

# Sustainability Assessment and Roadmap for a Green Campus Initiative

**Texas A&M International University**  
Laredo, Texas

Prepared By  
**Energy Systems Laboratory**  
**Texas Engineering Experiment Station**  
College Station, Texas  
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## **Acknowledgments**

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The Energy Systems Laboratory greatly appreciates the assistance and information provided by Texas A&M International University in Laredo, Texas, without which this report would be impossible. Special thanks go to the newly formed "Green Team" at TAMIU consisting of senior management, university faculty, and student representation. Their collective and individual cooperation and interest in pursuing this Sustainability Initiative are outstanding and bodes very well for the long-term success of this project.

The ESL also acknowledges the outstanding vision and leadership of President Ray M Keck, III who immediately recognized the potential of this initiative for the future of TAMIU, its students, faculty, staff, and the community it serves in the vibrant Laredo economy and sensitive environment. His initial reaction to this concept was, "What's not to like!" His commitment to a realistic, sustainable, Green Campus Initiative is without parallel in the Texas A&M System and serves as an outstanding example for his counterparts to follow.

## **Sustainability Assessment “Green Team”**

Special thanks goes to the TAMIU “Green Team” whose commitment and enthusiasm for this project make it possible for this assessment by the ESL. We would like to acknowledge all who have taken time out of their busy work schedules to meet concerning this initiative.

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## Foreword

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This document was produced by the Energy Systems Laboratory of the Texas Engineering Experiment Station, to provide a practical first-step to Texas A&M International University's quest for a more sustainable future. This is a living document that should be referenced often, critically questioned, and improved through constant input from University leaders, staff, students, and others to preclude it becoming obsolete. The authors believe that this is only the beginning of a long, rewarding, more sustainable path for the University, now and in the future. It will also serve as a model for the Texas A&M System and the surrounding Community to subscribe.

## Executive Summary

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Texas A&M International University and the Energy Systems Laboratory of the Texas Engineering Experiment Station have partnered to conduct a campus sustainability assessment and create a subsequent campus sustainability plan for TAMIU. This sustainable campus initiative will make TAMIU a leader in efficient and environmentally friendly campuses throughout the A&M system and the State.

Energy System Laboratory conducted a site visit and interview TAMIU management, staff, contractors, and student representatives to obtain data for this assessment. The current progress, good practices, and opportunities for TAMIU are discussed for four areas:

- Resource Conservation
- Campus Infrastructure
- Health and Well-Being
- Academics and Culture

The investigation revealed several points where TAMIU is already performing well and also revealed many opportunities. The authors of this assessment see the following areas as major opportunities. They are divided into immediate opportunities and areas that warrant additional study.

### Resource Conservation

Immediate Opportunities	Areas that Need Further Investigation or Time
<ul style="list-style-type: none"> <li>• Make energy conservation numbers easily available to faculty, staff, and students</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate purchase of green power through the TAMU system electricity contract</li> </ul>
<ul style="list-style-type: none"> <li>• Commission buildings that have not yet been commissioned and any buildings that are showing poor performance</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate the use of local natural gas</li> </ul>
<ul style="list-style-type: none"> <li>• Investigate use of more solar-powered illumination like the illumination for the signage at the entrance to campus</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate the use of clean diesel for standby generators</li> </ul>
<ul style="list-style-type: none"> <li>• Implement a water conservation awareness program that will educate students and staff on the importance of water conservation and encourage conservation of water</li> </ul>	<ul style="list-style-type: none"> <li>• Continue investigation of irrigation control based on measured evapo-transpiration</li> </ul>
<ul style="list-style-type: none"> <li>• Continue pursuit of use of gray water from the City of Laredo for sustainable irrigation</li> </ul>	<ul style="list-style-type: none"> <li>• Continue to investigate viable uses(s) for AHU condensate</li> </ul>
<ul style="list-style-type: none"> <li>• Continue to press for evaporation sewer allowance for cooling tower water</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate viability of mulching for water conservation</li> </ul>
<ul style="list-style-type: none"> <li>• Consider using waterless urinals in new construction</li> </ul>	<ul style="list-style-type: none"> <li>• Further investigate opportunity for composting</li> </ul>
<ul style="list-style-type: none"> <li>• Quantify recycling (document and further publicize)</li> </ul>	

**Campus Infrastructure**

<b>Immediate Opportunities</b>	<b>Areas that Need Further Investigation or Time</b>
<ul style="list-style-type: none"> <li>• Create a statement of how energy efficiency and other sustainability issues will be considered in future construction</li> </ul>	<ul style="list-style-type: none"> <li>• Assess opportunity for LEED-NC certification of the Student Success Center</li> </ul>
<ul style="list-style-type: none"> <li>• Set up preferred parking for alternative fuel and hybrid vehicles in visible, choice locations</li> </ul>	<ul style="list-style-type: none"> <li>• Assess potential for LEED-EB certification of the existing campus</li> </ul>
<ul style="list-style-type: none"> <li>• See if the city can add a bike rack to the bus line that comes to campus</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate incentives to encourage carpooling</li> </ul>
<ul style="list-style-type: none"> <li>• Encourage departments to choose Energy STAR equipment and appliances</li> </ul>	<ul style="list-style-type: none"> <li>• Complete Campus Loop</li> </ul>
	<ul style="list-style-type: none"> <li>• Facilitate the use of more bicycles</li> </ul>
	<ul style="list-style-type: none"> <li>• Investigate heat island mitigation strategies</li> </ul>
	<ul style="list-style-type: none"> <li>• Investigate use of retention pond for storm water</li> </ul>
	<ul style="list-style-type: none"> <li>• Implement an green purchasing policy</li> </ul>

**Health and Well-Being**

<b>Immediate Opportunities</b>	<b>Areas that Need Further Investigation or Time</b>
<ul style="list-style-type: none"> <li>• Increase availability of sustainable food products such as organic and hormone free foods (if there’s interest)</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate use of food scrap as animal food source</li> </ul>
<ul style="list-style-type: none"> <li>• Mitigate waste materials from food service</li> </ul>	<ul style="list-style-type: none"> <li>• Plan for dish washing facilities in new campus dining center</li> </ul>
<ul style="list-style-type: none"> <li>• Implement green custodial plan and practices</li> </ul>	
<ul style="list-style-type: none"> <li>• Use low VOC materials for carpeting and paint</li> </ul>	
<ul style="list-style-type: none"> <li>• Encourage neutralizing acid/base combinations as part of teaching process to eliminate these wastes and teach about waste disposal issues.</li> </ul>	

**Academics and Culture**

<b>Immediate Opportunities</b>	<b>Areas that Need Further Investigation or Time</b>
<ul style="list-style-type: none"> <li>• Get students involved through course project participation</li> </ul>	<ul style="list-style-type: none"> <li>• Implement green campus initiative based on this assessment report</li> </ul>
<ul style="list-style-type: none"> <li>• Insert sustainability related modules in existing courses</li> </ul>	
<ul style="list-style-type: none"> <li>• Create activities that foster participation in and awareness of sustainability (such as adopt-a-road, earth day, etc.)</li> </ul>	

**Next Steps**

The next steps for TAMIU are to put together an action plan that will make sustainable practices part of the University policy. The implementation plan should address the steps that they plan to make and show a timeline for completion of these steps.

Recommended steps:

- Finalize assessment plan
- Adopt University policy on Sustainable Campus
- Adopt action plan
- Create permanent Green Team and assign responsibilities for implementation

- Identify and secure implementation funding and personnel
- Actively involve students in planning and implementation
- Annually review progress and update implementation plan

#### Benefits

A Sustainable Campus initiative will have many short and long term benefits as follows:

- Reduced utility expenses (as much as 50% in new construction)
- Improved indoor air quality
- Improved learning environment
- Reduced air, land, and water impacts on environment
- Create new generation of resource and energy conscious graduates
- Creates benchmark for others in the Valley to follow
- Identifies TAMIU as a regional and national leader in sustainable educational advancements

This project will have significant impact on the University, local community, and Texas A&M University System as well as its international neighbors in Mexico.



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# Introduction

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## Background

Texas A&M University and Carnegie Mellon University (CMU) have a three-year Department of Energy grant to study Advanced Building Systems for high-performance buildings to significantly reduce energy use. One goal of the grant is to transfer and replicate approaches that are being researched at CMU in a TAMU facility or building. All Texas A&M System campuses were considered, but TAMIU seemed to be an ideal candidate based on its size, age, and expansion plans. TAMIU leaders also expressed interest in creating a Sustainable Campus Initiative that could include Advanced Building Systems technologies to reduce energy consumption. ESL employees agreed to facilitate a Sustainability Assessment and subsequent Sustainability Roadmap. Representatives from ESL met with TAMIU administration in June 2006 to kick off the project and decided to begin the Sustainability Assessment part of the Sustainable Campus Initiative immediately. In August 2006, ESL and TAMIU staff met to explore areas where TAMIU has existing excellent sustainable practices and explore areas of opportunity.

## Sustainability Defined

There are many different definitions of sustainability, but one of the most widely accepted is “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” Most see minimizing the impact on the environment and conserving natural resources as key aspects of sustainability. Some view it as an ideal, “Sustainability is an ideal end-state. ...it is a lofty goal whose perfect realization eludes us” (Alan Atkinson, *The Compass of Sustainability*, 1998), while others see it as an attainable goal. Some of the many indicators of campus sustainability include energy and water consumption, building technology, decision making processes, and curriculum.

## Relevance

Texas A&M International University in Laredo, Texas has the unique opportunity to become a sustainability leader for the Texas A&M University System, the State, and the local community. TAMIU is in a great position to become a sustainability leader because their campus is relatively new (opened in 1995), the university leaders are excited about sustainability, and the university generally has a “let’s try it” attitude. Thanks to this positive attitude, TAMIU already has many excellent sustainable practices. TAMIU is also unique in that 75-80% of its enrollment is first generation college students. Additionally, most of the students on campus (70-75%) are from the Laredo area. Many of the students do not have preconceived notions about campus life and since the university is young, there is not a stigma of doing things the way that they have always been done. These factors create the perfect environment for a successful sustainable campus initiative.

## Approach

TAMIU is growing rapidly in enrollment, which means the campus will continue to add buildings to keep up with the rapid growth. Currently, the campus consists of ten primary classroom, laboratory and office buildings, the Residential Learning Center dormitories, the University Village Apartments, and the physical plant. There is ongoing construction to finish a theater in the Center for the Fine and Performing Arts and an addition to the Kinesiology

Building is underway. In the next few years the university plans to complete the Campus Loop drive to ease transportation in and around campus and to construct a Student Success Center. There may be opportunity for the Laredo Children's Museum to relocate the TAMIU campus in about 5 years in a LEED™ Gold Building. The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings.

All of this activity creates tremendous opportunity to implement green initiatives at TAMIU. To control utility expense, efficient operation is not only an option but a "must" as energy and water costs will continue to rise. Energy prices have increased over 50 % in the last two years due to rising natural gas prices.

#### Assessment Areas

This assessment examines several areas under the broad categories of:

- 1) Resource Conservation,
- 2) Campus Infrastructure,
- 3) Health and Well-Being, and
- 4) Academics and Culture.

In each area, the importance to sustainability is discussed and TAMIU's existing practices and key opportunities are listed.

#### Purpose

The purpose of this assessment report is to identify existing green practices and identify opportunities for a TAMIU Green Campus Initiative for a Roadmap to a more sustainable campus.

Texas A&M International University  
Campus Sustainability Assessment

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# Resource Conservation

Energy

Water

Waste and Recycling



# Energy

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Both energy consumption and energy sources are important components of sustainability. By operating efficiently, a campus can conserve vital resources, save money, and decrease pollution from reduced generation that often leads to air emissions, acid precipitation, and climate change. Important areas to consider are building lighting and plug loads, HVAC consumption, and transportation energy. By purchasing green power, universities can contribute to a more secure and healthy energy future.

## Building Energy Consumption

The Energy Systems Laboratory (ESL) of the Texas Engineering Experimentation Station performed Continuous Commissioning<sup>®1</sup> on 408,000 ft<sup>2</sup> of campus space beginning in June 2000. Additional CC<sup>®</sup> projects were performed for the Center for Western Hemispheric Trade and the Student Center. The CC<sup>®</sup> report was published in June 2004. Since commissioning, the Lamar Bruni - Vergara Science Center and the Residential Learning Center have been added. These buildings should be commissioned and the previously commissioned buildings should be analyzed to see if they would benefit from re-commissioning. The Residential Learning Center and University Village Apartments are run by an external dorm management company.

Many more additions are planned for the TAMIU campus. Currently, the Kinesiology Building is being expanded and the theater in the Fine Arts Building is being completed. A Student Success Center is planned to come online in 2008-2009. As these new buildings are opened, it will be necessary to commission them to achieve optimum energy consumption and occupant comfort.

The plant on campus has four 1000 ton chillers, a heat pump and two boilers. During the hottest days of the year they use 1 ½ chillers. The boilers are turned off during the summer and the heat pump provides any hot water needed. There are 5 diesel standby energy generators. All building HVAC systems are controlled through a modern Siemens Direct Digital Control system. The gas usage and cost for the campus from September 2003 to June 2006 can be seen in Figure 1, and the monthly metered electricity usage for the past few years is shown in Figure 2.

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<sup>1</sup> Continuous Commissioning and CC are registered trademarks of the Texas Engineering Experiment Station.

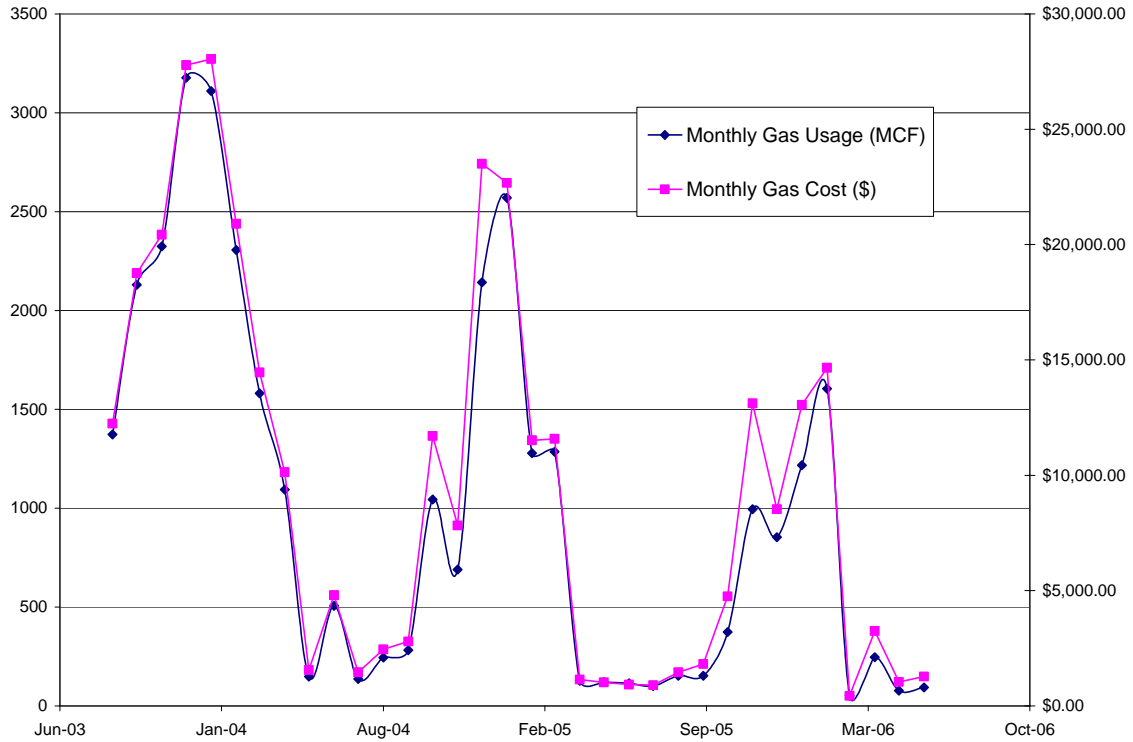


Figure 1: TAMIU Gas Usage September 2003-June 2006

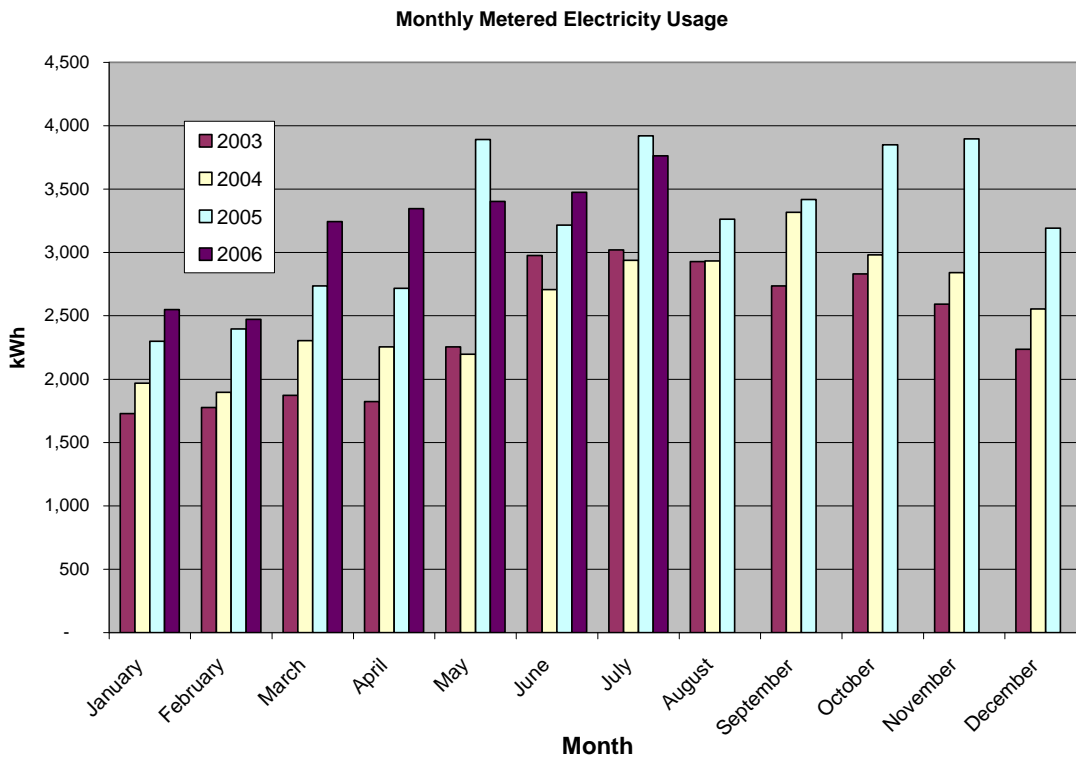


Figure 2: Monthly Metered Electricity Usage

### Vehicle Energy Consumption

TAMIU has five gasoline vehicles in their fleet: 2 police cars, 1 Physical Plant pickup truck, 1 van that departments can rent, and 1 mail van. The remainder of the fleet consists of 20 golf carts, 19 of which are electric. Grounds maintenance has four riding lawn mowers and 1 tractor. TAMIU is unique in that 76% of its vehicle fleet is alternative fuel (electric) vehicles. By using golf carts rather than gas-powered vehicles to move in and around campus, TAMIU saves considerable transportation energy and reduces the environmental impact. This is one area where current practices really stand out.

### Energy Sources

Campus electricity is competitively bid annually for the TAMU system and is negotiated by the Energy Systems Laboratory. TAMIU staff does not know if any renewable sources are used in off-site energy generation purchases. On campus, they have one solar panel to illuminate campus signage at the campus entrance. They would like to add more solar panels to light the other campus signage. Another solar panel is being installed to power the controller for the sprinkler system on the band field.



Figure 3: Solar Panel that Provides Lighting to Campus Signage

### Energy Tracking and Education

TAMIU participates in the Governor's initiative to save energy. They also have an internal program to educate staff and students about saving energy, which includes stickers on manual light switches reminding building users to save energy. The website and campus newsletter advertise the campus energy plan but have never reported energy use numbers. Electricity sub-meters exist in all auxiliary enterprise buildings and there is an electronic meter in the science building to facilitate energy tracking.

### Good Practices

- Many campus buildings have been commissioned



- Campus buildings use Direct Digital Control, allowing for accurate monitoring and easy changes
- Low vehicle fleet energy consumption
- Solar panel used to light campus signage with plans for more solar panels
- Have energy goals pursuant to Governor's executive order
- Internal energy awareness program
- Building sub-metering

### Opportunities

- Assess potential for additional building commissioning and energy retrofits
- Commission buildings, such as the science center, that have not yet been commissioned
- Commission new buildings as they come online
- Encourage students living on campus to conserve energy in their dorms or apartments. Consider using an incentive program or competition.
- Put a clause into contract with dorm management companies saying that green buildings are required on campus
- Investigate the use of local natural gas
- Investigate the use of clean diesel for standby power generators
- Investigate purchase of green electric power, such as wind power or other renewable energy sources, through the TAMU system electricity contract
- Make energy consumption numbers easily available for faculty, staff, and students
- Investigate the use of additional solar-powered illumination
- Track Energy Utilization Index (EUI)



## Water

Water is an essential but limited natural resource, and its efficient use and protection from pollution are required to meet the needs of an increasing population (2). In Laredo, where all water comes from the Rio Grande River, water conservation is especially important. TAMIU has the opportunity to be a leader to the community through exceptional practices by demonstrating how to incorporate sustainable water use and planning into all areas of operations. Reducing wastewater production is also important as it reduces sewage costs, reduces energy used to transport and treat the wastewater, and decreases the amount of chemicals needed in the treatment process. By tracking water usage and educating students and staff, water savings methods can continue to be successful in the long-term.

### Current Water Practices

For the first 11 months of FY 2006, the total water consumption at TAMIU totaled 96.5 million gallons. An overwhelming 80% of the total water consumption is used for irrigation, with only 6% used within the campus buildings. The central plant water is overwhelmingly used as cooling tower make-up. Figure 4 shows the breakdown of campus water usage. Of the 300 acres of space on campus, only 125 are developed. These 125 acres include the buildings and are the only areas that are irrigated. All of the water is acquired from the city, which comes from the Rio Grande River.

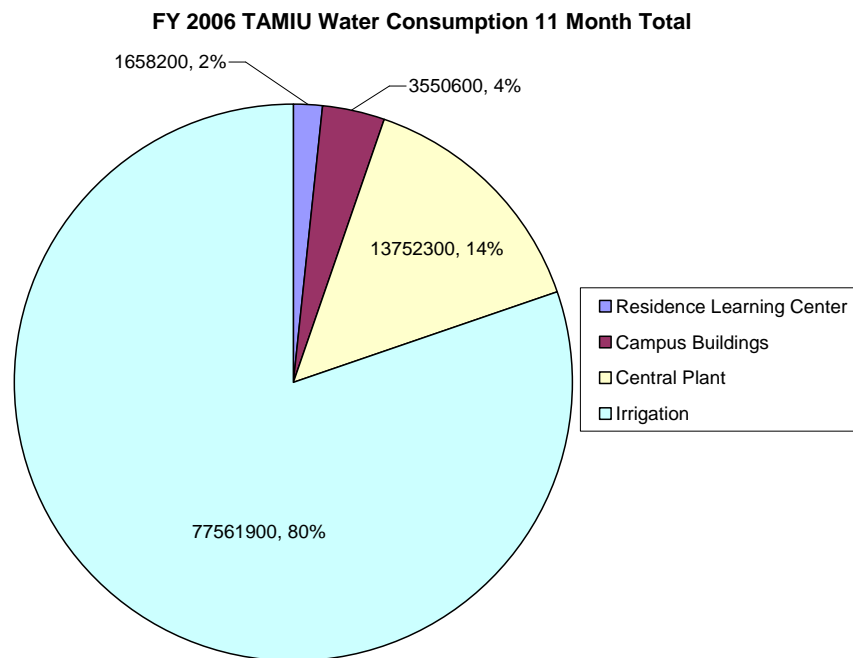


Figure 4: Breakdown of Campus Water Consumption

TAMIU has looked at alternative water sources and have concluded that a well is not viable since well water in the area is generally salty. The most viable option for irrigation water appears to be a treated effluent line (or “gray water” line) from the city that runs along the Bob Bullock Loop, which passes by the university (See Figure 5). This effluent line is presently used as an irrigation source for two golf courses. The university may be able to purchase this water at less cost than potable city water. The irrigation system could easily be converted to using this

gray water. Campus gray water production is not feasible since the overwhelming majority of water consumption is irrigation and cooling tower makeup.



Figure 5: Location of TAMIU in Laredo

Some important water reduction steps have been implemented. A new centralized irrigation system should control irrigation better and result in savings. Dr. Tobin of TAMIU has been working with the physical plant to see if they can couple a local weather station with the sprinkler system to better control irrigation based on evapo-transpiration rates. The university does use drought-tolerant plants but they also must be deer-proof. The campus has policies requiring native vegetation to remain in undeveloped areas of the campus.

The typical rainfall in Laredo is 16-20 inches per year, so there may be potential for a rainwater runoff retention pond. However, in the last year there was only 6 inches of total rainfall. AHU condensate is a more constant source of water that is not currently utilized.

Low-flow shower heads and toilets are used in the dormitories and other locations on campus, and there is excellent submetering on campus. There are no apparent programs on campus to encourage students and staff to conserve water.

### Wastewater

The university recently began incorporating data on sewer fees. The physical plant does have a submeter on the cooling tower makeup line, but they do not receive a financial credit from the city for cooling tower evaporation. They have been lobbying with the city for three years over an evaporation credit. The university ensures that wastewater is not contaminated by Hazardous Waste. All chemicals are disposed of through the Hazardous Waste Disposal EOG and are not put down the drain.

### Good Practices

- Automated irrigation control system
- Ongoing water conservation research
- Drought-tolerant vegetation
- Low-flow shower heads and toilets used in dormitories
- Excellent sub-metering
- Wastewater is kept free of hazardous chemical waste

Opportunities

- Implement a water conservation awareness program that will educate students and staff on the importance of water conservation and encourage conservation of water
- Continue pursuit of use of gray water from the City of Laredo for irrigation
- Continue investigation of irrigation control based on measured evapo-transpiration
- Continue to press for evaporation sewer allowance for cooling tower water
- Continue to investigate viable use(s) for AHU condensate
- Investigate viability of mulching for water conservation
- Investigate use of retention pond for irrigation water
- Consider using waterless urinals in new construction and/or as a demonstration

## Waste and Recycling

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Universities can generate a tremendous amount of solid waste. Between minimization and recycling of waste, we can greatly reduce the amount of waste that ends up in landfills. Recycling programs must be convenient and accessible to faculty, staff and students to be effective. Hazardous waste, though a small percentage of total campus waste, poses a large risk to handlers and to the environment and must be handled accordingly.

### General Waste

TAMIU uses a program run by the City of Laredo for recycling all paper, metal, cardboard, and plastic. They will not take Styrofoam<sup>TM</sup> or glass. The recyclables are picked up and separated by the city, making it convenient for the university to participate. The city provides blue bags for these recyclables that are distributed to all university departments who are interested in participating. Additional recycling boxes are placed by main copiers and printers. The custodian takes the bags to a central location daily and the city retrieves them weekly. Currently, the university is in need of a second weekly pickup to accommodate for the large response to the program, but the city has been unable to provide one. The university advertises the program with blue recycling bins and provides detailed information once a year in the safety newsletter. There is currently no quantification of the recycling efforts so it is difficult to know what effect the program has had on waste mitigation.



Figure 6: Picture of TAMIU Recycling Container

In addition to these common recyclables the university recycles batteries, lights, and phones. They used to have a toner refilling program but do not anymore because of purchasing issues. Computers are recycled through a state program that sends them to a correctional facility.

There is no composting program, but the physical plant has considered it and wants to investigate it further. Equipment such as a tractor with a front end loader may need to be purchased.

The university pays an external company to pick up boxes from food shipments to Dining Services. The company then sells the cardboard. If a student organization were to take this duty, they would be able to raise funds for their activities and save the university the cost of having these boxes removed.

TAMIU has implemented some measures to reduce paper waste on campus, in addition to placing recycling bins by copiers and printers. All bathrooms have roll towels and new buildings will most likely have motion sensing towel dispensers. This year TAMIU has implemented a debit system that has eliminated student refund checks, and 99% of all employees (including student workers) receive paychecks through direct deposit. The university is in the process of changing the employee reimbursement system to the same debit system used for student refunds and they are moving toward a paperless work order system.

### Hazardous Waste

The university is very careful about hazardous waste generation and disposal. TAMIU is a small quantity generator with very few sources of hazardous waste. All oils are recycled and professors are encouraged to teach students to neutralize acids and bases as part of their lab experiments. Other hazardous waste generation points are the print shop and the photo lab in the Fine Arts Building. The university recycles all fluorescent tubes and ballasts with a company out of Dallas.

### Good Practices

- Strong participation in active recycling program with broad range of materials recycled
- Several paper waste mitigation strategies
- Excellent accounting of chemical and hazardous waste control

### Opportunities

- Quantify recycling
- Find alternative ways to increase recycling capacity if city will not provide a second pickup
- Continue to educate about the recycling program by trying other avenues such as flyers and the website
- Further investigate opportunity for composting
- Continue to look for strategies to reduce paper waste
- Encourage neutralizing acid/base combinations as part of the teaching process to eliminate these wastes and teach about waste disposal issues

Texas A&M International University  
Campus Sustainability Assessment

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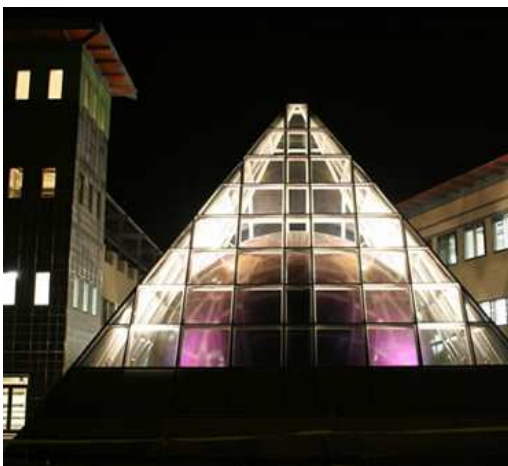
# Campus Infrastructure

Built Environment

Transportation

Land Use

Consumable Supplies and Equipment



## Built Environment

Buildings play a critical role in the public perception and efficient operation of the campus. The TAMIU campus is made up of modern, beautiful Spanish-style buildings that make Laredo proud. As an architectural benchmark of the community, TAMIU buildings can also set the precedent for sustainability. Some sustainable buildings actually produce their own energy, recycle and reuse their own water, provide healthy indoor air quality, increase worker productivity, and use sustainable and non-toxic renewable materials in their construction (UC). It is important, that as campus expansion goes forward, sustainable thinking is included in the building decision-making process and long-term campus planning.

### Green Building Practices and Policies

It is expected that the TAMIU campus will double in size in the next ten years, which will allow significant opportunity for green, efficient building initiatives. The master plan indicates plans for several new buildings with a space distribution as shown in Figure 7.

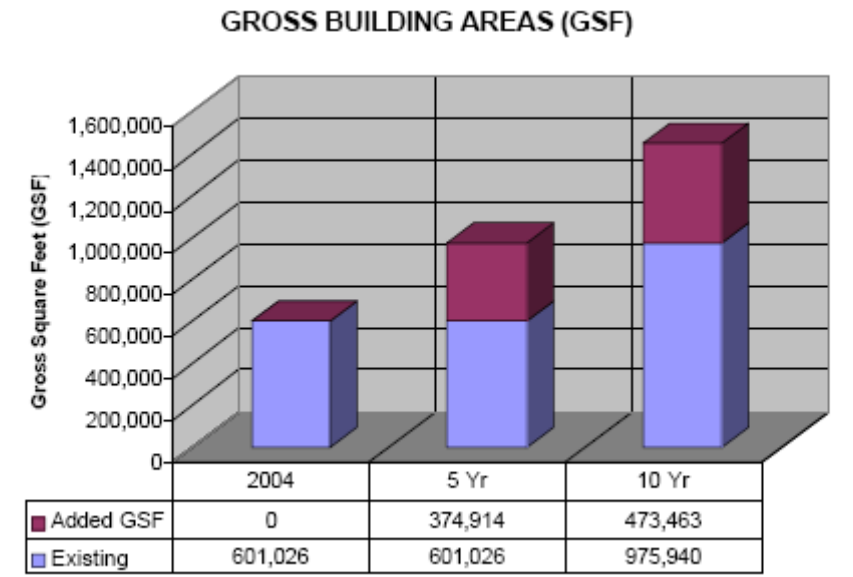


Figure 7: Planned Building Growth Detailed in TAMIU Master Plan (Does not include Residence Halls or Dormitories)

TAMIU has been considering and implementing many green practices in their existing buildings. All classrooms have lighting controls and all offices built during Phase II or later have lighting controls. Compact fluorescent lights and high-efficiency T-8 fluorescents have been installed in all buildings. All classrooms are wired with a double switch so users can shut down the lighting in thirds in classrooms. A modern, efficient central plant provides air conditioning to the campus.

For the new Student Success Center, the university leaders would like to look at constructing it to receive a LEED-NC Silver rating, if costs are acceptable. LEED (Leadership in Energy and Environmental Design) is a green building certification program established by the US Green Building Council. Having a LEED certified campus building would point out TAMIU's commitment to sustainability. The architect has not yet been selected for the project. In the past TAMIU has never requested a LEED AP architect or asked questions about



experience with green building projects during interviews, but they plan to do so for this building. The campus planning committee and the Green Committee will need to work together when new buildings are planned.

A high performance test facility that will be part of the TAMU/CMU project will be a great opportunity for sustainable building research at TAMIU to be led by the Energy Systems Laboratory with federal funding. With minimal funding, the mechanical infrastructure can be designed to facilitate “plug and play” applications of advanced HVAC, solar, and automated controls. The building will be an instructional tool for students who can take its principles and apply them to their own lives and careers. The publications that result from this research will make the university’s commitment to sustainability known nationally, and provide a low-cost, on-site testing facility for equipment that can be used in future construction at TAMIU and the TAMU System.

All architecture on the TAMIU campus is Spanish-style (see Figure 8) and the campus master plan has guidelines for future buildings to make sure they fit in with the campus setting. Some unique architectural structures such as the pyramid at the Lamar Bruni -Vergara Science Center are in place (See Campus Infrastructure Title Page).



Figure 8: Example of the Architectural Style on Campus

#### Good Practices

- Automatic lighting controls in all classrooms and most offices
- Compact fluorescent lights and T-8 fluorescents in all buildings
- Interest in LEED certification for new Student Success Center
- Interest in high-performance test facility capabilities to explore advanced technology

#### Opportunities

- Assess opportunity for LEED-NC (New Construction) rating of new Student Success Center
- Assess potential for a LEED-EB (Existing Building) rating for the existing campus
- Hire architects for future construction that have experience in green building design.
- Create a statement of how energy efficiency will be considered in future construction



## Transportation

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To promote sustainability, TAMIU should minimize single-occupant vehicle (SOV) transportation to, from, and around campus. SOV trips can be thought of as particularly costly due to their proportionately higher per capita emissions, as well as the related infrastructure costs and traffic and parking demand they generate (2) By encouraging bus use, bicycling, and carpooling, TAMIU can greatly reduce these problems. The university should support these types of alternative transportation as well as alternative fuel vehicle use and living on campus to reduce negative transportation impacts.

### Transportation Practices

The primary mode of transportation to and from the TAMIU campus by faculty, staff, and students is the use of a private car. This is primarily due to being in an area where few people use alternative transportation and being on the outskirts of town. However, there are good alternative options for commuters. A city bus line, which operates on clean natural gas, runs between the TAMIU campus and the downtown transit center where campus riders can pick up a bus to other parts of Laredo. The bus service runs from 7:00 AM to 9:00 PM. For bicycle riders there is a bike path along the Bob Bullock loop, which is the main feeder to the campus. On the campus, there are no dedicated bike paths or bike lanes, but there are many students, particularly those who live in the dorms, who ride bikes on campus. Bike racks for these students are located at the dorms, the gym, the Student Center, and the library. There are showers available at the gym for those with gym memberships, and there are two men's showers and two women's showers in the library restrooms. The university hopes to add bicycle paths along the campus loop when it is completed (see Figure 10). This path will continue to the future baseball and softball complex and pass by student housing.



Figure 9: City bus with service to and from TAMIU and Bike Racks on Campus

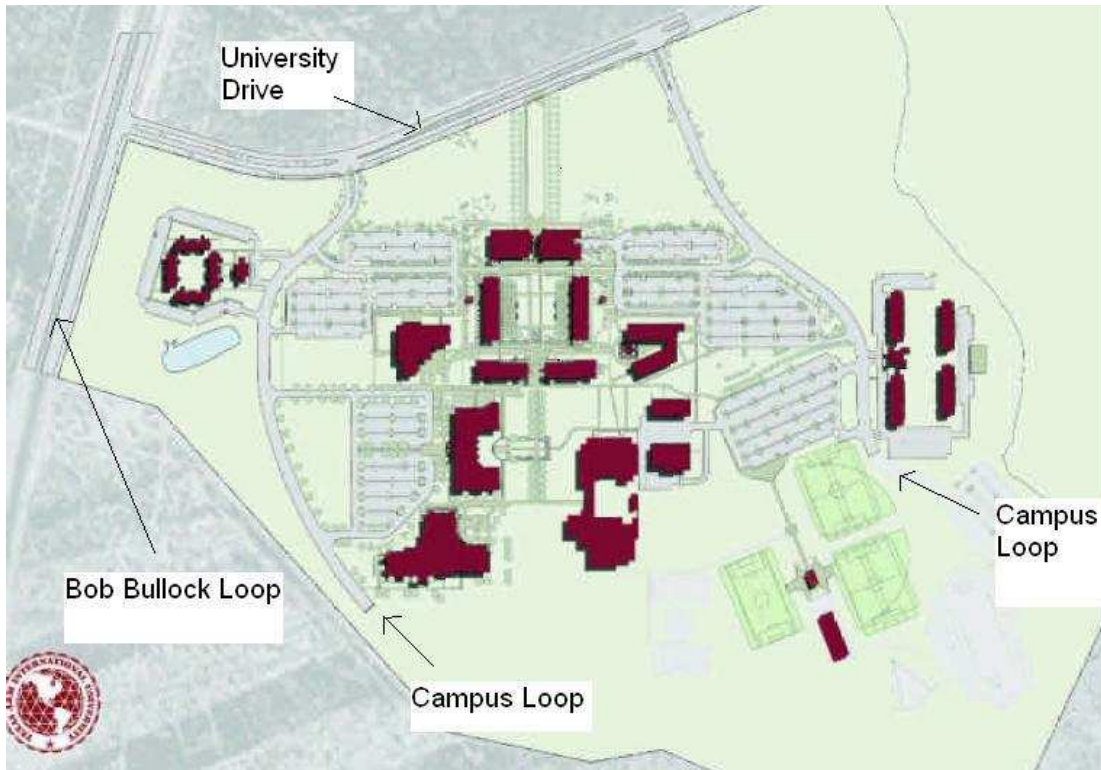


Figure 10: Campus Map Showing Bob Bullock Loop and the incomplete Campus Loop

There seems to be minimal carpooling to and from the TAMIU campus and no carpool or vanpool incentives are in place. The university staff likes the idea of having preferred parking for hybrid or other alternative fuel vehicles and could possibly implement a discount parking pass for those choosing to use these vehicles or carpool. As mentioned in the energy section, TAMIU is unique in that 75% of its campus vehicle fleet consists of electric vehicles.

There has been a large demand for on-campus housing for the 2006-2007 academic year. For the first time, on-campus housing will be near capacity. By increasing the number of students living on campus, the transportation burden is lessened. The housing demand will soon exceed the capacity of the 256-bed University Village and the 424-bed Residential Learning Center. The campus master plan includes adding another housing unit to accommodate the increased demand. By living in these facilities, the students will contribute to a sustainable campus.

#### Good Practices

- City bus service to campus
- City buses run on natural gas
- Bicycle path along Bob Bullock Loop
- Bicycle racks on campus
- Campus vehicle fleet is 75% electric
- Increasing number of students are living on campus

#### Opportunities

- See if the city can add a bicycle rack to all bus lines that come to campus

- Complete campus loop to ease transportation in and around campus
- Facilitate the use of more bicycles by adding dedicated bicycle paths and ensuring adequate racks and shower and changing facilities
- Set up preferred parking for alternative fuel and hybrid vehicles
- Investigate incentives to encourage carpooling

## **Land Use**

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TAMIU strives to have a healthy, aesthetically pleasing, and ecologically sustainable campus landscape. Stormwater must be well-managed so that it does not create problems for local bodies of water, and pest management practices that do not harm the health of people or wildlife on campus must be in place. This area is one where visitors to campus and the community will be able to notice excellent practices.

### Stormwater

TAMIU does not have a stormwater permit because drainage does not cross a city street. The stormwater from the parking lot is collected and goes to the city storm sewer. The stormwater does not flow into a local body of water. The physical plant would like to figure out a way to use stormwater, but because of the low amounts of rainfall in Laredo, AHU condensate is a steadier alternative. A stormwater retaining pond on the south end of campus has been considered.

### Landscape and Habitat

Landscaping on the TAMIU campus is regulated by stipulations in the master plan. The campus uses low-maintenance native species that are deer-proof so as to not harm the many deer on and around campus. Only 125 of the 300 acres of campus are developed, so there is plenty of open space. All new construction detailed in the Campus Master Plan through 2014 is planned for the core of campus and will not infringe on the natural, open space. The campus plan has reserved a “Green Space” border around campus (see Figure 11). For the duration of the campus master plan, they will keep this area in its natural, xeriscape state. Many species of wildlife can be found on the TAMIU campus including white-tailed deer, wild pigs, and javelina (see Figure 12). Erosion and sedimentation control on campus are governed by a State (TCEQ) regulations.

# Green Reserve

TEXAS A&M INTERNATIONAL UNIVERSITY  
CAMPUS MASTER PLAN

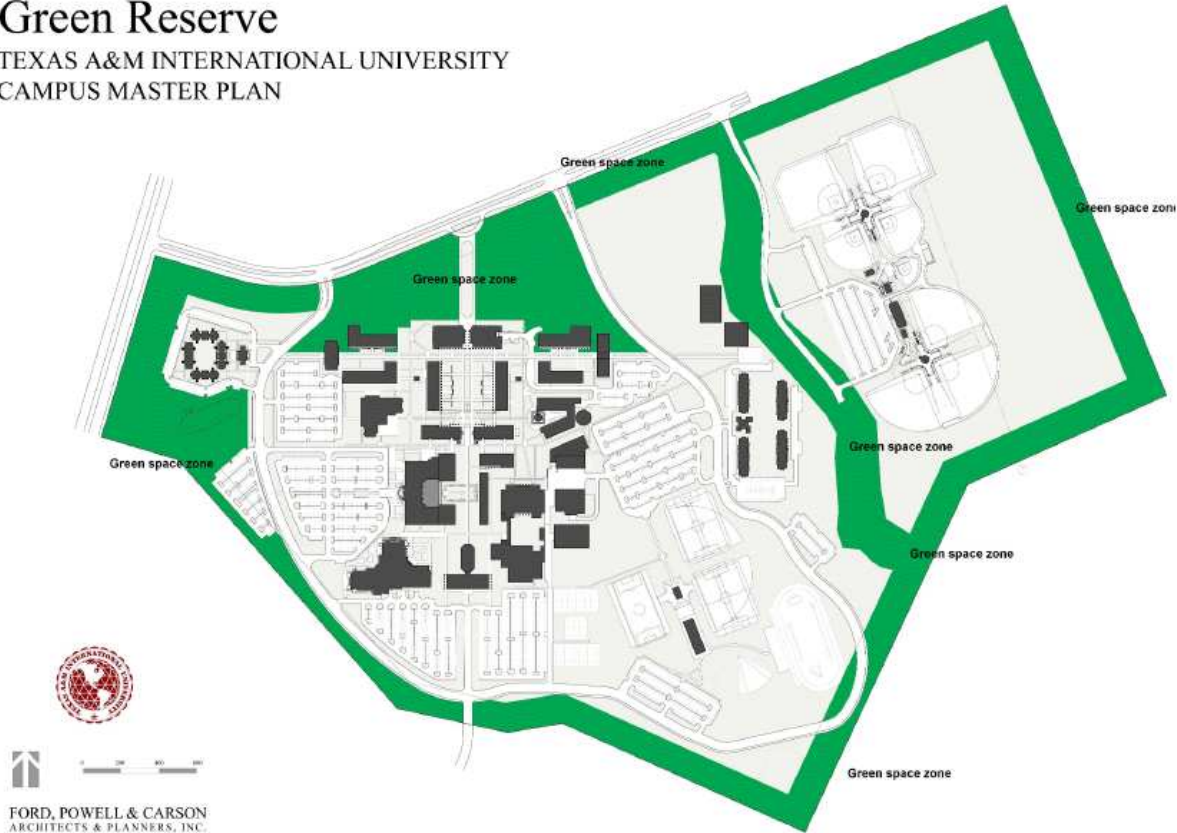


Figure 11: Ten Year Campus Green Reserve Plan for TAMIU



Figure 12: Javelinas, Natural Vegetation, and a Palm Tree on the TAMIU Campus

State legislation was passed on September 1, 1999 requiring all State-funded projects to use lighting that reduces outdoor light pollution. All lights on campus, other than the Phase 1 globe lights (installed prior to 1999) on the interior of campus, are in compliance with this act. In fact, when driving along the Bob Bullock Loop at night, one cannot see the campus. There is no good shading on parking, all of which is concrete.





Figure 13: A New Campus Light Fixture, A Parking Light, and a Discontinued Campus Light Fixture

The master plan includes additions of surface parking. Space has been reserved for potential parking garages, but there is currently no need for garages. Some shade trees have been planted near walkways that will provide more shade in time. The university also has planned to add a trellis by the Kinesiology Building that will add shade and provide a spot for food vendors. The roofs on campus are Spanish-style tile. While it is unlikely that any campus buildings (other than possibly the future children's museum) will have green roofs, there may be a Spanish-style tile that has a higher reflectance available that will mitigate heat island effects.

#### Pest Management

An Integrated Pest Management system (IPM) is used at TAMIU for outdoor pest control. This means that if there is a problem, the insect is identified and then controlled. Preventative spraying is done indoors on a rotation. By law the university keeps track of everything they spray, and generally there are very few chemicals sprayed. There is a small amount of weed control implemented on the athletic fields.

#### Good Practices

- Stormwater management policies in place
- Use plants that fit in the local ecosystem
- Much open space is preserved on campus, with plans to keep a green space reserve as the campus grows
- Campus lighting is compatible with night-sky regulations
- Shade trees have been planted and plans are in place for a trellis that will add shade along sidewalks
- Integrated Pest Management System with complete tracking and use of some organic pest control options

#### Opportunities

- Investigate Use of a Retention Pond for Stormwater
- Investigate heat island mitigation strategies (especially for parking and roofs)

## Consumable Supplies and Equipment

Universities purchase large amounts of products such as paper, computers, printers, copiers, office supplies, research supplies, cleaning supplies, building materials, furniture, paint, carpet, food and more. The purchasing practices of the university should educate students, improve human health conditions on campus, and lead the way as stewards of the Earth's resources by making environmentally preferable purchasing (EPP) choices (2). TAMIU can make a difference by purchasing recycled content paper and by requiring recycled content, reused, or regional building materials. Using Energy STAR equipment in offices and Energy STAR appliances in campus dormitories is an effective and noticeable method to promote sustainability.

### Campus Purchasing

Many TAMIU purchases are procured through cooperative purchasing contracts or State Contracts with the Texas Building and Procurement Commission. Computer equipment is purchased from the Department of Information Resources (DIR) or from TAMU Master Contracts. Building material and furniture purchases are primarily handled by the Texas A&M Facilities and Planning Office in College Station. If TAMIU orders furniture, they use cooperative purchasing contracts or TAMU master contracts. TAMIU purchasing does not know if energy-efficient computer equipment is given preference or if sustainable building materials are used. For appliance purchases, the department needing the appliance decides what they want to purchase and campus purchasing handles the purchase for them. Custodial supplies and physical plant purchases are not handled by the campus purchasing department. Campus purchasing does control the central stores, so they purchase paper for the entire campus. Recycled content paper is purchased as part of a state contract.

### Good Practices

- Recycled content paper is purchased for the entire campus

### Opportunities

- Implement a green purchasing policy for consumables and office equipment
- Encourage departments to choose Energy STAR equipment and appliances

Texas A&M International University  
Campus Sustainability Assessment

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# Health and Well-Being

Food

General Health and Well-Being





## Food

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Eating healthy is a key component to a healthy lifestyle. Food provided on campus should promote the use of fresh fruits, vegetables and whole grains as an alternative to refined starches and sugars, artificial preservatives and processed foods. By purchasing locally grown and raised foods, a university can promote the local economy, and by purchasing organic foods, universities can help eliminate many of the harmful impacts of typical farming practices on soil and water quality, habitat and human health (2). Dining also produces a considerable amount of organic and inorganic waste that should be minimized.

### Dining Services

Dining Services at TAMIU is provided by Aramark under the direction of Mr. Humberto Rivera. The on-campus dining facilities include a cafeteria-style all-you-can-eat Residential Dining Center, a Subway vendor, a grill, and a pizzeria. The only kitchen on campus is located in the student center. TAMIU Dining Services can be visited at [www.tamiu.edu/foodservice](http://www.tamiu.edu/foodservice). There is no convenience store located on campus, but there are vending machines in the main buildings.

Dining services does not regularly provide organic, hormone-free or other sustainable food options. These options are available through Aramark's food vendor and may be requested for catered events. Food for campus dining is not acquired through local vendors, mostly because there is very little locally-grown produce available. Low fat cooking oils are used in the campus kitchen.

Dining services tries to limit the amount of food waste generated by using leftovers for the next meal and keeping track of food closely to control products and portions. They do not donate left over food to food kitchens because of associated liability risks.

Currently, all dining ware (plates, bowls, forks, knives, cups, etc) is disposable because dining services does not have the facilities to wash reusable dining ware. There is no space in the existing student center to provide extra dish washing facilities, but the university does plan to build a new dining facility in a few years that will have dish washing capacity. Reusable dining ware would be a considerable cost and waste saver for the university. The campus does not acquire biodegradable dining ware due to high costs but can if it is specially requested for a catered event. There are no incentives offered to decrease waste consumption such as a discount on drinks if a student brings a reusable cup.

TAMIU has a wellness committee that encourages healthy options in campus dining, and Dining Services conducts surveys to see what food options students are interested in. The Residential Dining Center does provide a variety of options, many of which are healthy, including a salad bar. In addition to the new dining hall that is planned for 3-4 years from now, a coffee shop will be added at the library.

### Good Practices

- Dining Services has healthy options such as a salad bar in the main dining facility and a Subway sandwich vendor
- Organic foods are available for catered events
- Have wellness committee

### Opportunities

- Investigate student interest in sustainable food products such as organic and hormone free foods
- If an interest is shown, increase availability of sustainable food products
- Investigate use of food scrap as animal food source.
- Encourage students to bring their own coffee mug or drink bottle to help mitigate food waste.
- Use napkins made from recycled paper content
- See if dining center patrons would be willing to take on the extra cost of using biodegradable dining ware instead of Styrofoam plates and bowls and plastic utensils.
- Plan for dish washing facilities in the new campus dining center and focus on sustainable practices throughout the dining center planning process.

## **General Health and Well-Being**

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There are many places in and around campus buildings where occupant health must be considered. Some of the key areas are custodial practices, indoor environmental quality, and workplace safety.

Many traditional chemical cleaning products contain toxins that pose public health risks and cause environmental damage if used improperly. Fortunately, recent years have seen a surge in the availability of more environmentally friendly “green” institutional cleaning products that rival the effectiveness and cost of their traditional competitors (2). Using these products can greatly benefit the campus community.

Indoor air quality (IAQ) has a tremendous impact on productivity and health of building occupants. TAMIU must strive for excellent IAQ to promote the best learning environment possible. Quality of life on campus can also be increased by promoting a safe working environment for its employees, including consideration of training accessibility on ergonomic safety and monitoring of progress.

### Custodial Practices

The RFP for custodial contracts is currently being negotiated. The contract will specify that the Physical Plant Director must approve all chemical purchases. This will ensure that only green chemicals will be purchased. The new custodial company will begin providing supplies and working in October.

All custodians go through training and must be OSHA certified. The university keeps a good inventory of cleaning chemicals and enforces fill station technology.

The custodians work from 6 PM-2 AM. Since most lights in the university are on occupancy sensors, the custodians’ presence after hours does not cause large lighting consumption. The Student Center lights are on timers and turn off at 2AM, once the custodians are out of the building.

### Indoor Environmental Quality

The campus does not specifically monitor indoor air quality, but they do have good ventilation systems and humidity control in buildings. The campus print room has its own ventilation system, and the Physical Plant has the ability to increase the air changes in a building if needed due to painting or other reasons. There is carbon dioxide monitoring in the gym. A no smoking policy is strictly enforced in and around all buildings. Comfort of occupants is always given priority and workers are welcome to call the plant and request a temperature change in their office if they are uncomfortable. Additionally, TAMIU is a 100% asbestos-free campus.

For new buildings and renovations, there is not a program in place to purchase low VOC and IAQ compliant products such as paints and carpets.

### Workplace Safety

All employees on campus are required to go through a safety program that teaches about safe lifting procedures. The Physical Plant has belts available for heavy lifting projects. Excellent documentation is in place for tracking injuries and any associated costs. The department puts out a monthly safety newsletter and has a staff enrichment day that focuses on safety.

TAMIU wants to encourage ergonomics among their employees. They have had a specialist come to campus to offer one-on-one ergonomic consultations. There has been an

ergonomics workshop each of the last few years at the staff enrichment day that has been well attended.

### Good Practices

- Have excellent custodial chemical use and practices underway
- Custodian's presence does not significantly increase lighting energy consumption
- Asbestos-Free campus
- No smoking policy around buildings
- Campus print room has separate ventilation
- Air changes can be increased by physical plant if needed
- Carbon Dioxide monitoring in gym
- Aggressive workplace safety training and education program
- Ergonomic assessments and workshops available to employees

### Opportunities

- Carry out green custodial plan
- Use low VOC materials for carpeting and paint

Texas A&M International University  
Campus Sustainability Assessment

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# Academics and Culture

Sustainability-Related Courses and Research

Sustainability-Related Organizations

Sustainability and Campus Leadership



## **Sustainability-Related Courses and Research**

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By teaching sustainability through courses in a wide range of disciplines, TAMIU can provide students information about sustainability that will encourage them to promote and participate in sustainable practices on campus and help students in future endeavors. By providing opportunities for research, TAMIU can make an impact far beyond Laredo and the TAMIU campus by finding new ways to preserve resources and benefit the environment.

### Courses and Research

Dr. Cass, the Associate Provost, believes that many professors already fold some sustainable practices into their courses. Some of the courses available that include sustainability-related topics are Environmental Geology, Environmental Science, Ecology, Biology, and Chemistry. Dr. Tobin, who teaches the freshman level Environmental Geology course, also teaches a lab on fossil fuels that could tie into the sustainable campus initiative by teaching students about their personal greenhouse gas impact. There is no Environmental Studies major or program at the university, but there is some ongoing sustainability-related research. Dr. Vaughn does water quality research and Dr. Tobin's idea to tie a weather station to the irrigation system could benefit the university tremendously.

The university is in the process of beginning their first engineering program in Civil Engineering. Having engineering curriculum will increase the amount of sustainability-related research at the university. Michael Yoder is one individual whose interest and expertise in environmental concerns in urban geography will help introduce sustainability to this new department.

The sustainability Green Team, Dr. Cass, and others find it very important to integrate sustainable ideas into the core courses so that all students will learn what is going on around campus and get excited about continuing in a sustainable direction.

### Good Practices

- Sustainability related courses include Environmental Science and Environmental Geology
- Various sustainability-related research is already in progress
- Engineering curriculum is getting started
- Professors are willing to integrate sustainability into core courses

### Opportunities

- Get students involved through course project participation
- Insert sustainability related modules in existing courses, particularly core courses

## **Sustainability-Related Organizations**

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Sustainability-related organizations provide an important avenue for students, staff and faculty to learn and share information about issues and to generate and advocate new ideas for further movement toward campus sustainability (UC). These organizations can promote sustainability to the campus and community.

### Student Organizations

Of the 52 student organizations on the TAMIU campus, none are directly related to sustainability. In fact, there are no groups currently purely dedicated to community service. Dennis Koch, Director of Student Activities, would like to start activities to get students involved in the community such as the Big Event and highway cleanups. These groups would spread sustainability to the community as well as foster excitement on the campus. As a young school still defining traditions, there is tremendous opportunity to make sustainability a campus tradition.

While there is a student orientation on campus, it is not mandatory for all new students to attend. Next year they plan to require attendance. This is an excellent opportunity to educate new students about the sustainable campus initiative on TAMIU and tell them how they can get involved. The university also has a First-Year Student Experience Office that could have material available educating about sustainability.

### Good Practices

- Director of Student Activities has interest in Sustainability-related organizations

### Opportunities

- Involve student organizations in sustainability activities such as cardboard and aluminum recycling
- Create activities that foster participation in and awareness of sustainability (such as adopt-a-road, earth day, etc.)
- Educate students about the Green Campus Initiative at orientation

## **Sustainability and Campus Leadership**

The strength of an organization comes from the vision and management skills of its leadership as well as its ability to find resources and dedicated personnel to accomplish its mission. Strong leadership skills and a clear vision of the future are essential to change existing campus practices and perceptions to more sustainable practices. A green campus or sustainable initiative can be a daunting challenge to get every one on the same page and working to a common goal. It is not an easy concept to grasp initially and the end game is often a moving target.

### TAMIU Leadership

Leadership for a more sustainable campus most often comes from the students and/or faculty who are concerned with the short and long term impacts of existing practices on the environment and its use of natural resources and energy. It often takes years for a “grass roots” effort from students and/or faculty to take hold and convince senior management to adopt sustainable practices in its buildings, purchasing, food, housing, and supportive academic classes.

### Good Practices

- Dr. Keck, TAMIU President, has stated publicly several times to staff and faculty that he is committed to creating a green campus Sustainability Initiative.
- Faculty and staff have existing plans in place for recycling, water management, energy practices, and other sustainable practices as part of their job duties,
- TAMIU has formed a campus Green Team comprised of administrative staff, faculty, and students to evaluate options and to move towards a more Green Campus, and
- Dr. Keck signed a letter in September 2006 to seek additional funding to pursue a green campus initiative.

### Opportunities

- Implement a green campus initiative based on assessment report
- Formalize management policy through a modified mission statement and written strategy
- Include sustainable practices in job descriptions or relevant personnel and faculty
- Identify personnel to take lead role for plan implementation
- Utilize student organizations and manpower [interns] wherever possible to increase buy-in and reduce implementations costs
- Communicate strategies to community, peers, staff, and students periodically



## Summary and Roadmap for Green Campus Initiative

TAMU already has many excellent practices in place. The campus is well on its way to becoming a benchmark for sustainability. Some of the current standout practices that the assessment identified are

- Many campus buildings have been commissioned
- Have measurable energy goals pursuant to governor's executive order
- Automated irrigation control system and excellent water sub-metering
- City bus service provides mass transportation options to campus
- Campus vehicle fleet is 75% electric
- Strong participation in active recycling program with broad range of materials recycled
- Excellent accounting of chemical and hazardous waste control
- Trees and plants are used that fit in the local ecosystem and require little irrigation
- Integrated Pest Management System with complete tracking and use of some organic pest control options
- Have an existing wellness committee
- Have good custodial chemical use and practices, including procurement, underway
- Asbestos-Free campus
- No smoking policy in and around buildings
- Carbon Dioxide monitoring in gym
- Aggressive workplace safety training and education program and ergonomic assessments
- Sustainability-related courses include Environmental Science & Environmental Geology

While TAMU is well on its way to becoming a sustainable campus leader, there is much opportunity for improvement. The key opportunities for the campus are listed below. Some of these may be implemented immediately, while others may require more time or further investigation. The university can decide which areas it would like to pursue based on budget, impact and interest.

### Resource Conservation

Immediate Opportunities	Areas that Need Further Investigation or Time
<ul style="list-style-type: none"> <li>• Make energy conservation numbers easily available to faculty, staff, and students</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate purchase of green power through the TAMU system electricity contract</li> </ul>
<ul style="list-style-type: none"> <li>• Commission buildings that have not yet been commissioned and any buildings that are showing poor performance</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate the use of local natural gas</li> </ul>
<ul style="list-style-type: none"> <li>• Investigate use of more solar-powered illumination like the illumination for the signage at the entrance to campus</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate the use of clean or biodiesel for standby generators</li> </ul>
<ul style="list-style-type: none"> <li>• Implement a water conservation awareness program that will educate students and staff on the importance of water conservation and encourage conservation of water</li> </ul>	<ul style="list-style-type: none"> <li>• Continue investigation of irrigation control based on measured evapo-transpiration</li> </ul>
<ul style="list-style-type: none"> <li>• Continue pursuit of use of gray water from the City of Laredo for sustainable irrigation</li> </ul>	<ul style="list-style-type: none"> <li>• Continue to investigate viable uses(s) for AHU condensate</li> </ul>
<ul style="list-style-type: none"> <li>• Continue to press for evaporation sewer allowance for cooling tower water</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate viability of mulching for water conservation</li> </ul>
<ul style="list-style-type: none"> <li>• Consider using waterless urinals in new</li> </ul>	<ul style="list-style-type: none"> <li>• Further investigate opportunity for composting</li> </ul>

construction	
<ul style="list-style-type: none"> <li>Quantify recycling (document and further publicize)</li> </ul>	

**Campus Infrastructure**

<u>Immediate Opportunities</u>	<u>Areas that Need Further Investigation or Time</u>
<ul style="list-style-type: none"> <li>Create a statement of how energy efficiency and other sustainability issues will be considered in future construction</li> </ul>	<ul style="list-style-type: none"> <li>Assess opportunity for LEED certification of the new Student Success Center &amp; future buildings</li> </ul>
<ul style="list-style-type: none"> <li>Set up preferred parking for alternative fuel and hybrid vehicles in visible, choice locations</li> </ul>	<ul style="list-style-type: none"> <li>Assess potential for LEED certification of the existing campus</li> </ul>
<ul style="list-style-type: none"> <li>See if the city can add a bike rack to the bus line that comes to campus</li> </ul>	<ul style="list-style-type: none"> <li>Investigate incentives to encourage carpooling</li> </ul>
<ul style="list-style-type: none"> <li>Encourage departments to choose Energy STAR equipment and appliances</li> </ul>	<ul style="list-style-type: none"> <li>Complete Campus Loop</li> </ul>
	<ul style="list-style-type: none"> <li>Facilitate the use of more bicycles</li> </ul>
	<ul style="list-style-type: none"> <li>Investigate heat island mitigation strategies</li> </ul>
	<ul style="list-style-type: none"> <li>Investigate use of retention pond for storm water</li> </ul>
	<ul style="list-style-type: none"> <li>Implement green purchasing policy</li> </ul>

**Health and Well-Being**

<u>Immediate Opportunities</u>	<u>Areas that Need Further Investigation or Time</u>
<ul style="list-style-type: none"> <li>Increase availability of sustainable food products such as organic and hormone free foods (if there's interest)</li> </ul>	<ul style="list-style-type: none"> <li>Investigate use of food scrap as animal food source</li> </ul>
<ul style="list-style-type: none"> <li>Mitigate waste materials from food service</li> </ul>	<ul style="list-style-type: none"> <li>Plan for dish washing facilities in new campus dining center</li> </ul>
<ul style="list-style-type: none"> <li>Implement green custodial plan and practices</li> </ul>	
<ul style="list-style-type: none"> <li>Use low VOC materials for carpeting and paint</li> </ul>	
<ul style="list-style-type: none"> <li>Encourage neutralizing acid/base combinations as part of teaching process to eliminate these wastes and teach about waste disposal issues.</li> </ul>	

**Academics and Culture**

<u>Immediate Opportunities</u>	<u>Areas that Need Further Investigation or Time</u>
<ul style="list-style-type: none"> <li>Get students involved through course project participation</li> </ul>	<ul style="list-style-type: none"> <li>Identify resources and personnel for implementation</li> </ul>
<ul style="list-style-type: none"> <li>Insert sustainability related modules in existing courses</li> </ul>	<ul style="list-style-type: none"> <li>Implement green campus initiative based on this assessment report</li> </ul>
<ul style="list-style-type: none"> <li>Create activities that foster participation in and awareness of sustainability (such as adopt-a-road, earth day, etc.)</li> </ul>	

**Next Steps**

The next steps for TAMIU are to put together an action plan that will make sustainable practices part of the University policy. The implementation plan should address the steps that they plan to make and show a timeline for completion of these steps.

Recommended steps:

- Finalize assessment plan
- Adopt University policy on Sustainable Campus
- Adopt action plan

- Create permanent Green Team and assign responsibilities for implementation
- Identify and secure implementation funding and personnel
- Actively involve students in planning and implementation
- Annually review progress and update implementation plan

Benefits to TAMIU for Sustainable Initiative – A Sustainable Campus initiative will have many short and long term benefits as follows:

- Reduced utility expenses (as much as 50% in new construction)
- Improved indoor air quality
- Improved learning environment
- Reduced air, land, and water impacts on environment
- Create new generation of resource and energy conscious graduates
- Creates benchmark for others in the Valley to follow
- Identifies TAMIU as a regional and national leader in sustainable educational advancements

This project will have significant impact on the University, local community, and Texas A&M University System as well as its international neighbors in Mexico.

Texas A&M International University  
Campus Sustainability Assessment

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## Appendices

Appendix A: Campus Sustainability Mission Statement and  
Sample Policy Statement

Appendix B: Reference Sources for Sustainable Campuses

Appendix C: Commitment Letter for Interim Funding

## **Appendix A: Campus Sustainability Mission Statement and Sample Policy Statement**

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### **Model Addendum to Existing Mission Statement:**

*Texas A&M International University also recognizes the critical importance of sustainability to better prepare for the future of the University, the students, and the community. Our present needs must be met while protecting the interests of future generations.*

### **Sample Policy Statement from Duke University**

#### **Duke Environmental Policy Statement**

Duke University seeks to attain and maintain a place of leadership in all that we do. This includes leadership in environmental stewardship and sustainability on our campus, in our medical institutions, and in the larger community of which we are a part. We will bring vision, intellect, and high ethical standards to our pursuit of environmental leadership in research and teaching, institutional operations, and our relationship with the community.

#### *Academics*

Duke University will continue to be in the forefront of environmental research and education and will continue to use our institutional capability to constructively affect environmental policy throughout the world. We are committed to supporting interdisciplinary environmental scholarship and research, disseminating information about environmental research and policy, increasing faculty and student awareness of environmental issues, and enhancing environmental educational offerings.

#### *Operations*

Duke University will comply with all relevant environmental laws and regulations and go beyond compliance by integrating the values of sustainability, stewardship, and resource conservation into our activities and services. We will make decisions to improve the long-term quality and regenerative capacity of the environmental, social, and economic systems that support the University's activities and needs. We will engage in pollution prevention activities and develop and promote practices that maximize beneficial effects and minimize harmful effects of operations, research, and activities on the surrounding environment. We are committed to assessment of the environmental impacts associated with our activities and services, and we will develop and track measures of our progress.

*Community*

Duke University is committed to playing a constructive and collaborative role as a responsible environmental citizen in the life of the surrounding community. We will maintain a positive and proactive role in communicating with the surrounding community, especially the Durham community, regarding our environmental activities and performance.

**Richard H. Brodhead**  
President

**Victor J. Dzau**  
Chancellor for Health Affairs

**Tallman Trask III**  
Executive Vice President

**Peter Lange**  
Provost

*March 1st, 2005*

**Other Resources for Campus Model Policy and Mission Statements from the Association of University Leaders for a Sustainable Future**

<http://www.ulsf.org/cgi-bin/searchresults.cfm?catID=4&subcatID=13>

## Appendix B: Reference Sources for Sustainable Campuses

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### Documents:

1. Good Company's *Sustainable Pathways Toolkit for Universities and Colleges Indicators for Campuses*, Version 4.0, 2004.

<http://www.goodcompany.com/lib/documents/SPToolkit-v4-101904.pdf>

2. UC Berkeley Campus Sustainability Assessment, 2005.

<http://sustainability.berkeley.edu/assessment.html>

3. University Leaders for a Sustainable Future's *Sustainability Assessment Questionnaire (SAQ) for Colleges and Universities*.

### Sustainability Websites:

Association for the Advancement of Sustainability in Higher Ed: <http://www.aashe.org/>

Furman University <http://www.furman.edu/sustain/>

Rice University <http://sustainability.rice.edu/>

University Leaders for a Sustainable Future: <http://www.ulsf.org/>

University of British Columbia: <http://www.sustain.ubc.ca/>

University of California Berkeley: <http://sustainability.berkeley.edu/index.html>

University of California Office of the President: <http://www.ucop.edu/facil/sustain/>

University of California Santa Barbara <http://sustainability.ucsb.edu/>

University of Colorado: <http://ecenter.colorado.edu/index.html>

## **Appendix C: Commitment Letter for Interim Funding**

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**TEXAS A&M INTERNATIONAL UNIVERSITY**  
A Member of The Texas A&M University System

### Office of the President

September 18, 2006

Dr. Dan Turner, Director  
Energy Systems Laboratory  
3581 TAMU  
College Station, Texas 78743-3581

RE: Carnegie Mellon Advanced Building Energy Technology Initiative

Dear Dr. Turner:

It is my understanding that the Energy Systems Laboratory is participating in a proposed U.S. Department of Energy funded project for the transfer of technologies from the Advanced Building Energy Technology Initiative (ABETI) at Carnegie Mellon University in Pittsburgh, Pennsylvania. The purpose of this letter is to indicate our strong interest in collaborating with your Laboratory by evaluating the techniques and technologies of the ABETI program for potential application in our new \$25 Million Student Success Center planned for our campus in 2007.

The planning and design for the new Center is imminent so timing is of the essence if we are to consider any of the lessons learned from the ABETI project. Our goal is to make this new facility as energy efficient as possible, while utilizing the latest technologies and renewable resources in a building that will be a flagship for our new Sustainable Campus Initiative as well as serve as a pilot project for the entire Texas A&M University System capital expansion plan.

We look forward to working closely with your team.

Sincerely,



Ray M Keck, III  
President

CC: David Claridge Malcolm Verdict

5201 University Boulevard, Laredo, Texas 78041-1900, (956)-326-2320, Fax (956)-326-2319