

Green University: Changing Tomorrow, Today

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Abstract

As a part of the University of Central Oklahoma's core values: Character, Community and Civility, the opportunity to take initiative as an individual or a department is highly recommended. The opportunity to foster needed change and be a leader on campus is easier to take advantage of than to ignore. In 2004, the University of Central Oklahoma made the decision to become a Green University. A Green University is a university that is a steward of their resources, renewable and non-renewable, and strives to decrease the size of their carbon footprint by pursuing various mediums conducive to the proliferation of the environment. There are many facets to our journey of becoming a Green University. The most innovative of those facets are as follows: 100% green energy use through wind power, on-site creation of Bio-Diesel, Performance Contracting, Lean, and Recycling Campaign.

Each department, employee and student of the University of Central Oklahoma has the opportunity to be the change they want to see at their institution. The journey of becoming a Green University has been paved by many different champions. Each facet endeavored by the institution has a place in the success of the Green University project. The ideas have been fostered from many different places on campus, but at the end of the journey our employees recognize themselves as the employees of not only the College of Liberal Arts or Auxiliary Service, but of UCO.

The development, production, and implementation of each facet contributes to the overall goal of becoming a Green University and is an example of UCO's commitment to the community we reside. From the students to the President there are positive affects for all stake holders.

Introduction:

The University of Central Oklahoma is a regional institution with a current enrollment of 15,000+ students. Centrally located in Edmond, Oklahoma, a suburb of Oklahoma City, the University is in the top 6 % of higher education institution enrollment across the nation. The student population drawing from 76 (out of 77) Oklahoma counties, 47 states and 76 countries provides the University with a rich cultural diversity.

The University of Central Oklahoma is Oklahoma's oldest institute of higher learning, established 17 years before statehood in 1890. The Oklahoma State Regents for Higher Education was formed by state leaders in 1941 and has governed the University since then.

The University currently has five academic colleges offering both undergraduate and graduate programs. UCO is dedicated to educating responsible, productive and engaged Oklahomans in a dynamic environment where building leaders and welcoming the challenge of change is endorsed. Three core principles are embraced by the University: Civility, Community and Character.

Statement of Problem/Initiative

Problems are internal situations that are substantially affected by external factors. The problem that UCO faces is the same problem the world is facing, energy-consumption and sustainability. The increasing cost of energy has been a substantially impacting issue that UCO chose to overcome. UCO came to a crossroads. How can we curb the cost of energy while being stewards of the environment in which we reside? UCO focused on the following innovative facets: 100% Green Energy use, on-site creation of Bio-Diesel, Performance Contracting, Lean, and Recycling Campaign.

Green/Wind Energy. The University of Central Oklahoma is sited on 206 acres with approximately 1.6 million square feet of space in 45 buildings. The energy use of this “small city” is substantial. Each year UCO uses over 26,000,000 kwh of energy. The major issue with this amount of kwh usage through traditional means of electricity is as follows: the production of 26,000,000 kwh of traditional energy equals 37,000,000 pounds of CO2 emissions and would take nearly 60,000 trees to neutralize that amount of CO2 emission. This was the basic premise for the need to endeavor more environmentally friendly measures of sustainability. In the past, traditional energy was acquired via typical means. UCO had a partnership with the local electricity provider, Edmond Electric, and used electricity from the city electric grid. We realized we could purchase green energy through the power of wind with our partner Edmond Electric. We did not have enough resources to initially endeavor this project. Through the creation of

the innovative partnership with our vendor, Johnson Control, Inc. the university was able to attain maximum efficiency and therefore purchase wind power.

Bio-Diesel. The Physical Plant was dealing with the following external effects: rising cost of Petrol-Diesel, unknown effects of the new Ultra Low – Sulfur Diesel on heavy equipment (an EPA mandate, effective 2007), and environmental factors that did not correspond with UCO’s partnership as a “Green University”. The Physical Plant recognized this problem and began to develop ways to make the change they wanted to see in the world. The Physical Plant invested time, money, and labor into the development of Bio-Diesel. This effort was supported by the students, administration, and community. Through this investment there has been a reduction of hazardous fuel use on campus and fuel budget savings by utilizing university produced Bio-Diesel fuel.

Performance Contracting. By 2001, it was apparent that UCO needed to resolve longstanding facility energy and capital investment problems. Performance Contracting was recognized as the medium to resolve UCO’s energy problems. Two buildings had gone through the summer without air conditioning capability, the central plant was not operating efficiently or reliably, the HVAC staff was not capable of providing necessary maintenance and repair activities, and funding was insufficient to handle the university's emergency needs. Students had alerted the media to the situation, and faculty occasionally had to let classes go early because of the hot temperatures. Additionally, campus leaders needed to reduce energy costs to help keep tuition prices manageable.

Lean University. The University needed to find ways to dramatically improve both productivity and improve deteriorating employee morale. Limited fiscal resources with increases in mandatory personnel costs and growth in student enrollment have made it challenging to maintain existing programs, much less expand services.

Traditionally public university funding has been insufficient. Having experienced budget reductions of 15% in 2002 and no significant increases since then, the University of Central Oklahoma students now contribute 50% of the total University Budget. The budget situation is not expected to improve; therefore ways to more efficiently use the University funds is critical for program maintenance and expansion of programs to meet our customer needs.

In addition to limited funding, ineffective administrative processes were contributing to employee job dissatisfaction and low productivity levels. Mountains of red tape buried employees in non-value added administrative processes and created an environment that did not focus on customer service. With our limited staff, the energy to initiate and implement process improvements had been bypassed and instead, processes were patched with band-aids over and over again, which created a downward spiral reducing customer satisfaction and employee morale.

The Executive Vice President conducted focus groups with campus constituents to develop a list of priorities for process improvement. The outcome was a need to overhaul a multitude of administrative processes that over time had strangled the university's ability to function efficiently.

Recycling Campaign. At UCO recycling has always been viewed as an opportunity. With over 16,000 students, 2,000 employees and 200 acres of land it is imperative that we treat our university like a small city. With the size of our on-campus population and the size of our campus coupled with the number of people who visit our campus per year all signs pointed to recycling as a way to reduce the amount of trash we sent to the landfill. The problem in this case was obvious. We had to recycle, reduce, and reuse. Through Lean University, our recycling campaign, and various other methods of sustainability efforts we are able to keep our landfills from becoming overfilled. UCO recognized a problem that came with a simple solution: Recycle, Reduce, Reuse.

Design

Green/Wind Energy. UCO immediately began assessing the environmental opportunity and financial situation of the university. Beginning in 2004, UCO set our goal of becoming 100% Green Energy dependent by 2007. Through partnerships with the City of Edmond and the Environmental Protection Agency- Green Energy Division, we have become more engaged in the successful implementation of our commitment. Specifically, UCO realized that we could purchase wind power from our local electricity provider, Edmond Electric. We assessed what it would take to move to where we wanted to be. In the beginning, the production cost of wind energy was more costly than traditional energy. UCO began determining what we could do to create a more level playing field between the two energy costs (wind vs. traditional) and potentially create cost and energy savings. By becoming a Green University, UCO pledges to use a

minimum of 18% Green Energy. Green Energy eligible resources include: wind, solar electric, geothermal, biomass, and hydro. The partnership with EPA, being appointed to the Green Power Leadership Club, winning the Green Power Partner Challenge, and 100% wind energy are all pieces to the bigger picture that contributes to UCO's status as a Green University. To date, UCO has saved over \$51,000 in purchasing over 50,000,000 kwh of electricity provided via wind. This translates to the need of nearly 112,500 trees to absorb the 75,000,000 pounds of CO2 emissions released into the environment. Wind energy has been the largest component of the decreasing size of our "carbon footprint". We, at UCO, are doing our best to make today better than yesterday and that is a mantra of a true steward.

Bio-Diesel. In 2006, the employees of UCO Physical Plant took advantage of administrative support and the opportunity to use their abilities to promote change in the world of Bio-Diesel. The employees of our Physical Plant recognized a problem that came with an opportunity. The department explored a move from Petrol-Diesel to Bio-Diesel fuel for their equipment. Bio-Diesel is fuel produced for diesel engines from vegetable oil or animal fat. The vegetable oil and animal fat used for the Bio-Diesel was attained through our on campus cafeterias and eateries. This change allowed UCO to embrace a more economical fuel source, a more environmentally friendly fuel substitute, and create a template for other interested parties to implement. By using Bio-Diesel the concern of the Physical Plant in regards to the petrol-diesel stored on campus is being appeased. Currently a 2,000 gallon above ground tank stores the supply for vehicles not currently using Bio-Diesel. This is a potential hazard, and our goal is to reduce the

storage unit to a 500 gallon tank. The University's plan to expand the Bio-Diesel program will help to meet this goal. A byproduct of the Bio-Diesel process is glycerin. The motor-pool uses the glycerin as degreaser and soap for the mechanics. The glycerin's use as a degreaser saves the university \$2,346 per year. The University is currently using Bio-Diesel in their forklift, two trucks, and a John Deere Tractor. The University plans to expand the use of Bio-Diesel to many of their other diesel running engines. Since 2006, the Bio-Diesel project has saved over \$10,000 in the form of 2,400 gallons of Bio-Diesel and yearly supplies of degreaser. This translates to the need of 80 trees to absorb the 53,722 pounds of CO₂ emissions that would have otherwise been released into the environment. UCO's Physical Plant recognized this problem and began to develop ways to be the change they wanted to see in the world. The Physical Plant invested time, money, and labor into the development of Bio-Diesel. This effort was supported by the students, administration, and community. Through this investment there has been a reduction of hazardous fuel use on campus by utilizing university produced Bio-Diesel resulting in fuel budget savings.

The Bio-Diesel Team began by searching various methods of Bio-Diesel production which included internet Bio-Diesel maker websites and 'How To' training videos. Through their investigations they determined the most economical and plausible method for Bio-Diesel production.

The steps are as follows:

- Oil is pumped into containers from the used cooking oil collection site.
- The harvested oil is then pumped into the heating and filtering system.
- The oil is then heated to 140 degrees in order to thin the oil for final filtering.

- The oil is then filtered in order to remove all water and all but the smallest particulate matter.
- The still warm oil is then collected and held in a secondary tank.
- The most important step in the process is Titration.
 - Titration determines the amount of Free Fatty Acids (FFA) contained in the oil. FFA's are what make cooking oil "thick", too thick to be safely used in today's diesel engine. Titration consists of three effects.
 - Isopropyl alcohol.
 - A diluted solution Lye and distilled water.
 - A precisely measured amount of filtered oil.
 - Alcohol and oil are mixed together and the Ph is checked.
 - The water Lye solution is added until the Ph spikes, then stop adding solution.
- Add the Lye determined from the Titration process (accurate to .5 grams)
- Measure methanol (200 ml per liter of used cooking oil)
- The methanol and lye are then added to the floor mounted drill press that is outfitted for mixing Bio-Diesel. Mix until the lye is completely dissolved.
- The clean, still warm, filtered oil is then added to be mixed.
- The lye/methanol/cooking oil mixture is blended for one (1) hour.
- It is now a mixture of Bio-Diesel and glycerin. The mixture is now allowed to settle.
- The oil has now undergone the Transesterification chemical reaction process.

- The mixture sits sealed containers for a minimum of eight (8) hours. The glycerin settles to the bottom, leaving pure Bio-Diesel on the top.
- After settling, the Bio-Diesel is pumped off and filtered one last time. This removes any remaining impurities in un-reacted chemicals.
- Finally the specific gravity is checked. This confirms the reaction sufficiently thinned the oil.

After the final step the university has a cleaner burning, environmentally friendly diesel fuel that has much better lubricating properties than fossil diesel fuel. Another positive factor is the smell that arises during the burning process of the diesel—French Fries.

Performance Contracting. Through a performance contract with Johnson Controls, Inc., projects costing approximately \$8.9 million were undertaken to replace the central plant's main chillers, connect the two buildings without HVAC capability to the central plant loop, replace the boiler systems in two buildings and a host of other HVAC upgrades and modernizations. That phase was so successful that in 2005, Johnson Controls and UCO entered into an agreement for another \$1.8M in projects. Work performed in 2006 includes another \$1.8M in projects related primarily to energy efficient building controls systems. Major energy improvements have been made in the condition of the campus infrastructure that will be paid for with the guaranteed utility savings to be accrued from the projects accomplished which is the exact definition of performance contracting. Emergency conditions have disappeared, and customer satisfaction with facilities conditions is as high as it has ever been. Since the implementation of Performance

Contracting, more than \$3.8M has been saved and we have reduced our CO2 emissions by 60,000,000 pounds which equals nearly 90,000 trees needed to absorb that amount of CO2.

Lean University. The Lean University program was developed by UCO staff and works to eliminate waste in all processes. From time to resources the Lean University model has resulted in annual savings to the university of several hundred thousand dollars. One focus that spans over Lean processes is the effort to move processes to paperless. By using electronic tools that provide more accurate information, security, and paperless opportunities it increases efficiency, accessibility, and accuracy. One example of a Lean process conducted in our Facilities Management department has saved over \$14,000 in paper per year since 2005. This is the equivalent of 2,800 reams of paper and over 168 trees saved via the efforts of this one project. The total impact of Lean projects are over \$34,000 in cost savings, 6,800 in reams of paper saving and over 410 trees in tree savings. Instead of being produced into paper, the trees saved can absorb over 250,000 pounds of CO2 emissions. This is a huge savings to the university and the world.

Recycling Campaign. The UCO Recycling Program (UCORP) officially began in 2007, but the University has been recycling materials such as paper, oil, and landscape trimmings for several years. In 2007, as part of our commitment to resource and environmental preservation, UCO undertook the development of a comprehensive recycling program and expanded the service to include a wide variety of waste materials that are collected and diverted from area landfills. Much of the refuse goes to non-profit

organizations such as Cans for Africa and is then recycled, converted into dollars, and used for community advancements. Currently, the UCO Recycling program operates as a Facilities Management service, under the direction of the Physical Plant Director. A steering committee, made up of Physical Plant personnel, participate in program development and monitor the implementation of services. The program is designed to make recycling easy and accessible to all students, faculty, staff and campus guests. One of the key concepts of UCORP is to foster environmental stewardship through the recycling, reuse and reduction of solid waste generated campus-wide.

Implementation

Green/Wind Energy. The implementation of going to 100% green through the power of wind was disparate from the beginning. We were the first partner with the local electric provider and it was one of our first decisions in regards sustainability and green power purchase. The project initially had a few discrepancies, but we were able to overcome these downfalls through contracting and innovative resource use. Initially the price of green energy was higher than the cost of traditional energy. When a buyer purchases green energy you are locked into a price; therefore, if the price of traditional energy rises and falls, which it does and can, the price the buyer and provider locked in on becomes very important. Shortly after the purchase of wind power the prices of traditional energy substantially increased and this created a cost savings for UCO and the wind power purchase. More than the cost savings and partnerships is the fact that UCO is doing their best to be their best by being stewards of their environment.

Bio Diesel. Waste vegetable oil was requested and authorized from the Director of Food Services from the University's Student Union. The oil was then harvested. Experiments in Bio-Diesel production began with small test runs. After successful implementation of Bio-Diesel in various heavy equipment applications the Chemistry Department was consulted for further testing and information for improvement of Bio-Diesel end production. In order to create a higher quality fuel we implemented a bubble washing procedure. A methanol reclaimer was designed and built to reclaim methanol for re-use in the project saving approximately 30% in methanol costs.

The university is currently using Bio-Diesel in their forklift, two trucks, and a John Deere Tractor. In the future, the university is planning to use the Bio-Diesel in many of their other diesel running engines. The university Physical Plant is also concerned with the amount of petrol-diesel currently on campus. The 2,000 gallon above ground tank is a potential hazard with the renovations of a changing university. The university as a whole would like to see our on site petrol-diesel decline from the need of a 2,000 gallon tank to the need of a 500 gallon tank. Through the production and implementation of Bio-Diesel the university has also found benefit in the glycerin that is a byproduct of the Bio-Diesel process. The glycerin is currently being used in the motor-pool as degreaser and soap for the mechanics. Through the implementation of Bio-Diesel, the University of Central Oklahoma is becoming a more environmentally friendly place to study, work, or just enjoy a Sunday afternoon.

Performance Contracting. Once funding was available and all projects selected and approved, JCI began work on the balance of projects based upon a schedule that would cause the least, if any, disruption to faculty, students and staff. UCO made progress payments to JCI as with any normal construction or renovation project. JCI's audit of previous utility bills also revealed that UCO had been overcharged in some areas. With their involvement, the utility companies agreed to repay UCO over \$130,000. JCI was also instrumental in renegotiating the future electric rates for UCO. As a result of the project that would make the old thermal energy storage tank work properly, UCO could reduce its electrical demand during peak periods, thereby saving money, plus reducing the demand on the utility.

Based on their past history, UCO also had serious doubts the existing staff was capable of handling future operations, maintenance and repair requirements of the new systems.

UCO decided to outsource all HVAC system operations, maintenance and repair activities to JCI as part of the Performance Contracting effort. Fourteen employees were terminated with the guarantee from JCI that they could provide all operations, maintenance and repair activities at a guaranteed savings of over \$200,000 annually.

The transition went smoothly and JCI has performed flawlessly for over 15 months.

There have been no serious outages that can be attributed to failures of the JCI staff or the new equipment.

When the first phase of the contract was completed, the university had spent approximately \$8.9M and expected to pay for the bonds over 20 years. After Phase I was completed, additional candidate projects were reviewed and selected for Phase II, which is almost complete for a value of \$1.8M.

JCI is currently reviewing the campus situation to determine if there are other projects that can be accomplished as Phase III. If justifiable projects with acceptable paybacks can be identified, the University will consider proceeding with them for additional savings and improvement of the campus infrastructure.

Lean University. Utilizing the four-step Lean model, the University of Central Oklahoma began implementation of the Lean initiative by holding an informational meeting attended by all administrative support staff. This meeting was used to provide a brief overview of Lean, to convey the reasons for implementing Lean, to stress that all administrative support staff would be involved, and to explain the steps required achieving this cultural change. Argent and Francis Tuttle Technology Center partnered to provide the training at the University.

Step One of the Lean model was already in process. The campus-wide survey results were constantly being analyzed and reviewed for where the “pain” was greatest. Steve Kreidler, Executive Vice-President of Administration, and his immediate staff began prioritizing issues and opportunities looking for possible pilot projects and other areas where immediate attention was necessary to improve customer service. Processes in every department were identified for the Lean approach. A priority list was developed. The work order process used by the Facilities Management department was selected as the first process to be analyzed with the Lean approach for two reasons: 1) number of complaints regarding delays in work order completion and 2) impact of improvement on the whole campus, encompassing all divisions. The Facilities Management staff welcomed the opportunity to participate in this first workshop and improve their service.

Step Two was launched within two weeks of the development of the priority list. One-day classes were offered to train all administrative support staff from the lowest paid employees to the Executive Vice-President of Administration with the *Quality-Driven Lean Enterprise™* class, offered by Argent. This Lean class focused on the way Lean is used in administrative, service and support type processes, and how Lean ties into quality initiatives that may be implemented in parallel or are already in place. Each class contained lecture and simulation to not only explain the concepts of Lean, but also demonstrate the power in a hands-on fashion. A simulation exercise with class participants playing a role of an empty and critical position demonstrated the Lean tools and techniques using the hiring process.

These classes were followed with a Value Stream Mapping (VSM) workshop. This two-day workshop on-campus used a value stream of the university as the basis for learning. During the two days, a current state map and a future state map were created by the workshop participants. Approximately 50% of the time was spent in the classroom learning VSM techniques and the remainder of the time was spent actually walking the process, mapping it and discussing opportunities with the employees working the process on a daily basis. At the conclusion of the workshop, participants had acquired basic VSM skills to build on, and had a current state and future state map that were approximately 60-70% accurate. This level of accuracy is very close to being good enough to start making improvements.

Step Three began at the conclusion of this workshop. VSM maps visually illustrate the process for employees, first in the current state (as it is now) and then in the future state

maps (defining priority changes). A Lean implementation project, also known as a kaizen event, is used to address VSM maps future state.

Departments independently implemented changes in their process based on the maps prepared in the workshop. Some examples of major changes made to improve processes include:

- Employment Services – online hiring system
- Purchasing – online requisition process
- Budget Office – electronic monthly reports

While *Step Two* and *Step Three* of the Lean model are continuing to grow and expand, *Step Four* is also up and running. As quickly as an initial project is completed, the results are reviewed and efforts are being made to instill the concepts of continuous improvement into the affected process.

Recycling Campaign. The recycling campaign at UCO was initiated and “unveiled” in May of 2007. The implementation of this program has gone very smoothly. One of the most powerful outcomes has been in regards to the number of aluminum cans that have come in. UCO has partnered with Cans for Africa (a non-profit organization). The cans go directly to Cans for Africa and then get exchanged for money and the money is then used to develop areas in Kenya with education institutions, dormitories and clinics. This program will foster the desired results in the following year. Due to the early stages of development there is no way to give empirical data, but this is a substantial component to our success as a “Green University”.

Benefits

Green/Wind Energy. To date, UCO has saved over \$51,000 in purchasing over 50,000,000 kwh of electricity provided via wind. This translates to the need of nearly 112,500 trees to absorb the 75,000,000 pounds of CO2 emissions released into the environment.

	Savings				
	Cost	Gallons	Cost/Mo	Months	Savings/year
Current diesel usage per gallon	\$ 2.40	125	\$(300.00)	8	\$ (2,400.00)
Reclamation of Methanol (50% per 125 gal)	1.75	13.75	(24.06)	12	(288.75)
Safety Kleen Aqueous Brake Cleaner	717.63				(717.63)
Non-Chlorinated Brake Cleaner	831.60				(831.60)
J.B. Petroleum Degreaser	615.72				(615.72)
Chemco Hand Cleaner	181.44				(181.44)
					<hr/>
					Total Savings/year
					\$ (5,035.14)
					Savings/month
					\$ (419.60)

***Savings based on Bio-Diesel and the byproduct Glycerin for one year. (x 2 for two years)**

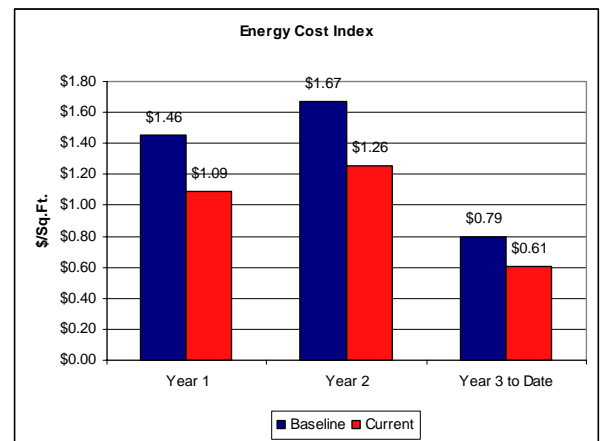
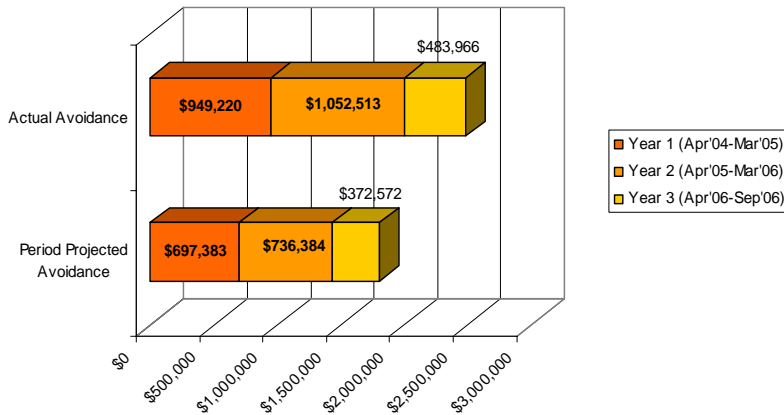
Bio Diesel. Since 2006, the Bio-Diesel project has saved over \$10,000 in the form of 2,400 gallons of Bio-Diesel and yearly supplies of degreaser. This translates to the need of 80 trees to absorb the 53,722 pounds of CO2 emissions that would have otherwise been released into the environment.

The benefits of Bio-Diesel have made an impact on the UCO campus. The benefits of Bio-Diesel are as follows:

- o Provides a cleaner immediate area around our student population.

- UCO can cut its fuel operation expenditures by a percentage while planning to lesson our hazardous stores of Diesel fuel.
- Budge savings
- Oil waste reduction
- Reduction of toxic emissions
- Budget savings statewide
- There are no immediate mandates on Bio-Diesel storage, since it is not classed as “hazardous” due to its characteristics.
- The waste product produced by mixing Bio-Diesel is Glycerin/lye soap that can be used for cleaning equipment as a degreaser.
- The glycerin can also be used to wash hands.
- The onsite amount of waste cooking oil is incredibly large. The harvest opportunity is also a benefit for Bio-Diesel.
- With new federal 2007 Diesel Fuel Mandates, we may be able to greatly lesson the University’s liability for storage, clean up, and responsibility.
- Bio-Diesel has a detergent characteristic that enables engines to run cleaner, as well as superior lubrication through fuel system components.
- Bio-Diesel is easier on the engine and machine.
- Student research involvement via College of Business/College of Math and Sciences
- Template that will be created in order to teach other interested parties how to produce their own Bio-Diesel.

Performance Contracting. Since the implementation of Performance Contracting, more than \$3.8M has been saved and we have reduced our CO2 emissions by 60,000,000 pounds which equals nearly 90,000 trees needed to absorb that amount of CO2.



Lean University. One example of a Lean process conducted in our Facilities Management department has saved over \$14,000 in paper per year since 2005. This is the equivalent of 2,800 reams of paper and over 168 trees saved via the efforts of this one project. The total impact of Lean projects are over \$34,000 in cost savings, 6,800 in reams of paper saving and over 410 trees in tree savings. Instead of being produced into paper, the trees saved can absorb over 250,000 pounds of CO2 emissions.

The following summary demonstrates many of the benefits experienced to date:

Training

- By providing the basic one-day introductory Lean course, all employees of Administrative Services have begun to realize that they are a part of the big picture,

that they do have input into the processes they work within, and that good things can and do occur as a result of continuous improvement.

- Creating a common understanding and explaining to groups consisting of both management and staff positions that everyone is expected to participate, has opened the door for positive input and constructive criticism without fear of retribution. Many employees are not even waiting for events and workshops to occur. They are proactively making small immediate changes with excellent results.

Cost Savings

- Even though the emphasis of this effort is on improving customer service across campus, there have been multiple instances of cost savings through project work. The first Facilities Management project alone was able to save more than \$14,000.00 in annual paper cost with only one week's worth of work.

Efficiencies

- In addition to the obvious efficiencies that have been created in Facilities Management, several other areas have experienced improved efficiency. In the Purchasing Department the flow of processing purchase orders was changed from a batch and queue methodology to synchronous flow. By working each purchase order as far into the process as possible and completing the work and printing in a non-stop manner, one process agent has been able to reduce the average time to complete a work order by over 70%.

Personnel Performance Improvements

- The overall morale and work ethic of employees in areas where changes have been made has improved significantly. By empowering employees to make positive process changes, actually have accountability and be responsible for their work, Lean

thinking has brought out the best in many employees. It has also on occasion motivated some employees who have stagnated or are entrenched in their ways to move on. Removing these human roadblocks in many departments has only made it easier for the rest of the employees in these departments to embrace the culture of continuous improvement.

Student Satisfaction

- Students have already begun to see the positive impact on services offered. The Facilities Management work order process improvements gained immediate support from students living on campus in student housing. Work order requests are considered to be part of the solution instead of a useless and prolonged step in the process.

Faculty Satisfaction

- While the efforts of this initiative have primarily focused on Administrative processes, the Lean core teams have addressed processes in Academic Affairs and Enrollment Management divisions. Faculty members are benefiting from the improved processes. Faculty feedback has provided insight into the wants and needs of faculty, and how they interact with Administrative staff. Faculty members whose responsibilities include the role of building monitor have once again become engaged in the process. These building monitors funnel work order requests to Facilities Management and monitor progress on the work. Under the old process, faculty members attempted to avoid this role. With the improved process, faculty members have become supportive team members.

Retrospect/Prospect

This Best Practices proposal is an overarching concept that allows the learner the opportunity to view a journey of one university and their goal of becoming a “Green University”. Many of the projects and programs implemented at the University of Central Oklahoma are designed around concepts that were most possibly and plausibly implemented on the campus. The noted “focal facets” are just the beginning of UCO’s goal to become a true “Green University”.

It is the responsibility of the University of Central Oklahoma to be stewards of our resources. The city of Edmond, state of Oklahoma, and United State of America confide in our higher education system to create well-rounded, environmentally conscious, and prepared individuals to lead our country in a global economy. As a university we pride ourselves on being the change we want to see in our students. We strive to exemplify character, community, and civility by being stewards of our resources. The total impact UCO has made on the environment due to the described efforts are as follows:

90,000,000 kwh used via environmentally safe means, avoided the use or killing of 202,500 trees, and 135,839,045 CO2 emissions avoided. While being stewards UCO also strives to be innovative in our processes and continually seek improvement in areas in need. We are always adapting and ever changing because the world we reside and our student are doing the same.