurial spirit of our members or eager participants. There are many facets in the day-to-day operations of our District and not any one person or group knows all of the conditions in which we operate. By documenting our proposals and receiving prior approval, we can make sure to avoid duplicate efforts, maximize our potential, steer clear of regulatory mishaps, and document our progress and successes.

The Sustainability Plan is also available on the website.

Sustainability Steering Committee Members



1. Community & Civic Engagement

Category Sponsor/Author: Mia Casey

A Sustainability Management Plan requires broad support from across the campus and community in order to be successful. To achieve that support, it is necessary to raise awareness, educate, and provide opportunities for engagement.

Through these methods, Foothill will move forward towards the goals of our Sustainability Management Plan. Increased awareness and civic engagement, a global perspective, and service learning also contribute to student learning and success. By infusing sustainability and environmental literacy into our campus life and curriculum, we can prepare future generations for their role as responsible world citizens of a global economy. It is important to our future as a college, a community, and a world, to work together to build a culture of sustainability.

> "Sustainability is not about recycling cans and bottles. It's about recycling our values and learning how to live differently. It involves acting now, and it involves acting on behalf of somebody other than just oneself."
>
> —*Scott McNall*
> *Cal State-Chico Provost*

Where do we start?

Raising awareness begins with simple messages. These ideas begin to change perspectives, broaden viewpoints, and allow the seeds of change to take hold. From this groundwork, we gain support for initiatives and begin to move the campus forward in a more sustainable direction. Some of the short-term goals identified by the Sustainability Committee in this area include:

- ❑ Raise consciousness through specific messaging and activities on campus;
- ❑ Establish an online presence to enhance visibility of our initiatives and provide education/information;
- ❑ Provide civic engagement opportunities for faculty, staff and students.

Accomplishments to date

Library 190x – Environmental Learning Community

In Spring 2007, a 'learning community' course was established that focused on environmental awareness and action. The course, offered to faculty, staff and students (including staff from Middle College, and De Anza) met for 12 consecutive weeks. Topics included global warming, climate change, carbon footprints, composting, sustainability in the garden, biodiesel, slow food movement, solar energy, wind power, personal sustainability and population connection.

Earth Day 2008

In April 2008, as part of Earth Day activities, there was a fluorescent light bulb giveaway (in conjunction with PGE/The Sierra Club). "Green Means Go" was the message delivered, signaling the beginning of the Foothill movement toward a more sustainable campus.

Opening Day Activities

Sustainability was a major focus at Foothill's Opening Day in Fall 2008. Two important messages were introduced to faculty and staff. The first was "the Emerald Campus" theme. Environmentally produced posters were distributed throughout campus in September 2008 (and can still be found around the campus). The poster posed some leading questions, designed to inspire thought about sustainability and develop an environmental consciousness.

The second message "One College, One Community, One World", introduced a global aspect and reminded us of our connection to the outer community and world beyond. Both messages were carried on throughout the 2008-09 year.

The traditional lanyards/plastic nametags used on opening day were replaced with lanyards from recycled materials and plant-based name badge holders. Signage was put up in all departments/division offices reminding people to turn off copiers and lights. The Foothill Bookstore followed this theme by carrying "One College, One Community, One World" t-shirts and mugs as well as the addition of a line of recycled binders, folders and other necessities.

Sustainability Website

In fall 2008, a sustainability website was created to enhance visibility, share information and keep the Campus and Community informed of projects and meetings. The site has been expanded over time, and consists of a green tips section, current sustainability initiatives, contact information, calendar of activities, links to resources as well as a green bookshelf listing. The sustainability committee also publishes its meeting agendas and minutes here.

Focus the Nation

On April 18, 2009, Foothill hosted a Focus the Nation Town Hall event. Focus the Nation is a nationwide project that assists campuses across the country to organize Town Hall events. These events open a dialogue between students, citizens and local and state politicians around issues of sustainability and clean energy. The event provided a perfect opportunity for civic engagement, and relationship building on campus and with our community. Political leaders in attendance included Los Altos Hills Mayor Jean Mordo, Mountain View Mayor Margaret Abekoga and Assemblyman Ira Ruskin. The Foothill Associated Students leadership class helped manage the event, and panelists participated from all four of our local service areas (Los Altos, Los Altos Hills, Mountain View and Palo Alto). Focus the nation also helped lay a foundation for Foothill's longer term goals of building partnerships within the community and enhancing our relationships between Foothill-De Anza Central Services and De Anza College campus. Discussions are underway to participate in future Focus the Nation events in concert with De Anza.

Foothill Organic Garden

The overall goal of the organic garden is to demonstrate a sustainable and organic ecosystem on campus. It is an educational tool that teaches about our food system and its implications for the environment, health and nutrition and our culture through modeling local, sustainable food production that is free of chemicals. The Foothill Organic Garden models sustainability. As part of the design and building process, we diverted

waste from landfill by building the garden from reclaimed materials. As a creative fundraising project, many plants, bushes and trees scheduled for destruction as part of new construction on campus, were sold at a 'Dig Your Own' plant sale, May 29, 2009. The money raised was used to purchase needed materials to complete the garden. The on-site composting process helps reduce our waste stream by recycling leaves, manure from Veterinary Technology, coffee grounds and other materials from campus. Multiple disciplines, including biology, horticulture, anthropology and nutrition will use the garden for instructional purposes. Ornamental Horticulture has developed curriculum specifically designed around the organic garden and will be using the garden as an outdoor teaching space upon completion.

What does the future hold?

Foothill College will build on the groundwork laid out over the past two years in the areas of raising awareness, education and civic engagement. Some of the long-term goals for Foothill include:

- ❏ Building partnerships with local governments, community-based organizations, and business as a civic engagement activity to share ideas and gain support for sustainable initiatives;
- ❏ Develop the relationships between the Foothill-De Anza Central Services and De Anza College campus and collaborate on sustainable projects;
- ❏ Expand the Sustainability website to highlight achievements on campus and encourage participation;
- ❏ Inclusion of sustainability as a core principle of operation;
- ❏ Integration of sustainability across the curriculum.

2. Hazardous & Solid Waste Reduction & Control

Category Sponsor/Author: Frank Nunez

> "Wisdom understands that in a world of ecological interconnectedness there is no such thing as 'away.' We don't throw things 'away,' we simply put them someplace where they defile the land, foul the water, pollute the air or change the earth's atmosphere."
>
> *—Brian Walsh & Sylvia Keesmaat*

The California Integrated Waste Management Board (CIWMB) has developed a uniform waste disposal characterization method for collecting data on the waste stream. The method was developed for local governments in California to use in meeting regulatory requirements for solid waste planning. The method was designed to collect information only on the disposed waste stream, not on materials that have been diverted through recycling, composting or source reduction.

Assembly Bill (AB) 75 was passed in 1999 and the State Agency Model Integrated Waste Management Act (Chapter 764, Statutes of 1999, Strom-Martin) took effect on January 1, 2000. This bill added new provisions to the Public Resources Code (PRC), mandating that State agencies develop and implement an integrated waste management plan (IWMP); AB 75 also mandated that community service districts providing solid waste services report disposal and diversion information to the city, county, or regional agency in which the community service district is located.

The provisions of AB 75 require all State agencies and large State facilities to divert at least 25 percent of their solid waste from disposal facilities by January 1, 2002, and at least 50 percent on and after January 1, 2004. Another requirement of the law is that each State agency and large facility shall submit an annual report to the CIWMB summarizing its yearly progress in meeting the diversion goals. The annual report is due September 1 for the previous calendar report year.

Specifically, PRC sections 40148, 40196.3, and 42920-42926 require State agencies to:

- ❏ Develop and submit an integrated waste management plan by July 15, 2000;
- ❏ Divert at least 25 percent of their solid waste from landfills or transformation facilities by January 1, 2002, and divert 50 percent on and after January 1, 2004; and
- ❏ Annually, submit a report to the CIWMB on the previous year's diversion amounts and activities by September 1, of each year.

Current Foothill Practices

Foothill College has been complying with AB 75 waste diversion mandate since its inception in year 2002. In 2007 Foothill College diverted 70% of its waste from landfill. Our goal for the coming years is 80% diversion.

The Foothill-De Anza Community College District employs Los Altos Garbage as our waste pick-up contractor. Los Altos Garbage anticipates having a collection route that can accommodate single stream recycling containers. The materials collected now are being recycled, but with a two-sort system (bottles/cans vs. mixed paper). To this end, the goal of the Sustainability Management Plan (SMP) is to identify those items used on the campus that can be recycled more efficiently and effectively. This would include bottles, cans and plastic, paper, cardboard, books, and food waste.

Alternative companies to assist in waste diversion are being sought for a more aggressive solution.

Pest Management. Foothill does not advocate spraying on site. Trapping is used instead. Natural pest-repellent plants are planned during the upcoming Landscape Site Improvement project. Ivy, a rodent favorite, has been identified for replacement.

Secondhand Smoke. Foothill College is a smoke-free campus, with the exception of designated areas within two parking lots. Smoking is prohibited in district vehicles, and "No Smoking" signs are conspicuously posted at campus entrances. Consequently, patrons and employees entering the campus often walk through areas of secondhand smoke. Additionally, many students disregard the no smoking signs and smoke in areas on campus other than designated parking lots. This is a highly volatile topic to faculty and students alike and the issue will require additional study. The No Smoking Policy Committee is currently working with the District, HR, and environmental and risk personnel to increase awareness about the health and legal risks of unwanted exposures to secondhand smoke, and encouraging enforcement of the smoke-free campus. The committee's goal is to draft a formal plan with the District to reduce, minimize, and eventually eliminate secondhand smoke exposures to patrons and employees.

Hazardous Materials. Quarterly facility walk throughs are done to make sure programs are in compliance (storage, disposal, etc.) with an annual review by the Environmental Health & Safety Representative. Requirements include:

- ❏ Hazardous materials are stored in secure cabinets, and employee training and handling is provided to authorized persons.
- ❏ Spill-cleaning equipment is available at all areas where hazardous materials reside to prevent them from entering a drain.
- ❏ Employees are encouraged to report equipment leaks immediately.
- ❏ Equipment is secured, and notifications are posted.

The Foothill-De Anza Community College District hires a consultant to compile the annual waste management reports for each campus. As a part of that report, detailed manifests are gathered from the Environmental Health & Safety Representative and converted into tonnage numbers for the state.

California Integrated Waste Management Board's website lists data for Foothill's tonnage diverted in prior years. To view this information, see the following website:
http://www.ciwmb.ca.gov/StateAgency/SOARD/Diversion.asp?ORGID=204&UBID=204&DOCID=3185&RYR=2006

Items currently recycled or diverted:

- *Computers / Electronics:* E-waste is a major component of disposal efforts for the College. From our research, the process and policies are not readily available and the process flow is confusing. *(The Sustainability Committee recommends a study group to look into this area in more depth to identify the issues.)*

- Other Hazardous and Universal E-Waste: Tracked and disposed of by the Director of Environmental Health and Safety and the Procurement Department. *(The Sustainability Committee will recommend a study group to look into this area in more depth to identify the issues noted above.)*

- *Asphalt / Concrete:* Construction materials are recorded through the building program. Plant Services needs to capture waste and recycling efforts and record it. *(The Sustainability Committee has written a policy and will send to the District's Management for incorporation. See Appendix G for Policy.)*

- *Batteries:* Small batteries are considered Universal waste and are collected in specific containers, (red buckets with lids) strategically placed around the Foothill campus for collection. The disposal vendor empties the buckets per a published schedule for proper recycling purposes. The vendor replaces the label on the container for continued use. Car batteries are not Universal waste and are therefore not managed through the battery recycle process. The producer of the used vehicle batteries (the mechanic shop and Auto Tech predominately) return the spent batteries to the company from which they were purchased. This vendor recycles the batteries as part of their service. *(The Sustainability Committee will encourage the District to track their metrics.)*

- *Beverage Containers (Glass, Aluminum, Plastics):* Currently these items are thrown into the garbage and sorted at the garbage company location. *(The Sustainability Committee will explore diverting as many items as possible into a revenue stream through use with alternate sources.)*

- *Cardboard:* Custodians and food service break down boxes and put into white dumpsters. *(The Sustainability Committee will explore diverting as many items as possible into a revenue stream through alternate sources.)*

- *Confidential Paper:* Campus and district employs outside service to shred and recycle paper. *(The Sustainability Committee recommends a study group be formed to evaluate how much of this activity is used on our campus, what are the various rates vendors charge, and is the shredded material used sustainably.)*

- *Fluorescent Lights:* Foothill Maintenance collects all spent light bulbs. Bulbs are placed in the Universal Waste Shed at the District parking lot, and periodically a vendor removes them for disposal. The District is utilizing "green bulbs". These bulbs have different names, but are often referred to as

"green" bulbs because they have green markings, such as a green printed monogram, green end-caps or other green indicators. *(Per the Sustainability Committees research, "Green" bulbs may be non-hazardous, but they still contain mercury. Mercury, even at very low levels, can become air-borne and be deposited into the environment, such as lakes and other water bodies. Green fluorescent bulbs should not be disposed as a general solid waste unless the generator can document that the waste is non-hazardous. This information should be provided in writing. Note: Even if the bulbs are non-hazardous waste, some landfills may not accept any type of mercury-containing waste. The Sustainability Committee will encourage the District to track their metrics.)*

- ❏ *Food Grease:* Recycled by tallow vendor. *(The Sustainability Committee will look into this program further to define the sustainable efforts associated with it.)*

- ❏ *Hardback Books:* Up until 2008 a 40 yard dumpster was provided at no cost to recycle books. The program was eliminated due to do cost increases. Approximately 30-50 medium-sized boxes of books are recycled per year. Since the recycling service is no longer available, interior pages of books are recycled in regular recycling dumpsters, and hard covers are discarded to landfill. Recycling falls within the area of responsibility of the collection development librarian. *(The Sustainability Committee will be tasked to look into alternate solutions with the Library staff in the near future.)*

- ❏ *Mixed Paper/Office Paper:* Clean paper is placed in separate dumpsters by custodians. *(Foothill College has made excellent use of paper used on one side only. The Transition to Work (TTW) students collect the paper twice a week, sort it, glue it, cut it into various sized "scratch pads" and then redistribute them during their on-going pick-ups for use by the Foothill community.*

- ❏ *Yard Waste/Composting:* Placed in separate dumpsters when not mulched into ground or spread onto hillsides. Mowers are all mulching mowers. *(The Sustainability Committee will look into this program further to define the sustainable efforts associated with it. The District will be encouraged to set up a composting program in coordination with the Organic Garden.)*

- ❏ *Inkjet/Laser/Copier Toner Cartridges:* The District has a recycling program through Office Depot, which picks up these items, and also supplies the District with pre-paid plastic mailing envelopes and cardboard collection containers for inkjet cartridges. *(Currently Foothill is recycling 10-20 cartridges per month at a local retail establishment which awards $3.00 per cartridge. The store coupons are used in $20 increments to incentivize carpooling for faculty and staff.)*

- ❏ *Course Catalogs and Unused Marketing Publications:* Each quarter there are many left-over catalogs. *(The Sustainability Committee will work with the Marketing Department to reduce the amount of publications and find alternative ways of conveying the information in a sustainable manner.)*

- ❑ *Paper Towels/Electric Hand Dryers:* As renovations occur and new buildings are built, electric hand dryers are being considered instead of supplying paper towels. This eliminates the paper manufacturing and bleaching process initially, as well as the waste created.

- ❑ *Styrofoam:* There is currently no way to economically recycle this product. Vendors will be requested to use recyclable packaging. *(The Sustainability Committee will work with the Procurement Department to change this.)*

Suggestions for Minimizing the Generation of Waste

- ❑ Reduce the volume of material flows on campus with just-in-time deliveries

- ❑ Establish and continually improve comprehensive recycling and composting programs

- ❑ Promote the concept cradle-to-cradle sustainable product design, in which "waste equals food" by purchasing goods that are designed to be recycled and or composted

- ❑ Work with the local and regional community to improve recycling and composting infrastructure and policies

- ❑ Follow Green Procurement Guidelines for all purchases.

Summary

In order to minimize negative environmental effects we must give priority to efficient and safe use and disposal of hazardous, as well as non-hazardous, materials. Foothill has demonstrated its commitment to this process.

3. Water Use and Conservation

Category Sponsor/Author: Karen Smith

> "We forget that the water cycle and the life cycle are one."
>
> —*Jacqes Cousteau*

Conservation of potable water reduces the need for new supplies and treatment plants.

Understanding water usage is vital in conservation efforts. The Sustainability Committee will strive to understand our use of water, how much we use, the trends, what drives the trends and what needs to be done to promote sustainable water use.

After analyzing the current situation, will recommend measures to decrease water use, which will also reduce maintenance labor, energy and CO_2 emissions (mowers, leaf blowers, other power equipment, energy to heat water, vehicle emissions etc.) needed to maintain the College.

Water Sources

The San Francisco Public Utilities Commission (SFPUC) owns and operates the San Francisco Regional Water System, a complex system connecting the Hetch Hetchy Valley, Tuolumne River and Crystal Springs Reservoir. The system provides Hetch Hetchy water, flowing more than 160 miles from Yosemite National Park, to the San Francisco Bay Area. It is driven wholly by gravity except where local watershed-treated waters are introduced. Foothill College exists in the Lower Peninsula Watershed, a 98 square mile tract of land encompassing six cities, seven creeks, and two reservoirs.

Foothill College purchases water from the Purissima Hills Water District (PHWD), an autonomous agency and part of the Bay Area Water Supply and Conservation Agency (BAWSCA). One-hundred percent of this water is received from San Francisco Public Utilities Commission. Foothill College purchases this water untreated, and is the largest user of water within the Water District, which meters our water usage and charges a flat rate.

Two on-site wells are also sources of water for college landscape irrigation.

Campus Water Use

Landscape. The Foothill campus landscape is predominately shrubs, trees and grasses, which account for the majority of water use. Much of our landscaping is at the end of its lifecycle and is showing signs of stress and disease. The Foothill campus will undergo a massive redesign through the Measure C Site Improvement Project which will address landscape, xeriscape, hardscape, and irrigation. This is a particularly timely project considering the sensitivity to finite resources and rising costs. A Master Plan has been developed with a clear path forward to provide designs that conserve water, manage rainfall and drainage patterns to improve water runoff quality. Landscape criteria for new projects include native or drought-tolerant plants, improving the plant areas around buildings, use of impermeable surfaces, sensors and data collection systems used to provide continuous metering of building energy and water consumption performance. Trends will be analyzed carefully for anomalies that should be addressed.

Environmentally-sensitive landscape design practices can have direct financial and human health benefits. The use of native or other ecologically appropriate plants reduces water consumption, maintenance requirements, the use of pesticides or herbicides, and increases the area's suitability for wildlife.

Other Water Uses.

- ❑ Toilets, urinals, faucets
- ❑ Water fountains
- ❑ Campus pool
- ❑ Shower areas
- ❑ Food Services Equipment
- ❑ Classroom/Laboratory
- ❑ Water mains

Action Plan

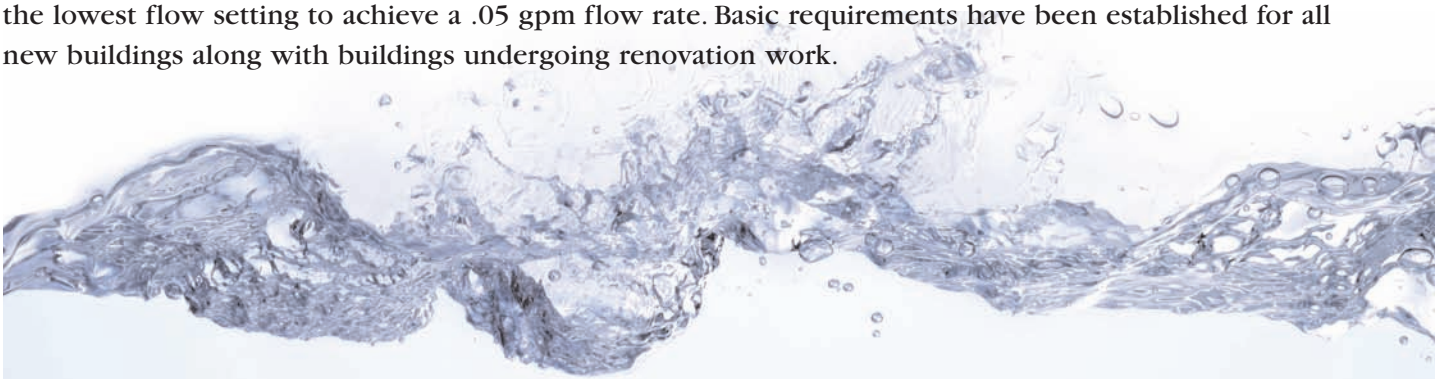
Data Collection: First we must create a water-use baseline by collecting historical water data. This first step allows us to provide metrics by answering questions such as:

What is our current total gallons-per-year usage? Outside of landscaping, where else is water used on campus? What is the location and break-down among various uses: pool, showers, sprinklers, laboratory sinks; What specific conservation measures are already in place, and what is the effect of these measures?

Purissima Hills Water District (PHWD) reports that Foothill College conservation measures have already resulted in significant reduction in water use. Due to 3 consecutive years of low rainfall, the PHWD instituted voluntary H_20 use reduction in 2009. If drought persists, more severe water restrictions will be instituted. Changes resulting from our inventory of current usage will allow us to address this requirement. Additional information we will seek includes how the sewer charge can be affected by decreased water use, and what will be the conservation requirements and rate increase during a drought.

Investigation of free/rebate programs. It is recommended that the District and Foothill investigate free programs offering water and cost benefit analysis with return on investments clearly spelled out, as well as rebates offering low cost or free fixtures to replace those that are vintage or not working adequately.

Fixtures. State-of-the-art water conserving fixtures, fittings and appliances will be used. The goal for replacement is to install fixtures that produce a 30% water usage savings over those currently in use. Water faucets are being replaced with fixtures that have built-in motion sensors. The faucets are set for the lowest flow setting to achieve a .05 gpm flow rate. Basic requirements have been established for all new buildings along with buildings undergoing renovation work.



During the previous Bond Measure E, not all restrooms were renovated with the building renovations. To assess the types of plumbing fixtures and equipment at Foothill, a matrix will be compiled logging the location and number of restrooms, the type of equipment, and if possible, the water consumption.

Waterless urinals, which save significant amounts of water, are recommended as existing urinals are replaced, or new ones are installed.

We will investigate replacing 3.5-5 gallon per flush (gpf) toilets with flushometer valves and bowls designed to use 1.7 gpf or less. If tank-type toilets are replaced, high-efficiency toilets with a WaterSense label will be recommended. These toilets are independently tested and certified to use 20% less water than ultra-low flow flush (ULF) toilets and pass rigorous waste removal performance tests.

Showers with low-flow heads will be recommended, if not already in place.

Locations of sinks will be identified, and recommendations for individual building monitors will be made to capture and record water use metrics for further analysis. *(The Sustainability Committee will convene a Water Conservation subcommittee to perform this audit and capture these metrics.)*

Energy Star Rated Appliances. Energy Star clothes washers are available in a wide range of capacities. These washers accommodate larger loads, so they are more efficient. Initial costs may be higher, but the payback of reduced energy can be realized between 2-3 years. Washers should be specified with an Energy Rating of 2.6 or greater for a 20% reduction in water and energy costs. This information will be shared with Procurement. Commercial dishwashers should also be Energy Star rated to use less hot water to clean and save 40% water and energy costs. Non-commercial dishwashers should have an ER rating of 0.55 for more than a 20% reduction in water and energy costs. This information will be shared with Procurement.

Employees. Faculty and staff contributions will be encouraged through a campaign to conserve water and to report leaks to maintenance.

Community Involvement. As part of our Civic Engagement, the Sustainability Committee will develop 'brown bag' lunch-time information seminars to provide faculty, staff, community and students with sustainability information. Several of these will be devoted to water use, and gardening and planting techniques, as well as information on how to choose ecologically responsible landscaping for their homes.

Electric Dryers. Existing paper towel dispensers will not be filled in restrooms where electric hand dryers have been installed (reduces water, paper and bleach from the manufacturing process).

Swimming Pool. Measures to limit evaporation will be recommended.

Food Services Equipment. A list of equipment will be generated, indicating energy ratings and gallons of water used, to identify replacements, when recommended, that use less energy and water.

Water Mains. Water mains will be identified and verified that all have shut-off valves. For those that do not, the Sustainability Committee will work with Plant Services to develop and implement a plan.

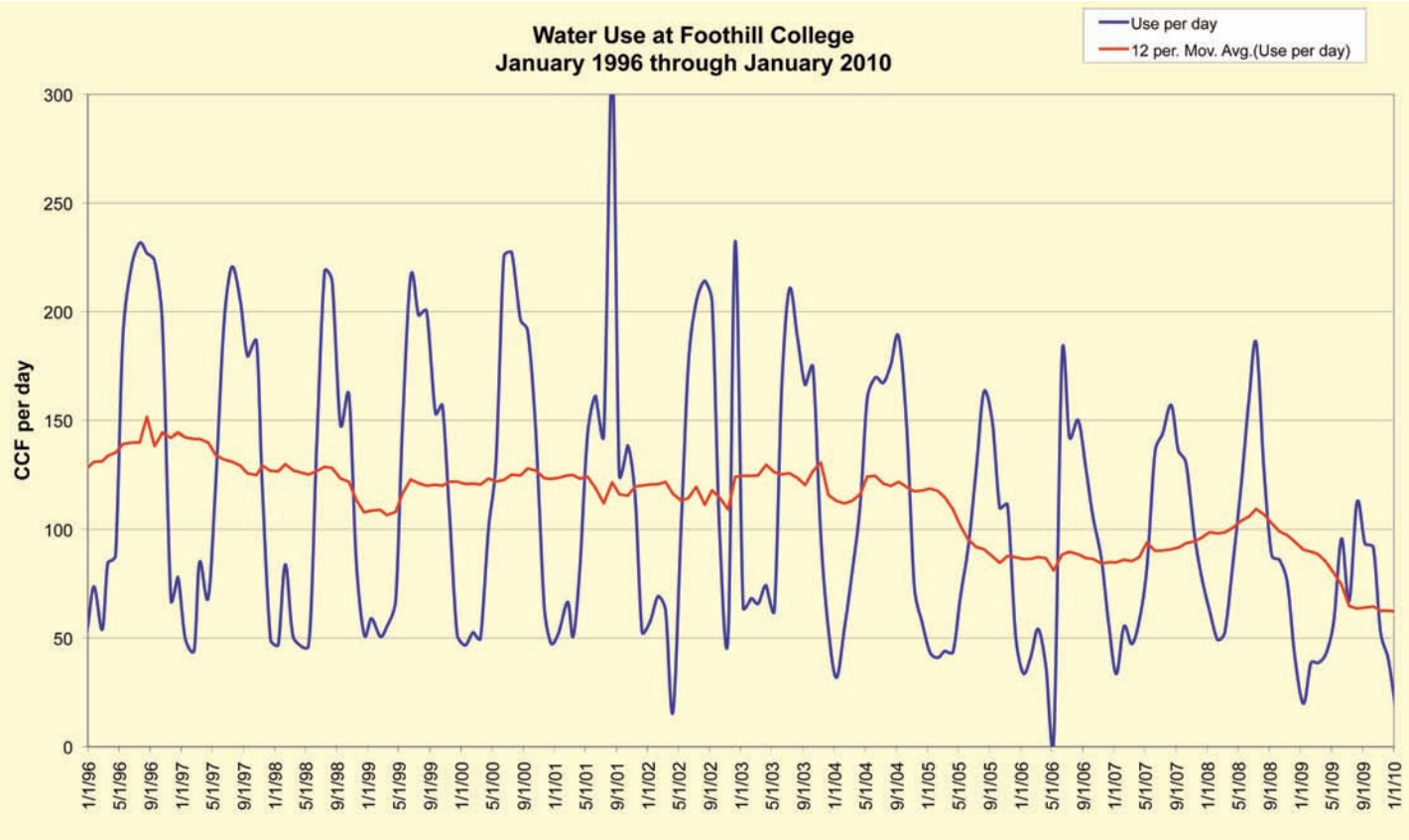
Landscape. Maintaining the landscape at Foothill is a major source of water use, and the following steps are being undertaken to increase efficiency of equipment and reduce water consumption:

- ❑ Foothill will verify that landscape designers are utilizing software (WATERGY) to analyze the potential of water savings and associated energy savings with installation of water efficient devices. A survey will indicate the number and location of sprinklers. Under Measure C Site Improvement Project a new irrigation system will be installed, resulting in decreased water use, and reduction in the need for hand watering by maintenance staff.
- ❑ Low-volume, low angle sprinklers for lawn areas are being considered where appropriate.
- ❑ Sprinkler heads that fit the size and shape of the areas to be watered are under review.
- ❑ Drip irrigation will be reviewed for trees, shrub beds and areas of groundcover to eliminate evaporation losses.
- ❑ Controllers with adjustable watering schedules, and moisture sensors to account for seasonal variations, will be part of the measure C Site Improvement Project.
- ❑ Replacement of high maintenance campus lawns with drought-tolerant native grass plugs will be recommended, as planned in the Measure C Site Improvement Project. This will also help reduce emissions from frequent blowing & mowing of existing lawns.
- ❑ Synthetic turf will replace a portion of natural turf at the new Soccer & Softball fields, which will reduce water consumption.
- ❑ Metropolitan area courtyards, near division offices will be replanted with drought-tolerant and native plants, as planned in the Measure C Site Improvement Project.
- ❑ Each spring, the Grounds Department will add 3-5 inches of mulch in planting beds to minimize irrigation evaporation.
- ❑ Plants appropriate for site and climatic conditions will be selected.
- ❑ Campus water features will be reduced through Measure C Site Improvement Project. Two of the existing decorative fountains (Library Quad and Appreciation Hall) will be renovated and the third (Administration Building) will be used as a planter.
- ❑ Where possible, the use of gray water for irrigation will be considered.

SUMMARY

Continued economic and population growth will put additional pressure on finite water supplies of the region. Foothill will do its part in reducing demand for water, as the most effective and economical strategy, and the one to implement after establishing a reduction target.

Water Use Table



4. Transportation, Energy, CO_2 Reduction

Category Sponsor/Author: Robert Cormia

> "Energy saved is energy found."
>
> —*Chevron Website*

Energy use, and associated Greenhouse Gas (GHG) emissions from the combustion of fossil fuels, is the single largest environmental impact of any large organization, and for the District. Measuring, monitoring, and managing energy for electricity, natural gas, and transportation for our students and employees is a central element of our Sustainability Management Plan (SMP). The District has been a leader in energy efficiency, starting with efficiency projects in the late 1990s utilizing Chevron Energy (energy efficiency division) to significantly lower both electricity and natural gas use employing an Energy Management System (EMS). The District is unique among large organizations in having energy data from 1991 to the current time, captured monthly, compared year over year, and using metrics including square footage, number of total students, and Full Time Equivalent Students (FTES).

The District has made both energy and green house gas (GHG) emission reduction commitments with our participation in Sustainable Silicon Valley (SSV) and the Presidents' Climate Commitment (ACUPCC). The District has also played a leading role in Silicon Valley Leadership Group (SVLG) in advocating for clean energy/smart energy systems for large organizations to manage their energy consumption and reduce greenhouse gas emissions.

During the summer of 2008, a formalized emissions inventory was undertaken using the Clean Air Cool Planet Methodology and submitted to Association for the Advancement of Sustainability in Higher Education (AASHE). These data were presented to the District in August 2008 and to the the District Board of Trustees in September 2008. In 2009, a Climate Action Plan (CAP) was prepared including a ten step strategy, analysis of energy use and GHG emission trends, and likely reductions in both over the next 5 to 10 years.

Resource sustainability is important to Foothill College, the State of California, and the nation. Efficient energy use is central to this initiative. Renewable energy and energy-conservation projects provide a means to help stabilize campus budgets. Below are described energy use trends, current and future energy efficiency projects, and plans to reduce GHG emissions, including efforts to work to climate neutral status by 2015.

Energy Use Status

Electricity. Foothill's electricity use is about 500,000 KwHrs a month 'purchased' and about 150,000 to 170,000 KwHrs a month generated 'onsite' (cogen and photovoltaics). These levels of electricity use have been fairly constant for the last five years, after declining significantly in the late 1990s (energy efficiency gains). The District sources from PG&E but purchases electricity through direct access (Constellation New Energy).

Natural gas. Foothill's natural gas use is slightly more difficult to analyze, as natural gas is used to heat buildings, as well as produce 'cogen' electricity, with the waste heat from cogeneration used to heat the

Physical Education swimming pool. Overall this is both an excellent investment and use of natural gas, as burning it to heat the pool is only about 50% efficient, as compared to the cogen process, which is 80% efficient (discussed later).

Green House Gas Emissions are estimated using standard PG&E conversions; every KwHr of electricity generates roughly 0.6 lbs of CO_2 per KwHr. The District's contract with Constellation New Energy may affect how GHG emissions are assigned. A conversion factor of 1.0 pound of CO_2 per KwHr is used for electricity imported into California. Natural gas use is assigned 11.7 pounds of CO_2 per therm (a therm is 100,000 BTU).

Emissions are calculated only for imported electricity – as cogen electricity emissions are 'counted' through the direct combustion of natural gas on site. The approximately 6-7 million KwHrs of electricity consumed by Foothill College equates to roughly 3.6 million pounds, or 1,800 tons. Natural gas use of about 3.6 million therms (annual average) equates to about 4 million pounds of CO_2, or about 2,000 tons.

Energy use appears to track increases and decreases of square footage as buildings are taken offline during renovation, and square footage added as new buildings are commissioned. Energy use shows no statistical correlation with FTES trends, suggesting that proper commissioning and retro-commissioning of buildings, and deploying efficiency measures, including EMS/BMS, lighting and inductive load technology, will be needed to reign in the increase in energy use as our building footprint expands. This will be especially critical as we attempt to meet ACUPCC energy/GHG reduction goals and commitments, while simultaneously 'growing' building footprints by fifty percent (1991).

Indirect emissions from transportation are much more difficult to estimate, as assigning Vehicle Miles Traveled (VMT) with certainty isn't possible, and additionally students may conduct other activities while they are traveling to and from the college. Nonetheless, we used statistical surveys of 500 students to estimate average number of trips, mileage per trip, and an 'average vehicle' with 26 miles per gallon. Those results were compared to an estimated number using student registration (zip code) data. The survey data suggested a per student petroleum consumption of 4.5 to 5.5 gallons per week (depending on carpooling) or roughly 100 pounds CO_2 / student / week. As these were mostly full-time students, we need and plan to conduct a more rigorous survey of student driving every two years.

*Transportation. C*ommuting to campus by students and employees and use of personal vehicles are the single largest use of energy, and consequently the single largest source of GHGs. Using a combination of student survey data and the zip code analysis performed for the PCC (described above), we estimate roughly 1,500 pounds (three-quarters ton) of CO_2 per year for part-time students and up to 4,000 pounds (two tons) of CO_2 per year for full-time students assigned for commuting to college.

Vehicle Miles Traveled (VMT) are estimated to be 26 miles round trip for students and slightly more for employees. Using the Clean Air Cool Planet approach to VMT analysis we divided employees into three categories: classified/admin, part-time faculty, and full-time faculty.

Student driving is estimated to be 5,000 tons of CO_2 for our full-time student population, and 5,000 tons for all other students' commuting, providing an estimate of 10,000 tons of CO_2 for all Foothill College 'student driving', which is roughly half of the driving for De Anza College, consistent with our student survey data.

Employee driving represents about 10 to 15% of the total campus related GHGs, roughly 1,000 tons. We are encouraging carpooling, telecommuting, smart meetings, and 4/10 employee schedule to reduce total VMT by 10-15% within 5 years or about 100 tons.

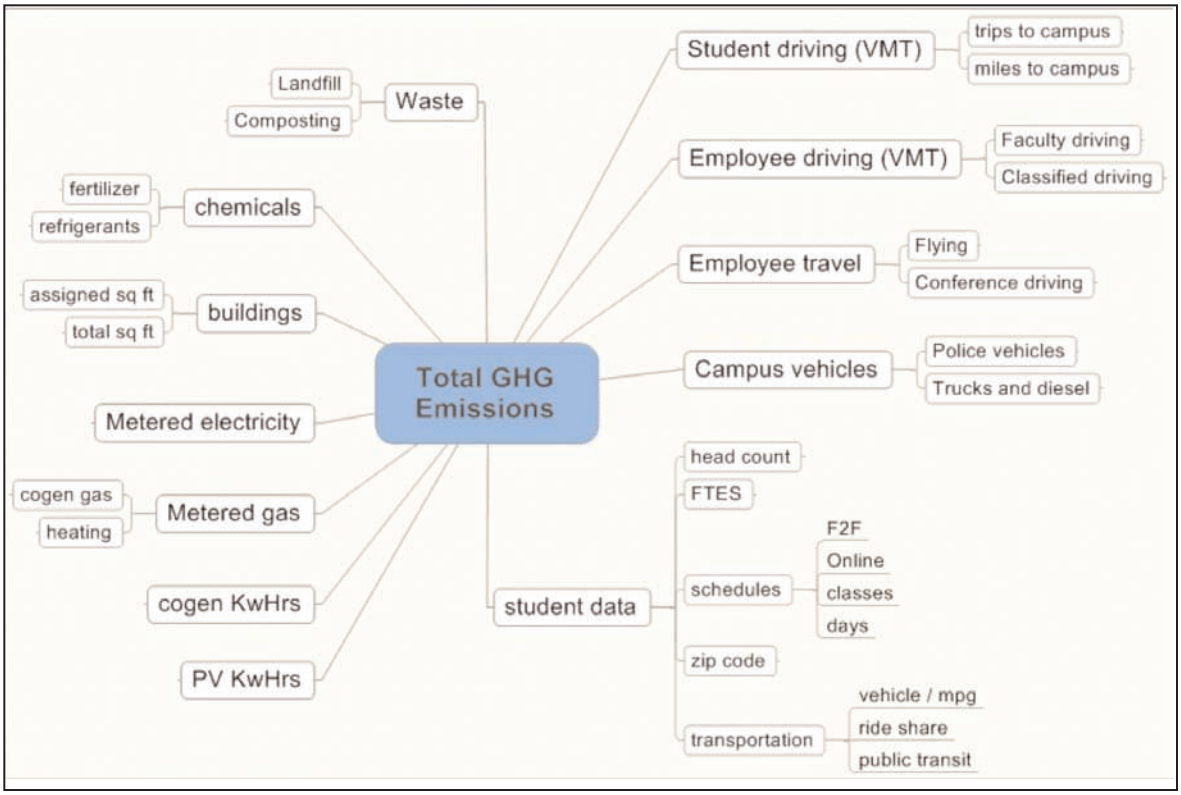
Actions Taken

We have conducted a rigorous GHG emissions inventory using the Cool Air Clean Planet (PCC/AASHE) and reported those results (expanded discussion below). We have also conducted a number of primary student and employee commute surveys, to determine how people get to campus, and establish a statistical approach to validate our use of a zip code analysis for estimating student trips, and associated GHG emissions, traveling to campus.

From these three approaches (utility bills, primary surveys, and zip code / scheduling analysis) we have developed a full emissions inventory for scope 1 (natural gas), 2 (imported electricity), and 3 (indirect emissions including, and especially, transportation of employees and key stakeholders). These data allow us to perform an energy and emissions benchmark at several different levels (sq. footage, number of employees, number of full-time students etc.)

From energy and emission baseline and benchmarking we have developed a list of activities which the District, employees, and students can perform to reduce both energy use and associated GHG emissions. These ten key action items comprise our Climate Action Plan, which are included in this SMP as a reference.

The methodology for determining energy and assigning GHG sources is shown in the topic map below.



Plans for the Future

Plans for Reducing Energy Use

	Goal	Activity	Data Collection	Analysis	Reporting
ENERGY	Understand the use of energy on campus. How much electricity? How much natural gas? Amount of emissions? Where is it used? How does this use compare to past trends?	Collect energy data from facilities on a monthly basis. Work with facilities to gather data in an automated format (spreadsheet to spreadsheet). Install and monitor new energy meters.	Spreadsheet for collection of energy data. Gather sq. ft. (assigned and total) and FTES data. Gather degree-day data if possible. Use AASHE benchmarking to determine what other colleges are using.	Benchmarking. Compare to same month in prior year. Determine energy use trends (year over year) energy per sq. ft. and energy per FTES. Use advanced metering to determine where efficiency measures are needed.	College and District divisions, all students. Sustainable Silicon Valley (SSV). Report to Presidents' Climate Commitment (PCC). Report to AASHE. Annual report to College President.

In addition to logging energy data (through interval reports) the District is planning to conduct rigorous physical energy audits with a growing network of physical meters.

These ideas will become part of a larger directive as we make reasonable efforts to reduce GHGs through energy efficiency, conservation, and lower carbon sources.

Plans for Reducing Vehicle Miles Traveled

	Goal	Activity	Data Collection	Analysis	Reporting
VMT *(Vehicle Miles Traveled)*	Reduce employee VMT by 20% in two stages. Target 10% reduction 2008-9 and 20% reduction 2009-10. Reduce student driving by 10-20% using a combination of rideshare.	Run an additional survey. Compare to zip code data. Get class schedule data and determine how many trips to classrooms must be made. Add a vehicle counting measure.	Survey data and scheduling data. Determine how many trips need to be made to campus. How many cars are entering the campus? Can we determine who is ridesharing?	How many trips? Student driving? Smart campus and block scheduling impact on trips to campus. Can iTunesU or video delivery increase student retention and decrease trips?	Report data to each campus, District and track rideshare use. Report data to faculty to support classroom efforts. Report data to students/other groups. Utilize AASHE results table (from ES62B Final Project Cormia-Smith) Strategies.

Climate Action Plan

Both the District and the college campuses have implemented energy-saving projects, and created and implemented strategic and master plans since the inception of the institution. Rising energy costs, shrinking budgets, campus growth and recently enacted legislation make developing a strategy for cutting carbon emissions extremely challenging but necessary. Foothill College will address its Green House Gas emissions (GHGs) through a ten-point multidimensional program, described below, which includes energy efficiency and retrofitting, a comprehensive transportation plan, smart campus technology (VMT/ trip reduction), installation of additional onsite PV energy, sourcing cleaner electricity (wind/PPA), investing in carbon sequestering projects (carbon offsets), and waste stream and supply chain management (procurement).

- ❏ Energy efficiency /retrofitting
- ❏ Smart energy (EMS/BMS)/Demand Response (DR)
- ❏ Comprehensive transportation plan
- ❏ Smart office technology (VMT reduction)
- ❏ Enhanced video classroom / iTunesU (VMT reduction)
- ❏ Source clean electricity (wind contract/RECs/PPA)
- ❏ Add additional photovoltaics
- ❏ Invest in carbon sequestering projects/offsets
- ❏ Reduce waste stream (recycle/reuse)
- ❏ Supply chain management (procurement)

Details of the plan are discussed below, followed by a summary of our energy and GHG audits, plans to implement the Climate Action Plan, monitor and track performance against GHG reduction targets.

1. Energy Efficiency and Retrofitting. Energy efficiency and retrofitting will unfold over the period of the next three to five years and is dependent on California State budget conditions. Investment in energy efficiency projects will continue as part of our campus renovation master plan (Measure C), including installation of additional onsite photovoltaics. Foothill College retained Chevron Energy in the late 1990's to install an EMS/BMS, resulting in significant energy reduction in the late 1990's. Additional energy efficiency projects will build on the current EMS/BMS, including replacing inefficient HVAC systems, adding insulation and improving window glazing, and implementing new electrical energy technology (ILT). Projected energy and emission savings are estimated at 10 to 15% of current electrical and natural gas use.

2. Smart Energy / Demand Response (DR). We are currently engaged in planning a campus-wide smart-metering effort for reporting building by building energy use, enhancing energy efficiency retrofitting efforts, help optimize our EMS/BMS efforts, and the ability to monitor and manage heating and cooling with better precision. The meters will eventually integrate bidirectional and demand-response (DR) capabilities. Incremental energy and emission savings, when coupled with retrofitting projects, are estimated at 5-10 percent of current electrical and natural gas use.

3. Comprehensive Transportation Plan. Foothill College has begun an effort to develop a comprehensive transportation plan for employees and students, focused on ride sharing, trip reduction and alternatives to personal vehicle use. Foothill College conducted an informal survey of student driving in fall 2007, which yielded driving habits of our on campus 'traditional' student. These data were used to calibrate our statistical/zip code analysis of student registration records, used to estimate 'Scope 3 GHG emissions' for the Presidents' Climate Commitment. This survey was repeated in fall 2009 using both on campus and electronic data collection (web survey). Foothill College is researching a ridesharing portal with Zimride, which will be launched in Fall 2010 as part of an overall transportation plan, with a goal of increasing ridesharing from an estimated 20% to a range of 30% (often) to 40% (often or frequent). Student driving accounts for roughly two-thirds of total GHG emissions, hence a reduction of 10% student driving (not including trip reduction) would reduce total college GHG emissions by roughly 6%.

4. Smart Office Technology. De Anza College began retrofitting with 'smart room' technology in 2007. These efforts included integrated wireless networking, projector and audio/video capture technology in conference room and meeting areas. The goal of these efforts is twofold; first, to 'capture' meetings and presentations for later playback and distribution and archiving, and second, to facilitate participation by a broader audience through real-time teleconference capabilities. This increases productivity for faculty, staff and administrators, who often must juggle meeting conflicts, and second, to either reduce trips to campus, and/or flexibility to daily schedule, allowing more ridesharing opportunities. Additionally, this technology may be integrated into office/workflow, allowing staff and administrators to more easily 'telecommute', e.g., as part of a 'flex Friday' policy, enabling employees to work a reduced schedule while ridesharing. Flex Friday's encourage ride sharing and also allow the EMS/BMS to begin reducing HVAC in the early afternoon on Friday. Estimated energy/GHG reduction is initially 2% of employees VMT, with an eventual goal of 5% employee VMT reduction.

5. Enhanced Video Classroom/ iTunesU (VMT Reduction). Foothill College has started a pilot program to capture audio/video from classrooms, to allow playback of lectures for students who miss a lecture or class meeting, or who plan to 'attend' a lecture 'remotely' as part of 'web enhanced' classroom delivery strategy. Audio/video capture may later transition to a pilot iTunesU project—enhancing both traditional and online education and reinforcing the development of 'hybrid classrooms'—where students fill a larger section and participate both remotely and in person.

6. Source Clean Electricity. In addition to fixed photovoltaic (PV) energy systems procured from Chevron Energy, Foothill College will explore purchasing energy which combines lower carbon content, through an enhanced Renewable Energy Portfolio (or a Power Purchase Agreement (PPA) with a remote Renewable Energy provider) and carbon offsets. Pacific Gas and Electric offers a carbon offsetting product, ClimateSmart TM, which if bundled with a lower carbon electricity product, could help colleges reduce the amount of Scope 2 (electrical) emissions to offset.

7. Photovoltaic and Cogen Onsite Electricity Production. Foothill College installed 100KW of PV electrical capacity in the early period 2001-2002 and in August 2009 contracted with Chevron Energy to install an additional 400KW on premises, adding to the initial 100KW installed as shaded parking lot structures. This additional electrical generation will produce about 600,000 KwHrs annually, about 10% of annual electrical use. This additional electrical generation will offset a total of 720,000 pounds of

CO_2 annually, about 10% of total Scope 1/Scope 2 emissions. Foothill also operates four 60KW Microturbines, producing onsite electrical generation with enough waste heat to heat the campus swimming pool.

8. Invest in Carbon Offsets. Foothill College will work with PG&E to develop a plan to offset our 'delivered' electricity regardless of contract source. Our intention is to evaluate Climate SmartTM offsets as part of a 'bundled energy solution' which might include lower carbon content. Given the size of the California Community College system, and service territory of PG&E in Northern California, a combination of California offsets (carbon sequestering projects maintained in California) and Renewable Energy (RE) added to California's installed base, purchased as a renewable energy credit might be the most affordable and cost effective way for Colleges and Universities to offset GHGs in a protracted and restricted budget environment.

9. Waste Stream Minimization. Foothill College is working on enhancing onsite recycling, composting and waste stream minimization through both awareness and using a small cadre of students in a Green Academy. We currently defer about 66% of waste, with a goal of 80% reduction by 2010-2012. We are evaluating a more aggressive 'sifting' of recyclables from waste dumpsters to defer 10-15% of reusable material which otherwise might enter the waste stream.

10. Supply Chain Management. Foothill is working with vendors to source the least carbon intensive products and process, and requesting that vendors state the carbon content of products they sell/deliver to us and their plans to reduce carbon content.

Managing Energy

In developing the Climate Action Plan (CAP), it was almost immediately evident that returning to our gross energy baseline of 1991 wasn't realistic given the almost 50% increase in building footprint (487,000 sq ft in 1991 to 680,000 sq ft in 2015). Following the directive of the California Community College Chancellor's Office, Foothill College has reported energy use per square foot, in BTUs, as a common measure of both energy use and comparative efficiency. Annual energy use in BTU per square foot was calculated for calendar years 1991-2009, and estimated for calendar years 2010-2015. These values are derived from standard energy conversion (3,412 BTU per KwHr and 100,000 BTU/therm), and serve as both a standard measure of internal energy use, independent of new construction, and additionally as a benchmarking tool for comparison with other colleges and universities (reference report from National Science Foundation). Estimates of BTU/square foot are also more realistic in projecting future total energy use, as trends from previous years are better integrated into current and future estimates, and aggregate energy use will be more realistic, helping in developing better budgeting tools for future energy expenses (additionally helping to plan strategic investments in energy efficiency and renewable energy). These data show that Foothill College will likely return to the 1991 'energy intensity footprint' of 100,000 BTU per square foot/year by 2015, which is, by comparison, a reasonable value for colleges of our size, scope, and location.

5. Green Procurement

Category Sponsor/Author: Charlotte Thunen

> "How long can men thrive between walls of brick, walking on asphalt pavements, breathing the fumes of coal and of oil, growing, working, dying, with hardly a thought of wind, and sky, and fields of grain, seeing only machine-made beauty, the mineral-like quality of life?"
>
> —*Charles Lindbergh*
> *November 1939*

What is Green Procurement?

Green Procurement involves choosing products based on efficient use of energy and natural resources, product safety and potential for safe, non-hazardous disposal.

The Purchasing Department, with input from the Sustainability Committee, shall provide the Foothill College community access to the highest value of goods and services in a manner consistent with environmental stewardship and should make purchasing decisions based on sustainable and just business practices.

How is Green Procurement achieved?

- ❏ Product selection
- ❏ Durability
- ❏ Energy-efficient appliances
- ❏ Locally produced
- ❏ Recycled Content
- ❏ Recyclability
- ❏ Strategic Vendor Partnerships
- ❏ Reuse

What action steps are required to implement Green Procurement practices?

Product selection. Know what we are buying. Learn about products that are eco-labeled compared to those that are conventionally produced. Look for products such as those with low volatile organic content (VOC), office furniture from Forest Stewardship Council (FSC) certified timber, reduced-mercury fluorescent lamps and mercury- and lead-free high pressure sodium (HPS) lamps, and neutral cleaning products. Choose goods made out of post-consumer waste and high recycled content (e.g. printer paper made from 100% recovered scraps from consumer use).

Durability. Choose quality! When buying anything, use performance specifications based on the North American Green Purchasing Initiative (NAGPI) and the Environmental Protection Agency (EPA) Procurement Guidelines for durability and long life spans.

Energy-efficient appliances. Look for ENERGY STAR appliances when shopping. ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy to help consumers save money and protect the environment through energy-efficient products and practices.

Energy-efficient choices can save about a third on an energy bill with similar savings of greenhouse gas emissions, without sacrificing features, style or comfort.

Locally produced. Supporting local manufacturers keeps jobs and money in our community, and reduces the emissions generated by transporting goods across the country (or world). In addition, items manufactured in developing countries might be subject to less stringent environmental laws, putting the ecosystem and workers at risk.

Recycled Content. "Manufacturing goods from recycled materials typically requires less energy than producing goods from virgin materials. When people reuse goods or when products are made with less material, less energy is needed to extract, transport, and process raw materials and to manufacture products. When energy demand decreases, fewer fossil fuels are burned and less carbon dioxide is emitted into the atmosphere." – EPA

Foothill will require a minimum of 30 percent, as appropriate, recycled content in purchased items.

Recyclability. Because of the great benefits of recycling, it is also important to purchase items that are designed to be recycled, e.g. furniture that disassembles into its component, recyclable parts (part-out).

Strategic Vendor Partnerships.

- ❏ Coffee Service and Supplies: Request the Fair Trade and organic options. Use biodegradable packaging and serviceware.
- ❏ Furniture: Strive for recycled content, recyclability and chemical-free materials.
- ❏ Print and Publications: Ask for vendors' recycled-content papers and vegetable-based ink.
- ❏ Green Office Supply Vendors: Ask vendors to supply items that have recycled content and/or items that are recyclable.
- ❏ Food Service: As much as available, use organic products, local purchases, seasonal products, biodegradable and recyclable supplies.

Reuse. Where possible and practical, do not buy new; reuse surplus items! Desks, chairs, tables and filing cabinets are just a sample of what may be found in storage. Since the collection of surplus materials varies throughout the year, Purchasing should initiate online listing and storage practices to enable divisions to efficiently find stored surplus items.

Current practices

Green procurement practices currently underway are recorded on project logs.

What are the next steps?

Assessment. We will use our self-assessment tool (see Appendix F) to gather further data on our procurement practices. We will also review current purchasing contracts for sustainable guidelines and practices, and will encourage the inclusion of more recycled-content items in the Central Stores Catalog.

Funding. Any successful Sustainability Master Plan takes into account, and plans for, ways to fund its projects. Capital investment ensures that money is available to fund the changes necessary in buildings, transportation systems, property, and curricula that speed the campus toward carbon neutrality. Lowering an institution's emissions can often increase energy efficiency and lower operating costs, resulting in a win-win scenario for both the institution and the environment.

Implementation. Any deficiencies in current practices identified by our self-assessment tool will be rectified using NAGPI's Environmentally Preferred Buyer's Guides, when applicable.

An additional source of buying guidelines is the EPA's database of Environmentally Preferable Purchasing (EPP) providing recommendations for greener buildings, carpets, cleaners, office supplies, electronics, and food serviceware.

Subsequent reports will document our progress in implementation of our green procurement policies.

6. Green Building: Construction and Renovation

Category Sponsor/Author: Brenda Davis-Visas

> "We shape our buildings,
> and afterwards
> our buildings shape us."
>
> —*Winston Churchill*

What is Green Building?

"Green" building places a high priority on health, environmental and resource conservation performance over the building's lifecycle. These priorities expand and complement the classic building design concerns: economy, utility, durability and aesthetics. Green Building emphasizes a number of new environmental, resource and occupant health concerns:

- ❑ Reducing human exposure to noxious materials
- ❑ Conserving non-renewable energy and scarce materials
- ❑ Minimizing the lifecycle and ecological impact of energy and the materials used
- ❑ Using renewable energy and materials that are sustainably harvested
- ❑ Protecting and restoring local air, water, soils, flora and fauna
- ❑ Supporting pedestrians, bicyclers, and users of mass transit, and utilizing alternatives to fossil-fueled vehicles.

By many measures sustainability, or green building, has yet to have a significant effect on the way in which we construct, operate and occupy the built environment. "Green building" provides the foundation for our re-evaluation of the design process.

Goals for green buildings:

- ❑ High-quality
- ❑ Durability
- ❑ Reduced operating and maintenance costs
- ❑ Greater occupant satisfaction (thermal comfort)
- ❑ Low environmental impact
- ❑ Built as "carbon neutral"

What is the Design Process for Green Building?

Our buildings require changes, and our inability to change them easily leads to obsolescence. The efficiency of typical construction, and the economics of the overall process, hinge on the design being

frozen in time and casting change as an enemy of budgets and schedules. In the end, the space as built constitutes the final design. The building becomes a static expression of a set of requirements that begin to change before the first occupant moves in.

Conventional design and construction methods produce buildings that can negatively impact the environment as well as occupant health and productivity. These buildings are expensive to operate and contribute to excessive resource consumption, waste generation and pollution. To help reduce these impacts the Sustainability Management Plan has revised design specifications for new and renovated buildings on the Foothill campus.

Green Building requirements are intended to increase sustainability without putting excessive burdens on builders. A greater emphasis with regard to how buildings can support flexible floor plans, and deliver what occupants need and to do so more efficiently is the challenge before us. Some of the "green" proposals have associated initial costs. However, others can actually reduce first costs and operating costs, and all of them increase the overall value of a building. A key component of green design is a close collaboration with the multi-disciplinary design members and the owner, starting with the conceptual design, through final construction documents, construction and commissioning.

Recommendations for Green Building Guidelines

Analysis of Sustainable Suggestions. At the Schematic Design Development Stage a list of sustainable measures shall be developed by the Architect for consideration by the Owner with a budget included for decision-making.

New Buildings - Building Site and Form. Location, orientation and building mass decisions made in the early stages of design have a major effect on the energy and environmental impacts of buildings. Early decisions establish the potential for solar-responsiveness, day-lighting, natural cooling and storm water management.

- ❏ All new Foothill building projects will be designed and built to a minimum standard equivalent of LEED "Certified". The goal for our Physical Sciences and Engineering Center is Silver Certification, to be completed in the year 2012.

Building Envelope and Building Materials. The building envelope should maximize daylight, natural views to the exterior, and control or capture solar heat gain and traffic noise.

- ❏ Per Foothill standards, windows must open where possible (with the exception of safety related issues). The exterior of new buildings must integrate harmoniously with the existing surroundings and established buildings.

Space Planning and Interior Finishes. Interior space planning and finish materials significantly affect the distribution and effectiveness of day lighting, natural ventilation and passive solar gains. "Green materials" used in buildings are selected for low consumption of scarce raw materials; low pollution in their production, delivery, use and disposal; long life; low maintenance; and their suitability for salvage or recycling in addition to their aesthetic value.

- ❏ Foothill's design specifications have been reviewed, revised and rewritten to incorporate "greener" choices.

Local manufacturers/products are specified, strengthening the community and local economy by using local products and services where they are available. Local materials reduce the CO_2 and gas emissions of transporting materials long distances.

- ❏ Foothill College design specifications have been revised to include local manufacturers and products whenever possible. Ideally, whenever possible, three local manufacturers/products will be specified.

Healthy buildings are a result of healthy material choices. Constructing a new building with use of pesticides, engineered wood products, furniture containing formaldehyde, new carpets, plastic and rubber flooring, new paint, mineral and glass fiber insulation, glues and caulking contribute to indoor air quality issues.

- ❏ Foothill College is dedicated to minimizing the exposure occupants encounter in new or renovated buildings.

- ❏ Design specifications have been revised to use environmentally friendly products, eliminating, formaldehyde and other toxic substances.

- ❏ Building Bake-Out policies, which essentially heats the building and contents for days prior to move-in will help remove toxins.

Water Systems. Continued economic and population growth will put additional pressure on finite water supplies. Environmental benefits of water conservation include less pollution from water and sewage treatment and improved habitat quality in the San Francisco Bay.

Water conservation is becoming more important and one of the many priorities when redesigning the landscaping and foliage across campus; keeping beauty, efficiency and integrating native landscape as primary goals.

- ❏ Foothill College Measure C - Site Improvement Project will address water issues.

There are other reasons to reduce potable water consumption, such as the need to reduce the energy used to heat water. Heating water constitutes a large portion of the energy budget for our buildings. Most water is heated using natural gas, which produces carbon dioxide, the most important contributor to GHG. Carbon dioxide is not the only air emission from water boilers and heaters. Air pollutants from poorly maintained natural gas water heaters and boilers include carbon monoxide, nitrogen oxides, and formaldehyde, and other trace pollutants. Utilizing electric water heaters produces the same pollutants and sulfur oxides.

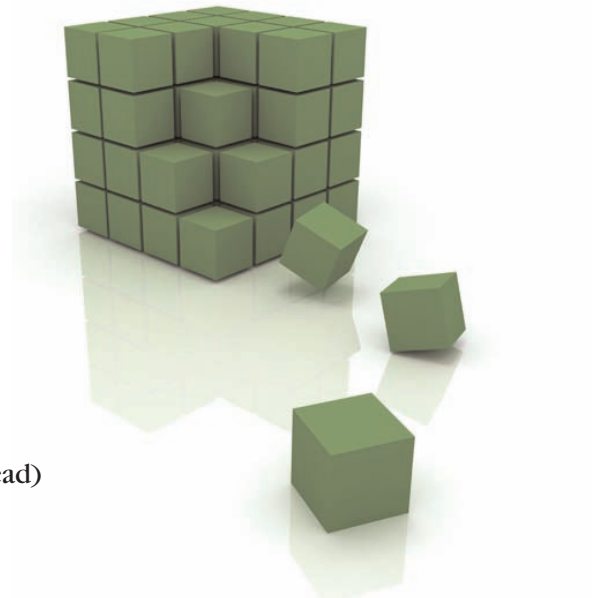
- ❏ Boilers – annual inspections and preventative maintenance includes calibration of the boiler exhaust (insures the cleanest exhaust possible). Annual inspection of water heaters (tied to boilers or electric).

- ❏ Filed copies - Resides with HVAC Supervisor or Boiler technician.

To reduce ecological impacts, water and water-heating energy conservation will be considered early in design, monitored during construction and properly commissioned to ensure proper installation and operation.

- ❏ At Foothill College, where applicable, services will be provided by a new central boiler system in Parking Lot 6. The new Physical Science and Engineering Building will utilize this resource. By utilizing existing boiler capabilities, we avoid using premium square footage in academic buildings and reducing maintenance (fewer boilers to attend to).

State of the art water-conserving fixtures, fittings and appliances are used in our new buildings and retrofitted into renovated restrooms.



- ❏ Motion sensors on faucets
- ❏ Energy Star Appliances
- ❏ Low-flow toilets
- ❏ Waterless urinals
- ❏ Low-flow shower heads
- ❏ RainMaster DX2 irrigation system (computerized smart system tied to a Weather head)

Energy Star appliances result in reduced energy and water costs and essentially pay for themselves within 2-3 years. All dishwashers shall be Energy Star compliant, with an ER of 0.55 or greater, which will result in a 20% reduction in water and energy costs.

Energy Star compliant water heaters will be specified with higher efficiencies than the legally required minimum. Energy Star compliant gas service water heaters must use less than 242 therms/year; electric units less than 4700 kWh/year, verified by independent testing.

- ❏ Foothill College will recommend to the district, as part of our Green Procurement practices in replacing appliances, to purchase Energy Start appliances when they are available.

Electrical Systems. Electricity generation for California buildings has huge environmental impacts. Standard buildings consume approximately 40% of the total annual U.S. energy usage. Buildings, being one of the major consumers of fossil fuels, release carbon dioxide, nitrogen oxides, sulfur oxides, ozone and particulates.

- ❏ Foothill will strive to limit the electrical demand and consumption of buildings through good architectural and mechanical design decisions and building automation. New buildings will be designed with the following in mind:

- ❍ Control of solar cooling loads
- ❍ Use sunlight for passive solar heating
- ❍ Use natural cooling and ventilation
- ❍ Incorporate day lighting
- ❍ Energy Management System
- ❍ Use high efficiency motors.
- ❍ Review the advantages of a lighting specialist versus an electrical engineer for all lighting layouts
- ❍ Select transformers with low lifecycle cost. Transformers are mostly lightly loaded, and should be selected for low core losses. With higher load factors, transformers with low winding losses save more. Utilize EPA's Commercial and Industrial Transformer Cost Evaluation Model (CITCEM) and Distribution Transformer Cost Evaluation Model (DTCEM) software for life-cycle analysis
- ❍ Individually metered buildings for HVAC and energy consumption

❏ Foothill College has a plan to equip buildings with individual energy meters connected to an on-line system for data review. High-use buildings can be identified and issues corrected. The first proposed installations will be in Buildings 1900, 5500 and 6400.

Title 24-2005 code requirements are the baseline of green building electrical guidelines. Surpassing code requirements, life-cycle cost assessment can be especially valuable when selecting equipment with large capital costs and long operational lives. New computer tools make it easy to produce energy simulations, assess energy conservation measures early and throughout the design process, focusing on peak energy loads, demand and consumption.

❏ Foothill College is working with an architectural firm in developing the Physical Sciences and Engineering buildings. As part of this design, refrigerant management will use 410a which is a replacement for R22.

Lamp and fixture choices should optimize light distribution and fixture spacing. This not only reduces capital cost and energy consumption, it can also improve space aesthetics and atmosphere.

❏ Foothill College is reviewing existing lighting standards:

- ❍ Exterior building lighting – High pressure sodium
- ❍ Interior fluorescent bulbs – T5, 4-foot lengths (high bay applications)
- ❍ Interior fluorescent bulbs – T8, 4-foot lengths

- ❏ Foothill College is revising design specifications to include fluorescent lamps with reduced mercury content, and mercury and lead-free HPS lamps which rules out using induction lights on the campus.

- ❏ LED lighting is the newest technology available with retrofits and is under consideration for the new Campus-wide Site Improvement Project. LED lamp life ranges 50-70,000 hours. The reduced energy consumption of LED lamps lowers CO_2 emissions.

Photovoltaic (PV) systems use solar electric panels to directly convert the sun's energy into electricity. This conversion of sunlight to electricity occurs without moving parts, and is silent. The solar electricity fed through electronic equipment is converted pollution-free in its operation. The solar electricity fed through electronic equipment is converted to utility grade electricity for use directly in our buildings. The solar electricity can be used to offset the need for purchased utility electricity, or the PV electricity can be sent back to the utility company, typically for credit.

Photovoltaic panels require an unobstructed exposure to sunlight to obtain their maximum efficiency. Most PV panels are tested to meet both electrical and environmental performance criteria. Experience with existing photovoltaic products over the past 20 years has shown that they have excellent reliability with very little maintenance requirements. Expected cost of electricity produced from a PV system is equal to about .24-.50 cents per kilowatt-hour (kWh) when considering initial cost spread over the lifetime of the system, plus maintenance costs. This compares with an average rate of now over 9.53 cents per kilowatt for utility-supplied power. Many states and the federal government have active programs to reduce the capital cost and/or the installation cost of PV systems by providing tax credits, tax deductions and rebates. Some of the benefits are significant enough to make the PV electricity nearly competitive with utility-supplied electricity. Panel PV products provide environmental benefits because they do not produce pollution or carbon dioxide emissions like fossil fuel-based utility power. Unlike utility-supplied power, the cost of producing PV electricity remains constant over the life of the system, once purchased, since the only fuel used is sunlight.

- ❏ Foothill College's first photovoltaic system was installed in 2004 and is located in Parking Lot 2A, behind the Physical Education buildings.

- ❏ Foothill's second photovoltaic system was installed in 2009 in Parking Lot 1H.

- ❏ A third installation is being planned for Parking Lot 2 and 3.

As new technology emerges, the Sustainability Committee is committed to doing their due diligence in keeping abreast of what the industry has to offer and how it might benefit Foothill College and its students.

HVAC Systems. The primary role of heating, ventilation and air conditioning (HVAC) systems is to provide healthy and comfortable interior conditions for occupants. Climate-responsive building design reduces heating and cooling loads, and thus the size of HVAC systems and equipment. Selection of more efficient HVAC equipment can further conserve non-renewable energy, and reduce air pollution from electricity generation and on-site combustion. As demand for better equipment has increased, the cost of energy-efficient HVAC equipment has dropped.

The use of chlorofluorocarbons (CFCs) in HVAC equipment have been banned for some time and hydrochlorofluorocarbons (HCFCs) are being phased out and production will stop by 2010. Both of these gases cause major damage to the ozone layer. Building design for the long term must consider how HCFC equipment will be replaced in the future. The choice of air conditioners and heat pumps using non-chlorinated refrigerants is currently limited. Non-HCFC equipment is preferred, if it meets capacity. This issue will be monitored by the appropriate design teams and the Sustainability Committee.

- ❏ Foothill Plant Services uses 134A, the newest generation of refrigerant (no CFC's). As chillers are replaced, 134A replaces the old toxins.

Control Systems. Ideally, green buildings have simple lighting equipment and minimal HVAC systems since their form, structure and envelope are designed to provide comfort. Existing buildings, with their site and program constraints, require more extensive electrical and mechanical systems with automatic controls.

The best control strategy allows occupants to directly manipulate simple and understandable building features, such as windows and shades. However, when this is not feasible, controls should provide immediate feedback on their effects, but should not require attention for safe, healthy indoor conditions, low energy consumption and operating costs. Automatic building controls must ensure the building operates efficiently regardless of occupant behavior.

Direct Digital Control Systems. Direct digital control (DDC) allows precise, flexible management of electrical and mechanical systems, and allows monitoring and management of energy consumption and demand. Rapid advances in computer technology have provided improved digital control systems at moderate costs.

Daylighting Controls. Day lighting controls can allow the electric lighting energy to be reduced as much as 80%. Properly designed, controls are essentially unnoticeable, and provide occupants with the ability to adjust space lighting to their own needs. Reduced lighting power translates into lower cooling loads, smaller HVAC equipment and reduced energy consumption.

Digital controls coupled with occupancy sensors for lighting and HVAC systems ensure that if lighting or space conditioning are not needed, they are not used. This helps to reduce the energy consumption and equipment needs of a building, and offset control costs. Similarly, variable-speed motor controllers ensure that energy is not wasted providing air or water flows that are unnecessary for comfort. Speed controller costs are falling quickly and are now economic in much smaller applications than before.

Foothill College will install occupancy sensors in all new and renovated buildings to meet Title 24 requirements. The Sustainability Committee will be tasked with identifying existing rooms without the sensors and a plan will be developed with Plant Services.

HVAC Control Strategies. DDC systems allow optimal HVAC control strategies that were difficult or expensive with older pneumatic controls.

- ❏ Foothill College HVAC temperatures are driven by set point and schedule. Our goal will be to fill classrooms for the maximum hours of the day and review the set points. Much can be gained in energy savings by delivering a little less cool air and a little less warm air.

Design efforts to control solar gain, natural lighting, ventilation and cooling will be wasted unless the systems are set up and commissioned properly from the beginning. Proper testing, commissioning and documentation are essential for efficient operations, preventive maintenance and occupant satisfaction. Ensuring that all features and systems are built and function as intended is called building commissioning. Commissioning buildings usually covers air conditioning, electrical, communications, security and fire management systems and their controls. Other systems may be included if they are complex or unusual. Control technicians can operate many buildings from a remote central location making work time more efficient.

- ❏ Foothill College will commission all major renovations and new construction. Steps include the following:
  - ❍ Documenting design intent for future reference.
  - ❍ Testing components when they arrive on the jobsite and again after they are fully installed.
  - ❍ Adjusting (balancing) of air and water distribution systems to deliver services as designed, and checking and adjusting controls to ensure energy savings and environmental conditions.
  - ❍ Final Commissioning Report (including all records of the commissioning procedures, testing results, deficiency notices and records of satisfactory corrections of deficiencies and any requirements or recommendations to test the building several months or a year after occupancy).
    - occupancy and schedule assumptions
    - heating and cooling load calculations
    - summaries of intended operation sequences
    - as-built and equipment shop drawings
    - schematic drawings of all mechanical, electrical and control systems
    - equipment manuals
    - equipment operating procedures (normal and emergency)
    - balancing reports
    - air and water design conditions
    - maintenance procedures and schedules
    - control program software documents
    - 24-hour telephone contacts for emergency service companies
    - Annotated source code for all control system programs in both hard copy and electronic form, complete with control point listings with set points and anticipated operating range. Ensure all deficiencies and their successful corrections are clearly documented.

Older digital control systems have issues with "interoperability" – integrating building controls, sensors, and actuators with security, communications and computer local area networks (LANs). Lonworks and BACNet, are two protocols that have been established to allow equipment from many different vendors to "talk" to each other. Integrating one of these systems would ease the task of control integration in new designs and in future retrofits.

- ❏ Foothill is actively seeking other EMS systems.

Computer technology advancements are responsible for falling costs of DDC systems for buildings. DDC systems have much finer control and energy savings than pneumatic controls. Along with monitoring lighting and HVAC, fire, intruder alarms, security and access systems can be monitored through a DDC system.

- ❏ Foothill College will be implementing individual building monitoring to identify excessive energy use and take timely corrective action to minimize energy costs.
- ❏ All pneumatic controls have been eliminated and HVAC is digitally controlled, which is more reliable and eliminates moving parts and maintenance labor.

For larger, more complex buildings, central controllers or centrally supervised zone controllers connected with a network offer the most flexibility and potential for energy savings. Foothill College has the following in place:

- ❏ A graphic interface for building operators that shows floor plans of all areas of the building, locating all controlled equipment
- ❏ Schematic drawings of each controlled device, with on/off status, current sensor readings, setpoints, operator positions, control constants, and a link that shows the operating control program code
- ❏ Graphic trend logs of inputs, outputs and control points selected by the operator
- ❏ Graphs and tables of building energy and demand history for all fuel types
- ❏ Optimal start and temperature-predictor programs for cooling and heating plant equipment
- ❏ Storage for at least 12 months of hourly trend-logging of flows, temperatures, pressures and other important data for all plant equipment
- ❏ Secure dial-up modem access for remote monitoring, supervision and trouble-shooting by building service companies contracted by Foothill

Good design documentation for each controlled device should include schematic drawings, listings of control points, expected operating readings and acceptable range, and sequences of operation. Field review and commissioning should check to ensure compliance with document design intentions, and any changes made should be recorded for future reference by building operators.

Good communication and documentation are essential to a trouble-free control system. Sensors, actuators and controllers must be carefully commissioned and building operators must be trained in control system use.

- ❏ Foothill College training is part of the Closeout process included in the construction documentation. See Specifications Section 017700

The use of occupancy sensors to control lighting, heating and cooling according to motion detected within an intermittently occupied area is a strategy that is long over due. Occupancy sensors can save up to 80% of the lighting and HVAC energy when properly applied. Sensors must be properly located, adjusted and calibrated in commissioning and regularly maintained.

- ❏ Foothill College utilizes occupancy sensors for lighting control in all new and renovated buildings.

Two commissioning adjustments are critical for energy savings and occupant satisfaction:

- ❏ Time out: how long equipment will remain on after last detection of motion. This will vary with the space use and should be adjusted after occupancy.

- ❏ Sensitivity: how small a change in infrared heat, movement or noise is required to trigger the sensor. Adjustment is important to prevent false-on and false-off signals.

Lamps and sensors should be adjusted after they have been installed, room furnishings are in place, fluorescent lamps have burned in for 100 hours, and HVAC systems are operating. Sensors, actuators and controllers must be carefully commissioned.

- ❏ Commissioning process will address the above at Foothill College.

Building operators must be trained in control system use.

- ❏ Foothill College training is part of the Closeout process included in the construction documentation. See Specification Section 017700

Commissioning. The purpose of Building Commissioning is to ensure that all features and systems are built and function as intended.

The scope of work usually covers mechanical systems, electrical systems, communications, security and fire management systems and their controls. It may also include other systems and components, particularly if they are unusual or complex. Commissioning begins by hiring a third party commissioning agent and documenting design intent for future reference. This is followed by testing components when they arrive on the jobsite, and again after they are fully installed. Adjusting (balancing) of air and water distribution systems to deliver services as designed, and checking and adjusting controls systems to ensure energy savings and environmental conditions is the following step. Providing maintenance training and manuals for building staff is usually the last step of commissioning.

Along with the drawings and equipment manuals, a final commissioning report is also submitted to the owners by the third-party commissioning agent. A complete commissioning report contains all records

of the procedures, testing results, deficiency notices and records of satisfactory corrections of deficiencies. Commissioning may also extend to testing the building and systems several months or a year after occupancy.

- ❏ LEED buildings include testing after occupancy as basic requirements for certification.

Commissioning is a relatively new procedure that includes what was formerly referred to as "testing, adjusting and balancing" but goes several steps further. Commissioning has been found to be very valuable, particularly with complex mechanical and electrical systems, to ensure that they operate as intended, and to realize energy savings and a quality building environment—which are often the reasons more complex systems are installed. When special building features are installed to generate renewable energy generation, recycle waste or reduce other environmental impacts, commissioning is often necessary to ensure optimum performance.

The purpose of commissioning is to ensure:

- ❏ Performance of contractual obligations
- ❏ Quality of construction and correct operation of all functions
- ❏ Environmental quality and energy-efficient operation as designed
- ❏ Complete as-built, operating and maintenance information are passed on to Owners and operating staff.

Formal commissioning is recommended for buildings with complex and digitally-controlled HVAC systems, or those with renewable energy, on-site water treatment systems, daylighting or occupancy sensor lighting controls, natural ventilation systems integrated with HVAC systems or other unusual technologies. Commissioning is usually not used for projects with very little mechanical or electrical complexity.

Commissioning should be done for:

- ❏ Both new construction and major retrofits
- ❏ Medium or large energy management control systems (systems with more than 50 control points
- ❏ Unusually complex mechanical or electrical systems
- ❏ On-site renewable energy generation systems, such as solar hot water heaters or photovoltaic arrays; and
- ❏ Innovative water-conservation strategies, such as graywater irrigation systems or composting toilets.

Preparation and Follow-up of a Formal Commissioning Plan

A plan is essential for successful commissioning:

- ❏ Determine the degree of commissioning required early in the design process
- ❏ Assign responsibility for commissioning, also early in the process
- ❏ Define commissioning requirements clearly in specification documents for all systems that require it
- ❏ Instruct the contractor to coordinate and delegate commissioning duties among subcontractors
- ❏ Assign the commissioning coordinator or consultant (if involved) the coordination of all documents and commissioning work.

In the specifications, language must be emphasized to contractors during the bidding process so they understand that more testing and verification will be required than has been standard practice.

Foothill College has revised the design specifications to include a section on commissioning which address the above. See Section 01 91 00.

Summary

Sustainable initiatives have gained a great deal of interest and emphasis at Foothill College during the past two years, with the realization that we still have a challenging task before us. Fifty-plus years ago, when Foothill College was built, the architects attempted to blend the new buildings into the serene landscape setting of the surrounding hillsides. Today environmental stewardship must stretch so much further.

The focus categories contained within this document, are able to stand on their own, but also support one another in striving for a sustainable campus.

As the Sustainability Management Plan progresses forward, it does so with the full understanding that concepts, pages or full sections of the document may need to be clarified, revised or completely rewritten over time. The document is intended as a 'road map' with updates evolving from best practices in sustainability efforts.

When determining what actions to take within the six focus categories, we will use the Presidents' Climate Commitment guidelines:

- ❏ Moves the school towards sustainability, where there are no violations of the four principles;
    - ❍ Eliminating our contribution to systemic increases in concentration of substances from the earths crust in natural systems (fossilized carbon, scarce metals like mercury)
    - ❍ Eliminating our contribution to systemic increases in concentration of substances produced by society into natural systems (such as toxic chemicals, CFCs, etc.)
    - ❍ Eliminating our contribution to systemic degradation of natural systems by physical means (deforestation, erosion, flooding)
    - ❍ Eliminating our contribution to the systematic undermining of people's capacity to meet their needs worldwide (supporting companies with unfair labor practices, perpetuating policies that create barriers to escaping poverty, etc.)
- ❏ Decisions are flexible enough not to lock the school and or the school's resources into unsustainable practices for long periods of time (dead-ends on the road to sustainability)
- ❏ Provides a sufficient return on investment (in terms of financial, social and political capital) to continue the process and reinvest in future actions towards sustainability.

Sustainability work is highly dynamic and requires a full-time sustainability coordinator. Until this position can be created and funded, the Sustainability Committee will continue to progress forward, as much as other obligations allow, re-examining this document, at a minimum, every three years and providing an annual report to the College President each September.

Appendix

APPENDIX A

Sustainability Committee

Mission Statement

The mission of the Foothill College Sustainability Committee is to take a leadership role in promoting, developing and modeling sustainability initiatives for students, staff, faculty and other public entities that are served by the College. Sustainability concepts will be incorporated into the academic and daily affairs of the college, minimizing the college's impact on the environment, and providing opportunities for, and encouragement of, student leadership roles in the endeavor.

APPENDIX B

Foothill Community College

Policy on Sustainable Practices

Foothill College's primary mission is to educate students. To enhance the curriculum and learning opportunities, Foothill College will strive to model exemplary sustainable practices that will become a part of our students' everyday lives as they progress through the educational system and begin their careers. The sustainability efforts are committed to minimizing the College's impact on the physical environment, to be accountable for our actions and provide guidance for our future endeavors.

The College President shall appoint a sustainability Committee composed of representatives of stakeholder groups from the College community. To achieve Foothill's goals, the Sustainability Committee will develop priorities and implement decisions regarding sustainability practices.

Sustainability Committee Structure

The Sustainability Committee's primary responsibility is to develop a Sustainability Management Plan (SMP) which will outline goals, implement programs, monitor and evaluate results, and provide an annual report to the President. The SMP will be an integral part of the Foothill Educational Master Plan. As part of the reporting process, the committee will examine past practices and revise and redefine parameters as necessary to produce meaningful data.

Implementation of action plans will focus on the following six areas:

- ❏ Community & Civic Engagement – Promote awareness and education
- ❏ Hazardous & Solid Waste Reduction & Control – Decrease volume of waste generated and minimize the amount of hazardous and solid waste sent to landfills
- ❏ Water Use & Conservation – Minimize resource use through ecologically responsible landscape
- ❏ Transportation, Energy Conservation, Efficiency & CO_2 Reduction – Research alternate energy sources, track, report and minimize greenhouse gas emissions and energy use
- ❏ Green Procurement – Modify College's purchase processes and procedures to meet sustainability objectives.
- ❏ Green Building Design, Construction & Renovation– Modification of design specifications to address environmental issues

The Committee and sub-committees may appoint additional members. The Committee shall meet as a whole approximately once per month. All terms are two years, with the exception of the student mem-

ber(s), whose term shall be one year; there are no term limits. Sub-committees shall be appointed, and meet, as necessary.

The President shall review the scope and structure of the Sustainability Committee every 3 years.

With this commitment, a viable "road map" and annual reporting to the College President, Foothill College is in position to move sustainably through the 21st century and beyond.

APPENDIX C

Board Policy - Sustainable Practices 3214

Environmental sustainability is critically important to the Foothill-De Anza Community College District, the State of California, and the nation. Efficient use of resources is central to this objective. The District is committed to stewardship of the environment and to reducing the District's dependence on non-renewable energy sources. The Board of Trustees recognizes the importance of new initiatives to incorporate sustainable practices. Such sustainable practices shall include:

- Incorporate the principles of energy efficiency and sustainability in all capital projects, operation and maintenance within budgetary constraints and programmatic requirements.
- Minimize the use of non-renewable energy sources by creating a portfolio approach to energy use which would include: on-site energy production (e.g. Photovoltaic), purchasing local renewable energy; purchasing "green" power from the grid, and conservation measures that reduce energy consumption.
- Minimize greenhouse gas emissions on District facilities, and incorporate fuel-efficient vehicles and practices into the District's fleet of vehicles.
- Promote alternate means of transportation to and from the campuses.
- Minimize the amount of Districts-generated waste sent to the landfill through an aggressive recycling program for all products, which can be diverted from the landfill.
- Utilize the District's purchasing power to reduce packaging, purchase green products and evaluate life cycles of products to determine how they will be disposed of at end of life cycle.
- Establish communications strategies for students and staff to understand and promote these values.

The Board of Trustees will regularly review progress towards these goals.

See Administrative Procedures 3214

Title 5 Sections 57100, 57121

Title 14, Div 6, Chapter 4

Approved 8/16/99

Revised 2/22/05

Revised _/__/__

APPENDIX D

Resource Websites

AASHE STARS Program: *www.aashe.org/stars/*

American Association of Sustainability in Higher Education (AASHE): *www.aashe.org/*

American Cancer Society Smoke-Free College Campus Initiative: *www.cancer.org/cocroot/COM/content/div Northwest/COM 5 1xx Smoke-Free College Campus Initiative.asp*

Bay Area Water Supply and Conservation Agency: *http://www.bawsca.org/*

Build It Green Materials Database: *www.builditgreen.org/guide/*

Building Green.com – Building Green News: *www.buildinggreen.com/index.cfm*

California Integrated Waste Management – Costs & Benefits: *www.ciwmb.ca.gov/GreenBuilding/Design/CostIssues.htm#Cost&Benefit*

California Materials Exchange: *www.ciwmb.ca.gov/CalMAX*

California Recycled-Content Products Database: *www.ciwmb.ca.gov/rcp*

Carpet and Rug Institute – Indoor Air Quality: *www.carpet-rug.org/commercial-customers/green-building-and-the-environment/green-label-plus/index.cfm*

City of Palo Alto: *www.cityofpaloalto.org/environment/water_quality.asp*

Clean Power Estimator: *www.consumerenergycenter.org/renewables/estimator/index.html*

Database of State Incentives for Renewables and Efficiency (DSIRE): *www.dsireusa.org*

Electronic Product Environmental Assessment Tool (EPEAT) Silver registered products or the equiv: *www.epeat.net*

Environmentally Preferable Purchasing (EPP): *www.epa.gov/epp/*

Environmental Protection Agency (EPA): *www.epa.gov/lab21gov/tookkit/bp_guide.htm*

EPA Comprehensive Procurement Guidelines: *www.epa.gov/epawaste/conserve/tools/cpg/index.htm*

Federal Tax Incentives: *www.energytaxincentives.org*

FEMP Buying Energy-Efficient Products: *www1.eere.energy.gov/femp/procurement*

Global Green USA: *www.globalgreen.org*

Green Biz News Center Sustainability and the Bottom Line:
www.greenbiz.com/news/reviews_third.cfm?newsid+21584

Green Building Smart Market Report McGraw Hill Construction

Green-e Renewable Energy Certification Program

Green Guard – Product Guide: *www.greenguard.org*

Green Seal GS-3740Environmental Standard for Industrial and Institutional Floor Care: *www.greenseal.org*

GSA LEED Cost Study: *www.wbdg.org/newsevents/new_040105.php*

ISO14000: *www.iso.org/iso/iso14000 essentials*

Lawrence Berkeley Laboratory—EH&S Waste Minimization:
www.lbl.gov/ehs/waste/wmin_hazardous.shtml

Lean Construction Institute: *www.leanconstruction.org/*

The National Institute of Building Sciences: *www.nibs.org*

New Buildings Institute: *www.newbuildings.org*

Oikos Green Building Source: *www.oilos.com*

Presidents' Climate Commitment: *www.presidentsclimatecommitment.org*

Savings by Design: *www.savignsbydesign.com*

Sustainability – Financial Incentives: *www.dsa.dgs.ca.gov/Sustainability/incentives.htm*

Sustainable Building Sourcebook: *www.greenbuilder.com/sourcebook*

Santa Clara Valley Water District: *www.scvwd.dst.ca.us*

US Green Building Council: *www.usgbc.org*

Valley Water: *www.vallewater.org/Water/*

Whole Building Design Guide C&D recycler tools: *www.wbdg.org/tools/cwm.php?a+1*

EXHIBIT E

Foothill College
CLIMATE ACTION PLAN
December 2009

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INTRODUCTION

Foothill-De Anza Community College District's past Chancellor Martha Kanter, and Foothill College President Judy Miner, signed the American College & University President's Climate Commitment (ACUPCC) along with 600 other signatories in an effort to address global warming by pursuing climate neutrality for their campuses and developing the expertise of their faculty, staff and students to help society do the same. There are two colleges within the Foothill-De Anza Community College District (District): Foothill College (Foothill) and De Anza College (De Anza). The District, in addition to the ACUPCC commitment, additionally supports California's S-3-05 and AB32 bills. Foothill committed within two years to develop and begin implementing a plan to accomplish carbon neutrality. Within one year of signing the commitment, all signatories pledged to begin measuring and publicly reporting their GHG emissions inventory.

This document will describe the efforts of Foothill in developing both a sustainability mission statement and sustainability working group, and specific efforts in our Climate Action Plan to reduce energy use and greenhouse gas emissions.

The Foothill College Sustainability Committee (Committee) was convened April 9, 2007 at the request of Chancellor Kanter and President Miner in response to our ACUPCC commitment. Prior to this commitment, a handful of staff and faculty engaged in various "green activities" on campus, such as recycling coffee grounds for composting, paper collection and reuse, and performing small scale refuse and recycling audits. Representatives from the various shared governance groups were requested. The resulting committee consisted of the Director of Facilities (as chairperson), and included one staff representative, one classified representative, two faculty representatives, the Director of Maintenance and Plant Services, and the Special Assistant to the President. Sustainability Coordinator duties were added to the job description of the Special Assistant to the President effective Fall 2009.

The first task of the Committee was the development of a Mission Statement. Once accomplished, the Committee set to work to create a campus Sustainability Policy. During this time, the District was also revising Board Policy 3214 to align their sustainability policy with both Foothill and De Anza.

In September of 2008, the District and Foothill held their respective Opening Day activities, with Sustainability as a key theme for both. On September 18, the District held a panel discussion to introduce sustainability issues to the faculty and staff. Panel participants from Foothill included Robert Cormia (Faculty), Charlotte Thunen (Faculty), and Sarah Snow (Foothill Student Trustee). Sarah Snow presented the initial results of the GHG audit performed in summer 2008. At Foothill Opening Day on September 19, the theme was "One College, One Community, One World," and the Committee hosted a table, with green promotional items and information available, as well as a signup sheet to participate in future sustainability efforts. As a result of that recruitment effort, the Sustainability Committee membership now comprises six steering members, 12 faculty representatives, 15 staff representatives, three administrators and three student representatives from the Foothill Environmental Technology Club. Two of the members also report to the Academic and Classified Senates with monthly updates from committee meetings. Monthly meeting minutes are recorded with copies distributed to the President's Cabinet. A Sustainability website has been created and monthly meetings and sustainable events are posted, along with green tips and other pertinent information. As the committee began to work on the Sustainability Management Plan for the campus, six focus areas emerged: Awareness/Civic Engagement; Hazardous & Solid Waste Reduction; Water Conservation; Transportation,

Energy Conservation, Efficiency & CO_2 Reduction; Green Procurement; and Green Building & Construction. Issues and initiatives within the six categories are brought to the monthly meetings for discussion, review, implementation or resolution. As part of the committee's work around a Sustainability Management Plan, elements from the plan are being incorporated into our upcoming Educational and Strategic Master Plan that will be finalized in Fall of 2010. Comprehensive reviews of the Sustainability Management Plan are anticipated every three years with minor revisions yearly. Progress will be tracked through annual reports to the Foothill President and the ACUPCC.

The Foothill Climate Action Plan dovetails with the Transportation, Energy Conservation, Efficiency, and CO_2 Reduction section of the Sustainability Management Plan. Foothill conducted its first greenhouse gas emissions (GHG) audit and report in August 2008. Per the ACUPCC commitment, this audit and report will be repeated every two years. The 2008 GHG audit/report will be the baseline for future improvements and interim targets for the reduction of GHG emissions.

On June 1, 2005, Governor Arnold Schwarzenegger signed S-3-05, an Executive Order stating that California will reduce Greenhouse Gases to specific targets to avoid future catastrophic climate changes. AB32 is the Global Warming solution Act of 2006 and gives California the authority to regulate Greenhouse gas emissions as follows:

- by year 2010 greenhouse gases will be reduced to the year 2000 levels
- by year 2020 greenhouse gases will be reduced to year 1990 levels
- and by year 2050, 80 percent below year 1990 levels

Foothill performed a GHG inventory using the Clean Air Cool Planet process, and submitted these results to AASHE in the fall of 2008. The following year, the District developed an approach for measuring, managing, and reducing GHG emissions to 2000 and 1990 levels. During the period of 1990 to 2010 and beyond, the District has embarked on a series of renovations of existing buildings as well as the construction of new buildings, which has increased Foothill's 'building footprint' by almost 50 percent. Deploying energy efficiency measures in the late 1990s reduced our energy use per square foot by 20 percent, with minimal gain of energy/emissions per full-time student load (FTES). We are in the middle of ongoing construction, with plans to address energy efficiency, monitoring and management through renovation and additional technology, including state of the art building monitoring and significant addition to onsite PV (photovoltaic) electrical generation.

The District's energy use and GHG emissions, shown in Appendix 1, are typical of noncommercial service organizations, where 50 percent or more of stakeholder emissions are attributable to transportation, i.e., Foothill is a 'commuter school.' Buildings built before 1978 were not designed with conservation and energy savings in mind. Forthcoming legislation in California will require all new buildings beginning in 2020 to be built utilizing 'net zero energy.' New buildings will follow LEED building design (Leadership in Energy Efficiency and Design), and additionally be separately metered to monitor, regulate and reduce energy and water use. The District has committed to incorporate LEED engineering principles in all new construction, which will lower energy use, emissions, and future operating costs for the District.

Regional studies by Sustainable Silicon Valley (SSV), Joint Venture Silicon Valley, and the California Climate Action Registry (http://www.climateregistry.org/) indicate the major cause of regional green house gas emissions is transportation, with natural gas and electricity use in buildings the second largest contributor. Towards that end, a significant component of future GHG reduction will entail a comprehensive transportation plan for employees and students. California has made energy efficiency a primary goal for both reducing energy use and controlling greenhouse gas emissions. California no longer burns coal, but during periods of peak demand will purchase electricity from out of state where coal comprises a significant portion of electrical generation. California produces 50 percent of its natural gas and electrical energy resources, and purchases the remainder from the United States, Canada and Mexico.

CLIMATE COMMITMENTS

We live in an era of numerous 'climate commitments', including Sustainable Silicon Valley's (SSV) commitment to reduce energy use and GHG emissions, California's landmark climate legislation AB32, and ACUPCC, with reduction targets similar to both SSV's and AB32. These commitments are both qualitatively and quantitatively similar to the Kyoto Protocol, which while the United States did not sign, serves as a guide for reduction targets to the above climate

commitments. Notably, the District is unique among the 100 SSV signatories, in that the District is the only one to actually have several years of past energy data from which we can both baseline and benchmark our progress internally and comparatively to organizations similar in size and shape.

The ACUPCC identified seven tangible actions that could have immediate impact. Foothill College has chosen to pursue the following actions.

1. All new campus construction will be built to the U.S. Green Building Council's LEED silver standard or equivalent.
    - Foothill is currently in the process of design and construction of our new Physical Science & Engineering Center, and is seeking LEED silver standard certification. Both the Foothill and the District Sustainability Plans have included provisions regarding new buildings meeting or exceeding LEED standards.

2. Adopt an energy-efficient appliance purchasing policy requiring purchase of ENERGY STAR certified products in all areas for which such ratings exist.
    - Foothill has included provisions for purchasing or replacement of appliances to be specified as Energy Star rated whenever available, as a part of the Green Procurement section of it's Sustainability Management Plan.

3. Encourage use of and provide access to public transportation for all faculty, staff, students and visitors at our institution.
    - Foothill is serviced by Santa Clara Valley Transportation Authority (VTA) bus routes. As part of a comprehensive Transportation Plan currently in development, Foothill is seeking ways to encourage and increase ridership to and from campus on mass transit. The Committee is working with VTA to look closely at ways of increasing/improving bus routes and encourage ridership. Foothill is considering the adoption of an internet-based rideshare program and has implemented a monthly raffle to incentivize faculty and staff to carpool. Additionally, Foothill is in the process of raising funds for a new multiuse path to be used by pedestrians and bicyclists.

4. Within one year of signing this document, begin purchasing or producing at least 15 percent of our institutions electricity consumption from renewable sources.
    - Foothill's second installation of Photovoltaic solar panels has been installed in Parking Lot 1H. Planning is underway for further Photovoltaic installations on campus.

The following recommendations were not feasible for Foothill to undertake at this time, however, they will be reviewed and implemented if/when practical.

1. Establish a policy of offsetting all greenhouse gas emissions generated by air travel paid for by our institution.

2. Establish a policy or a committee that supports climate and sustainability shareholder proposals at companies where our institution's endowment is invested.

3. Participate in the Waste Minimization component of the national Recycle Mania competition, and adopt 3 or more associated measures to reduce waste.

A TEN POINT PLAN

Foothill and De Anza have both implemented energy-saving projects and created and implemented strategic master plans since the inception of the institutions. Rising energy costs, shrinking budgets, campus growth and recently enacted legislation make developing a strategy for cutting carbon emissions extremely challenging but very necessary. Foothill will address its GHG emissions through a ten-point multidimensional program which includes energy efficiency and retrofitting, a comprehensive transportation plan, smart campus technology (VMT/trip reduction), installation of additional onsite photovoltaic energy sources, sourcing cleaner electricity (wind/PPA), investing in carbon sequestering projects (carbon offsets), and waste stream and supply chain management (procurement).

Details of the plan are discussed below, followed by a summary of our energy and GHG audits, plans to implement the CAP, monitor energy use, and track performance against GHG reduction targets.

1. Energy Efficiency and Retrofitting

Energy efficiency and retrofitting will unfold over the period of the next three to five years, and is dependent on California State budget conditions. Investment in energy efficiency projects will continue as part of the campus renovation master plan (Measure C), including installation of additional onsite photovoltaic systems. Foothill retained Chevron Energy in the late 1990s to help with an EMS/BMS (Energy Management System/Building Management System), resulting in significant energy reduction in the late 1990s. Additional energy efficiency projects will build on the current EMS/BMS, including replacing inefficient HVAC systems, adding insulation and improving window glazing, and implementing new electrical energy technology (ILT). Projected energy and emission savings are estimated at 10 to 15 percent of current electrical and natural gas use.

2. Smart Energy / Demand Response (DR)

Foothill is currently engaged in planning a campus-wide smart-metering effort, reporting building by building energy use, enhancing energy efficiency retrofitting efforts, optimizing our EMS/BMS efforts, which will provide the ability to monitor and manage heating and cooling with better precision. These meters will eventually integrate bidirectional and demand-response (DR) capabilities. Incremental energy and emission savings, when coupled with retrofitting projects, are estimated at 5 to 10 percent of current electrical and natural gas use.

3. Comprehensive Transportation Plan

Foothill has begun an effort to develop a comprehensive transportation plan for employees and students, focused on ride sharing, trip reduction, and alternatives to personal vehicle use. Foothill conducted an informal survey of student driving in fall 2007, which yielded driving habits of our on campus / 'traditional' student. This data was used to calibrate our statistical / zip code analysis of student registration records, used to estimate 'Scope 3 GHG emissions' for the President's Climate Commitment (ACUPCC). The survey was repeated in fall 2009 using both on campus and electronic data collection (Web survey). Foothill College is in the process of adopting an internet based ridesharing portal with a goal of increasing ridesharing from an estimated 20 percent to a range of 30 percent (often) to 40 percent (often or frequent). Student driving accounts for roughly two-thirds of total GHG emissions, hence a reduction of 10 percent student driving (not including trip reduction) would reduce total College GHG emissions by roughly 6 percent.

4. Smart Office Technology

Following the lead of De Anza College, Foothill will begin integrating 'smart room' technology in all new buildings starting in 2010-11. These efforts will include integrated wireless networking, projector, and audio/video capture technology in larger conference rooms, meeting areas, and lecture rooms. The goal of these efforts is twofold; first, to 'capture' meetings and presentations for later playback and distribution, and archiving and second, to facilitate participation by a broader audience through real-time teleconference capabilities. This increases productivity for faculty, staff, and administrators, who often must juggle meeting conflicts and will help to either reduce trips to campus, and/or add flexibility to daily schedule, allowing more ridesharing opportunities. Additionally, this technology may be integrated into office/workflow, allowing staff and administrators to more easily 'telecommute', e.g., as part of a 'flex Friday' policy, enabling employees to work a reduced schedule while ridesharing. Flex Friday's encourage ride sharing and also allow the EMS/BMS to begin reducing HVAC in the early afternoon on Friday. Estimated energy/GHG reduction is initially 2 percent of employee VMT (vehicle miles traveled), with an eventual goal of 5 percent employee VMT reduction.

5. Enhanced Video Classroom / iTunesU (VMT reduction)

Foothill is planning a pilot program to capture audio/video from classrooms, to allow playback of lectures for students who miss a lecture or class meeting, or who plan to 'attend' a lecture 'remotely' as part of 'web enhanced' classroom delivery strategy. Audio/video capture may later transition to a pilot iTunesU project – enhancing both traditional and online education, and reinforcing the development of 'hybrid classrooms' – where students fill a larger section and participate both remotely and in person.

6. Source Clean Electricity
In addition to procurement of fixed photovoltaic (PV) energy systems, Foothill will explore purchasing energy which combines lower carbon content, through an enhanced Renewable Portfolio (or a PPA with a remote Renewable Energy provider), and carbon offsets. Pacific Gas and Electric offers a carbon offsetting product, ClimateSmart™, which if bundled with a lower carbon electricity product, could help colleges reduce the amount of Scope 2 (electrical) emissions to offset.

7. Photovoltaic and Cogen Onsite Electricity Production
Foothill College installed 100KW of PV electrical capacity in the early period 2001-2002 and in June 2009 contracted with Chevron Energy to install an additional 400KW on premises, adding to the initial 100KW installed as shaded parking lot structures. This additional electrical generation will produce about 600,000 KwHrs annually, about 10 percent of annual electrical use. This additional electrical generation will offset a total of 720,000 pounds of CO_2 annually, about 10 percent of total Scope 1/Scope 2 emissions. Foothill also operates four 60KW Micro turbines, producing onsite electrical generation with enough waste heat to heat the campus swimming pool.

8. Invest in Carbon Sequestering and Renewable Energy
Foothill will work with PG&E to develop a plan to offset our 'delivered' electricity regardless of contract source. Our intention is to evaluate ClimateSmart™ offsets as part of a 'bundled energy solution' which might include lower carbon content, perhaps through an RE-PPA enhanced RPS contract. Given the size of the California Community College system, and service territory of PG&E in Northern California, a combination of California offsets (carbon sequestering projects maintained in California) and Renewable Energy (RE) added to California's installed base, purchased as a 'REC' (renewable energy credits), might be the most affordable and cost effective way for Colleges and Universities to offset GHGs in a protracted and restricted budget environment.

9. Waste Stream Minimization
Foothill is working on enhancing onsite recycling, composting, and waste stream minimization, through both general awareness and using a small cadre of students in a Green Academy. We currently defer about 65-70 percent of waste, with a goal of 75 percent reduction by 2012-2013.We are evaluating a more aggressive 'sifting' of recyclables from waste dumpsters.

10. Supply Chain Management
Foothill is working with vendors to source the least carbon intensive products and process, and requesting that vendors state the carbon content of products they sell/deliver to us, and their plans to reduce carbon content.

ENERGY AND GHG AUDIT RESULTS

The goal of the President's Climate Commitment (ACUPCC) is two-fold, first to reduce energy related GHG emissions, and second to offset those emissions. In the discussion above we described our ten point plan to reduce and offset GHG emissions. In the following section we will show how this plan will unfold over time, and specifically, meet the numerical target emission reductions specified in the ACUPCC.

Simply attempting to reach energy/emission reductions avoids the value of understanding the relationship between and among raw energy use, building evolution, and service (product/output). In this section of the report, we describe our multidimensional analysis of electricity and natural gas use, total building envelope (sq. footage) and student population (headcount and FTES). Table 1 shows electrical and natural gas use for Foothill and the District (same meter). Using factors from PG&E, we converted KwHrs (electricity) and therms (natural gas) to carbon dioxide (CO_2) the primary greenhouse gas warming the atmosphere. Included in Table 1 is the square footage (gross and assigned) for each campus, headcount, (total number of students served) and FTES (a measure of total student contact hours, and thus a proxy for total time students would be on campus.

These data immediately show one surprising result – there is no immediate or obvious correlation between the number of students served (FTES), or contact hours (student time on campus) with either electrical or natural gas use. In fact, there are three trends, shown in Figure 2, which shows a negative correlation among these variables, i.e., energy use went up in the mid 1990s as student headcount decreased, and energy declined, significantly, in the early 2000s as

student head count increased. In the last few years, energy has increased again while student headcount has stabilized to a norm of about 30,000 FTES. These trends occurred on both campuses, both simultaneously and independently of each other, making interpretation of the data analysis even more interesting.

These results suggest that changes in energy use are primarily driven by changes in the number, size and energy management of buildings, rather than student enrollment. During the late 1990s a number of buildings were taken offline for remodeling and retrofitting, and additionally an EMS/BMS was installed. The addition and subtraction of square footage, combined with addition of new HVAC systems, didn't begin to 'equilibrate' until the period of 2005-2007, including new buildings entering service in 2007-2008. As such, there appears to be no reliable or single metric during the period from 1991-2007 from which energy use can be accurately predicted. However, three conclusions can be drawn from analysis of these results.

- First, the addition of EMS/BMS in the late 1990s had a significant impact in reducing energy, and those efforts need to be revisited during the current period of 'new building' and recommissioning.

- Second, the addition of both square footage and HVAC will trend energy use higher in both summer and winter, hence the addition of individual building meters, and enhanced smart energy systems, will be required to optimize the use of energy integral with master scheduling systems (classrooms, students, etc.).

- Third, addition of PV energy systems will be essential for 'peak shaving' of air-conditioning load as temperatures continue to rise (see Global Climate Change Impacts in the United States).

It is not enough to reduce student trips to campus to decrease the GHG emissions per student learning output, we must manage our buildings wisely. Smart energy systems are the best solution for that challenge, and fortunately the District is at the center of a geographical nexus focused on that problem. Over the next three to five years, integrating 'energy analytics' to smart metering with our EMS/BMS systems should allow the District to bring electrical energy use back down to 1990 levels, even with the addition of square footage, and greater use of HVAC. Investment in LEED buildings, which use natural ventilation in addition to HVAC, and additional PV electrical generation, will be a key component of that strategy, and protect the District from escalating electrical prices in future decades.

As we continue to grow in headcount and much of it in distance (online) and hybrid (partially online) instruction, it is likely that our 'energy productivity' will be close to our early 1990 levels, when student enrollment was higher and HVAC use was lower. As we gain access to lower carbon electrical energy products, including solar PPAs (Power Purchase Agreements), our electrical GHG emissions will decrease. Combining energy efficiency, onsite PV electrical production, with a lower carbon intensity electrical product, will lower electrical GHG emissions to approximately 1990 levels. Natural gas use can be reduced 10% through combined efficiency and EMS/BMS measures. Mitigating transportation emissions will be the larger part of our emission reduction plan. Developing a comprehensive transportation plan, including a ridesharing portal, smart campus technology and flexible block scheduling (hybrid instruction) has the potential of reducing petroleum emissions by roughly 20 to 30 percent.

The climate plan described above addresses Scopes 1 (onsite) 2 (electrical) and 3 (indirect / transportation) by reducing roughly 20% of current levels, bringing the District and both colleges close to 1991 energy use. Reducing emissions beyond that would require purchase of low carbon solutions for both electricity and natural gas, which might be accessible through group energy purchases through the Community College League of California (CCLC). Offsetting carbon (GHG) emissions is straightforward, and Scopes 1 and 2 (natural gas and electricity) can be addressed through mechanisms similar to PG&E ClimateSmart™, which could be financed as easily as a $1 per quarter donation should students choose to engage this effort. Most importantly, the District will lead by example, integrating smart energy and technology solutions that enhance service delivery while decreasing both energy and GHG emissions. We are at the center of the emerging clean and green technology economy, and embrace the many opportunities to visibly participate in this effort.

MANAGING ENERGY

In developing the Climate Action Plan (CAP), it was almost immediately evident that returning to our gross energy baseline of 1991 wasn't realistic given the almost 50% increase in building footprint (487,000 sq ft in 1991 to 680,000 sq ft in 2015). Following the directive of the California Community College Chancellor's Office, Foothill has reported energy use per square foot, in BTUs, as a common measure of both energy use and comparative efficiency. Annual energy use in BTU per square foot are reported in (Table 1.2) for calendar years 1991-2009, and estimated for calendar years 2010-2015. These values are derived from standard energy conversion (3,412 BTU per KwHr and 100,000 BTU/therm), and serve as both a standard measure of internal energy use, independent of new construction, and additionally as a benchmarking tool for comparison with other colleges and universities. Estimates of BTU/square foot are also more realistic in projecting future total energy use, as trends from previous years are better integrated into current and future estimates, and aggregate energy use will be more realistic, helping in developing better budgeting tools for future energy expenses. (Additionally helping to plan strategic investments in energy efficiency and renewable energy) These data show that Foothill College will likely return to the 1991 'energy intensity footprint' of 100,000 BTU per square foot / year by 2015, which is, by comparison, a reasonable value for colleges of our size, scope, and location.

FOOTHILL'S HISTORIC DATA TABLE 1.1

Academic Year	Electricity *(Kw/Hrs)*	Gas *(Therms)*	Electricity GHGs	Gas GHGs	Total GHGs	Tons GHG	Sq Ft *(includes District)*
1991-1992	6,493,091	311,463	3,895,855	3,644,120	7,539,975	3,770	367,055
1993	6,350,400	320,679	3,810,240	3,751,944	7,562,184	3,781	367,055
1994	6,403,200	339,751	3,841,920	3,975,087	7,817,007	3,909	367,055
1995	6,643,200	358,908	3,985,920	4,199,224	8,185,144	4,093	367,055
1996	6,352,800	240,859	3,811,680	2,818,050	6,629,730	3,315	367,055
1997	6,981,600	317,421	4,188,960	3,713,826	7,902,786	3,951	367,055
1998	7,312,800	395,436	4,387,680	4,626,601	9,014,281	4,507	367,055
1999	7,370,062	443,068	4,422,037	5,183,896	9,605,933	4,803	367,305
2000	7,475,188	341,564	4,485,113	3,996,299	8,481,412	4,241	367,305
2001	6,636,229	251,626	3,981,737	2,944,024	6,925,762	3,463	385,993
2002	6,155,964	241,348	3,693,578	2,823,772	6,517,350	3,259	385,221
2003	6,234,991	242,383	3,740,995	2,835,881	6,576,876	3,288	383,707
2004	6,466,556	250,863	3,879,934	2,935,097	6,815,031	3,408	382,022
2005	5,830,864	241,953	3,498,518	2,830,850	6,329,369	3,165	383,859
2006	4,283,862	392,052	2,570,317	4,587,008	7,157,326	3,579	347,995
2007	4,881,036	453,826	2,928,622	5,309,764	8,238,386	4,119	349,033
2008	6,031,808	558,891	3,619,085	6,539,025	10,158,110	5,079	427,924
2009	6,654,876	454,990	3,992,926	5,323,383	9,316,309	4,658	427,924
2010 *(est.)*	6,676,881	338,514	4,006,129	3,960,614	7,966,742	3,983	427,628
2011*(est.)*	6,300,000	500,000	3,780,000	5,850,000	9,630,000	4,815	427,628
2012 *(est.)*	6,300,000	500,000	3,780,000	5,850,000	9,630,000	4,815	427,628
2013 *(est.)*	6,500,000	550,000	3,900,000	6,435,000	10,335,000	5,168	539,945
2014 *(est.)*	6,500,000	550,000	3,900,000	6,435,000	10,335,000	5,168	539,945
2015 *(est.)*	6,500,000	550,000	3,900,000	6,435,000	10,335,000	5,168	539,945

FOOTHILL HISTORIC ENERGY INTENSITY TABLE 1.2

Academic Year	Electricity *(KwHrs)*	Gas *(Therms)*	BTUs	Square Ft. (estimated)	BTU/sq ft	GHG/sq ft
1991						
1992	6,493,091	311,463	5.33E+10	487,000	1.09E+05	15.48
1993	6,350,400	320,679	5.37E+10	487,000	1.10E+05	15.53
1994	6,403,200	339,751	5.58E+10	487,000	1.15E+05	16.05
1995	6,643,200	358,908	5.86E+10	487,000	1.20E+05	16.81
1996	6,352,800	240,859	4.58E+10	487,000	9.40E+04	13.61
1997	6,981,600	317,421	5.56E+10	486,737	1.14E+05	16.24
1998	7,312,800	395,436	6.45E+10	486,737	1.33E+05	18.52
1999	7,370,062	443,068	6.95E+10	486,737	1.43E+05	19.74
2000	7,475,188	341,564	5.97E+10	486,737	1.23E+05	17.43
2001	6,636,229	251,626	4.78E+10	533,342	8.96E+04	12.99
2002	6,155,964	241,348	4.51E+10	533,342	8.46E+04	12.22
2003	6,234,991	242,383	4.55E+10	537,771	8.46E+04	12.23
2004	6,466,556	250,863	4.72E+10	541,472	8.71E+04	12.59
2005	5,830,864	241,953	4.41E+10	545,738	8.08E+04	11.60
2006	4,283,862	392,052	5.38E+10	494,941	1.09E+05	14.46
2007	4,881,036	453,826	6.20E+10	497,023	1.25E+05	16.58
2008	6,031,808	558,891	7.65E+10	544,176	1.41E+05	18.67
2009	6,654,876	454,990	6.82E+10	626,704	1.09E+05	14.87
2010	6,676,881	338,514	5.66E+10	621,208	9.12E+04	12.82
2011	6,300,000	500,000	7.15E+10	621,208	1.15E+05	15.50
2012	6,300,000	500,000	7.15E+10	621,208	1.15E+05	15.50
2013	6,500,000	550,000	7.72E+10	711,469	1.08E+05	14.53
2014	6,500,000	550,000	7.72E+10	711,469	1.08E+05	14.53
2015	**6,500,000**	**550,000**	**7.72E+10**	**711,469**	**1.08E+05**	**14.53**

APPENDIX F

Green Procurement Self-assessment

Department/Service assessed_____ Date_____

Person completing this survey_____

Please return completed form to _____ By_____

Please comment, where applicable, on the extent to which your department follows these procurement practices, or what plans you have to implement them.

1. Reusing surplused items: Where possible and practical, do not buy new; reuse surplus items. Desks, chairs, tables and filing cabinets are just a sample of what may be found in storage at the Facilities Department.

2. Product selection: Learn about products that are eco-labeled compared to those that are conventionally produced. Look for products such as those with low VOC content, office furniture from FSC certified timber, reduced-mercury fluorescent lamps and mercury- and lead-free HPS lamps, neutral cleaning products, vegetable-based ink, and organic food products when available. Use biodegradable packaging and serviceware for food service and coffee service. Ask if vendors offer anything with chemical-free materials.

3. Durability: Choose quality. When buying anything, choose products with long life spans and durability.

4. Energy-efficient appliances: Look for ENERGY STAR appliances when shopping. Energy-efficient choices can save about a third on an energy bill with similar savings of greenhouse gas emissions, without sacrificing features, style or comfort.

5. Locally produced: Supporting local manufacturers and food suppliers keeps jobs and money in our community, and cuts down on the emissions generated by transporting goods across the country (or world). In addition, items manufactured in developing countries might be subject to less stringent environmental laws, putting the ecosystem and workers at risk.

6. Recycled content: Ask if vendors offer anything with recycled content. Choose goods made out of post-consumer waste and high recycled content (e.g. printer paper made from 100% recovered scraps from consumer use).

7. Recyclability: Ask vendors to supply items that are recyclable. Because of the great benefits of recycling, it is important to purchase items that are designed to be recycled, e.g. furniture that disassembles into its component, recyclable parts.

Revision of Existing Design Specifications

Inclusion of **Section 01 35 43** Special Environmental Requirements.

Division 3: Concrete

Making Portland cement, for concrete, requires major gas and oil energy, and produces a great deal of carbon dioxide, a greenhouse gas.

Fly ash concrete is available in many regions as an alternative to conventional mixes. Fly ash is a waste material from coal burning power plants. It can be used to replace up to about 30% of the Portland cement in conventional mixes. It is also mixed with ground blast furnace slag, a waste from metal smelting. Fly ash produces a superior concrete with excellent finishing characteristics, but only some types of ash are appropriate for certain applications, and the proportions are restricted.

- Foothill College concrete specifications have been revised to make use of this recommendation. See Division B 1900: Section 033000, page 1-4.

Using low waste formwork is another resource conservation. Systems such as modular steel forms, slipforms, preformed blocks and others can substantially reduce waste material from concrete forming.

- Foothill College specifications have been revised to recommend this method when applicable. See Division B 1900: Section 033100, page 5.

Form release agents are sometimes made from diesel oil, or other odorous petroleum oils that will produce emissions. Wax or mineral or vegetable oil based products are available substitutes.

- Foothill College specifications have been revised to recommend this method when applicable. See Division 3: Section 033100, Addendum 1.

Division 4: Masonry

Masonry and tile products are made from concrete, clay and various types of lightweight aggregates. Most masonry products are installed with mortar made from Portland cement, sand and lime.

Lightweight concrete blocks and bricks are available, made with expanded aggregates such as pumice to reduce weight and add insulating value. Brick and block products are available with waste and recycled contents.

- Foothill College specifications will be revised to recommend this method when applicable.

Glass block is available with recycled glass content.

- Foothill College specifications will be revised to recommend this method when applicable.

Masonry sealers will be specified with a low-volatile content, water-dispersed product, not a solvent based variety.

- Foothill College specifications will be revised to recommend this method when applicable.

Division: 5 Metals

Steel, aluminum, copper, stainless steel and brass are highly valued recyclables. Coatings such as "powder coating" have specific benefits. See Division 9 Painting below

Steel may be specified with recycled content of 30% or greater, as applicable.

- Foothill College specifications have been revised to recommend this method when applicable. See Division _: 05 50 00, page 2

Aluminum may be specified with a recycled content between 20-30%, as applicable.

- Foothill College specifications have been revised to recommend this method when applicable. See Division _: 05 50 00, page __

- Foothill College specifications have been revised to "reclaim recyclables" for steel, aluminum, copper, stainless steel and brass. See Division 01: Section 01 74 19, page 1

Galvanized metals that are zinc coated use an energy intensive process, but are relatively low in toxic emissions.

Division 6: Wood & Plastic

Appropriate forest management and wood salvage are keys to more sustainable wood sources. It is possible to find processed woods and wood substitutes that have the interest and properties of fine woods without depleting threatened species.

Nearly all plastics are made from non-renewable petroleum feedstocks. The majority of plastics are used as interior finishes.

Engineered wood products make better use of low grade fiber, small diameter trees and fast growing, less utilized tree species. Certified, sustainably-harvested forest products from domestic wood producers are now available for some products. Careful attention when specifying these products must be given, to avoid harmful adhesives.

- Foothill College specifications have been revised to recommend this method when applicable. See Division 1: 01 35 43, page 1

Structural sheathing is also available made from pressed post-consumer newsprint. This material not only uses a recycled product, but it adds substantial insulating value and acoustic absorption to the wall or roof. Specified as applicable.

- Foothill College specifications have been revised to recommend this method when applicable. See Division _: _____, page ___

Engineered wood products made with exterior type glues (phenolic resins) and polyurea or isocyanurate adhesives (MDI based) have the least emissions.

- Foothill College specifications have been revised to recommend this method when applicable. See Division 6: 06 01 20, page 1-3

Division 7: Thermal Insulation & Moisture Protection

Thermal insulation is not typically considered during renovations, only during new construction. Typical Foothill architecture of 12' overhangs mitigates the effects of exterior temperatures.

Cladding and roofing materials should be appropriate for the climate and application,. They should be the best quality material allowable within the budget. Durability is the most important criteria, and recyclability is the second.

Metal panels (galvanized steel, enameled or anodized aluminum) are appropriate for pitched roofs and cladding. The product uses a small amount of material and they are durable and recyclable.

Composite shingles, tiles and panels also are durable, and may contain recycled content. These are not recyclable, but are good for durability and resource efficiency.

- Foothill College specifications have been revised to make use of this recommendation. See Division 7: Section 07 21 00, page 2

Stucco is a resource efficient and durable finish. Acrylic stucco has good thermal performance.

Built up roofing for flat roofs has important advantages. Such as being fairly durable and repairable, and easily removed. An inverted roof design using a ballasted insulation layer over the membrane has advantages because the membrane is better protected from weather and damage. Flat and shall pitched roofs can also be prepared with drainage mats and topsoil to grow grass if the structure allows. "Green roofs" help filter rainwater runoff, adds insulation value to the building, and provides habitat for birds, butterflys, etc.

Hot mopped asphalt roofing releases extremely high levels of air pollutants during installation.

- Foothill College specifications have been revised stating hot mopping can only be done when the majority of students are not on site. See Division 7: Section 07 52 16, page 7

Sealants with the best service life will always be the best choice, considering high labor cost and potential for building leaks causing damage.

Acrylics, silicones and siliconized acrylics are typically the safest to handle and have the lowest solvent content. Acoustic caulking, butyls and urethanes, which have quantities of solvent based products should be avoided indoors.

- Foothill College specifications have been modified to include this language. See Division 7: Section 07 92 00, page 4

Division 9: Finishes

There is no greater opportunity to reduce indoor air pollution than when specifying interior finish materials. Our goal is to emphasize low toxicity, recycled content and reusability/recyclability.

The best choices are those that contain the least amount of volatile organic compounds (VOCs) which evaporate and pollute indoor air. These are safer for people and the environment than the solvent-based products they replace.

- The healthiest floor, ceiling and wall coverings are those that release the least dust and do not support microbial growth.
- Paints and adhesives formulated to "zero VOCs" or "low VOCs" will be included in our design standards
- Insulations containing no glass or mineral fiber, which are totally contained by a permanent barrier when installed, or made from plastics formulated for low chemical emissions and fire resistance
- Carpets tested to comply with low-emission carpet rating standards. Carpet with factory-installed dry adhesive (tac-tiles) is safer than field-applied wet adhesive. Carpet should minimize chemical emissions and have high recycled content.
- Specifications will include engineered wood products containing no supplementary adhesive, or those using formaldehyde-free or other low-emission adhesives.
- Utilize caution in specifying rubber flooring and particleboard which may have prolonged emissions
- Smaller heating and cooling loads allow smaller, less expensive HVAC equipment and ductwork.

- Reduced energy costs can pay for HVAC equipment investment within two or three years
- High-efficiency equipment tends to be higher quality, with longer service lives and warranties. A typical warranty runs approximately 1-5 years.

Gypsum board can have 10-15% recycled content. Gypsum board is highly recyclable if it has not been contaminated with paint or adhesives. Fiber gypsum should be considered for high use/wear areas. This board doesn't have a paper face, like other gypsum boards, and contains recycled wood and paper fiber, with perlite in the interior. It is strong and scratch-resistant.

- Foothill College specifications have been modified to include this language. See Division 1: Section 01 3543, page 1

Wood & Plastics

Hardboards are durable and resource efficient. The boards are manufactured with wood fiber pressed and heated to form panels. Adhesive is not usually required because the natural lignin in wood binds the fibers. Wood demolition waste can be used for manufacturing this product.

Particle and Medium Density Fiberboard panels are made from recyclable materials, however they should be chosen for low pollution potential. Acoustic panels, underlayment and tackboards are available from 100% recycled newsprint. Recycled plastic panels are available for interior uses and are made from consumer product waste. Fiber reinforced cement boards made with recycled fiber are durable and can be used as substrates for tile and decorative finishes.

- Foothill College specifications will be modified to include this language.

Engineered wood products can be specified with (phenol formaldehyde), stablilized by ammonia treatment, which both have low emissions or formaldehyde which would be the lowest in emissions of all glue-bonded boards.

- Foothill specifications will be modified to include this language as applicable.

High pressure laminates are surface materials made by laminating paper and colorants together with melamine (phenolic) resin. They are relatively resource efficient use of plastics because a very small quantity of materials suffices to produce a durable surface. At this time, there are no known manufacturers utilizing substantial recycled content in their products.

Ceramics and terrazzo

Ceramics and terrazzo are among the most durable and low emission finishes. Glazed or sealed products do not absorb odors or pollutants, are easily cleaned and resist abrasion and wear. The initial cost may be more than other materials, however the life cycle cost is among the lowest of all finishes, due to their long life and minimal maintenance.

- Foothill College specifications have been modified to include local or regionally manufactured ceramics to reduce the costs of transportation to include: 31-45 percent of recycled material. See Division 1: Section 01 35 43, page 2

- Foothill College specifications have been modified to include terrazzo shall be manufactured with recycled cement and crushed stone. See PSEC Division __: Section 09 66 23.

- Sealers: Low volatile, acrylic or water-dispersed silicone types. No sealants with hazardous solvents. See Division 7: Section 07 92 00, page 2

Wood Flooring

Salvaged, laminated and veneered products can be used with emphasis on the installation method and finish. Products which have a plywood or MDF core with a hardwood surface are durable and have a low-maintenance finish. However, this product is less repairable than solid wood.

Domestic hardwoods such as oak, maple, birch and ash and imported species such as Australian eucalyptus and Scandinavian beech are most likely from sustainable sources.

Resilient Flooring

Resilient flooring (vinyl, rubber, linoleum and cork) are easy to maintain, and some are very durable. Some materials have renewable contents and others have recycled content.

- Foothill specifications have been modified to include this language. See Division 1: Section 01 35 43, page 2

True linoleum is made with renewable materials (linseed oil, cork, wood dust and jute) as are cork products. Linoleum is very durable.

Recycled rubber tile and sheet goods are also available made with waste tires. These are good choices for heavy traffic and utility areas.

All resilient flooring products produce some air pollutant emissions; as well as their adhesives. Interlocked rubber tiles and heavy linoleum can be laid without adhesives.

Flooring with sealed “low maintenance” surfaces are preferred for reducing maintenance costs and the use cleaning products.

Carpeting

Carpets are high maintenance and have high pollution potential. Products should be specified with recycled content, inherent lower pollution and lower maintenance requirements.

Polyester and nylon blended carpet are available with recycled content from PET soft drink containers, which have similar properties to other polyesters.

Releasable carpet tile and roll carpet systems can be picked up and cleaned or moved from high traffic areas to rotate wear. Low pile, dense loop and needlepunch types trap the least soil and show the least wear.

- Foothill College specifications have been modified to include this language. See Division 9: Section 09 68 13, page 3

Carpet recycling is an industry priority today due to the large quantity sent to landfills, where it does not easily decompose.

- Foothill specifications have been modified to include this language. See Division 1: Section 01 35 43 Carpet Reclamation, page 2

Carpet construction is one important factor in the air pollutant emissions from the product. The vast majority of carpet is made by pressing the face fiber into a polypropylene mat, and then gluing it in place with a synthetic latex resin. The synthetic latex is a source of air pollution, including 4 PC (4 Phenylcyclohexene), an irritant which is believed to contribute to sick building syndrome. One method of low emission carpet construction is to eliminate the latex bond through "fusion bonding". The type of carpet has a sponge plastic backing into which the face fiber has been heat welded. It is a good choice for reducing indoor pollution. Needle punched carpets which are very low pile and mass are also made without latex. Among all other latex bonded carpets, including wool products, there is a wide variability in emissions. A few manufacturers have made a great effort to provide a low emission products and some of these can provide full test results, listing VOC emissions at different time periods.

- Foothill College specifications have been modified to include this language. See Division 1: Section 01 35 43, page 2

Airing out new carpet has often been recommended as a pollution reduction measure, but the evidence is not strong for the effectiveness of this method. Bake-out, where the building heat is turned up to the highest degrees possible over several days have been a more effective method to remove semi-volatile emissions.

<u>Finished Concrete Flooring</u>

Finished concrete flooring is an integral system of slab and finish, produced by adding colorants and sealers to the topping concrete either before or after it cures. Systems with integral color added to the entire topping layer are more resistant to damage and less likely to require recoloring. The concrete is often stamped with tile patterns and grid lines that also control cracking. It is a durable and low maintenance finish. Adding color(s) to the concrete gives the concrete a more complete look with very low maintenance.

Finished concrete is inherently low in emissions. Waster dispersed, acrylic sealers should be selected that meet low volatile standards to maintain the low emission rating.

- Foothill College specifications have been modified to include this language. See PSEC Division__: Section 03 35 00

Painting

Painting is an important indoor air pollution and toxic waste consideration. Volatile emissions from liquid coatings (paint, _____) tend to be short term (few days or weeks). The most toxic emissions from paints and coatings are usually evaporating solvents and a wide variety of volatiles released by oxidation. These volatiles are produced not only by solvent-based paints, but also water-based formulations. Water based paints may contain up to 12% solvents, though some new formulations contain very little. Water borne acrylics are preferable to alkyds (solvent based oil paints); they are highly durable and produce no solvent use.

- Foothill College has used water based paint for interiors prior to 1982. See section 09 90 00 Paint, page 3

- Foothill College specifications have been modified to include this language. See Division 1: Section 01 35 43, page 2

For exterior use, it is necessary to use solvent-based coatings. Where solvent coatings are required the painters shall be required to recycle solvents.

- Foothill College specifications have been modified to include this language. See Division__: Section 09 90 00, page 8, Addendum 1

Low pollution options should include avoiding products that contain lead, mercury, hexavalent chromium and cadmium. Paints will be specified to meet the California low or "zero VOC" standard.

- Foothill College specifications have been modified to include this language. See Division 1: Section 01 35 43, page 3

Ceiling Tile

Tile is made from wood fiber, including recycled material, and often mineral fiber with added clay or gypsum fillers for fire retardancy. It is then painted. Some tile has recycled content, though none currently are made with post-consumer contents at this time. Tile is reusable and paintable.

All tile collects dust and absorbs odors. Tile with mineral fiber contents may also begin to shred hazardous fiber if disturbed, or as it deteriorates. Both problems are of concern where the ceiling is used for a return plenum to carry air back to HVAC air handlers. If this type of return system is used, the tile should be checked for damage and the plenum

space occasionally cleaned with a high performance vacuum. If possible, in new and renovation design, HVAC returns should be ducted instead of risking contamination by debris in suspended ceilings. On a case-by-case basis, renovation projects will be reviewed for the feasibility of new duct work.

- Foothill College specifications have been modified to include this language, post consumer contents. See Division 1: Section 01 35 43, page 2
- Foothill College specifications have been modified to include this language "no mineral fiber contents". See Division 7: Section 09 54 28, page 3
- Foothill College specifications have been modified to include this language, tile checked for damage, HVAC returns ducted. See Division __: Section 09 34 28, page 3
- Foothill College specifications have been modified to include this language, plenums vacuumed. See Division 1: Section 01 74 10, page 2
- Plant Services cleaning procedures , annual work order, Director of Facilities to track work

Division 10: Specialties

Interior panels for office partitions and non-structural interior barriers allow reconfiguration without major demolition and waste. The cost of these systems are more than built-in walls, they are reusable and allow rapid changes to be made with minimal disruption.

- Foothill College reuses panels as often as possible as a matter of practice.

Division 12: Furnishings

Furnishings are one of the most important resource efficiencies and the biggest indoor air quality considerations. Furnishings represent a major cost and maintenance component.

"Powder coated" metal finishes are an environmentally friendly substitute for painting and plating, using dry powder polymers applied to the metal and then fused with heat. Powder coated finishes are harder than many paints and can rival plating for durability.

Upholstery foams used in chairs are generally high-density urethane products. These were once manufactured with ozone depleting CFC's but are now made with safer HCFC's. chairs should carry labels certifying that the foams are non-CFC.

- Foothill College Facilities works with furnishings vendors to utilize the above whenever practical and has informed Purchasing of our intent. Memo: C. Redmond, 1/21/10.

APPENDIX H – Sample Project Log

SUSTAINABILITY COMMITTEE PROJECT LOG

PROJECT NAME: Carpet Reclamation	2-1
	Control #

SPONSOR: Brenda Visas

EXPLANATION: As part of Foothill's efforts to divert landfill, products from projects will be recycled or reused whenever possible. Broadloom carpet being removed from our buildings during demolition and renovation will be sent back to carpet manufacturers for melt down and reuse as new stock for carpet/carpet tiles.

START DATE: 8/08 Building 5000

METRICS:

1. 8/09 B/5000 Carpet and padding - vendor's (Harry L. Murphy) take-off measurements for demolition. 10 tons (600 yds of carpet)
2. 11/08 Office 1903, 34 yards (Harry L. Murphy)

EXPECTED RESULTS:

1. All carpet removed from the Campus should be recycled if possible. (Adding carpet reclamation section into standard specifications for carpet replacement.)

ACTUAL RESULTS:

2008 - 34 yards of carpet diverted from landfill
2009 – 10 tons of carpet diverted from landfill

APPENDIX I

GLOSSARY

AASHE – Association for the Advancement of Sustainability in Higher Education, promoting sustainability in all sectors of higher education –from governance and operations to curriculum and outreach- through education, communication, research and professional development. Member institutions include two and four-year colleges and universities throughout the United States and Canada.

AB32 – The law requires that by 2010 the state must begin efforts to offset its carbon emissions from all sources, including educational buildings. By 2020 the state will be required to reduce its CO_2 emissions by 30 percent, based on 1990 levels as established by the California Air Resources Board. In 2050 this will be raised to 80 percent.

American College & University Presidents' Climate Commitment (ACUPCC) – Launched in 2007, is a network of 650 signatory schools representing all 50 states and the District of Columbia to garner institutional commitments to neutralize greenhouse gas emissions and accelerate the research and educational efforts of higher education to equip society to re-stabilize the earth's climate.

Building Commissioning - Ensuring that all building features and systems are built and function as intended.

Carbon Footprint – A carbon footprint is the direct effect an individual's actions and lifestyle have on the environment in terms of carbon dioxide emissions.

Carbon Negative – Refers to a negative (less than zero) balance of sequestered or offset against carbon dioxide released.

Carbon Neutral – Refers to neutral (meaning zero) total carbon release, brought about by balancing the amount of carbon released with the amount sequestered or offset.

California Climate Action Registry – A program of the Climate Action Reserve and serves as a voluntary greenhouse gas (GHG) registry to protect and promote early actions to reduce GHG emissions by organizations. The California Registry provides leadership on climate change by developing and promoting credible, accurate, and consistent GHG reporting standards and tools for organizations to measure, monitor, third-party verify and reduce their GHG emissions consistently across industry sectors and geographical borders.

Certification Programs – For reliability certification should meet the following three criteria:
1) make their standards publicly available and free of charge

2) develop their standards openly and transparently

3) thoroughly examine the claims a company makes

EcoLogo, Forest Stewardship Council, Green-e and Greenguard are among organizations that follow these steps.

Change Management – A structured approach to change in individuals, teams, organizations and societies that enables the transition from a current state to a desired future state. Change management provides a framework for managing the people side of these changes.

Climate Neutral – The effort to offset the carbon footprint (CO_2 emissions) of an organization through investments in sustainable energy, agriculture, reforestation and energy efficiency, whose benefits offset or avoid an amount of CO_2 equivalent to the organization's carbon emissions.

Community - The term "community" usually means those who live or work or govern or go to school in an organization's hometown or city and often means the people who are nearby neighbors of the institution.

Cultural and Biological Diversity – The adaptive interweave of people, language, place, culture and ecology, which is a source of exchange, innovation, creativity and cultural diversity. (Adapted from UNESCO).

EcoLogo, Forest Stewardship Council (FSC) Green-e and Greenguard are among organizations that follow these steps.

Energy Management Plans – The plans to implement energy efficiency projects such as sustainable green buildings, renovations, and wind or solar farms that will move the college toward energy independence. (Energy Policy Handbook)

Energy Star – Launched in 1982, energy efficiency rating system. Energy Star program administered by the U.S. Environmental Protection Agency and U.S. Department of Energy is a leading standard for energy efficiency for more than fifty product categories, including appliances, heating and cooling, electronics, lighting, food service and office equipment. Energy Star products use 25-50% less energy, have extended product lives and decreased maintenance costs.

Environmental Literacy – To have a basic comprehension of environmental sustainability, natural capital, exponential growth, carrying capacity, environmental history, ecology, biodiversity, energy, resources, pollution prevention, waste reduction, ethics, economic and political systems ("Living in the Environment" text)

Environmental Performance – Incorporate continuous improvement and refers to "continuous reduction of social, environmental, and social risks and impacts, over time, and continuous enhancement of social, environmental, and financial opportunities over time.

Green Building – A building that has been designed to reduce both direct and indirect environmental consequences associated with construction, occupancy, operation, maintenance and eventual decommissioning, whose design is evaluated for cost, quality of life, future flexibility, ease of maintenance, energy and resource efficiency and overall environmental impact with an emphasis on life-cycle cost analysis. (Energy Policy Handbook)

Green Seal – Independent non-profit organization dedicated to safeguarding the environment and transforming the marketplace by promoting the manufacture, purchase and use of environmentally responsible products and services.

Green Washing – A result of misinformation or misguidance about the green benefits companies claim their products provide.

Interested Parties – See Stakeholder.

ISO 14000 Environmental management standards to help organizations minimize how their operations negatively affect the environment and comply with applicable laws and regulations.

Labs for the 21st Century (Labs 21) – Shared guidelines and Best Practices by industry experts. Website: www.epa.gov/lab21gov/tookkit/bp_guide.htm

Leadership in Environmental & Energy Design (LEED) – Certification system, which was developed by the U.S. Green Building Council (USGBC), is the premier green building standard in the United States. The certification process for buildings involves rigorous documentation, which helps to ensure accurate, fair and meaningful standards. LEED certification includes criteria grouped into the following categories: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation and Design.

Personal Sustainability – Plans and actions that individuals take at all stages of their life to help ensure their physical, social and financial sustainability.

Renewable Energy Credits (REC's) – Available from a variety of nationwide retailers, REC's are created when a new renewable energy facility generates electricity and the environmental benefits of that electricity are sold to the REC buyer.

Silicon Valley Leadership Group – Organization involving principal officers and senior managers of member companies in a cooperative effort with local, regional, state, and federal government officials to address major public policy issues affecting the economic health and quality of life in Silicon Valley.

Social Equity – Decisions and actions that require that we recognize the values and norms of other peoples and that our decisions and actions are guided by notions of justice and fairness that accept the integrity and validity of other cultures and lifestyles. (Adapted from United Nations University Press)

Stakeholder – Refers to anyone who is affected or perceives him/herself to be affected by the college. Given the college's commitment to enhanced community engagement or involvement, the role of stakeholder is a critical continuing theme in this report. Stakeholders can include internal stakeholders (or interested parties), such as staff, faculty, administration and students, or external stakeholders (interested parties), such as families of employees, faculty, staff and students, other community members, regulators, the legislature and the college district, or suppliers of the college.

Stewardship – Having an ethical responsibility toward nature. Encouraging environmentally beneficial forms of economic growth in part by using energy and resources wisely. ("Living in the Environment" text)

Sustainably Managed Forests – Means forests that are being managed through a professionally administered forestry management plan in which timber growth equals or exceeds harvesting rates in both quality and quantity.

Sustainability – To utilize components of social, cultural and biological diversity in a way and rate that does not lead to long-term decline, thereby maintaining the potential to meet the needs and aspirations of present and future generations. (Adapted from the "Conventions of Biological Diversity")

Sustainability Performance – Incorporate the notion of continuous improvement and refer to "continuous reduction of social, environmental and social risks and impacts, over time and continuous enhancement of social, environmental, and financial opportunities over time.

Sustainable Silicon Valley (SSV) - A collaboration of businesses, governments, and non-governmental organizations that are identifying and addressing environmental and resource pressures in the Valley.

Sustainability Tracking, Assessment & Rating System for Colleges & Universities (STARS) - This rating system was developed by AASHE, and is a voluntary, self-reporting framework for gauging relative progress toward sustainability for Colleges and Universities.

U.S. Green Building Council (USGBC) – Nonprofit organization dedicated to raising awareness about green buildings, developed the LEED certification rating system

Vehicle Miles Traveled (VMT)

United Nations Educational, Scientific and Cultural Organization (UNESCO) – Founded in 1945 as a special United Nations agency, Organization functions as a laboratory of ideas and a standard-setter to forge universal agreements on emerging ethical issues. Promotes international co-operation among its 193 member states and six Associate members in the fields of education, science, culture and communication.

Xeriscape – Water efficient landscape design