Universidad San Francisco de Quito

Sustainability Report Universidad San Francisco de Quito: baseline year 2012

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I. Open Letter from Carlos Montúfar, Vice-Chancellor USFQ

The role of higher-education institutions is to continuously adapt to the challenges that the world presents. Universidad San Francisco de Quito (USFQ) was founded 25 years ago out of the need for an education that would break away from traditional technically based programs, and the University found Liberal Arts to be the key to strengthening and creating value for the community in Ecuador. Subsequently, USFQ has continuously been challenged to fuel freedom through knowledge.

Today USFQ faces a different reality: how does an economy grow sustainably in order to protect both economic interests and short-term needs of individuals; with a long-term strategy to protect the world we live in? In order to face this challenge, the University must look back to what it stands for, starting from its foundation 25 years ago. USFQ stands for freedom, knowledge and community enhancement. Because University models people's behaviors, USFQ wants to embrace the opportunity to be a living laboratory for sustainability and help foster this behavior on young-adults. Our students will be, in the short-term, leaders in our communities.

This is USFQ's first sustainability report, the baseline study that will set the stage for future progress. This is a written acknowledgement of USFQ's willingness to become a sustainable campus.

II. Background

In December of 2012, Universidad San Francisco de Quito took upon the challenge to calculate its carbon footprint for the baseline year of 2012. A group conformed by 4 PhD Professors from the Environmental Engineering Department and 1 MBA instructor from the Business School was assembled.

The project started with a focus on the calculations of carbon footprint and University operations. By December 2012, the University joined the Starts International Pilot Program. ASSHE STARS is a self-reporting framework for Universities to measure their sustainability performance. The Pilot encourages Universities outside of the United States to use criteria for Universities in the US and report on what had worked and what not. The project was then enhanced to include Sustainability in Education, Planning and Administration areas.

The first goal of this Project was to have an understanding of the University's current situation and have a baseline analysis of the carbon footprint for the year of 2012. The second goal of this study was to generate information in order to prioritize projects that would contribute to become a sustainable campus; these projects will be based on importance due to limited time and resources needed for investment.

1. The Baseline

Universidad San Francisco de Quito is a small, private liberal arts university in the capital city of Ecuador. The University was established in 1988 by Santiago Gangotena, Carlos Montúfar and a group of intellectuals and business people, it now has close to

6000 students with 4500 of them undergrads (1), and signaling a fast "chaotic" growth. The main campus is located in Cumbayá, a small campus designed just for languages is located in Riobamba and another small campus located in Guayaquil. The University also has research scientific stations. Tiputini Biodiversity Station (TBS) located in the Amazon, the Galápagos Institute for the Arts and Sciences (GAIAS) in San Cristóbal, Galápagos and Paluguillo Paramo Station located in Papallacta; and several other research stations or operations function through Ecuador.

The academic curriculum at USFQ is based on the Liberal Arts philosophy, which incorporates all areas of knowledge in order to provide a well-rounded education. From 2012, the university has the following academic departments:

- College of Administration for the Development (CAD)
- College of Architecture and Interior Design (CADI)
- College of Biological and Environmental Sciences (COCIBA)
- College of Health Sciences (COCSA)
- College of Science and Engineering (POLITÉCNICO)
- College of Social Sciences and Humanities (COCISOH)
- College of Communication and Contemporary Arts (COCOA)
- College of Hospitality, Culinary Arts and Tourism (CHAT)
- College of Law (JUR)
- Institute of Contemporary Music School (IMC)

USFQ is recognized as a model higher-education institution having the most active and productive academic community in Ecuador. Furthermore, the Ecuadorian Council of Evaluation, Accreditation and Assurance of High Education (CEAACES) have ranked the USFQ as one of the top three institutions in the country. USFQ is the only private university that does not receive financial support from the Ecuadorian government. The following tables present important indicators for the University for the year of 2012. Table 1 shows the specific and indexes for the University, Table 2 presents the operational performance index expressed as functional unit per student per year, Table 3 indicates the operational cost and Table 4 shows academic sustainable indexes.

Table 1. University 2012 specifics and indexes.

Number of enrolled full-time students	5953
Full-time employees	1014
Campus Area (Cumbayá)	529 735 square feet / 49 214 meters
Laboratory Area (Cumbayá Campus)	8999 square feet/ 2743 meters

Table 2. Operational Performance Index for 2012 (*Functional Unit per student per year).

Building Density (meters)	27.12
Energy Cost	27.93
Total MMBTu	1.47
Total Kilowatts	431.19
kg of Waste Produced	28.80
kg of Waste sent to landfill	24.06
Gallons of water used	1146.99
t CO_2 emitted	0.80

Table 3. Operational Costs for 2012.

Electricity	$166 273.43
Waste Disposal	$16 627.26
Water	$25 847.00
Diesel	$5176.36
Fuel	$6381.76
LPG	$31 320.71
Air travel	$319 224.30
Total	$570 850.82
Price paid per t of CO_2	$397.75

Table 4. Sustainable Academic Performance Index for 2012.

	# Students	Percentage of Total (%)
Ethnic Students	191	3
Students with University awarded scholarships	574	10
Students with financial aid	1220	20
Publications and research	25	17
Volunteered hours	60 000	100

2. Baseline Year, Boundaries and Scope

Although the baseline for the project was the year of 2012, the time frame in which data was collected was January 2012 to November 2013. Even though some information was gathered in 2013, it was decided to include it in this first report in order to obtain information for important aspects such as CO_2 emissions from transportation. In fact, commuting surveys were administered in 2013.

Each individual section of the report has boundaries and scope section where both year and physical limitations in further detail are explained.

III. Why should this matter to USFQ and what are the benefits?

Definition of sustainability for USFQ:

Sustainability is an approach where business and society are balanced with a finite amount of resources in order to achieve quality of life. Because the University is located in a developing country the definition of sustainability also includes topics such as healthcare, potable water and electricity.

1. Foster Innovation

The concept of innovation is to bring changes through market disruption and redefine the way the world we live. To do this, the University has to ask who are its stakeholders and how value for each of them will be created. Today's we face problems different from those 100 years ago. For this reason technology, value chains and economic models have had to respond effectively to these new challenges. Change requires innovation, and innovation is risky. Universities have embraced innovation by feeding the trend of "made local" and "custom made."

2. Mitigate Risk

a. Electricity shortages

La Niña is a climate event that happens every 8 years in which Ecuador is brought under harsh dry spells (2). Given Ecuador's dependency on hydroelectric power, especially now that it has invested in changes on the energy grid, the authorities want to ensure the University's preparedness and that electric shortages will not interfere with everyday operations.

b. Prevent upcoming legislation

For Accreditation purposes, the University has to be certified by CEAACES, which is the local government accreditation agency for higher education institutions. Although a sustainability report is currently not part of their agenda, this type of reports will be part of what they will ask for in the short term. This has come to our attention for the following three reasons. First, the Ecuadorian Ministry of Environment contacted the University a couple of months ago to work on a voluntary project to define what the carbon footprint should include for Universities. Second, CEAACES already has asked for information regarding certain toxic materials and their disposal. Third, both the Ecuadorian Ministry of Planning and Ministry of Environment have been working on technical training at Global Footprint Network's Oakland office. Moreover, the city of Quito is currently participating in the program "Huella de carbono y huella de agua en tres ciudades andinas: La Paz, Quito y Lima", the aim of the Andean cities carbon and water footprint project is to support and implement local strategies at the municipal level to mitigate the effects of climate change in La Paz, Quito and Lima (3). In 2010, Ecuador became one of Latin America's first countries to set a concrete Ecological Footprint target at a level at which its ecosystems can renew. This continues despite the President's latest decision to exploit oil reserves in YASUNI National Park. The Footprint target was set due to the fact that Ecuadorian people use recourses at a current rate that exceeds Ecuador's biocapacity (4).

3. Cost reduction and Economic savings

The University has no written policies for operational savings. Each t of CO_2 that the University produces equals spent money. Regulating operations and sustainability policies will allow the implementation of local strategies that would reduce CO_2 emissions and promote better use of resources, which could translate into a decrease in operational costs.

4. Adapt to change in preferences:

Other institutions may regard the business opportunity as ways to attract new students. Princeton Review's 2012 showed that nearly 7 out of 10 college applicants surveyed indicated that a school's commitment to the environment would influence their decision

to apply to or attend the school (5). Sustainable campuses also create brand recognition or association of good standing in the community.

5. Continue as a market leader

Higher education institutions have recognized the importance of including sustainability in their students' and community's future. University leaders now believe in a mixed proposition of prosperity by ensuring that future generations have the resources to meet their needs. This recognition has transformed into leading initiatives such as the American College & University Presidents' Climate Commitment with over 664 signatories and 476 climate action plans (6).

Two other Ecuadorian higher education institutions have already shown their interest in sustainability. Universidad de las Américas (UDLA) is currently building a Leadership in Energy & Environmental Design (LEED) campus, and Universidad Internacional del Ecuador (UIDE) is a member of the International Sustainable Campus Network (ISCN).

IV. College Sustainability rating systems:

1. Association for the Advancement of Sustainability in Higher Education (AASHE)

What AASHE provides is a guideline of possible categories which universities could pursue in order to achieve a sustainability status. At the moment AASHE is for USA and Canada institutions. Due to growing interest of international higher education on the subject, the association has implemented the international pilot program for institutions worldwide.

Sustainability Tracking, Assessment & Rating System (STARS) a program of AASHE has established an International Pilot Program that started with 50 institutions, outside of the US and Canada. Universities are present from different regions such as Europe, Africa, Asia. In Latin America the only two universities that participated are USFQ and TEC de Monterrey. The Pilot included publicly documenting efforts, share feedback and make suggestions for improvements to the system (7). There are associated challenges with implementing the current version of STARS internationally because there are many third party certifications and applicability issues that apply only to North American universities. Examples of these are: LEED certification for existing buildings, USDA Certified Organic, Marine Stewardship Council Blue Ecolabel, Food Alliance, Green-e Energy, Fair Labor Association and Worker Rights Consortium, among others.

An additional minor impediment is the use of United States metric system versus the international metric system, which is used in the rest of the world. Using conversion factors solves this but has to be closely conducted in order to report correctly.

Colleges and universities participating in the International Pilot Program will be eligible to receive the recognition of STARS Reporter as well as that they will be able to select the credits they would like to pursue without having to complete the entire assessment.

2. The International Sustainable Campus Network (ISCN)

In contrast to STARS, ISCN is an international program, which provides support in the exchange of information, ideas, and best practices on sustainability. They currently do not have a rating system but they work on promoting open communications for campus operations and integrate sustainability into research and teaching activities.

The benefits of participating in ISCN are that they have requirements to ensure the full strategic commitment. Some of these requests are:

- The president, vice-chancellor, rector, or chief executive officer (CEO) of the institution must sign the report.
- A commitment to produce short Charter Reports annually to facilitate knowledge-exchange and transparency.

The ISCN has a well-ordered way of reviewing and separating criteria for reporting. It provides a detailed framework for newcomers (8). The three fundamental principles are:

- Buildings and their sustainable impacts
- Campus wide planning and target setting
- Integration of research into teaching, facilities and outreach.

As for benchmarking ISCN has reports from universities all over the world and provides peer-to-peer communication as well as peer "direction." In the future, the University has to evaluate the possibility of participating in the ISCN and be part of the network of higher education professionals that can prove to be a database resource for comparable partners.

3. ISO Family of Certifications

ISO 14000 family addresses various aspects of environmental management. It provides tools to identify and control environmental impacts and improve environmental performance. For example, ISO 14040 certifies Life cycle analysis and ISO 14069 Carbon Footprint. Other possible certifications could be focused on ISO16001 designed to help businesses use energy in an efficient manner and standardizing procedures.

At this stage, USFQ has completed the carbon footprint report for the baseline year of 2012. In the future, the University will evaluate the possibility of applying for and ISO certification taking into consideration the action plans to ensure sustainable performance that are required and the implied costs.

V. Key Supporters

This section acknowledges people who have participated in this project in a range of ways, those who have believed in the project, who have worked out of their personal time, who have shown interest and cheered the project on and, with whom this report would have not been possible to complete.

Carlos Montúfar – Vice Chancellor
Diego Quiroga – Dean of Research and International Affairs
Gabriela Moreno – Dean of Students
Diego Gabela – Director of Admissions
María Elena Heredia – Chief Financial Officer
Janeth Montenegro – Head of Human Resources
Catalina Terán – Administrative Assistant
Mario Jiménez – Executive Chef
Alexandra Basantes – Director of human resources, Food service
Karla Díaz – Coordinator of Business School
Carlos Simba – Director of Operations and Maintenance Department
Silvio León and all the Maintenance staff at Planta Física.

The Student Government (GOBE)
The Ecology Club
Deans and area supervisors
Students, faculty members, instructors and the administrative team that always had time for the project.

Finally, our sincere acknowledgement to Joshua Skov from the University of Oregon, whose trajectory in this field makes him a walking encyclopedia and he never hesitated to share his knowledge with USFQ and act as a mentor.

VI. STARS: Difficulties applied to the Ecuadorian context.

While USFQ decided to report its first baseline we found the opportunity to join ASSHE's International Pilot. We joined thinking we could leverage our report by using knowledge and benchmarks that American universities had already developed, as well as become a reporting University, the First in South America.

The following is a recorded list of difficulties that we had applying the ASSHE framework to the Ecuadorian context.

1. Because universities work based on academic year it is harder to gather information for a calendar year. A guide should be provided on how to calculate the quantity of students registered for a given calendar year. The University operates in 3 semesters in each one there are different numbers of students.
2. USFQ has to provide printed information to Ecuadorian University accreditation entity, which derives in a lot of document printing.
3. There is a lack of eco-friendly, sustainable products that are the same quality that the purchasing department could use.
4. This report is the first sustainable baseline report that the University has worked on. Many of the STARS categories award change in a year. Maybe STARS could provide a guide for Universities that are just starting their baseline.

5. One of the less applicable categories was Dining Services. Food is not wasted in Latin American countries or as processed as in the US.
6. Points for waste could be measured by the amount produced per student.
7. Because Ecuador has an unreliable power grid, the University counts with back up electricity generators that are powered with diesel in order to provide energy in case of power shortages. This data is included in the energy report although it says fuel should not be included. This is part of Scope 1 energy in our case.
8. For volunteering, the functional unit for future reference is the number of people served. This measurement enables to view the scope of volunteering, which at this time is not included. This shows how many people benefited from volunteering, which in the big picture is what really counts. The University is asking to view quality of the volunteering over quantity as an indicator.
9. For ethnic diversity, the impact that our ethnic diversity program has in Ecuador has no measurement in STARS. This is due to the fact that Ecuador is a multi-racial country but most ethnic students come from the Amazon region, where they did not have a formal school education or in fact, their first language is not Spanish. Furthermore, they have to move away from family and live alone in a big city which is not common in Ecuadorians, who live close to their families all their lives.
10. Ecuador is a developing country. This report still has to include the sustainability definition primary needs such as overall health, family support especially for women and children and other needs such as fresh potable water.

The category Investment PAE credit 16 to 18 Tier 2 has a lot of economic, cultural and political context and is very hard to apply; therefore, it was not considered in the report for the following reasons:

- Although USFQ is a private University, about 40% of the students have financial aid provided by the University at a very low interest rate for Latin American Standards.
- The University has no endowment because alumni donations are not part of the Latin American culture. Therefore the University has to work with private companies whose brand is present in campus in exchange for sponsorship. For example Samsung has built computer labs. The money is usually re-invested as working capital because the University is still in a growth stage. The outcome of this is that the University does not have an endowment to invest.
- To this date there is a small faculty's retirement fund, which is managed in Ecuador. Financial markets in Ecuador are not fully developed. There are only about 10 companies that are public. As for fixed income markets this is also limited to companies that are rated at least B+ but they just recently have started to think about sustainability and social corporate responsibility.
- Ecuadorians are also limited to international investment due to the fact that the government charges a 5% fee over all money transferred out of Ecuador.

VII. Report

1. Co-Curricular Education

ER Tier Two Co-Curricular Education Tier Two Credits

1.1 Background

A. Student Group

USFQ's Student Government (GOBE) in 2012 worked on various projects that focused on recycling, reduction of single use plastic bottles and paper copies, as well as giving back to the community.

a. Homework is turned in as an electronic file through the online platform Desire 2 Learn (D2L). This platform was implemented on August 2011. A main component of GOBE's work was to train instructors and professors to use this online tool appropriately. The project also included delivering readings on PDF format instead of printed copies.

Figure 1. Information about Desire to Learn Platform.

b. Guerilla marketing for recycling. The strategy was to create a recycling conscience. GOBE collected over 6000 plastic bottles and strategically placed them in high occupied campus areas in order to create visual impact.

Figure 2. Plastic bottles in campus for the recycling campaign.

c. GOBE purchased 3 water fountains for students to refill their personal bottles and decrease the use of single use water bottles. Both cold and hot water is now available through campus.

Figure 3. One of the water dispensers in campus.

d. Christmas's celebration for 400 children in la Tola Grande, a vulnerable neighborhood in the town of Cumbayá, where the University is located. This included entertainment and food.

Figure 4. Christma's celebration for children

e. A "Gratitude Celebration" for the cleaning and security staff. The celebration included entertainment and lunch in order to thank them for their hard work, which is essential for the University's operations and success.

Figure 5. University's staff in campus during the celebration.

B. Organic Garden

USFQ's Organic Garden is a mandatory class to agriculture introduction. The garden is located 6 miles away from the main campus in Cumbayá in a 2.4 acre leased piece of land.
Each semester there are generally between 7 to 10 students in the class where activities from seed planting to genetic research are carried out. Besides students, there are 3 full-time workers that oversee the organic farm. Students stick to a scheduled production process and are required to assist daily.

Besides cultivating in season-crops, the organic garden also serves as a seedbed for native plants such as chilca, guabo, santa-maría, ajisillo and podocarpus, which are then transplanted to parks and ravines. Everything is organically managed, from the fertilizer made form quail excrement, to the red earthworms for compost as well as fumigating with *Trichoderma* mushrooms for pest control.

Products for sell have to pass a sanitary verification in order to be packed and shipped to the farmers market on Friday's at noon which takes place at the University's main campus in Cumbayá. Leftover products are fed to rabbits and guinea pigs at the farm. All other organic left overs are used for compost and re-used as organic fertilizer.

C. Outdoors Program

Currently, the University offers a Climbing/Hiking 3-credit class. The program started in 1999 as a club and since then the president of the club has remained as class instructor. The class is based on taking a theory in mountaineering, rappel and ropes. Besides attending all theory classes, students have to take at least 3 weekend trips during the semester.
The class has a policy of leave no trace behind but has no theory on it. As for rock climbing the policy is to use previous bolts.

1.2 Limits

a. GOBE's efforts are limited to one-year periods. Although the projects change in a yearly basis their main focus has remained on recycling and community involvement and no financial information is recorded. This is a limitation for the University because the final report delivered by GOBE at the end of the period does not contain financial information on the amount of money that was invested on these campaigns. Therefore, the University cannot compare the investment in these activities in contrast to other areas such as arts and entertainment.

b. The Organic Garden is limited to Agriculture students and it is not located close to the University campus in Cumbayá.

c. For Climbing class in 2012 an average of 4 classes were opened in the summer and fall semesters with an average of 20 students per class and one more class was offered during the summer session. There is not a written policy regarding the amount of classes offered per academic period meaning that the amount of classes can significantly change from period to period.

1.3 Assumptions

Regarding online content, it is assumed that we are all information follows international IP laws.

1.4 Methodology

Individual meetings with each person were conducted that headed each of the co-curricular activities. GOBE handed in their yearly individual report as well as photographs for the organic garden.

a. USFQ GOBE Environmental Coordinator 2013-2014
Contact: David Vasquez
Email: vasquezdavid11@gmail.com

b. USFQ GOBE President 2013-2014
Contact: Nicole Galindo
Email: nicole.galindo@estud.usfq.edu.ec
Related files: rendicion_de_cuentas_gobe_2012-2013 copy.docx
Where: Dropbox >Folder>Documentos varios

c. Organic Ag. Instructor.
Contact: Victor Hugo Castillo
Email: vhcastell@homtail.com
Related files: fotosGranja.docx
Where: Dropbox >Folder>Documentos varios

d. Climbing Instructor
Contact: Diego Egas
Email: diegoegas@hotmail.com
Related links: http://ssb.usfq.edu.ec/cursos.html

1.5 Stars Related

ER Tier Two Co-Curricular Education Tier Two Credits
a. Student Group 0.25
b. Organic Garden 0.25
c. Outdoors Program 0.25

Total points **0.75**

Not pursuing:
ER Credit 1 Student Sustainability Educators Program 5
ER Credit 2 Student Sustainability Outreach Campaign 5
ER Credit 3 Sustainability in New Student Orientation 2
ER Credit 4 Sustainability Outreach and Publications 4

1.6 Results and conclusions

The University currently has Co-Curricular Educational programs that work internally but should promote their strategy and their project efforts externally. The three main points that can be achieved in a short time are:

a. Develop student educator programs in sustainability through the admission office. These programs could include talks to perspective students in high schools, which could be organized by the environmental club led by student's office.
b. Include a sustainable talk to incoming students during their day of orientation; specially introduce them to the carsharing tool that the University has contracted.
c. Develop an outdoor leadership program with a leave no trace policy and open the program for the external community. This is a long-term goal that could be very beneficial in becoming a sustainable campus.

2. Curriculum

ER Credit 10: Undergraduate Program in Sustainability
ER Credit 11: Graduate Program in Sustainability

1.1 Background

Undergraduate Program in Sustainability

a. Environmental Management
A 5-year online program that the University offers with the objective of combining economic development with the social and environmental aspects and how these relations affect the overall system. This area of study is under the School of Environmental and Biological Science and focuses on individuals who are interested in planning, implementing and evaluating natural resources and the tradeoffs.

b. Environmental Engineering
This degree looks into forming professionals who can provide technical solutions to contamination and environmental degradation problems in order to preserve our biodiversity and contribute to sustainable development. This is a multidisciplinary career that provides strong footing in several areas of knowledge such as biology, exact sciences and engineering. Our professionals are committed to preserve the environment and human health by adequately using natural resources, implementing environmental management systems, designing functional and environmentally compatible treatment facilities, managing urban and hazardous solid waste, modeling of environmental contaminants, controlling air quality, among others.

Up to 2010, the University offered a Graduate Program in Sustainability called Master of Science in Sustainable Energy Development Program. This Masters was taught in conjunction with the University of Calgary and was focused as an interdisciplinary program for professional individuals seeking a broad-based education in energy and sustainable development. The objective of the Program is to provide students with a

background in energy and environmental management such that they will be able to ensure sustainable energy development and minimize the impact on the environment.

The program was stopped because of new regulations for accreditation under CEAACES, and it is expected to re-start by the end of this year. This is an important Degree program that could in fact thrust the University's Sustainability efforts.

1.2 Boundaries and Scope

Degrees that can be found either online or full time have been included.

1.3 Assumptions

Assumptions are that online degrees do comply with the criteria.

1.4 Methodology

Information was obtained from the main webpage of the University where information for each individual program can be found.

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Office: DW001

Dr-Ing, Ródny Peñafiel, Coordinator of Environmental Engineering
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Phone Ext: 1225
Office: M 209

Related Content:
http://www.usfq.edu.ec/programas_academicos/colegios/cociba/carreras/Paginas/Administracion_Ambiental.aspx
http://www.usfq.edu.ec/programas_academicos/colegios/politecnico/carreras/Paginas/ingenieria_ambiental.aspx

1.5 Stars Related

ER Credit 10: **4 points**

Total 4 points

1.6 Results and Conclusions

Environmental Management is a career offered only on-line, so there are not associated costs of commuting to and from the university. There is also an option to take a two-month propaedeutic course that serves as admission to the University. Therefore, students are required to come to campus only to take final exams on Math courses. However, for students not living in Quito or Ecuador, arrangements are made for them

to take these exams at educational facilities near their home towns, or through videoconferences arrangements with monitors. The use of Respondus, a software to increase control during on-line exams, has been evaluated but compatibility problems with Mac users could not be solved. Besides, in the past two years there has been an effort to reduce the use of textbooks. Most classes offer now only electronic resources.

USFQ's Environmental Engineering Department counts with five faculty members who work in sustainable research projects in the areas of water/wastewater treatment, bioremediation, solid hazardous waste management, air modeling, air quality, meteorology and hydrology (refer to Table 5). The publications on sustainability of the faculty members are presented below:

1) Torres A., F.; **Ochoa-Herrera, V**.; Zambrano, C.; Mendez, M., Dueñas, M. E. "On the role of vitamin B_{12} in the reductive dehalogenation of perfluorinated persistent organic pollutants: A DFT study." *American Chemical Society, 2013*

2) Andrade, V. and **Ochoa-Herrera, V**., ¨Effect of the substrate as electron donor during the microbial sulfate reduction and its possible applications in the biological treatment of acid mine drainage¨. *Avances en Ciencias e Ingenierías, 2013, 5, 1, C31-C38.*

3) **Parra, R.** "Preliminary evaluation of average Surface temperature in Ecuador for the year 2010 obtained through the Weather Research Forecasting (WRF) model"; *Avances en Ciencias e Ingenierías, 2012, 4, 2, C27-C35*

4) **Parra, R.** "Molecualr simulation of the photochemical transport of air contamints in the city of Cuenca – Ecuador" VII Congreso de Ciencia y Tecnología ESPE 2012 Sangolquí – Ecuador June 2012, *Revista Digital Congreso de Ciencia y Tecnologia*

5) **Parra, R**. "CO_2 emission factor due to the electricity generation in Ecuador during the period of 2001 – 2011"; *Avances en Ciencias e Ingenierías, 2013, 5, 1, C39-C42.*

6) Naciph, K.; Rivadeneira, L.; **Cazorla, M.C.** "Calculation of the CO_2 emissions from University San Francisco de Quito corresponding to the student transportation for the second semester 2012-2013", *Avances en Ciencias e Ingenierías, 2013, 5, 2, C1-C4*

7) **Cazorla, M.C.** "Analysis of the solar radiation hourly data and the ozone abundance in the Metropolitan District of Quito from 2007 al 2012, *Avances en Ciencias e Ingenierías, 2013, 5, 2, C67-C78*

Moreover, the environmental engineering faculty is fully involved in the carbon foot print project. Each professor has worked in the area of his/her expertise in order to calculate the CO_2 emissions from each sector. This baseline report repr
For the undergraduate level courses in the Business school the introduction of Sustainability is highly recommended as a sub specialization or even better as a core pillar of the school due to the increasing demands on the subject. Innovation (ADM 430) is already a mandatory class and is being taught under the above impending trend in all industries.

Not Pursuing

Credit 5 Sustainability Course Identification
Credit 6 Sustainability-Focused Courses
Credit 7 Sustainability-Related Courses
Credit 8 Sustainability Courses by Department
Credit 9 Sustainability Learning Outcomes
Credit 12 Sustainability Immersive Experience
Credit 13 Sustainability Literacy Assessments
Credit 14 Incentives for Developing Sustainability Courses

2. Research

ER credit 15 Sustainability Research Identification
ER Credit 16 Faculty Engaged in Sustainability Research
ER Credit 17 Departments Engaged in Sustainability Research
ER Credit 18 Sustainability Research Incentives
ER Credit 19 Interdisciplinary Research in Tenure and Promotion

2.1 Background

Faculty Engaged in Sustainability Research

Table 5 shows a listing of the sustainable research topics and the people involved with the research for 2012.

Table 5. Sustainable Research 2012

College	Principal Investigator	Research Project	Research Field
COCIBA	Andrea Encalada	Funcionalidad y Calidad Ecológica de los ríos altoandinos	Water resources management
COCIBA	Andrea Encalada y colaboradores	Dimensions: Collaborative Research: An integrative traits-based approach to predicting variation in vulnerability of tropical and temperate stream biodiversity to climate change	Climate change
COCIBA	Andrea Encalada y colaboradores	Long-term sustainability of water resources and biodiversity under scenarios of climate change in the Napo watershed, Ecuador.	Sustainability of water resources

College	Principal Investigator	Research Project	Research Field
POLITECNICO	Antonio León-Reyes	Identificación de microorganismos que crecen en simbiosis con ácaros en especies vegetales	Agricultural and Food Biotechnology
POLITECNICO	Antonio León-Reyes	Caracterización molecular y funcional de especies nativas del hongo benéfico *Trichoderma* frente al fitopatógeno *Botrytis*	Agricultural and Food Biotechnology
COCIBA	Carlos Mena	Proyecto NEBE: Conflictos en la Nacionalización de los Recursos Naturales	Natural Resources
COCIBA	Carlos Mena	Proyecto PEER: Cambio Climático y Seguridad Alimentaria en la Amazonía Ecuatoriana	Climate change/ Food security
POLITECNICO	Daniela Almeida	Programa SynFuel	Renewable energy
POLITECNICO	Daniela Almeida	Programa CAPfuel – USFQ	Renewable energy
POLITECNICO	Daniela Almeida	Programa BioDO –USFQ	Renewable energy
POLITECNICO	Daniela Almeida	Programa BIO-Alcoholes – USFQ	Renewable energy
POLITECNICO	David A. Egas	Fabricación e implementación de un potenciostato para cuantificación de metales pesados en niveles de microtrazas	Chemistry
POLITECNICO	David A. Egas	Fabricación de pilas a partir de materiales sencillos y baratos para encender luces de árboles de navidad	Chemistry/ Renewable energy
POLITECNICO	Esteban Suárez	Efectos del cambio climático sobre la dinámica y regeneración de ecosistemas de páramo	Climate change
POLITECNICO	F. Javier Torres	Evaluación del potencial para el almacenamiento de hidrógeno de cristales formados por clusters B1N12	Renewable energy
POLITECNICO	F. Javier Torres	Descripción teórica DFT del complejo PFOS-Cobalamina	Environmental remediation
POLITECNICO	Francisco Carvajal	Modeling of the aqueous debittering process of *Lupinus mutabilis* Sweet	Water and energy management

College	Principal Investigator	Research Project	Research Field
COCIBA	Gunther Reck	Aplicación del sistema de manejo de visitantes (SIMAVIS) en tres áreas protegidas Marino-Costeras del Ecuador: Refugio de Vida Silvestre Marino y Costero Pacoche (RVSMCP), Reserva de Producción Faunística Puntilla de Santa Elena (REMACOPSE) y Refugio de Vida Silvestre (REVISMEM)	Natural Resources
POLITECNICO	Gustavo Muñoz	Modificación del comportamiento reológico de los pasivos ambientales mineros almacenados en diques o piscinas de relaves	Metalurgy
POLITECNICO	Jesús Portilla	Wave energy resources: wave climate and exploitation	Numerical modeling/ Water resources management
POLITECNICO	Jesús Portilla	Wave energy resources in the Equatorial Pacific Zone	Numerical modeling/ Water resources management
POLITECNICO	Jesús Portilla	Wave energy resources in the Equatorial Pacific Zone	Numerical modeling/ Water resources management
POLITECNICO	Jesús Portilla	Evaluación del recurso energético del oleaje en el Mar Territorial Ecuatoriano	Numerical modeling/ Water resources management
COCBIA	Judith Denkinger, Gabriel Trueba, Verónica Barragán	Estado de salud de lobos Marinos en Galápagos	Biodiversity conservation
COCIBA	Kelly Swing	Implicaciones de la presencia del camarón barril, *Gnathophyllum panamense*, en la costa ecuatoriana	Biodiversity conservation
COCIBA	Kelly Swing	Estado de conservación de los atunes	Biodiversity conservation
POLITECNICO	Lourdes Orejuela Escobar	Estudio de la Actividad Antimicrobiana del Látex de *Jatropha curcas*	Chemistry/ Microbiology
COCIBA	María de	Estudio piloto de la diversidad	Biodiversity

College	Principal Investigator	Research Project	Research Field
	Lourdes Torres	genética de la guayaba en la Isla San Cristóbal	conservation
COCIBA	Renato León	Efectos de la construcción de la represa Hidroeléctrica Toachi Pilatón en la fauna de Dípteros Nematóceros transmisores de enfermedades. Monitoreo piloto de especies vectores con énfasis en Malaria	Biodiversity conservation
POLITECNICO	René Parra	Simulación numérica del transporte fotoquímico de los contaminantes gaseosos del aire en la ciudad de Cuenca - Ecuador	Numerical modeling/ Climate change
POLITECNICO	Ródny Peñafiel	Tratamiento de las aguas residuales de procesos de teñido mediante degradación fotocatalítica	Wastewater treatment
POLITECNICO	Ródny Peñafiel	Tratamiento de las aguas de riego de la granja del Jardín Botánico mediante filtros con plantas	Wastewater treatment
POLITECNICO	Ródny Peñafiel	Tratamiento de las aguas de riego de la granja de la USFQ mediante filtros con plantas	Wastewater treatment
POLITECNICO	Ródny Peñafiel	Power Generation Potential and Greenhouse Gas Emission Potential of the Municipal Solid Wastes in the Province of Pichincha (Ecuador)	Waste management / Renewable energy
POLITECNICO	Ródny Peñafiel	Plan de Protección de las Fuentes de Agua de San Pablo y Llío de la Ciudad de Riobamba	Water resources management
POLITECNICO	Ródny Peñafiel	*Jatropha* Plantation Zoning as Feedstock For Biofuel Production Within a Sustainability Framework in Ecuador, Case Study in Manabí Province	Renewable energy
POLITECNICO	Ródny Peñafiel	Feasibility Study of Methane Capture from Effluents of Palm Oil Mills in Las Golondrinas - Ecuador for Electrical and Thermal Energy Generation	Wastewater management/ Renewable energy

College	Principal Investigator	Research Project	Research Field
POLITECNICO	Stalin Santacruz	Aprovechamiento de los excedentes de exportación del banano (*Musa cavendish*) para la elaboración de jarabe de glucosa	Improvement of waste management
COCIBA	Stella de la Torre	Diversidad genética del leoncillo Callithrix pygmaea en la Amazonía ecuatoriana	Biodiversity conservation
COCIBA	Stella de la Torre	Efectos del uso del suelo en la estructura y funciones ecosistémicas de zonas agrícolas y urbanas en San Cristóbal, Galápagos	Soil management
POLITECNICO	Valeria Ochoa	Diseño, puesta en marcha y monitoreo de una Planta de Tratamiento de Aguas Residuales (PTAR) a escala laboratorio	Wastewater management
POLITECNICO	Valeria Ochoa	Diseño de un sistema de tratamiento físico-químico de los drenajes ácidos de mina	Wastewater management
POLITECNICO	Valeria Ochoa	Biorremediación de los drenajes ácidos de mina	Wastewater management/ Bioremediation
POLITECNICO	Valeria Ochoa	Diseño, puesta en marcha y monitoreo de reactores anaerobios escala laboratorio para el tratamiento de residuos orgánicos provenientes del mercado central de Tumbaco	Waste management
COCIBA	Venancio Arahana	Estudio piloto de la diversidad genética de la guayusa en la Amazonía Ecuatoriana	Biodiversity conservation
COCIBA	Verónica Barragán (coinvestigadora)	Transferencia de genes bacterianos humanos a lobos marinos (*Zalophus wollebaeki*) de la Isla San Cristóbal a partir de aguas residuales domésticas.	Biodiversity conservation
COCIBA	Vlastimil Zak	Estudio de las partes de *Xanthosoma* que contengan las mayor concentraciones de fitofungicida	Biological control of pests

2.2 Boundaries and Scope

In the end this credit was not pursued because the credit asked for faculty engagement from the total pool of faculty that participated in research for 2012. The information that was mined gave us a total of people that participated in research and not all of them are University professors.

2.3 Assumptions

Because this was visually mined data the assumption is that there is a marginal error. The current information technology system the University uses does not provide reports.

2.4 Methodology

All reports the University Published in 2012 where reviewed by titles and picked if the research was linked to the sustainability framework that was defined in the introduction of this report. A head count the faculty that worked on publishing research was reviewed and of those how many had sustainable content where accounted for. In the en this credit was not pursued due to the difficulty of mining the data.

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2.5 Stars Related

Total Points= 0

Not Pursuing:
ER Credit 15 Sustainability Research Identification
ER Credit 17 Departments Engaged in Sustainability Research
ER Credit 18 Sustainability Research Incentives
ER Credit 19 Interdisciplinary Research in Tenure and Promotion

2.5 Results and Conclusions

47 research projects on sustainability have been reported for 2012. These research projects wer conducted by faculty from the College of Biological and Environmental Sciences (COCIBA) and the College of Science and Engineering (POLITECNICO). Scientific publications on sustentability as results of these projects have been reported in USFQ CRM system. However, the system that the University currently uses to save research papers needs to be updated in order to have an advance search option. Currently it is hard to come up with indexes and compare from year to year. The system should provide a way to search for specifics papers per year published, if the person or group of people involved in the research was a University Professor or student and by department topic as well as if they consider if the content is related to sustainability.

3. Building Operations and Maintenance

3.1 Background

The University main campus in Cumbayá initially planned in 1993 was built to comply all environmental regulations at the time. Currently the University has no LEED-Certified Buildings nor have any of the expansions have followed LEED standards. All buildings are made of cinder blocks, which help to maintain a stable temperature year round. No air conditioning (AC) units were installed to maintain temperature other than in special classrooms where high tech equipment needs ventilation or laboratories where a certain temperature has to be maintained. Windows in the classrooms maintain natural airflow and these can be opened or closed depending on occupants' needs.

The University has grown at such a pace that space has been used as diligently as possible. In 2012 the University's density was 88 square feet (27.12 square meters) per student.

Conservation of water and energy is an everyday part of building operations, but strangely enough this has not formally been included into policies nor measured.

The climate

Quito, the capital city is located at 9350 (9) feet of altitude in the equator. This provides a unique spring-like weather year round with an average temperature at noon of 65.7 °F. As for sunshine, there is about 2058 sunshine hours annually and approximately 5.6 sunlight hours for each day (10).

Refrigerator and Air conditioning (AC) Units Inventory

In 2013 a visual inventory of all refrigerators and AC units installed in the main campus in Cumbayá was conducted. Many of these units are in places that are very hard to reach. The information collected was the following: place where it is located, brand and model, type of coolant and full capacity when it is initially purchased, time since last inspection and maintenance was carried out, amount of years since purchased and links related. The University does not register how much refrigerant has been placed back.

3.2 Boundaries and Scope

Building Report data includes only the main campus in Cumbayá; located on Diego de Robles y Vía Interoceánica, (Figure 6), contact details are provided below.

Geographic boundaries

The carbon footprint for 2012 will only include operations for the Cumbayá Campus delimited to buildings in the following quadrant streets: limited by Diego de Robles to the West, Francisco de Orellana to the South, Pampite to the North and Chimborazo to the East as can be viewed in

Figure 6.

Figure 7 presents the official University map for the main campus located in Cumbayá. Buildings no. 26 and 28 on Figure 7 are not shown on the map. Scientific research stations, university campus in other cities such as Guayaquil and Riobamba are not shown in Figure 7 and they were not included in the report.

The main constructor, José Ribadeneira, was not contacted for details on construction or additional information regarding the highlights of the concept behind the buildings.

As for the fridge and AC inventory, neither small refrigerators in laboratories nor personal use refrigerators in offices where included. Additionally, information on 30 out of the 70 pieces of equipment including refrigerators and air conditioning units was difficult to gather and therefore it is not included in this report

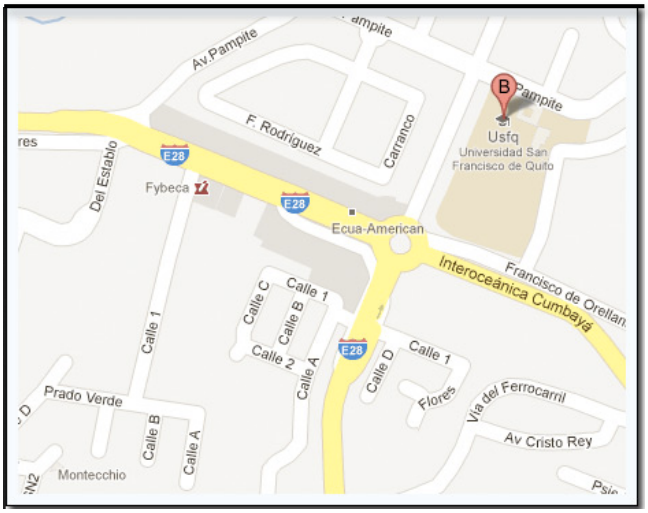

Figure 6. Location of the University in Cumbayá

Figure 7. Official University map

3.3 Assumptions

The first assumption is that in baseline year of 2012 there were a total of 5953 full-time students; this number was employed to calculate the density per square foot/meter.

The following assumption is that all new construction is reported to Facility Management; therefore the area data reported is up to date.

Finally some refrigerators and air conditioning units had to be visually identified by comparing them to technical information available in the Internet. Each category includes links for future reference.

3.4 Methodology

For data acquisition, the primary source of information was personal interviews conducted between June and October 2013.

Fausto Echeverría, USFQ architect and construction manager, and Silvio León, USFQ maintenance manager were interviewed. Fausto Echeverría was responsible of the design and construction of the campus Cumbayá in 1994. Since then he has been responsible for all adaptations and new constructions, while Silvio is currently in charge

of the operations of the campus. The data for the campus measurements was taken from the construction plans updated in December 2012 which were provided by Fausto Echeverría.

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Silvio León, Maintenance Manager
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Office**:** Planta Física

Related content or links:

- Drop box: Linea Base>Documentos Varios>REFRIGERADORAS Y AIRED ACONDICIONADOS USFQ.xlsx
- Drop box: Linea Base>Documentos Varios>buildingsdistribution2013
- Drop box: Linea Base>Documentos Varios>Carbon Footprint>Datos sobre Laboratorios USFQ.xlsx

3.5 Stars Related

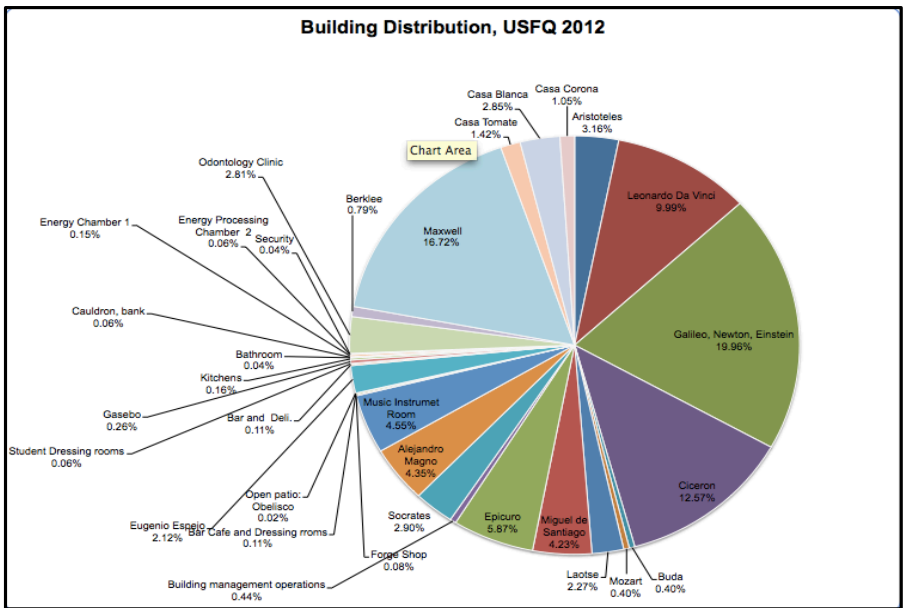
No Points awarded in this section

Not pursuing:
OP Credit 1: Building Operations & Maintenance
OP Credit 2: Building Design & Construction
OP Credit 3: Indoor Air Quality.

3.6 Results and Conclusions

The campus has a total area of 536 339.28 square feet, of which 397 923.79 square feet has been constructed on, representing 74.19% of the total area. Laboratories take up approximately 29 527.2 square feet of the built environment. Free space for recreation purposes represent the other 25.81% that includes an artificial lagoon, 2 soccer fields (1 is synthetic grass), 2 tennis courts , 2 volleyball courts and a parking lot.

The campus has 34 buildings, with a total construction area of 529 742.51 square feet. Furthermore there are 38 bathrooms distributed on the entire campus, most of the bathrooms have sinks with water saving mechanisms, and the toilets use water saving regulation devices. Individual consumption has yet to be calculated and it will be included in future reports. The building distribution on the main campus in Cumbayá is presented in Graphic 1.



Graphic 1. Building distribution on University's Cumbayá campus.

As for emissions from fugitive refrigerants, operations management should carefully monitor the amount of different refrigerants they add yearly; especially when maintenance is given to refrigerators from different brands and models. There is a need to institutionalize policies for maintenance.

The University has never had a LEED certified Architect inspecting the Cumbayá campus. Therefore, currently there is no information regarding if any of the buildings fulfill LEED credits. A benchmark building should be identified in order to compare efficiency and set goals. Currently there is a Green Building Council In Ecuador that could provide specifics in order to compare benchmarks. Other benchmarks could come from LEED certified buildings in Bogotá Colombia due to the high altitude (Andes Region) and low moisture (Tropical country), conditions that replicate Quito's environment. A LEED certified Architect should join the faculty and start moving the education of the Department towards the trend. Currently, there are no policies or guidelines for future construction.

In the future, an indoor air quality monitoring system is suggested, especially in laboratories and places with potential emissions of volatile organic compounds and fungi.

4. Climate

OP Credit 4: Greenhouse Gas Emission Inventory
OP Credit 5: Greenhouse Gas Emissions reduction
Tier Two

4.1 Background

USFQ started collecting data for the first time in 2012. This report is the first greenhouse gas emission inventory and will be referred from now on as the baseline USFQ report. The general strategy of the University based on the finding of this report is to promote actions to reduce CO_2 emissions as well as to mitigate environmental impacts and become a higher education institution leader in sustainability.

Each Carbon Category has been written as an independent section presented in the following pages; this is only a summary of the main findings.

4.2 Boundaries and Scope

Geographic boundaries for all categories are limited to the main campus in Cumbayá except for business travel. For the geographic operations please refer to the Built environment report for further information.

Scopes 1, 2 and 3 from the EPA reduction Program (11) were applied in this study. Figure 8 visually details the categories.

Scope 1

Included:

- Natural gas
- Diesel to power energy plants
- Diesel/gasoline to power vehicles

Excluded:

- Organic compost
- Laboratory gases: used in the health clinic and other laboratories. Compressed have climate implications such as carbon dioxide (CO_2) and nitrous oxide (N_2O).
- Refrigerants: as a goal for 2012 an inventory is been conducted. This inventory does not include small “personal” refrigerators.

b. Scope 2

Included:

- Emissions from purchased electricity

c. Scope 3

Included:

- Commute from students/faculty/staff

- Air travel
- Emissions from solid waste decomposition
- Emissions from wastewater treatment

Not included:

- Emissions from purchased goods: usually universities in the United States measure this category by using EIOLCA. EIOLCA is a model by Carnegie Mellon relates economic activity to carbon output. The last model for USA was developed in 2002 and it included 428 sectors in the Economy. American universities have to adjust for inflation and use the model in order to have their total emissions from purchased goods. This turned out to be the hardest category because it is difficult to adapt the information for Ecuador.

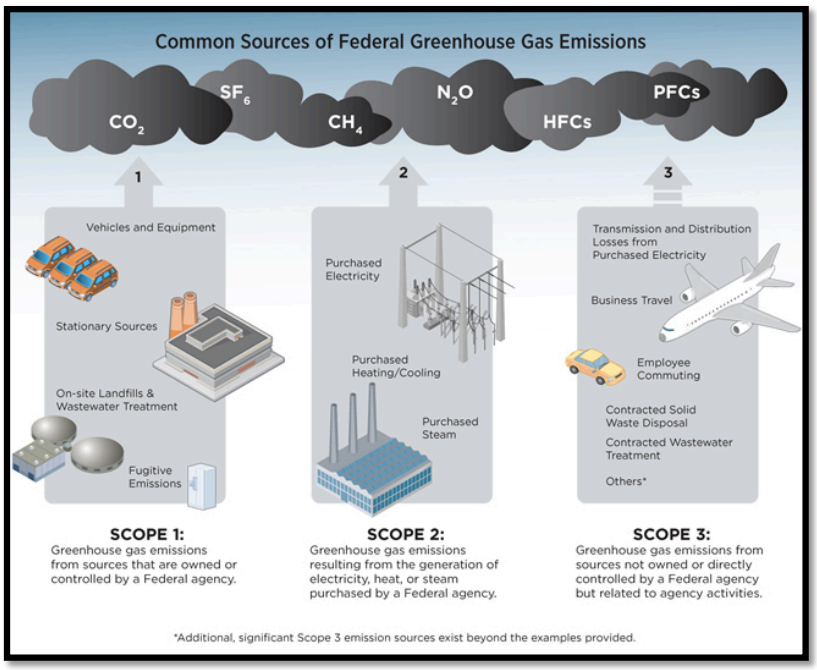


Figure 8. Common sources of Federal Greenhouse Gas Emissions (11)

Reporting Unit (t CO2e)

Total emissions for each category will be reported in the International system of units (SI), tons of carbon dioxide equivalent (t CO_2e). "Carbon dioxide equivalent (CO_2e) is a mean of describing the cumulative effect of all greenhouse gases weighted by their 100-year global warming potential" (12).

The general referenced literature for the accounting was ASSHES STARS that guided our Carbon Footprint on the operational side. As for Carbon Footprint criteria The

Climate Registry *General Reporting Protocol, Version 1.1, 2008* was consulted. This covers Scope 1 and 2 are direct emissions while Scope 3 are indirect.

4.3 Assumptions

There are two main accounting Departments. First the Corporación de Promoción Universitaria (CPU) which takes care of the catering, events and restaurants in the University. The second one is the general Accounting/Finance Department. Because of this division there are currently two separate entities that are in charge of purchasing products for the University such as fuel/diesel and gas. One of the most important assumptions for this report is that double accounting sources was not an issue. Finally, the accounting and finance reports handed to write this report were not detailed for the information required.

A summary of the Data uncertainty for each Scope can be found in Table 6. Please review each individual Report for category related assumptions.

Table 6. Data and calculations uncertainly

Emission Sources	Functional Unit Original Data	Data Uncertainty	Methodology uncertainty
Natural Gas	kilograms	At this time there are 3 different Departments as sources of information: Maintenance / Food Service / Food Processing Plant. Small gas lighters for lab usage is not certain not properly kept track.	
Diesel	gallons	Diesel is used for 2 main purposes. First to power energy plants and second for transportation. Data uncertainty comes because the operational estimation of what is being used for the energy plant differs from what is given by the Finance Department. An estimate was used.	
Fuel	gallons	There were no data regarding type of vehicles only total fuel consumed in gallons	

Emission Sources	Functional Unit Original Data	Data Uncertainty	Methodology uncertainty
Refrigerants	Not available 2012	Accuracy of refrigerator inventory and measurement of fugitive emissions	
Landscape Compost	Not available 2012		
Purchased Electricity	kilowatts	No Data for the Month of May. An average using two months April and June was used to obtain a value for May.	
Solid Waste	kg	N/A	
Wastewater	gallons	N/A	
Embodied Emission from purchased goods	Not available 2012		We do not know how to measure
Commute	kilometers	Transportation Survey done in 2013 was conducted assuming a total student population of 5000 students instead of 5953. The survey was conducted on 500 people. In order to study the amount of students who carpooled, the surveys were reviewed again including the ones not used before	
Air Travel	Destinations	The distance traveled by foreign students, faculty and services crews was calculated assuming direct routes and a standard airplane Boing 737 employ in commercial flights. The t of CO_2 per flight were directly obtained with the International Civil	

Emission Sources	Functional Unit Original Data	Data Uncertainty	Methodology uncertainty
		Aviation Organization travel emissions calculator	

4.4 Methodology

Information was gathered over a year from different Departments of the University. Reports were handed by the Department of Finance, surveys and interviews.

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Phone Ext: 1928
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Related reports:
Drop Box>Reportes> 2Category Operations>Buildings OPcredit1-3.docx
Drop Box>Reportes> 2Category Operations>Energy OPcredit7-8tier2.docx
Drop Box>Reportes> 2Category Operations>Transportation OP credit 17-21 tier2.docx
Drop Box>Reportes> 2Category Operations>Water OP credit 22-23 tier2.docx

4.5 Stars Related

Credit 19 Total Points **2**

Total points 2

Not pursuing:
Credit 20
Climate Tier Two credits

4.6 Results and Conclusions

Table 7. Results of tons of CO_2 on each scope.

Scope	Tons of CO_2	Percentage (%)
Scope 1 Total	249.28	5.2
Diesel	106.11	2.2
LPG	102.51	2.2
Fuel	26.5	1
Methane emitted from Waste	14.16	0
Scope 2 Total	**886.51**	19
Purchased Electricity	886.51	19
Scope 3 Total	**3614.94**	76
Waste stream Co2	36.17	0.8
Commute Students	2651.4	55.8
Commute Faculty and Staff	325.2	7
Business travel to Tiputini/Galapagos	338.94	7
Air Travel for Business	246.83	5
Water	16.4	0.35
Total	**4750.73**	**100**

Each student is responsible for 0.80 Co2t and it costs the University 397.76 US dollars for 2012. The price per ton reflects only what the University has directly paid for, thus it does not include commute for students, faculty and service crews. At this point the biggest CO_2 emission source is student commuting. This takes up to 55.8% of the total CO_2 emissions. Shared car initiative should be one of the leading projects that the University should partake in 2014 in order to reduce the carbon foot print.

5. Dining Services

OP Credit 6 Food and Beverage Purchasing Dining Services
OP Tier Two Credits

5.1 Background

Food and Beverage Purchasing *Dining Services*
The University has a culinary school. All food is purchased as a raw material and processed from scratch. This means only 10% of providers sell canned food or specialized products such as cured ham, among others. From the analysis of purchased goods, 15% of the goods were imported (13).

Tier Two Credits

a. Vegan Dining

Because food is made from scratch every time, it can be subject to change. This means that people can ask to leave out any components not only for personal reasons but also for dietary restrictions such as lactose intolerance or allergies. There are vegetarian options not necessarily vegan. Asian Wok 3% for vegetarian option (14). This means vegetarian broth, veggies and rice plus carve or tofu. Via Bonita, the sandwich bar at the University, prepares 20 vegetarian plates each day. These do not exclude dairy products. Salads are made to order thus people can leave out any animal products. There are enough grains such as lupin an andean grain that ranges from 32% to 52% of protein (15).
Marcus can accommodate any requests and even work with special products to prepare plates that are not necessarily included in the menu. Overall an estimated 5% of meals are made to satisfy vegetarian or vegan costumers. Most of them are American students who come in the exchange program.

b. Trans-fat Oils

The University uses 100% vegetable oil "El Cocinero," which is fabricated with palm oleins and pure soy extract in Ecuador. This oil is designed to resist high temperatures and has no cholesterol. This oil is considered to have no trans fats, which has a strict discarding policy to provide students high quality food. A company, which is environmentally certified, provides a service to the University and properly discards the oil.

One of the only possible products that may have trans fats are pre-fabricated potatoes chips and other snacks. An average of 624 bags of snacks were sold each month. That comes down to approximately 7 bags per day.

c. Pre-Consumer / Post Consumer Food Waste Composting

The University has a registered environmental manager that takes both raw and cooked waste. This organic material is not composted but it is fed to pigs.

d. Food Donation

Every day about 20 portions of the buffet left-over's go to feed University night workers. Additionally every week about 80 portions from the Buffet in Vía Bonita are not consumed (14). These portions are properly packed and frozen and await pick up from Fundación Reina de Quito, which serves underprivileged children. When the non-profit organization comes, the University cooks fresh rice due to the fact that rice cannot be frozen.

The other product which has left over's is bread. Internal policy for the bakery asks for continuous production of bread. The following is done:

- 1/3 of whole wheat and sweet breads are given to "Fundación Ocaso Feliz"
- 1/3 is given to kitchen staff in the morning with coffee in order to ensure everyone has had breakfast. This provides for around 100 people each day.
- 1/3 is made into breadcrumbs for cooking.

e. Recycled Content Napkins

Napkins are bought from "Representaciones Continental". The content is 75% recycled paper.

5.2 Boundaries and Scope

The 2012 base report has limited the inclusion of food and dining purchases to the activities inside the restaurants of the University. The University also has a catering service called Epikus. The catering for events for the University are included but not for private events outside.

CPU food service manages 6 different restaurants. The University currently does not offer a housing option thus no food is prepared to serve this activity. Food is pre cut and portioned and left for *"mis –en-plas"* until final preparation is needed.

The rest of the purchased

- Vía Bonita offers a lunch buffet that serves an average of 350 meals (this includes university staff). They prepare 200 meals to start and progressively add 30 to 40 depending on demand. Here people can find one choice of soup (broth or cream) carb, protein, salad, a side of bread, a small piece of dessert and fruit juice. It is not self-service and you can only serve yourself once. Attention hours: 12h00 to 14h30. Monday through Friday.
- The Cafeteria offers a faster food ambiance for students/faculty who are running on a tight schedule. They serve approximately 700 people on a daily basis. On average this includes 100 grilled hamburgers (35% grease content), 80 hot sandwiches, 40 cold sandwiches, 50 wraps and 90 oven cooked "empanadas." Taco salads are also a popular choice with 60 sold on average each day. As for other fried food, french fries (large 15 orders per day and small 33) and nachos (4 per day) are commonly popular. These are made to individual orders except for peak lunch hours where CPU food services works on past demand for production. Other common products found in the cafeteria are small cookies and bottled products such as yogurt and juice. Attention hours: 7h30 to 20h00, Monday through Friday.
- Ambrosia Bakery, here you can find a variety of breads, cookies, cakes, fine pastries and fine chocolate. A total amount of 500 people come through these doors every day. Attention hours: 7h30 to 20h00, Monday through Sunday.
- The Pyramid serves costume made salads, crepes and bagels. All made to order. On average serves 200, 120 and 60 in the above order. Other products include yogurt smoothies and coffee. Attention hours: 8h00 to 16h00, Monday through Friday.
- Sushino a small sushi restaurant serves 40 to 50 people each day. Attention hours: 8h00 to 15h00, Monday through Friday.
- Wok and Roll serves 250 people per day. People can choose from vegetable stir-fry, add rice or noodles, chicken, beef or tofu. Attention hours: 12h00 to 16h00, Monday through Friday.
- The Trattoria serves italian dishes and match 6 types of pasta with 3 types of sauces. One of these sauces, Bolognese, has minced meat. The Trattoria also serves breakfast with a total of 200 people purchasing food thought the day. Attention hours: 7h30 to 16h00, Monday through Friday.
- Marcus Auspicius is the fine dining option in campus. It serves 35 lunches mid day and 20 dinners each night. Attention hours: 12h00 to 16h00 and 19h00 to 22h00. Monday through Sunday.

5.3 Assumptions

Ecuador is a small Andean country with a total land area of 109 415 sq. miles (283 520 km). The total distance from the upper northern limit to the furthest southern corner is a total of 479 miles (772 km). Quito is located 1/3 down the way, making it very strategic ground for purchasing. Table 8 presents distances into context; most of them are cities where agricultural fields are located.

Table 8. Food transportation in kilometers and miles (16).

Distance from Quito to:	km	Miles
Machachi	38.8	23
Ambato	132	82
Ibarra	123	76
Santo Domingo de los Colorados	150	93
Quinindé	214	132
Guayaquil	421	261
Salcedo	104	64
Esmeraldas	309	192

Providers

The University purchases 90% from national providers (a good amount comes from produce open markets) the other 10% are imported products such as Chilean Salmon, cured meat from Spain, and mussels from Japan. Organics play only a 10% of the total check. From this, 80% of food travels on average less than 250 miles. Products such as cocoa, coffee and bananas come from 400 miles from the south of Ecuador making that 5% further than 250 miles.

A total of $ 224 462 dollars were spent on food for 2012. The accounting for food purchasing is calculated on basis of an academic year and not calendar.

Calculations were based on data provided for purchases done from July 1st to December 31st of 2012. Based on interviews with the Purchasing Department, the assumption is that the University spends on average the same amount of money for each semester. The data provided, gathered for 6 months, was multiplied by 2 in order to calculate annual costs.

The assumptions are that the information regarding the demand for food, restaurants and operations between 2012 and 2013 are extremely similar up to October 2013 when interviews were carried out.

5.4 Methodology

For data acquisition, the primary source of information was personal interviews conducted in September 2013. Both the head chef and purchasing manager made information available regarding purchasing costs for 2012.

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Phone Ext. 1169
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Related files:
Ventas cafetería papas y nachos 2012.xlsx
Compras CPU Food service Julio 2012-Junio2013.xlsx
Where: Linea Base> Documentos Varios>Datos Food Service>ComprasDatos Foodservice Julio2012-Junio2013.xlsx

5.5 Stars Related

OP Credit 6 up to 6 available
80% traveled 250 miles or less
80*224,462 = 179,569
10% organic *224,462 =22,446
179,569+22,446= 202,015

Expenditure in food that is sustainable
202,015/224,462 = 0.89
89%

0.12 × 89 = **10.68 (Max total 6)**

OP Credit Tier 2
Trayless Dining **Not applicable**
Vegan Dining **0.25**
Trans-fat Oils **0.25**
Pre-Consumer / Post Consumer Food Waste Composting **0.50**
Food Donation **0.25**
Recycled Content Napkins **0.25**

Total 8.70

Not pursuing:
Guidelines for Franchisees 0.25
Reusable Container Discounts 0.25
Reusable To-Go Containers 0.25

5.6 Results and Conclusions

All restaurants have staff that serves specific weighted portions except for Via Bonita and the Cafeteria on peak hours all food is made to order. Most food including sauces

and baking goods, are cooked from scratch. Examples of food not made from scratch are canned foods and pasta for the Trattoria. High fructose corn syrup is rarely used to make cake or caramel decorations.

The University recognizes that the problem with Ecuadorian food is not trans fats but the amount of carbohydrates consumed. Rice, potatoes and plantains are the basis of the food pyramid and are expected to be part of the food option. Rice is especially an Ecuadorian favorite, this means that even if other carbohydrates are present such as potatoes, people will still ask for a rice portion.

Possible strategies would be to have a vegetarian day or more vegetarian options that are equally attractive. For example a veggie burger made out of quinoa. This would raise awareness of the fact that humans do not need meat every day of the week and that it is more important quality over quantity.

6. Energy

OP Credit 7 Building Energy Consumption
OP Credit 8 Clean and Renewable Energy
OP Tier Two Energy Tier Two Credits

6.1 Background

This is the first report for energy consumption and management and its association to carbon footprint at USFQ main campus in Cumbayá. Currently, there is no building metering systems installed for energy consumption in the University. Moreover, consumption reduction policies have not yet been established. This document represents the baseline analysis report for energy consumption and the CO_2 emissions generated for the use of electricity. All the data and calculations correspond to the baseline year 2012.

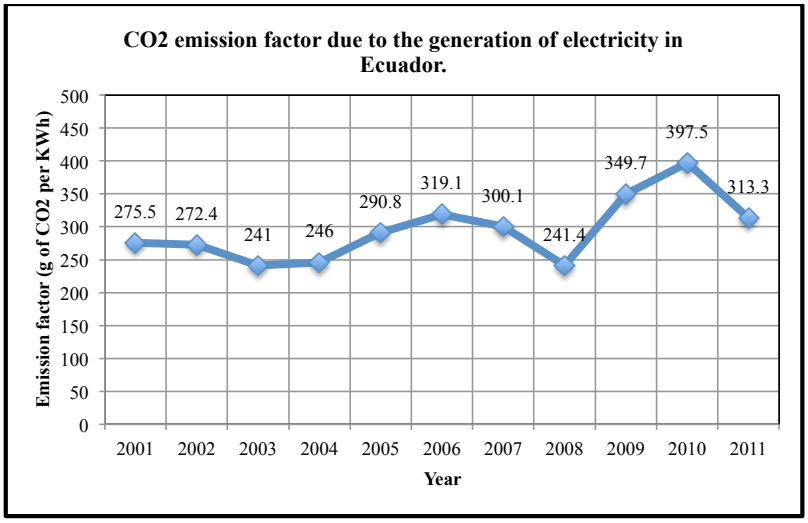
Purchased electricity

Electricity is very important for the economic and social development of society. In 2011, in Ecuador 20 544.14 GWh of electricity were generated and 1294.59 GWh of electricity were imported (17). The Ecuadorian power grid in 2011 was divided into 52.3 and 41.8 % of renewable and non-renewable sources, respectively (17). There are currently no options to purchase Renewable Energy Certificates or Green E-Energy from the Ecuadorian government. On the upside, the Ecuadorian government wants to transfer the energy grid to have an increase in renewable energy that does not depend on petroleum. At the moment, both public and private investments are focused on hydropower plants and solar farms, which will provide energy in the upcoming years (18), for further information about the energy matrix see Exhibit 1. The University is 100% dependent on the Ecuadorian energy grid and there are currently no energy consumption or reduction policies in place.

Carbon dioxide (CO_2) emissions from the electricity sector constitute the majority of greenhouse gas emissions worldwide (11). In fact, according to the International Energy Agency, 41% of the total global CO_2 emissions corresponded to the generation of

electricity and heat for the year of 2010 (19). In 2013, Parra published a study on the estimation of the CO_2 emission factor due to the generation of electricity in Ecuador during 2001 – 2011 (20). The CO_2 emission factor for Ecuador was calculated based on the total fuel consumption for the net energy production, the energy production from renewable and non-renewable materials and the imported energy (20). The CO_2 emission factors per unit of electricity available for consumption in Ecuador for the period 2001-2011 are presented in

Graphic 2 (20). The values vary between 214.0 to 397.5 g CO_2 kWh^{-1}, with a most recent value of 313.3 g CO_2 kWh^{-1} for 2011 (20).



Graphic 2. CO_2 emission factors for the generation of electricity in Ecuador from 2001 to 2011 (20).

In this study, the CO_2 emissions for the use of electricity in USFQ Cumbayá campus were calculated from the energy consumption data provided by the local public vendor Empresa Eléctrica Quito S.A. A CO_2 emission factor of 313.3 g CO_2 kWh^{-1} previously reported by Parra (20) was employed in order to calculate the University emissions. This emission factor has a national scope and it was calculated by Parra from the data provided by the National Council of Electricity (Consejo Nacional de Electricidad, CONELEC), this information corresponds to the year 2011 and is the most updated factor at this time.

Energy produced in Campus.

Diesel

The University has a power plant that is used in case of power shortages in the main campus in Cumbayá. The power plant depends on two power generators which use

diesel 2. The information about the power generators is presented in Table 9. These generators are powered for an average of 1 hour every week to keep them working

Table 9. Power generators description and diesel consumption

Characteristics	Power Generator 1	Power Generator 2
Brand	KOHLER	JOHN DEER
Model	500R0 ZD71	-
Power	500 kW	32 kW
Average Consumption (gallons / hour)	27,7	23
Annual Consumption	1333	1100

Gas

In USFQ main campus in Cumbayá, liquid petroleum gas (LPG) is used in the kitchen in stoves and ovens, in water heaters and in laboratories. There are two main commercial presentations of LPG in Ecuador. In the first place, the small containers are subsidized by the government and are destined for home usage. Secondly, industrial size containers which are not designed for industrial usage and are not subsidized. In the University, the small LPG containers are mainly used in the kitchens. However, it is important to notice that the University does not pay the subsidized prize of 4 dollars per container but instead the full price of 22.50 dollars per container. The industrial LPG containers are used in gastronomy laboratories and restaurants.

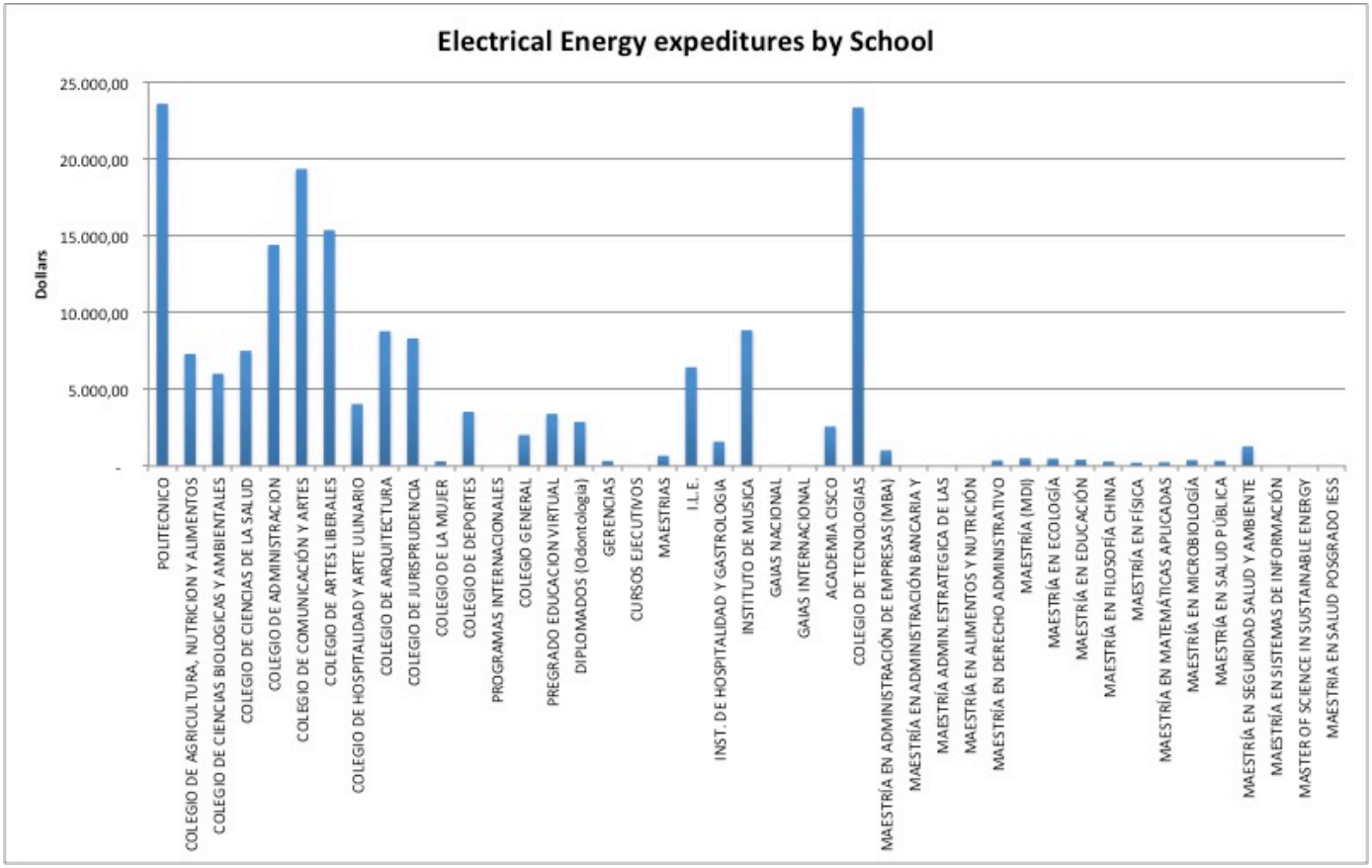
Energy Tier Two Credits

Energy Management System

Due to the University's built environment and the climate where the campus is located, there is no need for air conditioning throughout USFQ Cumbayá campus (as explained on the built environment report), except in places where there is special equipment. For instance, the data center where permanent air conditioning is required to avoid damaging by excess heating of special computers, the high performance computing system (HPC). The air conditioning system brand is "Canatal". The usage of electricity for air conditioning is included in the total usage of electricity in the campus

There is in fact an Energy Management System for where the servers are located, which not only provides constant monitoring of temperature but exactly knows the amount of electricity used. This Management System has technology to be connected by phone devices with the technical crew that monitors the servers and can be reached remotely if needed. Due to possible power shortages the management system also has a backup generator that provides servers with energy for 15 to 20 minutes until electric generators at the University start up. Additionally a fire system is also in place. Uninterrupted servers are Powerware brand.

Currently, there is no individual metering for each building. The University's Financial Department has broken down energy consumption by amount of students each individual school has, and therefore attributed the use, for details see Graphic 3.



Graphic 3. Electrical energy expenditures by school, based on the invoices reported from the Financial Department.

6.2 Boundaries and Scope

Data collected for energy consumption only includes the main campus in Cumbayá; located on Diego de Robles and Vía Interoceánica. Please Reference Building's Report for further details.

Due to the various sources of energy used in USFQ Cumbayá campus both scope 1 and 2 were included to define energy. This includes purchased electricity, diesel 2 used to power electric generators and LPG.

6.3 Assumptions

The invoice for electricity consumed in May of 2012 has been misplaced in the Financial Department. Therefore, this value was calculated as an average number from data obtained for April and June of 2012.

The CO_2 emission factor due to the generation of a unit of electricity used in this report is 313.3 g CO_2 kWh^{-1} (20). This factor was converted adequately to tons of CO_2 per MMBtu giving a value of 0.101217 t CO_2 $MMBtu^{-1}$.

Other conversion factors for the calculation of CO_2 generated form diesel 2 and LPG are listed below:

- Gallons of diesel 2 consumed were converted to mass, assuming a diesel density of 3.198 kg gal^{-1} (20).
- The calorific power employed for CO_2 was 43 TJ Gg^{-1} (20).
- The CO_2 emission factor employed for diesel 2 was 74 100 kg CO_2 TJ^{-1} (20)
- The calorific power employed for LPG was 47.3 TJ Gg^{-1} (20).
- The CO_2 emission factor employed for LPG was 63 100 kg CO_2 TJ^{-1} (20)
- Units used for expressing results of each component correspond to international system of units (SI).

6.4 Methodology

In order to calculate the amount of CO_2 emissions produced for the year 2012, the values of electrical energy, diesel 2 and LPG were calculated adequately using each conversion factor described as follows:

- Energy consumption from the electric interconnected grid provided by the local public vendor Empresa Eléctrica Quito S.A (21). Data for energy consumption was consulted from monthly invoices (Table 10). Silvio León, USFQ Maintenance Manager, provided the information.

Table 10. Electrical energy consumption for the year 2012 in the USFQ Cumbayá campus

Month	Electrical Energy Consumed (MMBtu month^{-1})
January	638.45
February	695.20
March	723.56
April	810.10
May	777.79
June	745.47
July	681.14
August	665.37
September	668.05
October	782.24
November	795.31
December	775.79
Total	**8758.48**

The CO_2 emissions were calculated from the energy data provided by the local public vendor using a CO_2 emission factor of 0.101217 tons CO_2 MMBtu^{-1} previously described (20).

- The data for the usage of diesel 2 or LPG was obtained personally by researching each source. The primary source was Carlos Simba, USFQ's Operations Manager, who provided the invoices for purchasing diesel 2 and LPG from the local distributors (Table 11). Other sources of information included personal from the Food Service Department and some laboratories within campus.

Table 11. Diesel 2 and LPG consumed during the year 2012

Source of Energy	Annual Consumption (kg)
Diesel 2	17 997.23
LP Gas	31 158.20

The CO_2 emissions generated from diesel 2 and LPG were calculated based on the emission factors reported by Parra (20), as follows:

- Diesel conversion factor, equal to 0.003512 t of CO_2 per kg of diesel 2. This conversion factor was estimated from the calorific power of 43 TJ Gg^{-1} for diesel 2 and the CO_2 emission factor of 74 100 kg CO_2 TJ^{-1} (20), this value was converted adequately to t of CO_2 per kg of diesel 2.

- LPG conversion factor, equal to 0.003289 t of CO_2 per kg LPG. This conversion factor was estimated from the calorific power of 47.3 TJ Gg^{-1} for LP Gas and the CO_2 emission factor of 63 100 kg CO_2 TJ^{-1} (20), this value was converted adequately to t of CO_2 per kg of diesel 2.

The amount of CO_2 emissions generated for the year 2012 were calculated employing the values of electrical energy, diesel 2 and LPG were calculated adequately using each conversion factor described previously.

The expenditures for each component were obtained from different sources as follows:

Electrical energy expenditures were obtained from the electricity invoices without taking into account the garbage recollection, firefighters and public lighting services fees.

Gas expenditures were calculated from the invoices reported by the Operations Department and the Food Processing Plant.

Diesel expenditures were calculated from the estimation of diesel consumption by the two power generators, on a basis of a workday of one hour for each week (48 hours for the whole year for each generator), an hour consumption of 27.7 and 23.5 gallons, respectively for each generator. Additionally the expenditures reported by the Food Processing Plant and laboratories of Gastronomy (kitchens) for the stoves were accounted in this report.

Contact Details

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Related Content:

- DropBox>Linea base>Tesis y Publicaciones> Tesis Energía Electrica Renee Parra 2013 (Parra, R., 2013. Factor de emisión debido a la generación de electricidad en el Ecuador durante el periodo 2001–2011. Avances en Ciencias e Ingenierías, Vol. 5, No. 1, Pags. C39-C42.)
- DropBox>Linea base>Documentos Varios> Carbon Footprint>Consumo de energia Servicios Integrados 2012.xlsx
- DropBox>Linea base>Documentos Varios> Carbon Footprint>DATOS ENERGIA.xlsx

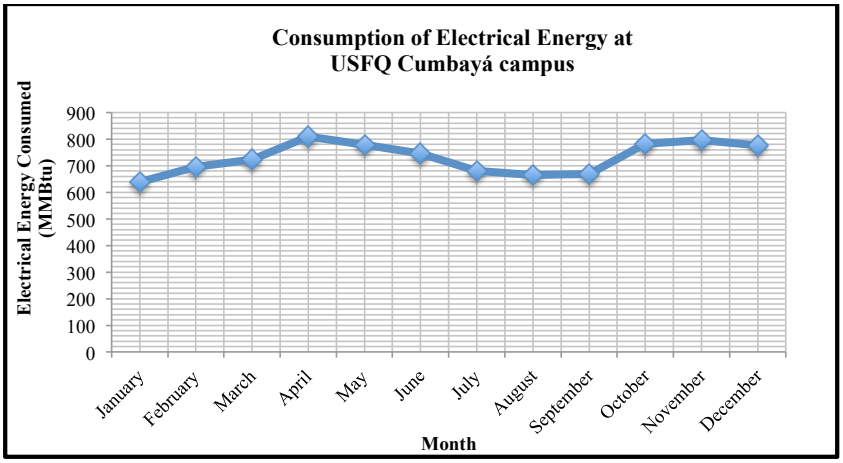
6.5 Stars

Not pursuing:
OP Credit 7 Building Energy Consumption
OP credit 8 Renewable Energy
Energy Tier Two Credits
Lighting Sensors
LED Lighting
Energy Metering

Not applicable:
Timers for Temperature Control
Vending Machine Sensors

6.6 Results and Conclusions

The total amount of electrical energy consumed from the interconnected grid was 8758.48 MMBtu in the year 2012 at USFQ Cumbayá campus. In general, the monthly consumption was pretty constant over the whole year with two peaks for the months of April and November (
Graphic 4).

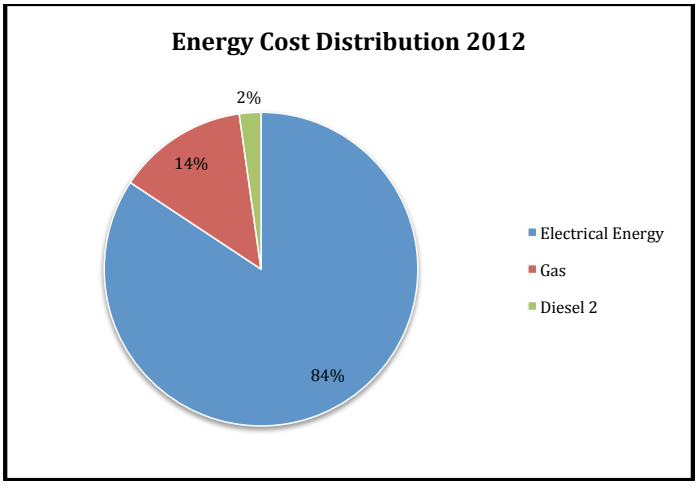


Graphic 4. Electrical energy consumption from the interconnected grid (public) for the year 2012 at USFQ Cumbayá campus.

The cost in dollars for each individual energy component is listed below:

- Electrical Energy: $ 166 273.43
- Diesel 2: $ 5176.36
- LPG: $ 31 320.71

Therefore, the total energy cost spent at USFQ Cumbayá campus for year 2012 was $232 646.30. A graphic distribution of each energy component is illustrated in Graphic 5.



Graphic 5. Energy cost expenditures by source of energy at USFQ Cumbayá campus

In order to calculate energy indicators the total energy consumption of 8758.48 MMBtu was divided by both building space (529 742.51 gross square feet) and students (5953 full-time students registered for 2012). These results are presented in Table 12.

Table 12. Detailed information for the energy consumed by square feet of building and student, respectively.

Index	Baseline year 2012
Energy Cost per student	$ 28 dollars
Kilowatt per student	431 kW h^{-1}
MMBtu per student	1.47 MMBtu
Energy used per square feet	0.0165 MMBtu per square feet.

Finally, the CO_2 footprint generated for 2012 was 1052.23 t of CO_2, detailed information is shown in Table 13.

Table 13. Detailed information of the CO_2 footprint generated for each source of pollution for 2012

Source of Pollution	t CO_2 generated (2012)
Electrical Energy	886.51
Diesel 2	63.21
LPG	102.51
Total	**1052.23**

7. Transportation

OP Credit 14 Campus Fleet
OP Credit 15 Students Commute Modal Split
OP Credit 16 Employee Commute Modal Split
OP Tier Two

7.1 Background

This document describes the preferable modes of commuting for students, faculty and cleaning, maintenance and dining staff to Universidad San Francisco de Quito (USFQ) and the CO_2 emissions generated by ground transportation and air travel.

It is important to establish that students, faculty and cleaning, maintenance and dining crew commute mainly from Quito, Tumbaco and Cumbayá. Cumbayá is located at 2200 meters above sea level and its topography is particular because the town sits on a valley where there is limited connectivity with the rest of the city (22).An important problem from the commuting system is that most of USFQ's population comes from Quito (2800 meters above sea level) and travels for at least 30 minutes or more on a daily basis. The main reason for this is that there are few highways and in addition the access to public transportation to the USFQ is limited (22)

The most important highways that join Quito and Cumbayá are Via Interoceánica and Via de Los Conquistadores. Due to their massive occupancy the travel time from and to Quito is variable between 20 minutes to 1 hour (22). Furthermore, Cumbayá is served only by the following bus cooperatives: Trans Floresta, Ecovía and Sotranor, and they are not enough to comply with the user demand (22). These factors contribute to 44% of students commuting on their own to USFQ.

The calculation of CO_2 emissions generated by commuting of the student population at Universidad San Francisco de Quito (USFQ) during the second semester of the academic year 2012-2013 was conducted by María del Carmen Cazorla, PhD, professor at the Environmental Engineering Department at USFQ, Karen Napciph and Laura Rivadeneira students from Environmental Engineering Department at USFQ (23). In the case of the CO_2 emissions generated by commuting of the faculty and cleaning, maintenance and dining crew at USFQ during the second semester of the academic year 2013-2014, the

calculations were also conducted by Maria del Carmen Cazorla and the same group of students described above with the participation of another Environmental Engineering student, Julieta Juncosa (24). All calculations were estimated by two methods. The first method employed was an application of the principle of conservation of mass while the second was a standard methodology using emission factors. The two methods are in agreement within 98 and 99% for calculations of CO_2 emissions from commuting of students and faculty and services crews (cleaning, maintenance and dining), respectively. In this report, the calculations of CO_2 emissions using emission factors are reported. These calculations also include flight emissions due to student and faculty travel. For detailed information of the complete study please refer to the two publications by Cazorla and coworkers (23) (24).

The University has its own fleet. A total of 13 vehicles were used solely for University purposes in the year 2012, see Table 14 for information on type of vehicle. A total of 3083 gallons of fuel where used to power these vehicles and none of them used alternative fuels. The CO_2 emissions generated due to the use of these vehicles were calculated using emission factors for Ecuador proposed by Parra (20).

Table 14. Type of vehicles owned by USFQ

Type of Vehicle	Quantity
Cars	4
Bus	2
Small bus	1
Pick-up trucks	6

7.2 Boundaries and Scope

The present report includes the estimation of CO_2 emissions generated for commuting of students, faculty and services crew (cleaning, maintenance and dining) from their homes to USFQ main campus in Cumbayá and back to their homes.

This report also includes the estimation of CO_2 emissions generated by air travel by international students arriving at USFQ based on one-way trips and national and international students at USFQ going to the University's research stations the Tiputini Biodiversity Station (TBS) in Amazonia and the Galápagos Institute for the Arts and Sciences (GAIAS) in San Cristóbal, Galápagos based on round trips. In the case of faculty, CO_2 emissions generated by air travel (national and international) for University purposes were calculated based on round trips.

The CO_2 emissions generated by campus fleet were directly related to the amount of fuel reported and believed to be used for University purposes.

7.3 Assumptions

For calculation purposes in commuting for students, a population of 5000 students was considered to calculate CO_2 emissions. This assumption was made before calculating the total student population for the academic year 2012-2013 which was 5953 full-time students.

In the case of faculty and services crews (cleaning, maintenance and dining), CO_2 emissions were calculated for the population interviewed which in general terms represents the total full-time faculty and the total cleaning, maintenance and dining crews.

Regarding air travel, the CO_2 emissions were calculated based on two main assumptions. First for international students arriving at USFQ, one-way trips were assumed and second as for international and USFQ students traveling to TBS and GAIAS, assumptions were made on a round trip basis and traveling by air from Quito to Coca or Galapagos, respectively. In the case of national and international air travel of faculty for work-related trips, emissions were calculated based on round trips.

Although, the CO_2 emissions for faculty and services crews from ground and air transportations were calculated for the academic year of 2013-2014, it is assumed that the faculty and cleaning, maintenance and dining crews behaved pretty similar throughout the years; therefore, the CO_2 emissions calculated for the academic year 2013-2014 will be the same for the academic year 2012-2013.

For fuel used to power the University fleet, the assumption was that all vehicles used fuel. The Finance Department could not provide information regarding the amount of diesel used for transportation vs. diesel used to power vehicles, therefore, it was assumed that diesel was only used to power the electric plant at USFQ Cumbayá campus and it was accounted for in the energy report.

For CO_2 emissions, the calorific values for gasoline and diesel 2 employed for each transport type were 44.3 and 43 TJ Gg^{-1}, respectively (20).

7.4 Methodology

Students, Faculty and Service Crews Commuting

500 students were surveyed in order to obtain data for commuting behavior for students from their homes to USFQ during the second semester of the academic year 2012-2013. The effective sample was 8.2% of the total student population and the survey was done in the month of May 2013. For faculty and services crews, 491 surveys were conducted during the second semester of the academic year 2013-2014.

The surveys were employed to collect information of the number of students, faculty and services crews traveling by public bus, owned vehicle, bicycle or foot. Other questions linked to students and faculty driving their own cars were the number of passengers that shared the vehicle, and brand, model and year of the car. The surveys also asked for details regarding the area of the city where students, faculty and services crews live, the distance they travel, how long it takes them to commute and the number of days they travel to USFQ.
The calculations of CO_2 emissions generated from transportation of students, faculty and services crews were estimated by the standard methodology of emission inventory for greenhouse gases (GHG) as described by Cazorla and coworkers (23) (24). This method of calculation is based on the calorific value of gasoline and diesel which are 44.3 and 43 TJ Gg^{-1}, respectively (20). With these fuel properties, the mass emission factor of CO_2 per unit of energy produced by gasoline and diesel was calculated to be 69 300 and 74 00 kg TJ^{-1}, respectively (23). The Department of Finance provided information regarding the amount of gasoline and diesel consumed for campus fleet.

In the case of students, faculty and services crews who used public transportation, the total fuel consumption was divided by an average number of 40 passengers per bus. The category "Other" refers to people who travel by walking or bicycle. There was only one person who registered a motorcycle as transportation and this was not considered.

The total number of students using each mode of transportation and the CO_2 emissions generated from each item was calculated using an extrapolation factor comparing the sample with the total population.

Air Travel

The amount of CO_2 emissions generated by exchange students arriving from abroad to USFQ was quantified by assuming one-way trips. The emissions from trips associated with academic activities of exchange and USFQ students going to the TBS and GAIAS facilities were estimated using a round trip model.

Air travel information for students arriving from abroad was obtained from the Office of International Programs. Furthermore, the data for the calculations corresponding to the trips to TBS and GAIAS was provided by GAIAS staff. In the case of faculty, travel information was provided by the Finance Department. The distance traveled by foreign students and faculty was calculated assuming direct routes and a standard airplane Boing 737 employ in commercial flights. The tons of CO_2 per flight were directly obtained with the International Civil Aviation Organization travel emissions calculator (23).

Campus fleet

The CO_2 emissions estimated from campus fleet were calculated by the standard methodology of emission inventory for GHG's described previously by Cazorla and coworkers (23).

7.5 Stars

Total using alternative ways: 100-37: 63

OP Credit 15 Students Commute Modal Split
0.4*0.63 = **2.52**

OP Credit 16 Employee Commute Modal Split
0.03*

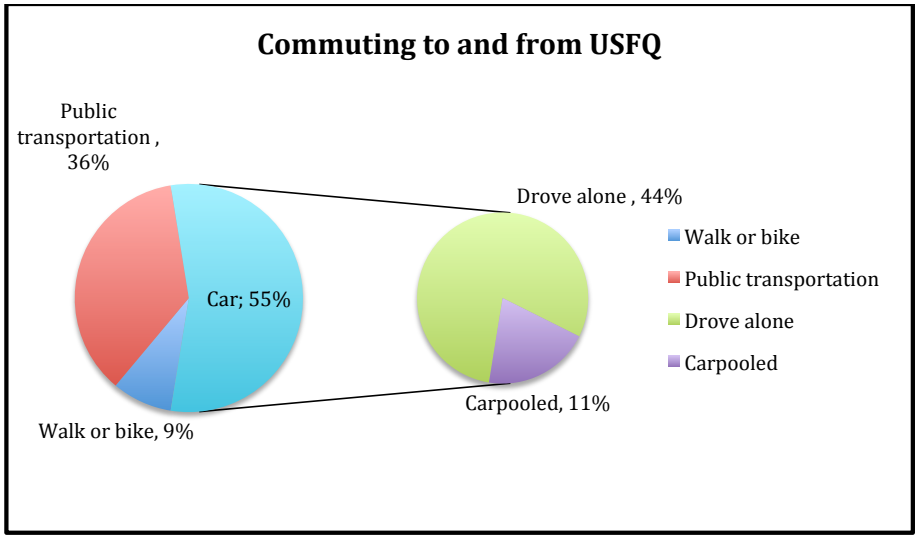
Not Pursuing:
OP Credit 14 Campus Fleet
OP Tier Two

7.6 Results and Conclusions

Students, Faculty and Services Crews Commuting

The percentages of student population using different modes of transportation for 2013 are described in Graphic 6. 49.5% of students come to USFQ by car (XX% drove alone and XX% carpooled), 40.9% commuted by bus and 9.6% walk or use bicycles. In the case of faculty and services crews (cleaning, maintenance and dining), 73.2% of population commuted to USFQ by car, 19.1% come by bus and 7.7% walk or uses bicycles.

Valeria Ochoa 5/26/14 8:29 PM
Comment [1]: Corregir esta informacion



Graphic 6. Students commuting distribution to and from University.

Valeria Ochoa 5/26/14 8:29 PM
Comment [2]: Corregir este grafico

The results for the CO_2 emissions calculated for commuting of the whole student population by mode of transportation are shown on Table 15.

Table 15. Total t of CO_2 generated by student population when commuting from their homes to the USFQ and back per semester (23).

Transportation mode	Student Population	t CO_2 per Semester
By Car	2475	1217.9
Public Buss	2045	107.8
Other	480	0.0
Total	**5000**	**1325.7**

Based on these results, it can be estimated that the CO_2 emissions generated due to student commuting in the academic year 2012-2013 were 2651.4 t CO_2. These calculations are based on two academic semesters of 18 weeks each one.

Table 16 presents the CO_2 emissions calculated for commuting of the faculty and services crews interviewed.

Table 16. Total t of CO_2 generated by faculty and services crews' population when commuting from their homes to the USFQ and back per semester (24).

Transportation mode	Faculty and Service Crews Population	t CO_2 per Semester
By Car	359	159.1
Public Buss	94	3.5
Other	38	0
Total	**491**	**162.6**

The CO_2 emissions generated due to faculty and services crews (cleaning, maintenance and dining) commuting in the academic year 2013-2014 were 325.2 t CO_2. 98% of CO_2 emissions correspond to faculty commuting by car.

Air travel

The amount of CO_2 emissions generated by the journeys of exchange students arriving from abroad to USFQ and by the trips of exchange and USFQ students to TBS and GAIAS research facilities resulted in 338.94 t CO_2 for the academic year 2012-2013. In the case of faculty, the amount of CO_2 emissions generated by national and international trips for University purposes was calculated to be 246.83 t CO_2 for the academic year 2013-2014.

Finally, it is important to indicate that the CO_2 emissions for faculty and service crews from ground and air travel were calculated for the academic year of 2013-2014 but considering that these populations are stable, it is assumed that the amount of CO_2 generated for the academic year 2012-2013 was pretty similar to that obtained for 2013-2014.

Campus Fleet

The amount of fuel to power the cars used for campus fleet purposes and the quantity of CO_2 emissions generated from its combustion are shown in Table 17. The total amount of CO_2 generated from campus fleet in 2012 was estimated to be 69.4 t CO_2.

Table 17. Consumption of fuel for campus fleet purposes and CO_2 generated from the combustion of each fuel

Fuel Type	Fuel Consumed (gal)	t CO_2 generated
Diesel 2	4208	42,9
Gasoline	3083	26.5

The CO_2 emissions generated for the academic year 2012-2013 extrapolated for the total student population due to transportation at USFQ Cumbayá campus are presented in Table 18.

Table 18. Total CO_2 emissions due to transportation at USFQ Cumbayá campus for the year academic year 2012-2013

Component	t CO_2 generated	
	Students	Faculty and services crews
Car	2435.8	318.2
Bus	215.6	7.0
Airplane	339	246.8
Campus fleet	69.4	0
Sub total	**3059.8**	**572**
Total	**3631.8**	

In conclusion, the total amount of CO_2 emissions generated due to student, faculty and services crews commuting, air travel from international students, faculty and trips of international and USFQ students to Tiputini Biodiversity Station (TBS) in Amazonia and Galapagos Institute for the Arts and Science (GAIAS) in San Cristóbal, Galápagos, and transportation by campus flee was estimated in a total of 3631.8 t CO_2 for the academic year of 2012-2013. It is important to notice that 73% of the CO_2 emissions correspond to students commuting to USFQ Cumbayá campus and back home while for faculty and services crews this value corresponds to 9%. Air travel contributes with 16.3% of CO_2 emissions and only 1.9% of the CO_2 emissions are due to transportation of campus flee. As expected, commuting of regular students is the most important contributor of the CO_2 emissions generated for transportation.

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Tracking Information

Related files:

- Drop box >Linea Base>Datos Varios> Carbon Footprint> Consumo de Recursos 2012.xls>viñeta Alumni Interca Transporte Avion y viñeta Viajes Galapagos y Tiputini
- Drop box >Linea Base>Datos Varios> Carbon Footprint> EmisionesCO2 Vfinal
- Drop box >Linea Base>Datos Varios> Carbon Footprint> Calculadora de Emisiones de CO2 para combustibles.xlsx
- Drop box >Linea Base>Datos Varios> Carbon Footprint> Plan desarrollo y ordenamiento de Cumbayá.pdf

8. Waste

OP Credit 17 Waste Reduction
OP Credit 18 Waste Diversion
OP Credit 19 Construction and Demolition Diversion
OP Credit 20 Electronic Waste Recycling Program
OP Credit 21 Hazardous Waste Management
OP Tier Two Waste Tier Credits

8.1 Background

This section describes the amount of waste generated at Universidad San Francisco de Quito (USFQ) at the main campus in Cumbayá. Currently the University does not hold a policy or process that provides the total amount of garbage generated in campus. The Department of Environmental Engineering is currently working to provide baseline information regarding garbage and establish potential strategies that could reduce the amount of total waste deposited in the local landfill. This document represents the baseline analysis report for waste generated and the theoretical CO_2 emissions calculated assuming that the decomposition of organic matter will take place in the landfill. All the data and calculations correspond to the academic year 2012-2013.

Waste Diversion

Garbage is an important aspect in an integrated solid waste management and directly impacts the operations and sustainable efforts of institutions. In this context, Empresa Pública Metropolitana de Gestión Integral de Residuos Sólidos (EMGIRS-EP) is in charge of garbage recollection service for the Metropolitan District of Quito (DMQ) which includes the waste from the University. This local public vendor not only manages

the waste recollection from the city but also the final disposal in the city's landfill, located 45 km from the city of Quito in a sector denominated "Inga Bajo".

Estefanía Narváez, Geovanna Ruiz and Dayana Vega, students from Environmental Engineering, under the supervision of Dr.-Ing. Ródny Peñafiel, professor and coordinator of the Environmental Engineering Department at USFQ, quantified and characterized all waste generated at USFQ Cumbayá campus (25). In this study, Narváez and coworkers selected randomly a week in the second semester of the academic year 2012-2013. The week selected was from March 5th to 9th of 2013. Each day, the waste in campus was weighted to estimate the total output that the University generates per day (25). Additionally, the composition of the waste was inspected on March 9th in order to obtain information on the type of waste (paper, plastics, organic and others) and categorize them properly (25).

The total amount of garbage generated from January to December of 2012 was estimated based on the data obtained in the quantification and characterization of the waste created at USFQ previously mentioned on March 2013. The estimated garbage generated at USFQ at the main campus in Cumbayá for the academic year 2012-2013 was employed to theoretically calculate the potential CO_2 and CH_4 emissions generated as result of the decomposition of the garbage in the landfill.

Electronic Waste Recycling Program

In 2012 an agreement with an Electronic Waste Management Program was signed by the University. This means that they will now recycle all electronic waste and it will no longer be sent to the local landfill. It is important to mention that the University extensively tries to reuse and refurbish as many components as it can. In fact, in 2012 no computers were handed over, for details see Exhibit 1.

Hazardous Waste Management

In 2013, laboratory procedure manuals for all laboratories at the USFQ Cumbayá campus were updated and an inventory of the hazardous waste generated by each USFQ laboratory was included for the first time. This manual contains general information such as locations of all laboratories, working area, contact information of the professor responsible for the lab, among others. Additionally, the mission and vision of each laboratory was included, the description of the activities carried out in each laboratory, all safety laboratory equipment, procedures, protocols, disposal of waste generated and an inventory of hazardous waste produced (both liquid and solid) were also in the laboratory procedures manual.

Currently, waste is being kept and accumulated in each laboratory because in order to dispose it through an external certified environmental manager, the University has to go through a certification process with the Ministry of Environment in Ecuador, Ministerio del Ambiente (MAE). Additionally a room that meets safety regulations is being

constructed to storage hazardous waste containers at USFQ in the main campus in Cumbayá.

Limiting Printing

There is currently no free printing in USFQ for students. Printing is carried out by a Xerox franchise and students have to pay 5 cents per copy. As for faculty and staff, there is currently no policy that limits printing, printing has to be reported per professor and Department.

Materials Online

USFQ has an online platform called Desire 2 Learn (D2L). This platform was fully implemented in 2011. Increased amounts of course catalogs, course schedules, and directories are now available online. PDFs and online readings are now most likely used as class materials.

8.2 Boundaries and Scope

The estimation of waste production only includes USFQ Cumbayá campus, located on Diego de Robles and Vía Interoceánica. Please Reference Building's Report for further information on the geographic delimitations and details.

The organic waste generated at the kitchen of the University is currently given to a farm to feed pigs. This study does not take into consideration organic waste because it is already being disposed.

Additionally, Quito's landfill has a passive system that collects and burns methane. Therefore, in this report, it is assumed that some greenhouse gases produced in the landfill like methane will be then converted to carbon dioxide before it reaches the atmosphere. There is no information regarding the performance and efficiency of the passive system in place in the city's landfill.

8.3 Assumptions

In order to calculate the total amount of garbage generated at USFQ Cumbayá campus, it is assumed that the total student and faculty populations have not dramatically changed in the course of one academic year. Additionally, the composition of garbage in the University in 2013 can be linked to the academic year 2012-2013 according with the population of students representative for each academic period

The theoretical calculations of CO_2 emissions generated were based on the amount of garbage produced obtained from a study conducted at USFQ in March of 2013 described previously (25)

8.4 Methodology

In campus waste

The waste stream was firstly calculated based on the waste generation for the academic year 2012-2013 estimated from data collected by Narváez *et al*. (25). The data illustrated in Table 19 shows the total amount of garbage and its composition in a week of March 2013 (25).

Table 19. Garbage composition and weight from various fractions of garbage, generated at the USFQ Cumbayá campus on daily base.

Composition	Weight (kg)	Weight (%)
Paper	118.5	18.01
Paperboard	7.00	1.06
Plastics	70.60	10.69
Garden Waste	98.20	14.92
Wood	4.67	0.71
Metal and Aluminum cans	5.29	0.80
Organic Waste	310.17	47.13
Glass	25.79	3.92
Others	18.11	2.75
Total	**658.10**	**100.00**

As the data used for the calculations was representative only for the second semester of the academic year of 2012-2013 which only includes 4 months (January to May 2013), it was necessary to adjust this value to the conditions of 2012. In order to conduct this adjustment a correction factor was estimated. The adjustment factor was estimated based on the student population of the second semester of the academic year 2012-2013, and it was obtained by normalizing the total academic population of each period with the population of the second semester of the academic year 2012-2013 as seen on Table 20.

Table 20. Adjustment factor for the garbage produced on the basis of the student's population.

Academic Period	Calendar Period	Student Population	Adjustment Factor
Second Semester 2011-2012	January - May, 2012	5712	0.942
Summer 2012	Jun - July, 2012	2260	0.373
First semester 2012-2013	August - December, 2012	6192	1.021
Second Semester 2012-2013	January - May, 2013	6064	1.000

The adjustment factor for each academic period was employed to calculate the total amount of garbage produced on a daily basis presented on Table 21.

Table 21. Calculated Waste production for academic calendar year 2012.

Composition	Jan-Mayo 2012 (kg day^{-1})	Jun-Jul 2012 (kg day^{-1})	Aug-Dec 2012 (kg day^{-1})
Paper	111.6	37.8	166.3
Paperboard	6.6	2.2	9.8
Plastics	66.3	22.4	98.7
Garden Waste	92.5	31.3	137.8
Wood	4.4	1.5	6.6
Metal and Cans	5.0	1.7	7.4
Organic Waste	292.2	98.9	435.3
Glass	24.3	8.2	36.2
Others	17.1	5.8	25.4
Total	**619.9**	**209.9**	**923.5**

The length of each academic period is expressed on Table 22. The final total amount estimated for garbage produced from January to December 2012 was calculated by using the adjusted data presented on Table 21 and the duration of the academic periods expressed on Table 22. The results of the garbage production are illustrated in Table 23.

Table 22. Duration of the academic activities on the year 2012.

Academic Period	Calendar Period	total # days
Second Semester 2011-2012	January - May, 2012	108
Summer 2012	Jun - July, 2012	43
First semester 2012-2013	August - December, 2012	109

Table 23. Garbage production in 2012.

Calendar Period	Total Amount (kg)
January - May, 2012	66 948
Jun - July, 2012	9027
August - December, 2012	100 661
Total	**176 636**

Finally the amount of waste produced in 2012 (176 636 kg) was used to estimate the possible emissions of CO_2 and CH_4 as result of waste degradation in the landfill. The amount of CO_2 and CH_4 was estimated by using the methodology proposed by

Tchobanoglous (26). For this, it was necessary to estimate the amount of recycled garbage depending on its composition as showed on Table 24, this estimation was done base on values recommended in the literature. The diverted waste was dismissed from the final calculations (annual total diverted waste).

Table 24. Estimation of Garbage diversion.

Composition	Garbage fraction diverted
Paper	10
Paperboard	50
Plastics	2
Garden Waste	15
Organic Waste	30

Valeria Ochoa 3/5/14 10:08 PM
Comment [3]: Rodny por favor revisar estas fracciones

A chemical formula for the garbage sent to the landfill was proposed based on the composition of generated garbage (Table 19), the fraction of garbage diverted (Table 24), the estimation of the total amount of garbage disposed to the landfill, and the typical moisture and elemental composition of the fractions (26). This chemical formula for garbage was employed to calculate the CO_2 and CH_4 emissions as result of the degradation of garbage sent to landfill (Equation 1).

Equation 1. Equation for the CO_2 and CH_4 emissions from the total garbage sent to the landfill.

$$C_aH_bO_cN + \left(\frac{4a-b-2c+3}{4}\right)H_2O \rightarrow \left(\frac{4a+b-2c-3}{8}\right)CH_4 + \left(\frac{4a-b+2c+3}{8}\right)CO_2 + NH_3$$

Equation 1 was used to estimate the amount of methane and carbon dioxide generated from the biodegradable fraction of waste until their stabilization in the landfill is reached.

Hazardous Waste

Currently, there are not policies or control over the hazardous waste production and management at the University in the main campus in Cumbayá. However, an inventory of the hazardous waste generated by each USFQ laboratory was updated in October of 2013. Personal interviews to each laboratory manager were conducted to gather information in this matter. Ruiz, Narvaez, and Vega, Environmental Engineering students, conducted this work leaded by Henry Naranjo who served as manager of the Laboratory of Environmental Engineering.

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Dayana Vega (dayana21992@hotmail.com)

Related Content:

- DropBox>Linea base>Documentos Varios> Carbon Footprint>Plan de Manejo RSU de la USFQ.xlsx
- DropBox>Linea base>Documentos Varios> Carbon Footprint>Descripcion de Metodologia RSU.xlsx
- DropBox>Linea base>Documentos Varios> Carbon Footprint>Calculos Generacion de Basura.xlsx
- DropBox>Linea base>Documentos Varios> reciclaje computadores>F.Prodes donacion 2013.página1
- DropBox>Linea base>Documentos Varios> Manejo de Residuos Peligrosos de la USFQ.xlsx

8.3 Stars

OP Credit 18 Waste Diversion possible points 3
(3* 33,426.8)/ 176, 636.2= **0.56**

OP Credit 20 Electronic Waste Recycling Program 1
Part 1: **0.5**

OP Tier Two Credit 39: Limiting Printing **0.25**
OP Tier Two Credit 40: Materials Online **0.25**

Total 1.56

Not Pursuing:

OP Credit 17 Waste Reduction
OP Credit 19 Construction and Demolition Diversion
OP Credit 21 Hazardous Waste Management
OP Tier Two Waste Tier Credits

- OP Tier Two Credit 38: Materials Exchange
- OP Tier Two Credit 41: Chemical Reuse Inventory

Not Applicable:
OP Tier Two Credit 42: Move-In Waste Reduction
OP Tier Two Credit 43: Move-Out Waste Reduction

8.4 Results and Conclusions

The total amount of waste generated for 2012 was 176 636 kg and the waste sent to the landfill was estimated to be 143 209.2 kg. For 2012 the production of garbage per student was 0.12 kg per day and 28.80 kg per year.

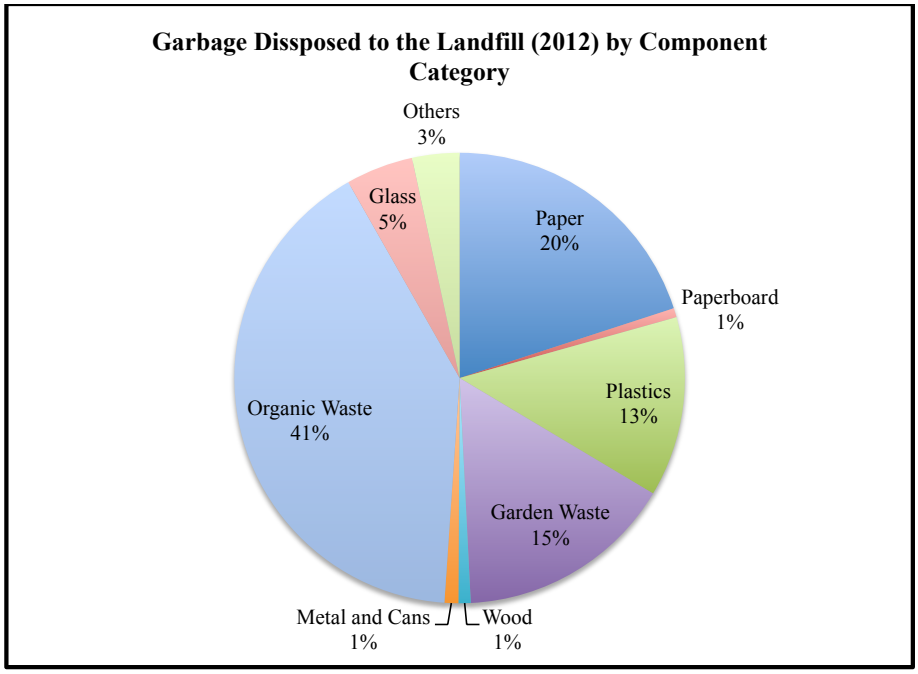
Waste diverted for 2012 was estimated 33 427.0 kg, for further details see Table 25.

Table 25. Details about diversion of garbage in the year 2012.

Composition	Generated in 2012 (kg)	Diverted Fraction (%)	Diverted Garbage (kg)
Paper	31 80633	10.0	3180.6
Paperboard	1878.9	50.0	939.4
Plastics	18 885.1	2.0	377.7
Garden Waste	26 357.6	15.0	3953.6
Wood	1253.5	0,0	0
Metal and Cans	1419.9	0,0	0
Organic Waste	83 251.9	30.0	24 975.6
Glass	6922.2	0,0	0
Others	4860.9	0,0	0
Total	**176 636.2**	107,0	33 427.0

Valeria Ochoa PhD 5/26/14 9:36 AM
Comment [4]: Rodny revisa esta columna por favor

The garbage diversion has an important role in sustainability because some components from the garbage produced can be recycled and used in a more adequate way. As seen on Graphic 7, some waste components as organic waste, paper, garden waste and plastics could be diverted more efficiently to reduce the total amount of garbage produced at the University that it is sent to the landfill.

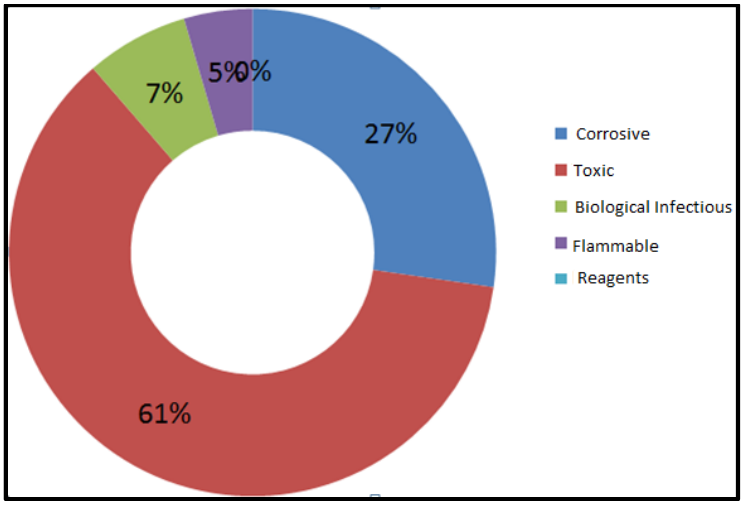


Graphic 7. Garbage composition, based on the total amount disposed to the landfill.

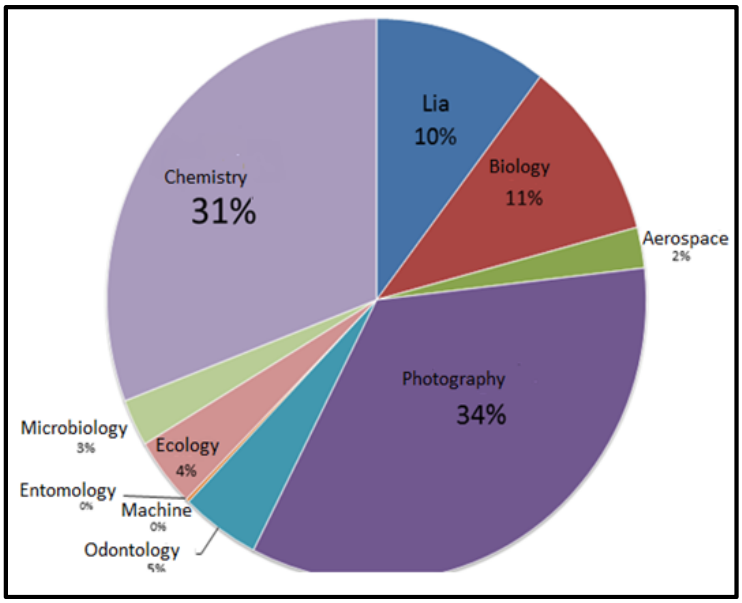
The total amount of CO_2 and CH_4 produced in 2012 from waste generated was estimated to be 36.17 t and 14.16 t, respectively.

As for Hazardous Waste, the graphs below show waste by type and by Department see Graphic 8,
Graphic 9

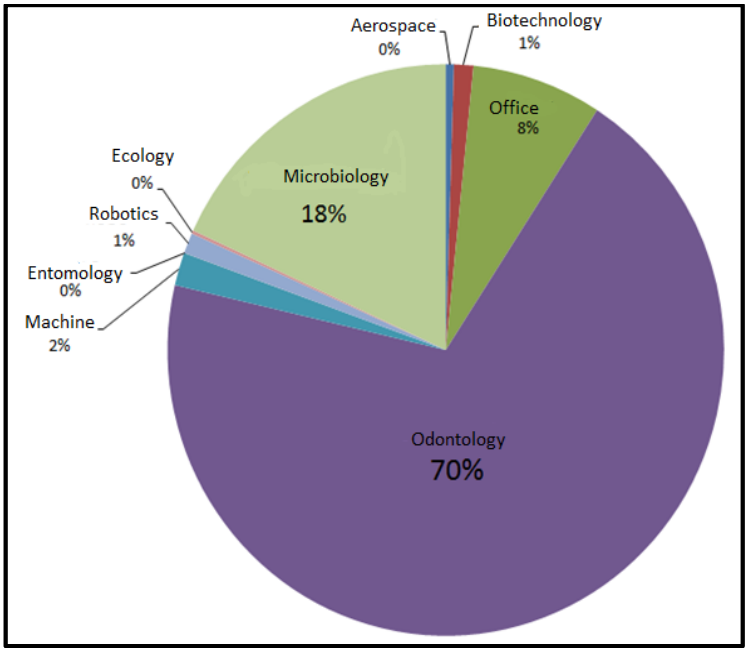
Graphic 10.



Graphic 8. Different types of waste produced at University.



Graphic 9. Hazardous liquid waste by department.

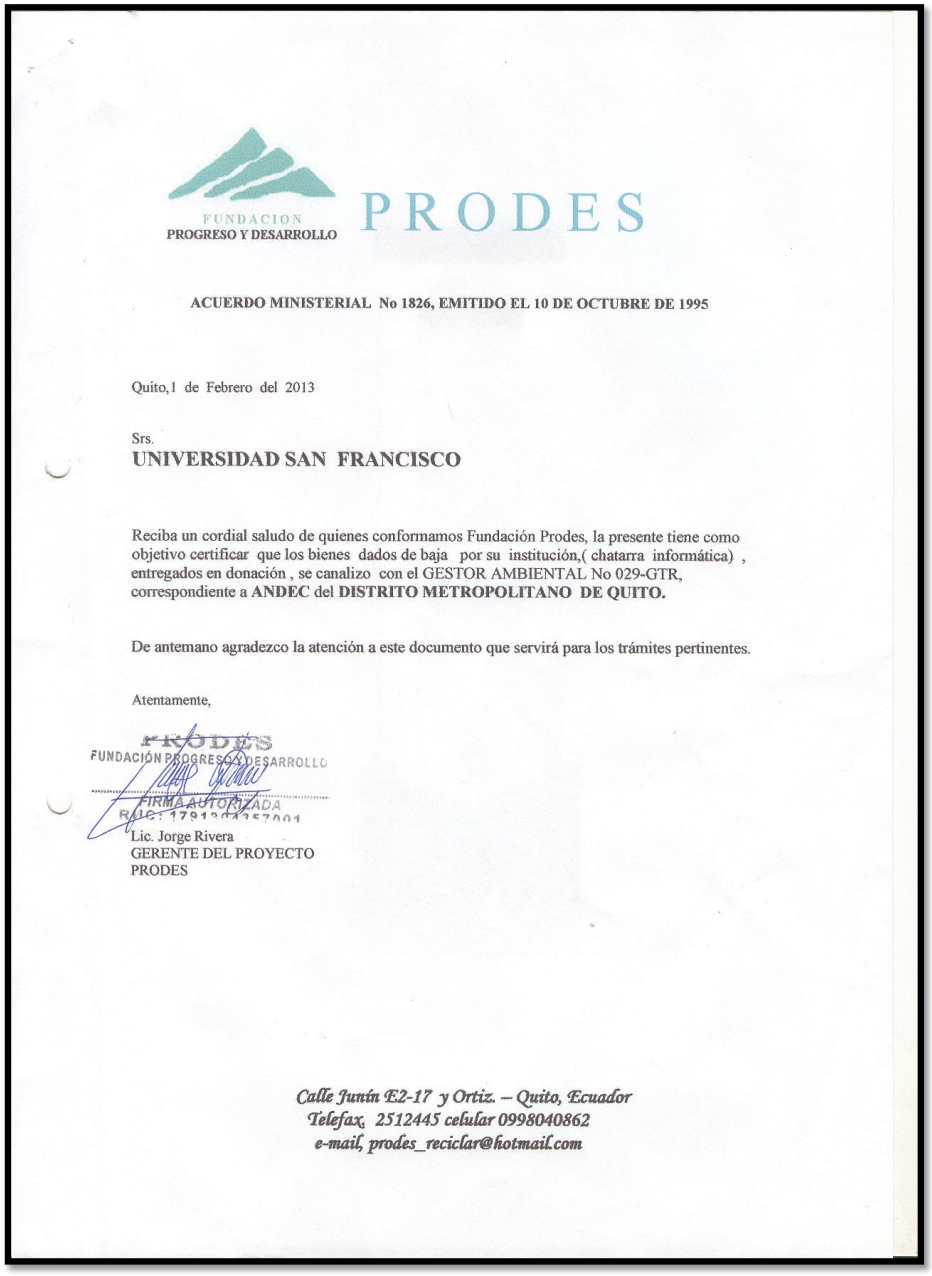


Graphic 10. Hazardous solid waste by department

The disposal and management of hazardous waste in Ecuador is based on two main Regulations which are "Norma INEN 2266" and "Norma NTP480 del INSHT"

As for the certification of hazardous waste producer required by the Ministry of Environment, the University has to arrange the formal procedures in the first quarter of 2014. For accreditation purposes, the Environmental Engineering Department will be in charge of acquiring the certificate, being this, the leader and adviser of the process.

Exhibit 1. Certificate of University's technological waste recycling.



FUNDACION
PROGRESO Y DESARROLLO

PRODES

ACUERDO MINISTERIAL No 1826, EMITIDO EL 10 DE OCTUBRE DE 1995

Quito,1 de Febrero del 2013

Srs.
UNIVERSIDAD SAN FRANCISCO

Reciba un cordial saludo de quienes conformamos Fundación Prodes, la presente tiene como objetivo certificar que los bienes dados de baja por su institución,(chatarra informática) , entregados en donación , se canalizo con el GESTOR AMBIENTAL No 029-GTR, correspondiente a **ANDEC** del **DISTRITO METROPOLITANO DE QUITO.**

De antemano agradezco la atención a este documento que servirá para los trámites pertinentes.

Atentamente,

PRODES
FUNDACIÓN PROGRESO Y DESARROLLO
FIRMA AUTORIZADA
RUC: 1791

Lic. Jorge Rivera
GERENTE DEL PROYECTO
PRODES

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9 Water

OP credit 22 Water Consumption
OP Credit 23 Storm Water management
Tier Two

9.3 Background

This section describes the consumption of water and its management at USFQ main campus in Cumbayá. Currently, there is no building metering systems installed for water consumption in the University. Moreover, consumption reduction policies have not yet been established. This document represents the baseline analysis report for water consumption and the theoretical CO_2 emissions calculated assuming that the wastewater will be biologically degraded in the environment. All the data and calculations correspond to the year 2012.

Quito is the capital city of Ecuador with an average altitude of 2800 meters above sea level. The population of Quito in 2010 was 2 239 191 people according to the last census (27). The climate in Quito is subtropical highland under the Koppen climate classification (28). The annual average temperature in Quito for the year 2012 was is 16.4°C with a minimal average temperature of 8.3°C and a maximal average temperature of 24.9°C (29). The accumulated normal precipitation in Quito for the year 2012 was 1071.1 mm and the annual accumulated precipitation was 1056 mm with a total of 163 days of rain (29).

Empresa Pública Metropolitana de Agua Potable y Saneamiento (EPMAPS) is the local public vendor in charge of providing drinking water and treating wastewater in Metropolitan District of Quito (DMQ) (30). The existing water supply system consists of water intakes, transmission lines, treatment plants, and a distribution network including reservoirs and pressure zones (31). The sewer system receives a combination of domestic wastewater and storm water with a total area drained of approximately 260 square kilometers (31).

Drinking water sources for Quito come from four different systems: La Mica – South Quito, Occidental conduction system, Integrated Papallacta system and Oriental conduction system (21). La Mica – South Quito collects water from Antisana Volcano, the Occidental conduction system gathers water from subsystems Atacazo, Lloa y Pichincha, while the Integrated Papallacta system gets water from the Antisana reservoir and finally the Oriental conduction systems obtains water from Río Pita (21). The capacity of the four systems are 1650, 700, 3000 y 3000 L s^{-1}, respectively. Drinking water is treated in 39 water treatment plants providing potable water of excellent quality (32). In fact, Quito's potable water meets all physical-chemical, microbiological, organic compounds and pesticides requirements established in INEN 1108:2011 regulation (33).

Regarding the treatment of domestic wastewater, Quito does not have a wastewater treatment plant (WWTP) and currently all domestic effluents without any treatment are

being discharged directly into the rivers (34). These discharges significantly affect water quality, alter the functioning of the ecosystem and pose a threat to public health. In November 26th of 2013, the mayor of Quito, Augusto Barrera announced the beginning of the construction of a WWTP in Quitumbe and the initiation of technical studies for the WWTP in Vindobona (35). These activities are conducted according to the actions established in the Program of treatment and recovery of rivers of Quito (35). The studies will be completed in 600 days and afterwards the WWTP will be constructed with a total inversion of 300 million dollars. In addition, a tunnel of 34 km length will be constructed in parallel to collect wastewater from all interceptor systems and collectors within the DMQ and they will be directed to the WWTP in Vindobona and finally, the treated effluent will be discharged in the Guayllabamba basin (35).

9.4 Boundaries and Scope

Water as well as other categories in the Operations Section of the Sustainability Report was limited to the USFQ Cumbayá Campus. For further details please review the Built environment report.

9.5 Assumptions

The CO_2 emissions involved in the natural degradation of wastewater generated from USFQ Cumbayá campus were theoretically calculated assuming an aerobic biological degradation.

9.6 Methodology

Silvio León, USFQ Maintenance Manager, provided the information for this category. The consumption water values were obtained from the invoices provided by the local public vendor Empresa Pública Metropolitana de Agua Potable y Saneamiento (EPMAPS) which included water amount consumed in gallons and total price per month. A complete list with details for the monthly consumption for the year 2012 is shown in the Table 26.

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Phone Ext.: 1998-1999
Office: Planta Fisica

Tracking Information
Related files:
Drop box >Linea Base>Datos Varios> Consumo de Recursos>viñeta agua

Table 26. Potable water consumption during the year 2012 in USFQ Cumbayá campus.

Month	Consumption (gallons)
January	581 178.51
February	575 895.07
March	569 290.77
April	565 064.02
May	481 057.31
June	302 477.00
July	466 792.02
August	623 974.39
September	699 263.42
October	866 484.33
November	656 995.89
December	439 582.29
Total	**6 828 055.03**

The CO_2 emissions that could potentially be generated during the aerobic biological degradation of wastewater from USFQ Cumbayá Campus were theoretically calculated with the simplified following equation:

Equation 2. Equation for the CO_2 conversion from degradation of wastewater

$$aC_{10}H_{19}O_3N + bO_2 \rightarrow cC_5H_7O_2N + dCO_2 + eH_2O + fNH_3$$

Where organic matter is represented as $C_{10}H_{19}O_3N$ the biomass produced is represented as $C_5H_7O_2N$ and *a, b, c, d, e* and *f* are stoichiometric coefficients (36). During the wastewater treatment, the biological oxidation of organic matter will be catalyzed by aerobic bacteria; therefore, a cell yield of 0.40 g biomass g organic matter^{-1} (36) was employed to balance Equation 2. Assuming a calculation baseline of 1 mol of organic matter then the stoichiometric coefficients of Equation 2 are presented in Table 27.

Table 27. Stoichiometric coefficients for the biological wastewater treatment

Compound	mol
$C_{10}H_{19}O_3N$	1.00
O_2	8.94
$C_5H_7NO_2$	0.71
CO_2	6.44
H_2O	6.58
NH_3	0.29

Baseline year (2012): 6 828 055.03 gallons

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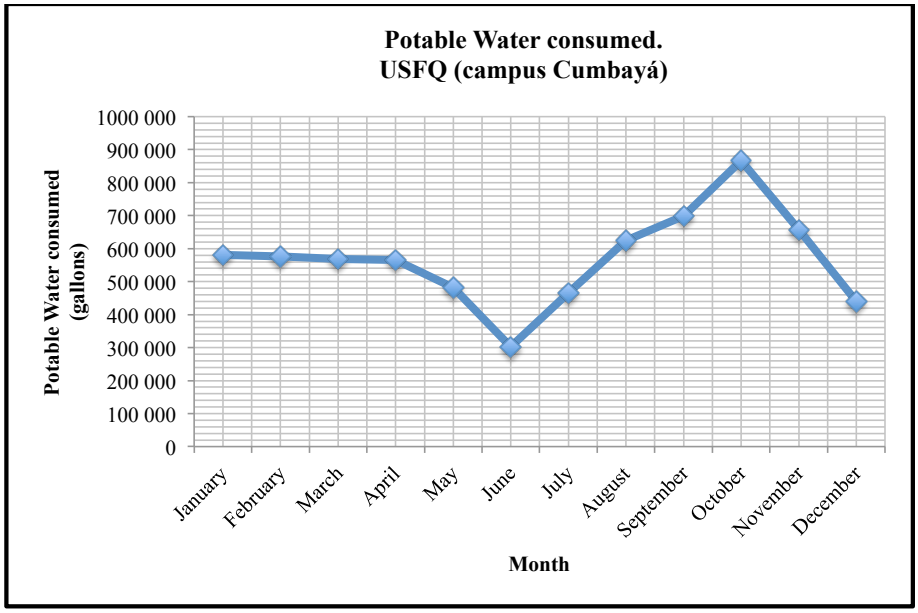
9.7 Stars

Not pursuing:
OP credit 22 Water Consumption
OP Credit 23 Storm Water management
Tier Two

9.8 Results and Conclusions

The total amount of potable water consumed during the year 2012 was 6 828 055.03 gallons. The peak month was October with 866 484.33 gallons and the low consumption took place on June with 302 477.00 gallons. The water consumption monthly was pretty similar for the first quarter of the year, afterwards the consumption went down by the middle of the year (June), then it came up reaching a peak in October and it got stabilized by December reaching levels similar to those registered in the first months of 2012.



Graphic 11. Potable water consumption reported for the year 2012.

The total cost for water in 2012 was $ 25 847 dollars. That makes a total $ 0.0037 dollars per gallon.

Currently, there are no wastewater treatment plants in Quito; therefore, the CO_2 emissions that could be potentially generated during the aerobic oxidation of organic matter present in wastewater were theoretically calculated based on Equation 2 described previously. To the best of our knowledge, there are no published literature studies on the characterization of municipal wastewater in Quito. However, the chemical oxygen demand of domestic wastewater is usually in the range of 0.25 – 0.90 g L^{-1} (36); therefore, a value of 0.5 g L^{-1} of COD equivalent to 0.5 g L^{-1} of organic matter was employed to calculate CO_2 emissions taking into consideration that only 90% of organic matter is biodegradable (36). The emissions of CO_2 generated for the potential natural degradation of wastewater from USFQ for the year 2012 were theoretically calculated to be 16.40 t CO_2 (Table 28). In future studies, it is recommended to include the CO_2 emissions generated for the energy consumption of the operation and maintenance of the aerobic reactor for the wastewater treatment system.

Table 28. CO_2 generated for year 2012

Organic matter g L^{-1}	Water treated gallons	t CO_2 generated
0.41	6 828 055.03	16.40

10 Diversity and Affordability

PAE Credit 6: Diversity and Equity Coordination
PAE Credit 7: Measuring Campus Diversity Culture
PAE Credit 8: Support Programs for Underrepresented Groups
PAE Credit 10: Affordability and Access Programs

10.3 Background

"Diversidad Étnica" has the objective to give support to students who come from indigenous or afro-Ecuadorian background as well as other minorities, especially students who come from low income families. The program ensures that ethnic groups that have traditionally been marginalized can access private undergraduate education. The program also gives support to the children of USFQ's security and cleaning staff whom cannot afford full tuition.

Diversity and Equity Coordination

Currently there are three people that work as full time staff at the office. Two of them identify themselves as ethnic minorities (Kitchwa from the Amazon and Otavalo). The head officer of the program is David Romo who started the program in 1995. His job is to ensure not only that students of ethnic backgrounds complete their individual programs of study but also to monitor their transition from their homes to the capital city and adapt to a new lifestyle. David Romo also takes care of a revolving fund that manages scholarships and donations (the office charges no overhead for the management of this money). Additionally he is also head of the Tiputini Biodiversity Station (TBS) in Amazonia where his role is to facilitate the relationships with ethnic groups that live around the station.

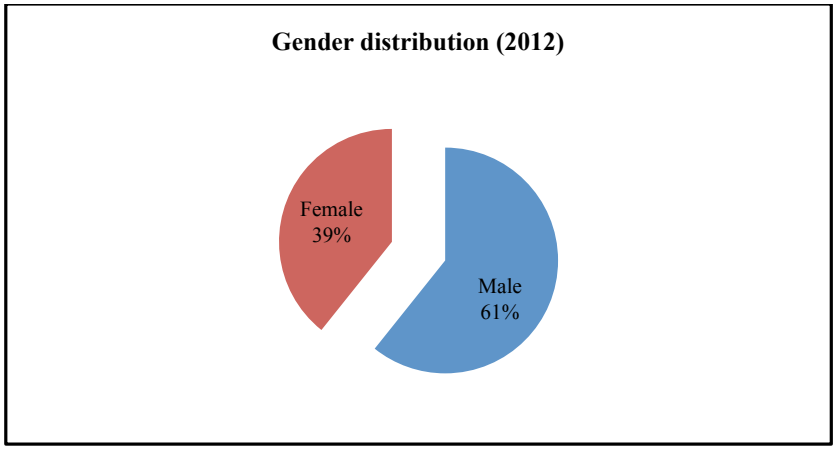
Measuring Campus Diversity Culture

The program has welcomed students from the Otavalo, Saraguro, Shuar, Kichwa (Amazon and Highlands), Cachi, Cofán, Waorani, Afro-Ecuadorian, among others. The assessment has formally been conducted since 2010 and is reported yearly. Table 29 shows a summary of diversity by ethnic background. In 2012 the number of students in the program came up to 191 a 17.5% increase from the previous year. It is important to mention that all students in the Program receive financial support through full or partial scholarship or student loans. Graph 12 in the other hand shows ethnic students by gender. The study is done by personal interview through the office staff.

Table 29. Ethnic students at USFQ

Group	2010	2011	2012
Afroecuatoriano	4	11	14
Afroshuar	0	1	1
Cayambi	1	2	2
Chachi	1	3	3
Cofán	2	2	1
Costa/mestiza	0	2	1
Galápagos	3	3	2
Kañari	4	2	4
Karanki	0	2	4
Kichwa Amazónico	27	17	19
Kitu cara	11	13	4
Mestizo	0	0	1
Montubio	0	1	1
Mulato	0	0	1
Otavalo	50	60	63
Others*	9	10	29
Panzaleo	0	12	4
Puruha	10	11	12
Salasaca	4	2	3
Saraguro	0	5	2
Shuar	12	9	11
Tsachila	1	1	1
Waorani	4	4	3
Waranka	2	2	2
Zuleta	0	0	3
Total	**145**	**175**	**191**

*Others: marginalized and low income students



Graphic 12. Gender distribution of ethnic students at University.

The University continuously tries to understand the limitations that ethnic students have in order to increase their presence and create opportunities for them to attend the University. For example, as mentioned through the report examples of policy and initiatives are: lowering test scores, providing full time tutoring, having a revolving fund for short term leases and emergency money.

Support Programs for Underrepresented Groups

"Diversidad Étnica" program looks for an overall development of the student through academic, social and personal support. The process starts when a prospect student comes in for information about admissions, takes the exam and is admitted as a USFQ student. It is important to notice that none of the support programs have an extra cost for the students.

The Learning Center gives a public schedule for students who need tutors in different subjects. This service is mandatory for students in their first year and who are in conditioned academic standing. The learning center is open for all USFQ students; the underlying difference is that tutors are awarded on a one on one form for underrepresented.

Personal Counseling is a service which includes personal or academic psychotherapy, both through a youth counselor and through full time faculty that oversee their academic progress and social wellbeing.

Revolving Fund helps students that do not have the economic means to cover for emergency or part of their basic needs that they are not able to pay for themselves: books, food, transportation, doctor's appointments, medicine and insurance.

Extracurricular activities for underrepresented students involve events such as: concerts, dance, theater, conferences among other activities. At the beginning of every year there is an event where students get to meet each other and show their talents as well as reflect on last year's achievements.

Exchange programs allow underrepresented students to have the opportunity to go on an exchange program as all other students. The University and the Diversidad Etnica Program fully supports students economically for them to go on the exchange. Additionally every year 10 of these students are sent to study English through the summer with the support of the United States Embassy.

Affordability and Access Programs

All students who enter to "Diversidad Étnica" Program are provided with scholarships or financial assistance with the majority falling in a 75% scholarship and 25% financial aid, which are then repaid in accordance to their income at the time they enter to the work force. The loan, to be repaid on a 3-year basis has no penalty for late payments. Economic support goes even further than in-school. USFQ alumni who have been part of the Program have applied for international master degrees and when they were accepted USFQ has paid for the airplane tickets.

As for general affordability for all the students, USFQ offers a combination of scholarship with financial assistance to students who do not have the financial resources but excel academically. In order for prospect students to apply they need 18.5 over 20 on their overall high school scores. Maintain a 3.2 average over 4.0 and not score a D or lower on any classes. Scholarships and financial assistance currently rely on the yearly budget.

A total of 574 students were awarded direct scholarships (10% out of total students), while a total of 1220 students had financial assistance provided by the University (20% out of total students).

10.4 Boundaries and Scope

The Program is limited to students identifying themselves as an ethnicity. Students hear about the program from admission officers or other fellow students who will suggest they approach to the diversity office.

In order to join as a student under the diversity program and the scholarship the candidate has to get a 1500 out of 2400 possible total points, while regular students are asked a minimum of 1800 points just to be admitted to the University.

In order to stay in the program, the students have to achieve a minimum average of 2.5 over 4.0 per semester and accumulated (other students who have financial aid need a 3.2 overage over 4.0 per semester). They also need to regularly attend classes and show up to

the meetings with their tutors that oversee their academic performance as well as guide them in their personal challenges.

10.5 Assumptions

Because the University has no official way to identify ethnic students such as an admissions survey, the assumption is that there are students who attend the University but either never learn about the Program or do not want to identify themselves as an ethnicity and graduate under their own personal and economic efforts.

10.6 Methodology

Interviews were conducted in 2013 with the Program from Ethnic Diversity. Additionally the Program has been writing a report and gave us a copy. Financial assistance provided a link to information regarding scholarships as well as statistics.

Contact: David Romo
Director Diversidad Étnica USFQ
Ext.: 1439
Email: dromo@usfq.edu.ec

Contact: Programa de Diversidad Étnica
Ext.: 1455
Email: diversidadetnica@usfq.edu.ec

Financial Assistance:
Contact: Paulina Cruz
Email: pcruz@usf.edu.ec
Link: http://www.usfq.edu.ec/admisiones/asistencia_financiera/Paginas/default.aspx

Related content:

- URL: http://usfqdiversidad.blogspot.com/
- http://noticias.usfq.edu.ec/2013/04/alianza-usfq-diners-pde.html
- http://www.youtube.com/watch?v=cOjbJs7Cnis
- Related files: DiversidadEtnica PDE 2012.doc
- Where: Drop box> Linea Base> DiversidadEtnica PDE 2012.doc

10.7 Stars Related

a. PAE Credit 6 Points 2
b. PAE Credit 7 Points 2
c. PAE Credit 8 Points 2
d. PAE Credit 10 Points 3

Total points 9

Not pursuing:
PAE Credit 9: Support Programs for Future Faculty
PAE Tier Two: Diversity and Affordability Tier Two Credits

- Employee Training Opportunities
- Student Training Opportunities

Not applicable:
Gender Neutral Housing

10.8 Results and Conclusions

There is room for improvement on the way the University detects and approaches ethnic candidates and students. The statistics only cover students who relate themselves to an ethnic background and join "Diversidad Étnica". On the meantime there is no study for the rest of the student body. A survey should be executed every semester to identify students of ethnic minorities and low income families to fully understand what the real statistics are. This survey should be included in the Banner system where students go in to manage their classes and registration.

Once the University has a clear idea of instructors that identify themselves as an ethnic minority. The University could have the opportunity to support professors who want to further their studies independent of their ethnic background.

As for PAE credit 9 and Tier 2. The University currently does not have programs to support these credits thus so these credits for 2012 are not being pursued.

11 Human Resources

PAE Credit 11 Sustainable Compensation
PAE Credit 12 Employee satisfaction Evaluation
PAE Credit 13 Staff Professional Development in Sustainability
PAE Credit 14 Sustainability in New Employee Orientation
PAE Credit 15 Employee Sustainability Educators Program
Human Resources Tier Two

11.3 Background

Sustainable Compensation

Sustainable Compensation is a top priority for the University, not just because the

University has the policy to remunerate workers properly and have a healthy work environment but because it is the law.

The University hires an intermediary company that handles human resources for cleaning, security and dining crews. The living wage in Ecuador is $ 320 dollars and the wages are reviewed by the government each year and adjusted for inflation. Most recently reviewed in 2012.

Human resources demands payments for Social Security each month in order to ensure workers have been paid on time plus their benefits in order for the company to get their payment. Few workers earn the lowest wage of $ 320 dollars, while the mean earns $ 350 plus Social Security. This also includes 2 extra salaries, one in August to help them with back to school costs and other in December. Additionally any extra hours are properly remunerated and recorded.

The same can also be said about the administrative staff. The University is well known to have competitive wages and low personnel rotation.

As for Faculty, the University is known for having the most amounts of PhD Professors and researchers in Ecuador. Wages depend on budget and also on level of studies.

11.4 Boundaries

Includes all workers for 2012.

11.5 Assumptions

None

11.6 Methodology

The head of Human Resources, Janet Montenegro was interviewed for information pertaining these credits. She also oversees contractor operations.

Contact Janet Montenegro
Email: jmontenegro@usfq.edu.ec
Phone ext: 1928
Office: E102

Related Files: None

11.7 Stars Related

Sustainable Compensation 8
8* 1014/1014= 8

Total Points 8

Not pursuing:
Employee satisfaction Evaluation
Staff Professional Development in Sustainability
Sustainability in New Employee Orientation
Employee Sustainability Educators Program
Human Resources Tier 2

11.8 Results and Conclusions

Employee Satisfaction Evaluation:
There currently is no Employee satisfaction evaluation. This is one of the recommendations in order to improve and create value for the stakeholders regarding corporate culture, incentives, productivity and overall satisfaction.

Employee Sustainability Educators Program:
The government asks University faculty to keep a certain amount of continuous education both in their own field as well as outside their field. The University puts together a summer school for faculty in different areas, which in turn creates a natural opportunity to teach a sustainability seminar that could be taught from both a personal level as well as from a business perspective.

12 Public Engagement

Credit 19 Community Sustainability Partnerships
Credit 20 Inter-Campus Collaboration on Sustainability
Credit 21 Sustainability in Continuing Education*
Credit 22 Community Service Participation
Credit 23 Community Service Hours
Credit 24 Sustainability Policy Advocacy
Credit 25 Trademark Licensing
Tier Two

12.3 Background

Community Sustainability Partnerships

USFQ has various formal partnerships with local communities, Non-profit Organizations, Government Institutions and International Universities to foster community relations and advance sustainability efforts.

Programa de Aprendizaje y Servicio (PASEC) Partnerships

PASEC is a program in which students have to take a semi-presential course which objective is that students combined applied theoretical knowledge with thinking during community services. This partnership includes over 55 non-profits, health clinics and public schools where students volunteer for 80 hours as a class requirement. Most of the partnerships have been ongoing since 2003. Organizations that wish to form a professional relationship with the University go thought proper screening to make sure that the requirements and objectives of the enterprise can be achieved. Once this screening takes place, a signed agreement among the parties is properly signed and filled. The Non Profit Organizations will then be published in the list of partners for PASEC. Every year the list is updated and partnerships are only finished if one of the two parts raises the desire. Most of these relationships are focused on the "social" axis of sustainability. Partnerships have been categorized according to the areas of focus and geographic location as shown on Table 30.

Table 30. Academic Department partnerships for projects for 2012

Academic Department	Project	Geographic Scope
COCSA	Community development	Altura and Guangaje-Cotopaxi
COCSA	Identify endangered fauna that could potentially be commercialized	Ecuadorian Territory
Politécnico	Energy Efficient Power Plants	Macas
CTT	Water management and Quality	Riobamba

Scientific Stations and Community Development

Galapagos Science Center (GSC)

GSC is located on Isla San Cristobal in the Galapagos Archipelago. GSC is a joint effort between the Universidad San Francisco de Quito and University of North Carolina at Chapel Hill (UNC). The two universities constructed this facility to promote science and education that will help protect these fragile ecosystems and enhance the lives of the local people. GSC is a multidisciplinary center based on three main principles: integrated scientific research, education and community outreach. GSC is a research facility adjacent to The Galápagos Institute for the Arts and Sciences (GAIAS).

GSC research facility houses four laboratories focus on: terrestrial ecology, marine ecology & oceanography, geospatial technologies (remote sensing & geographic information systems), and microbiology. The building also has office space for visiting scientists as well as space for community outreach and education events. The facility is being used by UNC and USFQ faculty and students conducting research in the Galapagos

Archipelago, as well as by UNC students in study abroad science programs hosted at GAIAS.

The Galápagos Institute for the Arts and Sciences (GAIAS)

GAIAS is an academic and research institution offering hands-on academic programs for international and Ecuadorian students. Students partaking in semester programs have the opportunity to choose between three tracks: Marine Ecology; Evolution, Ecology and Conservation; and People Politics and the Environment.

Established by Universidad San Francisco de Quito (USFQ) in 2002, GAIAS was created with the support of the Galapagos National Park, the Municipality of San Cristobal, and the local government.

GAIAS recognizes that effective environmental conservation requires accessible and sustainable economic alternatives for the local people. It is with this focus and understanding that GAIAS seeks to promote the development and replication of sustainable, non-extractive economic opportunities through access to quality higher education.

Tiputini Biodiversity Station (TBS)

TBS is a biological field station established in Amazonian Ecuador in 1994 by the Universidad San Francisco de Quito in collaboration with Boston University. The station includes 638 hectares (about 1500 acres) of Amazonian land and is an official guard post for the Yasuní National Park.

Primary activities are associated with research and education. The main goal is to better understand nature so that appropriate and effective conservation strategies may be implemented. Consequently, scientists are constantly conducting research on a wide array of topics ranging from cataloging the regional mega diversity to animal behavior to global climate change. A large proportion of efforts are dedicated to environmental education of students in organized groups that come for relatively short visits.

Sustainability in Continuing Education

USFQ is currently involved in community education programs. This credit recognizes institutions that provide continuing education courses and programs in sustainability to the community. Such courses train community members in sustainability topics and help build knowledge about the subject. The credit has part 1 and 2. The University does not have certificate courses under sustainability criteria therefore part 2 will not be completed.

Community Service Participation, Community Service Hours, Community Service on Transcripts.

USFQ students are involved with the community in two main ways: a class directed to volunteerism (it is a 4 credit class) and community work through each academic department mainly health clinics.

Student, who takes the class, has to meet once a week for an hour and a half and then work throughout the school using an online platform where virtual activities take place. Instructors give students support and follow their progress by monitoring these activities, including a phone call to all Non-Profit where students are servicing in order to get feedback about students activities.

Students pick an organization of their choice from a list of 50 Non-profits that the University has pre-approved. The work on these organizations put the students in contact with real, ongoing social problems in Ecuador. They have to complete 80 hours in order to pass the class. There are 2 ways to complete the required hours. First, they can strictly adhere to work under the requirements of the Non-Profit. An example is Habitat for Humanity in which students have to build homes. The second way they can help the nonprofit is by working on a special project that will be worth at maximum 30 hours. Students can apply their area of study or skills in order to create a project that must endure in time and has a scope. One example is a student whom developed a learning game and left a written manual for teachers on how to use the game and apply learning lessons. Every 5 to 8 students out of 25 students decide to pursue this initiative. This comes up to 60 000 hours of volunteering.

As for community work through academic departments, this involvement with the community includes all health clinics and its brigades (dental, health, veterinarian), law services, as well as data compilation for sustainable or health activities.

Incluir actividades de vinculacion con la comunidad

Valeria Ochoa 5/26/14 9:15 PM
Comment [5]: Hablar sobre este tema

Community Service on Transcripts

Valeria Ochoa 5/26/14 9:14 PM
Comment [6]: Hablar sobre este tema

This credit is also a requirement by the Ecuadorian Higher education accreditation identity CEAACES.

Farmers' Market

The University has a Farmer's market every Friday from 12:00 to 13:00. All products are organic and processed by students in the Agriculture Department as part of one their classes. Generally, products are brought in from the organic garden the University manages, as well as fruit and free-range eggs. The Farmer's Market also works as a Co-op where people can ask for produce in advance.

The Farmers Market is limited to University's operations and schedule. It is currently just for people who work/study at the University because supply is limited and they always run out of products.

12.4 Boundaries and Scope

This category is being limited to official partnerships where there are signed agreements as required by STARS.

For 2012 there were a total of 283 programs labeled as community education programs. There are other culturally immersion programs that relate arts to the community and are not included.

For community service hours, participation and credits, the analysis of this credit was divided into two major fields.

First, PASEC (Pas0102) is a 4-credit theory class. The seminar teaches service learning and simultaneously has each student volunteer for a minimum of 80 hours.

The second analysis came from the different academic departments. Not all departments have community initiatives that are free of charge. The report at this time is not systematized and information had to be mined. For example items that can then be indexed such as total students or hours volunteered is not reported in each effort; therefore, there might be an undervaluation of the amount of students and hours that were invested in volunteering.

12.5 Assumptions

For Sustainability in Continuing education the assumptions were improving people's life through health, maintaining small community identity and sustainable development, energy and water, biodiversity and conservation planning and programs. A total of 5 programs were left out because they were strictly related to biology and there was no evidence of sustainability criteria. Additionally there is a lack of information regarding if any other programs might have covered sustainable content.

For Community hours/participation the assumption is that all volunteered hours are reported and that these are the two main sources of data.

For PASEC the assumption is that each class is filled with 25 spots. For classes: Students who do not complete the amount of hours will get an F. There are about 10 parallels in fall and spring semesters and 8 parallels in the summer. Each parallel holds an average of 25 students. There are also 2 online parallels for students who study online with an average of 20. Making it a total of 750 students and 60 000 hours per year.

For academic department activities: community education programs, community partnership projects and volunteering projects were all combined in one spreadsheet. The

year 2011 were eliminated and any project that included community educational projects. Any community project that was not free for participants were also excluded. Finally the volunteering projects that had information for quantity of students participating and hours that the project took were added. This methodology left out many programs that had not properly recorded students or hours. Approximately 527 students were involved with their direct area of studies for a total of 23 848 volunteered hours.

For the Farmer's Market No Assumptions were made.

12.6 Methodology

All heads of departments and programs where contacted to gather the information. Each provided different material and can be found in related content.

Academic Department Partnerships
Contact: Diego Gabela
Phone ext: 1508
Office: N307
Email: dgabela@usfq.edu.ec

Scientific and Community Development Partnerships:
Contact: Diego Quiroga
Email: dgabela@usfq.edu.ec
Phone ext.: 1812
Office: N307

Diversidad Etnica
Contact: David Romo: dromo@usfq.edu.ec
Email: dromo@usfq.edu.ec
Phone ext.: 1439
Office:NP011

PASEM
Contact: Karla Diaz
Email: kdiaz@usfq.edu.ec
Phone ext.: 1401
Office: Casa Blanca first floor

Farmer's Market
Victor Hugo Castell
Email: vhcastell@hotmail.com
Office/ext non available

Related Content:

- Dropbox> Folder trabajo Comunitario> Sub folder Vinculación>matriz usfq y proyectos consolidada abril2013.xlsx
- Tiputini: http://www.usfq.edu.ec/programas_academicos/Tiputini/Paginas/default.aspx
- GAIAS:http://www.usfq.edu.ec/programas_academicos/galapagos/GAIAS/Paginas/GAIAS.aspx
- Dropbox>Folder> trabajo Comunitario>Vinculación>fundaciones_convenios.xsls
- http://www.usfq.edu.ec/programas_academicos/pregrado/colegio_general/aprendizaje_servicio/Paginas/default.aspx
- Dropbox>trabajo Comunitario>Sub folder Vinculación>matriz usfq y proyectos consolidada abril2013.xlsx

12.7 Stars Related

a. Pae Credit 19
Total Points **2**

b. Pae 20 Inter Campus Collaboration
Total Points 2

c. Pae Credit 21 Scoring 4 points max.
(40 x 53) % 283 = 6.78
Total points **4**

d. Scoring PAE Credit 22 maximum points 6
(6x 1277)% 5953 (37)= 1.29 (38)
Total points 1.29

e. Scoring PAE Credit 23 maximum points 6
(0.3 x 83,848) % 5953 (37)= 4.23
Total Points: 4.22

f. Scoring PAE Tier Two Credit 11 maximum points 0.25 (38)
Total points 0.25

Total Points 13.77

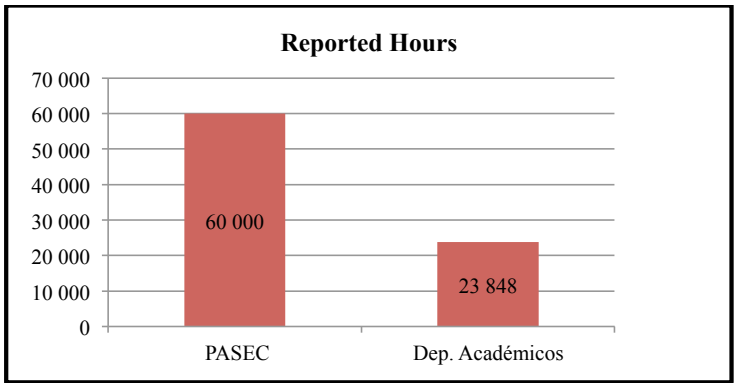
Not pursuing:
PAE Credit 20: Inter-Campus Collaboration on Sustainability
PAE Credit 24: Sustainability Policy Advocacy
PAE Credit 25: Trademark Licensing
PAE Tier Two Credit 10: Graduation Pledge

We found that one of the functional units that departments kept track of for future reference where number of people served. This is an interesting measurement because it shows scope of volunteering, which at this time it is not included. This tells us how many people benefited which in the big picture is what really counts.

12.8 Results and Conclusions

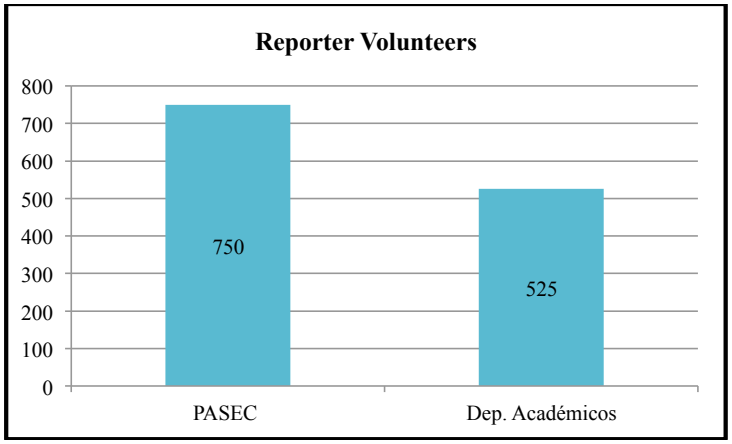
USFQ is an active service provider in the community for continuing education. Part 2 of this credit was not an option at the time because currently certificates were not provided. Additionally, content recording and statistic generation could visibly improve. For example how many people attended, what were the impacts intended and a checklist of sustainable concepts that the content is covering.

The results for students involved in volunteering activities for 2012 were as for hours spent a total of 83 348 hours.



Graphic 13. Hours reported for volunteering by PASEC and Academic Departments

Valeria Ochoa 5/26/14 9:17 PM
Comment [7]: Incluir eje Y (hours)



Graphic 14. Number of volunteers reported by PASEC and Academic Departments

Valeria Ochoa 5/26/14 9:17 PM
Comment [8]: Incluir eje y (number of volunteers)

We are asking to add the following criteria to the report.

1) If the activity is paid or not
2) Total hours volunteered
3) Total students who volunteered
4) Scope (how many people attended or where treated)
5) Impact and time
6) Does the impact of the volunteering activity endure in time.
7) Volunteering activity

The Farmer's Market is currently only a distribution outlet for the University's organic garden but is not currently thought of as a sustainability effort. This is not a high priority item, it has worked for over 10 years and having it grow to the public should be reviewed in the future.

VIII. Conclusions and Recommendations:

The Project was very rewarding because a brilliant group of people came together to make it possible.

Information was hard to obtain through deadlines. Key people/departments were usually very busy with their immediate responsibilities. The carbon footprint project needs to be systematized and information centralized. For accreditation purposes the University

currently manages a CRM program that could easily hold the criteria that is needed for this project. It is also important to identify who will be responsible of providing and keeping track of the information for future projects and

Many people at the University are trying to build a sustainable campus. There are many efforts around campus that were not connected. The grass root interest in the project was overwhelmingly positive. As for the general strategy there is the need to continue pursuing the project by offering a business case.

Bullet point recommendations are presented by area:

1. Operation Strategies:

- Create Office of Innovation and Sustainability
- Create "policy" for energy use, water use and solid waste generation
- Reorganize trashcans and waste education programs
- Install lighting sensors
- Evaluate the installation of solar panels
- Kitchen: establish "energy savings" walkthrough
- Install building metering systems for energy and water consumption
- Monitor indoor air quality
- Install water-saving toilets
- Install water-saving hand faucets

2. Transportation Strategies:
    - Formal launch of the Ride sharing platform *"Autocompartido."*

3. Education and Curricular sustainability:
    - Indicate if projects and research are sustainable within the University's data base
    - Include sustainability in new student orientation
    - Educate university community in Sustainability
    - Student Sustainability Educators Program: Office of Innovation and Sustainability, admission's office with speaking at schools, among others

4. Finance:
    - Build a green revolving fund

5. Human Resources:
    - Employee satisfaction evaluations

ACRONYMOUS

AASHE: Association for the Advancement of Sustainability in Higher Education

AC: Air Conditioning

CEAACES: Consejo de Evaluación, Acreditación y Aseguramiento de la Calidad de la Educación Superior

CEO: Chief Executive Officer

CONELE: Consejo Nacional de Electricidad

CPU: Corporación de Promoción Universitaria

D2L: Desire 2 Learn

DMQ: Distrito Metropolitano de Quito

EMGIRS-EP: Empresa Pública Metropolitana de Gestión Integral de Residuos Sólidos.

EPMAPS: Empresa Pública Metropolitana de Agua Potable y Saneamiento

GAIAS: Galápagos Institute for Arts and Sciences

GHG: greenhouse gas

GOBE: Gobierno Estudiantil

GSC: Galapagos Science Center

ISCN: International Sustainable Campus Network

LEED: Leadership in Energy & Environmental Design

LPG: Liquefied petroleum gas.

MAE: Ministerio del Ambiente

SI: International System of Units

STARS: Sustainability Tracking, Assessment & Rating System

TBS: Tiputini Biodiversity Station

UDLA: Universidad de las Américas

UIDE: Universidad Internacional del Ecuador

UNC: University of North Carolina at Chapel Hill

USDA: United States Department of Agriculture

USFQ: Universidad San Francisco de Quito

WWTP: Wastewater Treatment Plant

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