Northern Arizona University
Green Fund

Annual Project Review

May 2013

NORTHERN ARIZONA UNIVERSITY

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Executive Summary

In October 2007, President John Haeger signed on to the American College and University President's Climate Commitment (ACUPCC). The commitment he made was for Northern Arizona University to reach carbon neutrality by the year 2020. This commitment was followed in April 2010 by a Climate Action Plan (CAP) for the University (Appendix A: Summary of Goals). This CAP outlined emissions targets that would assist the University in meeting its carbon neutrality goal on time. Benchmarks of a 40% reduction by 2016 and a 60% reduction by 2018 have been set and reporting has already been submitted for 2008 and 2010 (with the dates of reporting being July 1, 2006-July 1, 2007 and July 1, 2009-July 1, 2010 respectively).

In March of 2010, the student body of Northern Arizona University voted to establish a Green Fund. This fund was set up in the form of a $5.00 per student per semester fee with funds being allocated to move the Northern Arizona University campus towards the stated goal of sustainability. It is stated in the mission of the NAU Green Fund that "The NAU Green Fund…provides funding for projects that reduce NAU's negative impact on the environment and makes NAU more sustainable. The NAU Green Fund will allocate funds to projects that increase the amount of renewable energy used on campus, increase energy and water efficiency, and reduce the amount of waste created by NAU." The NAU Green Fund differs from similar groups on other campuses primarily because it is a student-based group. All proposals must come form students and the voting members of the committee are of a student majority, with six of the nine members coming from the student body. All funded projects are required to have a goal of reducing the carbon emissions of the University directly and/or contributing to the culture of sustainability on campus.

From the Green Fund's inception in 2010 until today, 22 projects have been funded with results ranging from increased awareness of sustainability initiatives on campus, the creation of a culture of sustainability through different departments, buildings, and operations of the University, and a reduction in CO_2e emissions. All of these components are vital to the creation of a more sustainable University and should be considered as indispensable movements towards the end goal of carbon neutrality.

Timeline

- **October 2007: President Haeger signed the ACUPCC agreeing to reach carbon neutrality by 2020**
- **November 2008: First round of voluntary reporting submitted to the ACUPCC**
- **March 2010: Green Fund established at NAU**
- **April 2010: NAU submitted a Climate Action Plan setting benchmarks for carbon reductions**

- **December 2010: Second round of voluntary reporting submitted to the ACUPCC**
- **2016: Benchmark of 60% reduction**
- **2018: Benchmark of 80% reduction**
- **2020: commitment to carbon neutrality**

RESULTS OF VOLUNTARY REPORTING

Emissions Inventory for 12-month period beginning July 1, 2006

	Total	Per Full-Time Enrollment	Per 1000 Square Feet	% Offset
Gross emissions (Scopes 1 + 2)	59,552 metric tons of CO2e	3.4 metric tons of CO2e	11.6 metric tons of CO2e	0%
Gross emissions (Scopes 1 + 2 + 3)	78,858 metric tons of CO2e	4.6 metric tons of CO2e	15.4 metric tons of CO2e	0%
Net emissions	78,858 metric tons of CO2e	4.6 metric tons of CO2e	15.4 metric tons of CO2e	N/A

Emissions Inventory for 12-month period beginning July 1, 2009

	Total	Per Full-Time Enrollment	Per 1000 Square Feet	% Offset
Gross emissions (Scopes 1 + 2)	57,707 metric tons of CO2e	2.5 metric tons of CO2e	10.1 metric tons of CO2e	0%
Gross emissions (Scopes 1 + 2 + 3)	62,819 metric tons of CO2e	2.8 metric tons of CO2e	11.0 metric tons of CO2e	0%
Net emissions	62,819 metric tons of CO2e	2.8 metric tons of CO2e	11.0 metric tons of CO2e	N/A

Introduction

This report focuses on any project that has received financial support from the Green Fund during the time period of its inception in 2010 until the current round of funding was dispersed in December 2012. Some projects have been listed under the heading "Contributing to the Culture of Sustainability at Northern Arizona University", while other projects have specific carbon savings associated with them and have a more detailed description associated with their summary.

This report has three primary goals. These goals are to create a consistent method of evaluation and data collection that will allow for the comparison of current projects and

the analysis of potential future benefits from similar projects, to reveal a need to perform this data collection regularly to better assess progress and potential benefits, and finally to demonstrate the necessity of a fee increase in order to help the University reach its commitment of carbon neutrality by 2020.



Funded Projects

SUSTAINABLE LANDSCAPES

This project, although currently undergoing continued analysis, has provided multiple benefits that are not currently quantifiable through specific carbon savings. The main goal of this project has been an intended reduction in the use of herbicides throughout campus and an increase in the usage of non-toxic, environmentally friendly methods of landscaping (i.e . changes in soil pH). Although the Grounds Department of Facility Services uses herbicides according to manufacturer's recommendations, there is concern that these chemicals pose human health risks and can negatively affect local ecosystems, including damage to soils and water. The Sustainable Landscapes project has a variety of test sites in highly visible locations across campus. Each location has signage displayed that includes the list of project goals, allowing the impacts of this project to become noticeable to all.

The proposal for this project required a great deal of research to evaluate how the results align with the goals of the student body. Utilizing the data from a Green Fund Survey in 2010, it was determined that 96.6% of the student population agreed that the utilization of integrated sustainable practices into university life was worthwhile.

In the Climate Action Plan submitted by the University in 2010, Goal #2 under the Operations Section is listed as “Reduce the impact of chemicals used on campus”. An Action item listed below it states “Continue test-plot research on non-toxic grounds maintenance methods until a successful method is discovered and herbicide use on campus can be reduced”.

The university has also established a Learning and Enterprise Strategic Plan that includes the goal of **“**Stewardship and Sustainability of Place**” (see** App**e**ndix B: Climate Action Plan, Section 3). One strategy within this goal is for NAU **“t**o b**e** a mod**e**l o**f** **e**nvironm**e**n**t**ally r**e**s**p**on**s**ibl**e** and **s**u**st**ainabl**e** op**e**rat**i**on**s** and **e**du**c**a**t**ion**”**. The elimination of potentially toxic herbicides is seen as a critical first step towards environmental responsibility and sustainability.

As with all Green Fund projects, the goal is that this project would be awarded seed money and that continued maintenance of the project and any additional funds required for continued success be the responsibility of another department or agency. The continuation of this project is to be carried on by NAU Operations Department and the NAU Grounds Department.

The funding for the Sustainable Landscapes project has been awarded based on a variety of goals and anticipated results. Throughout this project, five students have already received academic credit from internship opportunities that were offered. As previously mentioned, the results of this project cannot currently be measured in carbon savings. These goals are, however, working towards the mission of the Green Fund and of the desires of the student body.

DYSON AIRBLADES

The proposal for the Dyson Airblades project was brought to the table by the Eco House. The Eco House is a student group dedicated to sustainable practices and lifestyles on campus. This project was developed for Reilly Hall, a freshman living hall, and included the installation of nine units throughout the building. The goal of the Dyson Airblade installation is to reduce the amount of paper waste and to increase the awareness of sustainability initiatives taking place on campus.

Based on the most recent Green Fund survey, 96.6% of students agreed that integrating sustainable practices into the university is worthwhile. This project meets this goal by eliminating the consumption of paper towels in all building restrooms. In this same survey 81.3% of students agreed that the installation of energy efficiency upgrades to the building (low flow showers, toilets, etc.) was at least somewhat important. The Dyson Airblades would fall into this heading as they have the lowest cumulative energy demand of any hand dryer tested [1] as can be seen in the chart below under the section of "Cumulative Energy Demand".

In the 2010 Climate Action Plan for the University, two goals were stated that are extremely relevant to this project. First, in Section 1: Academics and Research, Goal 3 lists the desire to "Promote the University as a responsible sustainable organization with experience in and commitment to sustainable practices". One focus of this project is to serve

[1] Montablo, T., Jeremy, G., and R. Kirchain. *Life Cycle Assessment of Hand Drying Systems.* Rep. Comp. Materials Systems Laboratory: MIT, 2011.

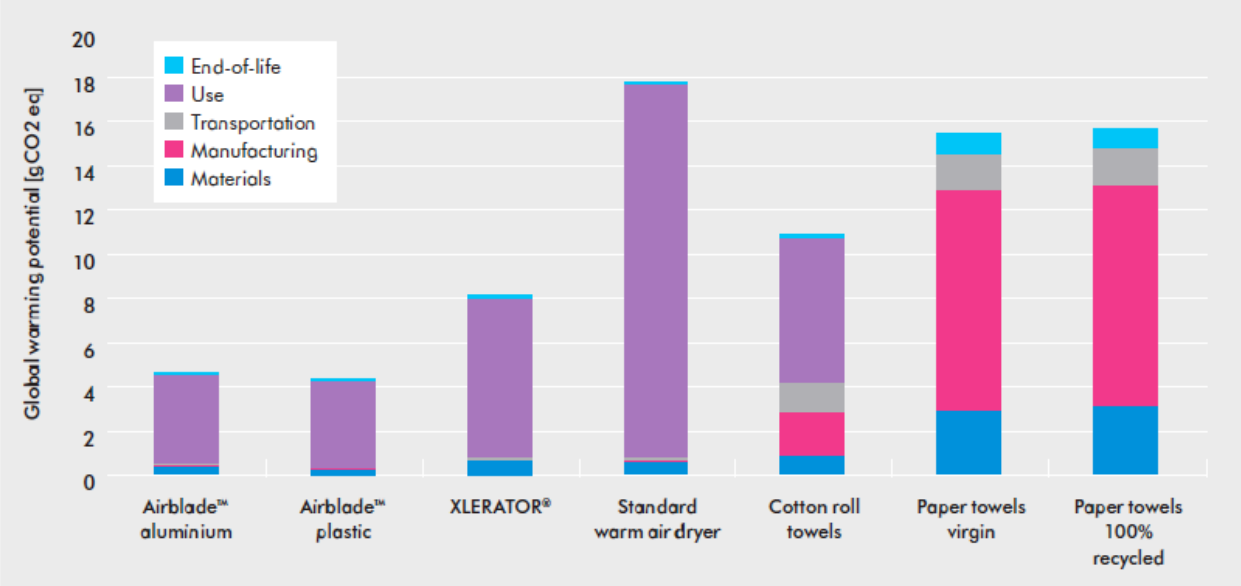
as a study site for comparison to Sechrist Hall, another Freshman dorm of similar size that still utilizes paper towels with the hope of demonstrating both financial and environmental savings. These results will help with the continued promotion of the expansion of sustainable practices to other dorms on campus. In Section 5, Recycling and Waste Minimization, Goal 1 is to "Create a zero waste campus". Based on the calculations preformed by the Eco House, the installation of the Dyson Airblades in Reilly Hall will be eliminating about 720,000 paper towels annually, moving the campus towards its zero waste goals. The life cycle costs of the specific product installed in Reilly Hall (labeled Airblade Plastic on the attached graph) can be seen below and takes into account the manufacturing, transportation, use, materials and end-of-life of these products for comparison.

As a Green Fund project, the question of continued maintenance and additional funding is always a critical component to ensuring a project's success. In the case of the Dyson Airblades, the maintenance has become part of the custodial staff's normal regime. No additional funding is required for this project and the hope is, that based on the demonstrated success of this project, that Residence Life will purchase these for other dorms.

The implementation of this project was fairly straightforward. Outreach efforts were completed through email, educational signage and news articles that were distributed throughout campus. This information detailed the introduction of and benefits to the new Dyson Airblades in Reilly Hall. This information was distributed to student, staff, and faculty and is increasing the visibility of sustainable practices and systems on campus.

Life Cycle Assessment of Dyson Airblades:

Global Warming Potential of Common Hand Drying Methods



Rankings of Common Hand Drying Methods. **(1=lowest impact, 7=highest impact; systems are assigned the same rank if the difference between their impacts is within 10% of the smaller of the two numbers).**

Product	Global Warming Potential	Human Health	Ecosystem Quality	Cumulative Energy Demand	Water Consumption	Land Occupation
Airblade™ aluminum	1	1	1	1	3	1
Airblade™ plastic	1	1	1	1	1	1
XLERATOR®	3	3	3	3	4	3
Standard warm air dryer	7	7	4	6	7	4
Cotton roll towels	4	3	6	4	1	6
Paper towels, virgin	5	5	7	7	5	7
100% recycled	5	5	4	5	5	5

CAMPUS ORGANIC GARDENER

Although the SSLUG Garden (Students for Sustainable Living and Urban Gardening) has existed since 2008 due the dedication of a group of Sustainable Communities students, it was Green Fund capital that allowed for the creation of the Campus Organic Gardner position in February 2011. This position was deemed necessary to provide consistent and continued leadership and vision for the success of the Garden and the position has since become institutionalized. The primary goals of funding this project were to ensure that the SSLUG Garden would have management of daily operations, organization and mentorship of student volunteers, and would be able to maintain the level of outreach and visibility of sustainable behavior on campus.

In the Green Fund Sustainability Survey results over 84% of students listed “Other Sustainability Initiatives” (those outside of renewable energy and green building) as either “Important” of “Somewhat Important” on NAU campus.

The funding of this position responds directly to Northern Arizona University’s goals set forth in the Climate Action Plan. In Section 1, Goal 1 it states that environmental sustainability issues should be embedded across the curriculum and Goal 2 of the same Section requests that the University “Maintain and develop disciplinary and interdisciplinary programs in environmental sustainability”. Through the funding of the Campus Organic Gardener, all of these goals have been met. On-campus course and workshops have included studies in food systems, ethnobotony, and sustainable practices. Section 5 of the CAP focuses on Recycling and Waste Minimization and Goal 1 under this heading is to “Create a zero waste campus”. Through compost collected on-site, the SSLUG garden acts as a demonstration site teaching others how

to reduce their waste footprint as well as a demonstration to the University as to what possibilities can come from the collection of food waste on campus, responding perfectly to Action Item 3 (Increasing the scope of the composting program on campus).

This funding of this position was never intended to be a long-term solution, but more of a demonstration of the necessity and the potential. Since the funding of this position in early 2011, the administration has institutionalized a part-time position for a Campus Organic Gardner within Enrollment Management and Student Affairs.

Due to the creation of this position, the structure and leadership existed to host volunteers from a variety of different groups, classes and class visits from Northern Arizona University, Prescott College, Ponderosa High School, and ORME School, as well as a variety of workshops and community presentations. Over 1,000 volunteer hours have been completed in the SSLUG garden, and the range of educational topics covered have allowed for the sustainability efforts of NAU to be visible to both the on-campus community as well as the greater Flagstaff community. This garden has also contributed to a spread of sustainability culture throughout the campus in the form of other SSLG inspired gardens (such as the SNAIL garden) and has served a utilitarian purpose in the community by producing food for the Flagstaff Food Center.

LOCAL FARE

The Local FARE (Fostering Agricultural Research and Enterprise) Project was funded to support a critical piece of the on-campus composting initiative. This project is intended to assist in waste diversion on campus, reducing waste management cost, reduce soil purchasing cost and to aid in the reduction of carbon dioxide emission emitted on campus. The Campus Organic Gardner, Local FARE, and VeloComposting are all separate projects that all play critical roles in the composting initiative on Northern Arizona University campus.

The Campus Organic Gardner, as mentioned in the previous summary, was a position funded by the Green Fund in February 2011 with the responsibility of organizing and caring for the SSLUG Garden (Students for Sustainable Living and Urban Gardening). The SSLUG Garden, however, is intended only to function on a small scale, with a primary purpose of demonstrating home scale methods of soil production, composting and gardening. The VeloComposting project, funded in February 2012, was designed to utilize bicycle transport to pick up as much waste as possible for the Local FARE project to compost. Additional transportation beyond the bicycle pick-up is necessary and expected for the success of the Local FARE project. The funds for the Local FARE project were awarded based on the methods designed to compliment these other projects without creating overlap or redundancy.

The Local FARE project takes into account the need for campus sustainability projects to be visible to students and has thus made this a critical component of their proposal. All on-campus dining locations include educational signage offering diners information on the project as well as the anticipated reduction of greenhouse gas emissions per ton of compost. This project also focused on how its accomplishments would align with the desires of the student body. It was determined that 74% of students surveyed were in favor of integrating sustainable practices into university life. The creation of a campus

wide composting program, of which Local FARE is designed to be a vital research plot, is a perfect example of an integration of sustainability into the lives of a substantial number of students on campus. Survey results also indicated that over 86% of students were unaware of the commitment made for NAU to become carbon neutral by 2020. The Local FARE project intends to remedy this through its educational signage and outreach campaign.

In the 2010 Climate Action Plan for the University, Section 5, Goal 1 states: Create a zero waste campus. Action Item 3 under this heading suggests "Increasing the scope of the composting program on campus by including the North Campus dining hall and gradually incorporating faculty lounges, building kitchens, and retail locations across campus." The Local FARE project is the research plot necessary to ensure success with this Action Item and move the University towards its goal of carbon neutrality through waste reduction.

As with every project the Green Fund commits to, there is the question of continued maintenance and operation for the project post funding. This project had demonstrated success early on by creating a detailed plan of deliverables and securing other funding sources prior to applying for Green Fund capital. This project was funded with the intention of saving the University money in the long run through the reduced cost of waste disposal. The continuation and success of this project depends on the addition of an institutionally supported position. The Local FARE portion of this project has since become institutionalized with the Velo Composting portion of bicycle pick up ending at the end of the 2012-2013 academic year.

This project has a variety of important deliverables associated with it. In addiction to the direct carbon reduction through the decreased amount of food waste headed to the landfill, there are also two student-funded positions that have been created to assist in the research component and the building of an ongoing full scale composting program. This project also has the intention of increasing the visibility of sustainability efforts on campus through the educational materials in the campus dining service areas and through a number of outreach activities that are planed to bring visibility to this project.

Assumptions:

- Every ton of food waste composted saves .82 tons of CO2 equivalent. Some of this is in the form of methane, which, according to the Climate Registry Protocol has a Global Warming Potential (GWP) of 25 times as potent as CO_2 for a 100 year life span.
- Composting on site instead of trucking waste far away further saves CO_2 emissions, since the distance driven to transport waste is greatly reduced.
- This project measure the quantity of food waste diverted from the landfill in order to calculate CO_2 savings, and analyzes waste streams on campus to determine most efficient means of diverting waste and reducing CO_2.
- Where possible, the VeloComposting infrastructure will be utilized to reduce the need for fossil fuels, but a pickup truck will need to be used in moderation and is included in the calculations.

Calculations:

Approximately 162,458 tons of CO_2 avoided

This data includes information from avoided transportation from compost, carbon reduction from composting instead of landfilling and emissions generated from on-campus composting

Data from these calculations can be seen in Appendix C.

WIND TURBINE

Perhaps taking the largest strides towards a measurable carbon reduction of any project the Green Fund has funded to date is the Wind Turbine project at the Applied Research and Development (ARD) Building. This project offers benefits of direct, measurable reductions along with an obvious and visible presence at one of the main gateways to the University. Its location at the ARD is both appropriate and in-line with the design and intention of the sustainability design for that site.

Based on the 2010 Green Fund survey results, the student body has spoken with an overwhelming majority (over 96% of students) that they either somewhat or strongly agreed that “Integrating sustainable practices (such as renewable energy) into university life is worthwhile” and about 85% of students feel like it is either somewhat or very important “that Northern Arizona University becomes a leader in renewable energy and energy efficient practices in higher education.” The same percentage of students also stated in this survey that they were in support of on-campus renewable energy installation (such as solar, wind, or biomass).

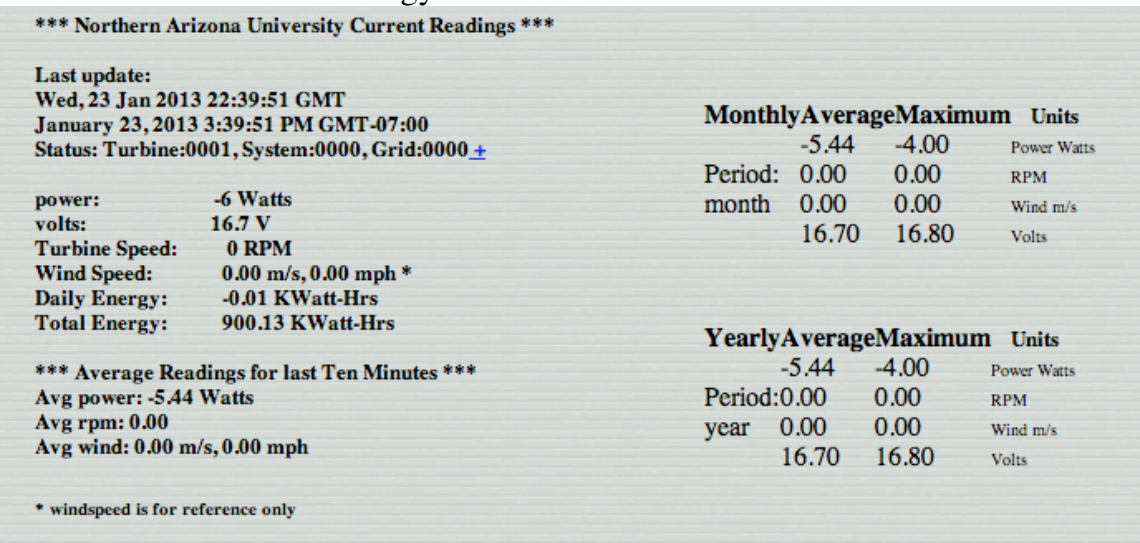
Onsite generation of renewable energy is mentioned in Section 2 in the Climate Action Plan, and is a key component necessary to make President Heager’s commitment that Northern Arizona University will be carbon neutrality by the year 2020 a reality. Within the text of the Climate Action Plan, Goal 2 suggests that we “Return to 1990 carbon levels by 2018”, followed by Goal 3’s plan to “Achieve carbon neutrality by 2020”. The first Action item listed under both of these Goals is to “Develop renewable or alternative energy production on campus”. This critical component cannot be ignored, as the goal of carbon neutrality cannot be reached without it.

Within the proposal for this project, as with all other Green Fund project proposals, the subject of continued maintenance and fees must be included. This project only required one time funding and has no need for continued maintenance and care. All responsibility for the upkeep of this project has been transferred to the Operations Department and Capital Assets, the group that was responsible for its installation in November 2011.

Although the obvious benefit of this project comes with the direct reduction in carbon emissions produced by the University, another, equally important, and often overlooked benefit is the visual cues to students, staff, faculty, the Flagstaff community, and the world that Northern Arizona University makes choices for the benefit of the environment. The commitment to sustainable behavior on campus is something that cannot, and should not be kept secret. These changes, no matter how large or how small should be something to be excited about and something to be proudly displayed to the world. Through the highly visible nature of this project, it does just that.

Calculations:

Capacity of 2.4kw/hour
900.13 KWatt-Hrs total energy



*** Northern Arizona University Current Readings ***

Last update:
Wed, 23 Jan 2013 22:39:51 GMT
January 23, 2013 3:39:51 PM GMT-07:00
Status: Turbine:0001, System:0000, Grid:0000 +

power:	-6 Watts
volts:	16.7 V
Turbine Speed:	0 RPM
Wind Speed:	0.00 m/s, 0.00 mph *
Daily Energy:	-0.01 KWatt-Hrs
Total Energy:	900.13 KWatt-Hrs

*** Average Readings for last Ten Minutes ***
Avg power: -5.44 Watts
Avg rpm: 0.00
Avg wind: 0.00 m/s, 0.00 mph

* windspeed is for reference only

Monthly	Average	Maximum	Units
	-5.44	-4.00	Power Watts
Period:	0.00	0.00	RPM
month	0.00	0.00	Wind m/s
	16.70	16.80	Volts

Yearly	Average	Maximum	Units
	-5.44	-4.00	Power Watts
Period:	0.00	0.00	RPM
year	0.00	0.00	Wind m/s
	16.70	16.80	Volts

WATER BOTTLE REFILL STATIONS

The primary goal for the funding of the water bottle refill stations was to reduce waste created from the purchase of plastic water bottles. This goal has been realized through the initial funding of two refill stations in the W.A. Franke College of Business, as well as through the addition of refill stations campus wide.

It was made clear in the Green Fund Survey of 2010 that student were in strong support of sustainability initiatives on campus with 84.5% of the students surveyed stating that these initiatives were either Somewhat or Very Important to them. As seen in the Climate Action Plan this is also a priority and stated goal for the University. The goals of “Creating a zero waste campus” and “Encouraging reuse across campus” are both tasks that have been designed to help the University realize their goal of Recycling and Waste Minimization on campus.

When considering the sustainability of this project and the responsibility of long term care and maintenance of the refill stations, Capital Assets submitted a letter accepting financial responsibility for the installation of all funded stations as well as strong support for the service that would be provided. Due to the high quality of water in Flagstaff refill stations without filters were chosen to further reduce waste and reduce or eliminate a continued cost for these stations. After the successful installation and overwhelming use and excitement surrounding the first two refill stations, a

request was made (and granted) for the funding of three more refill stations in other locations around campus.

Due to the proven success of all of these refill stations, the University has continued to install other stations around campus. These demonstration projects, ones that assist the University in adopting more sustainable systems, are the ideal projects to receive support from the Green Fund. There are now currently 25 water bottle refill stations on campus (Appendix B).

Total Impact:

It is estimated that through the use of these refill stations over 481,163 disposable water bottles have been eliminated.

Creating the Culture of Sustainability

There are many projects in addition to the ones listed above that have been funded by the Green Fund and are assisting in the creation of a more sustainable culture throughout different departments, buildings, and operations on campus. These projects

are all invaluable to the goal and movement of creating a carbon neutral campus by the year 2020.

A list of these projects can be found below and a brief description of each is located in Appendix B. Some projects, such as the Window Farm project or the Residence Hall Energy Competition, have made major strides to bring sustainability to departments, such as the School of Hotel and Restaurant Management and the campus dorms respectively, which had been lacking energy around green initiatives previously. Other projects such as the Free Compliments project, the Slow Food Film Festival, and the Zim Ride/Ride Share project (see Appendix D for carbon reduction data on this project) worked to create that energy throughout the student body. The Velcomposting program adds to this culture with the new bicycle-composting program designed to collaborate with the SSLUG Garden to reduces waste and carbon emissions on campus.

Plans for Campus Recycling Bins and the co-sponsorship of Earth Week events were s about creating a new social norm for what students can expect from a sustainable campus and what they can count on from the Green Fund. The Green Fund has also partnered with NORESCO to fund the Energy Conservation Through Behavior Change (ECTBC) project. This project allowed for the collection and analyzation of survey data that aided in the forward movement of the energy retrofits being undertaken on campus.

Green Fund resources have also accomplished a great deal in bringing the sustainability efforts of Northern Arizona University to the general public. Projects such as the Bike Powered Charging Station have been able to place NAU into a larger, national picture of sustainability. In this case, the project was seen across the web on

sites such as Treehugger.com, Ecoevolution.org, and aashe.org[2], while the Weatherization and Community Building Action Team (WACBAT) Intern program brought together the greater community of Flagstaff to celebrate energy efficiency programs in the area while raising funds and awareness for local and national weatherization project funding. This type of coverage is monumental in both raising awareness of sustainability efforts for current students as well as creating an image of dedication to a more efficient and environmentally friendly campus throughout the community and throughout the nation.

Other Projects Creating a Culture of Sustainability at NAU[3]

- Slow Food NAU Film Festival
- Residence Hall Energy Competition
- WACBAT Interns (+Addendum)
- NAU Campus Recycling
- Earth Week (Advertising)
- Bike Powered Charging Station
- Free Compliments
- Window Farm
- Ride Share/Zim Ride
- NORESCO ECTBC (refer to ECTBC questionnaire)

[2] AASHE is The Association for the Advancement of Sustainability in Higher Education and is known as the leader in promoting sustainability on campuses around the globe.
[3] Descriptions of all of these projects can be found in the Appendix.

Conclusions and Recommended Actions

While there are lessons learned within each individual project, the Green Fund has grown tremendously in our knowledge of project management, ethics, and fiscal responsibility when approving projects. Based on our past experiences, it is our recommendation to the student body to get directly involved in the entire process of the Green Fund, from start to finish. It is our goal as a committee to be as transparent as possible. One reason for this transparency is to keep students themselves accountable in the process and give them all the information they need to submit their own proposals and further engage in sustainability on campus.

FOR MORE INFORMATION PLEASE VISIT:
HTTP://WWW.GREEN.NAU.EDU/PROGRAMS/GREENFUND/ABOUT.ASPX

RECOMMENDED ACTIONS

Based on the above data, a variety of conclusions can be drawn. First, through a focused analysis of each of these projects it has become apparent that the Green Fund needs a clear and concise way in which to define the success of projects. Through this process of defining success, it has been determined that for a project to be considered successful and to receive financial support from the Green Fund in the future, the project must meet one of the following qualifications:

- The project must be able to demonstrate a quantifiable reduction in carbon emissions
- The project must demonstrate the creation of a lasting change in the culture of sustainability on campus
- The project must have student involvement and strong, documented staff support
- The project must benefit the University and its students

The Green Fund is recommending that, based on these above criteria, changes be made both internally and externally to ensure the most successful path forward for the Green Fund and for the achievement of carbon neutrality on campus.

INTERNAL RECOMMENDATIONS

- A revision of the committee review process
- An increase in data collection and periodic review
- The creation of revolving fund for investment in on site energy generation
- Provide a higher accountability through committee member positions

- Consistently hold projects and project leaders accountable for actions related to project
- Create a more succinct process for financial management

Committee review process

Based on the varied success of past projects supported by the Green Fund it is recommended that the standard to receive funding be raised. Improvements should come in a variety of shapes and should minimally include:

- An addition to the Funding Application that explains the criteria each project will be judged upon
- A Pre-Proposal Workshop that allows each individual or team to learn about the Proposal process and ask any questions they may have
- A list of contacts from any department on campus the student/team will be working with

Data collection and periodic review

As with any collection of data, information becomes more useful and more robust with the availability of baseline data to utilize in future decision making. It is helpful to have this information documented to assist in identifying where improvements are being made and where continued progress is needed. This report is intended to act as such. Based on the data gathered, it has become clear that the projects that have given us the most clear and quantifiable data that can be include in our next submission of NAU's voluntary reporting to the ACUPCC has been the renewable energy project and the significant waste reduction made through Local FARE and VeloComposting. Projects such as these will continue to be monitored and analyzed for an updated report, while the information from all of these projects is intended to assist the Green Fund in guiding decisions for future proposals.

Revolving fund for renewable energy

As mentioned above, the need for an increase in renewable energy produced on campus is a critical piece to helping Northern Arizona University achieve carbon neutrality. There is currently over $65,000 approved for on-campus renewable energy projects through the Green Fund. The most feasible, and likely, project to move forward with at this time is a solar array at the Hotel and Restaurant Management site. Acquiring the capital to move forward with the implementation of multiple renewable energy projects is currently not feasible for the Green Fund based on funding received each year.

The Green Fund is in strong support for the establishment of a green revolving fund (GRF) at Northern Arizona University, and perhaps even within the constraints of the Green Fund itself. There are currently over 52 campuses across the country[4] that have established this type of funding in higher education. The way a GRF works is simply that the savings achieved through a reduction in energy cost due to on-site renewable generation or an energy efficiency project becomes the source of capital into new renewable energy projects.

EXTERNAL RECOMMENDATIONS

- An increase in student fees
- Empowerment of the Green Fund to implement projects that will move the University towards carbon neutrality
- Create an official partnership between ASNAU and the Green Fund
- Create a mentorship program that nurtures and prepares students to become

[4] Hubbell, Ryan. "Renewable Energy Project Finance." *Green Revolving Funds Sprouting Up On College Campuses*. National Renewable Energy Lab, 23 Feb. 2012. Web. 28 Dec. 2012. <https://financere.nrel.gov/finance/content/green-revolving-funds-colleges-universities-energy-efficiency-renewable-energy>.

committee members

- Encourage administration to institutionalize viable Green Fund projects that have a business case

Increase in student fees

The Green Fund has demonstrated a wide variety of results with the data offered in this report. These results vary from creating a culture of sustainability by incorporating sustainability into specific departments on campus to increasing sustainable initiatives throughout campus. Based on the commitment made by President Haeger for Northern Arizona University to become carbon neutral by 2020, an increase in student fees to the Green Fund is a critical component to increasing the amount of renewable energy on campus. In the movement towards carbon neutrality the University will need to both reduce emissions as much as possible while increasing the amount of on-site renewables or the purchase of carbon offsets to compensate for the emissions still occurring.

Empowerment of the Green Fund

It is in the mission of the Green Fund to utilize student money to help the University move towards its carbon neutrality goal of 2020. It is intended that "the Green Fund will allocate funds to projects that increase the amount of renewable energy used on campus, increase energy and water efficiency, and reduce the amount of waste created by NAU." A more streamlined process between the Green Fund and the University must exist to allow for quicker implementation of on-site renewables and campus wide initiatives.

Appendix A

NAU: CLIMATE ACTION PLAN

Northern Arizona University's Climate Action Plan can be found at the following web address. The Summary of Goals are stated on Page 3 of this document with Operations being the focus of the Sustainable Landscapes project.

http://green.nau.edu/docs/Northern%20Arizona%20University_Climate%20Action%20Plan%202010.pdf

Summary of Goals

Interim goals have been identified as a means to reach climate neutrality.

Academics

1. Embed environmental sustainability issues across the curriculum.
2. Prepare students to compete in the green economy. Maintain and develop disciplinary and interdisciplinary programs in environmental sustainability.
3. Partner with the community to provide opportunities for students in the green economy (in concert with Research, Goal 4).

Research

1. Enhance and maintain the university's emphasis on environmental and sustainability research and graduate education.
2. Increase the university's impact on environmental and sustainability research through increased publication and outreach activity.
3. Promote the university as a responsible sustainable organization with experience in, and commitment to, sustainable practices.
4. Maintain and expand the opportunities for undergraduate and graduate student research and for student engagement in off-campus environmental and sustainability activities.

Energy and Climate Change

1. Return to 2000 carbon levels by 2014.
2. Return to 1990 carbon levels by 2018.
3. Achieve carbon neutrality by 2020.

Operations

1. Implement and maintain university technical standards so all new construction is built to strict energy standards.
2. Reduce the impact of chemicals used on campus.
3. Increase the use of local, organic, and fair-trade food in dining halls as local food production increases.

Procurement

Formalize an Environmentally Preferable Purchasing (EPP) policy with cooperation between the Purchasing Department and the Office of Sustainability.

Recycling and Waste Minimization

1. Create a zero waste campus.
2. Improve the utilization of Property Surplus Services on campus, encouraging reuse across campus.
3. Promote the "move-out" donation program in the residence halls.
4. Create a graduate assistant position responsible for recycling and waste minimization initiatives.

Transportation

1. Decrease greenhouse emissions from commuting each year.
2. Reduce campus fleet emissions each year.
3. Develop a system to centrally track all air travel.

Water

1. By 2015, reduce the annual use of potable water per square foot of building space by 20 percent (using 2002 as the baseline year).
2. Develop ways to make water consumption data available to users.

Appendix B

Climate Action Plan: Section 3, Goal 2.

Goal 2

Reduce the impact of chemicals used on campus.

Action

Continue to use Green Seal Certified cleaning products. Continue test-plot research on non-toxic grounds maintenance methods until a successful method is discovered and herbicide use on campus can be reduced.

Responsible Party

The Director of Operations will oversee these efforts.

Measure of Success

The reduction of chemicals used on campus.

Benefits

All the efforts listed in this section may not have a notable direct effect on the emissions inventory, but play a large part in creating a culture of sustainability.

Timeline

All actions are currently underway and will continue until completion.

Challenges

Green building materials and methods, green cleaning products, non-toxic grounds maintenance methods, and local foods all come at a premium. In a time of tight budgets, it is difficult to justify purchasing the more expensive product. It is important that the campus community be educated about the benefits of these stated goals so that sustainability initiatives and campaigns will be supported.

Opportunities

The university has an opportunity to support local food suppliers. There is currently significant student involvement in operations activities. Building maintenance, grounds maintenance, custodial services, and Campus Dining all employ student workers. The Planning and Development Department also provides internship opportunities.

Appendix C

Emissions from on-campus composting.

	A	B	C
1	NAU Composting Carbon Calculations	(Green = C02 reduction/saving, red = C02 emission)	
2			
3	Total Compost	202114	Through Dec. 13, 2012
4	Carbon reduction from composting instead of landfilling (lbs C02e)	165,733.48	Through Dec. 12, 2012
5			
6	Daily Truck Driving Distance (Miles)	6.5	
7	Estimated Average Truck Fuel Efficiency (miles/gal)	17	
8	Average C02 released/gallon of gasoline (lbs/gal)	15	
9	Average C02 released/mile of truck travel (lbs/mile)	0.88235294	
10	Average weekly truck emissions at 5 days/week (lbs C02/week)	28.6764706	
11	Average daily truck emissions (lbs C02/day)	5.73529412	
12			
13			
14	Daily Bicycle Route Distance (Miles)	1.7	
15	Number of Bicycles Completing Route	2	
16	Weekly bicycle distance at 5 days/week (Miles)	17	
17	Average C02 reduction per bicycle mile (lbs C02/mile)	0.88235294	
18	Average C02 reduction by Velo/week (lbs C02/week)	15	
19	C02 reduction by velo/day (lbs C02/day)	3	
20			
21	Hourly Deisel use in 544J Loader(Gal/hr)	3.1	
22	Average C02 released/gallon of diesel (lbs/gal)	22.44	
23	Average C02 released/hr of loader use (lbs/hr)	69.564	
24	Average weekly use of loader (Hrs)	1.5	
25	Average loader emissions per week (lbs C02/week)	104.346	
26			
27	Total days of program operation	154	Through Dec. 13, 2012
28	Total weeks of program operation	33	Through Dec. 13, 2012
29			
30	Actual Hours of Loader use (May through June 22, 2012)	14.5	
31	Additional weeks since then	25	Through Dec. 13, 2012
32	Estimated loader use in these additional weeks (Hours)	37.5	
33	Estimated total loader use (Hours)	52	Through Dec. 13, 2012
34	Estimated Total Loader emissions (lbs of C02)	3617.328	Through Dec. 13, 2012
35			
36	Estimated total Truck emissions (lbs of C02)	883.235294	Through Dec. 13, 2012
37	Estimated total VeloComposting C02 reduction	495	Through Dec. 13, 2012
38		462	(as 154 days)
39	Comparable Garbage Truck Hauling Emissions		
40	Average Garbage Truck Fuel Consumption (Miles per gallon of diesel)	3	
41	Average Garbage Truck Emissions per Mile (lbs C02/Mile)	7.48	
42	Capacity of Garbage Truck (Cubic Yards)	30	
43	Capacity of Garbage Truck (lbs of food waste)	22,722.08	(average of 18,185 as listed by city landfill report)
44			
45	Distance to landfill from NAU (Round Trip Miles)	26.00	
46	Garbage Truck C02 emissions per landfill trip (lbs)	194.48	
47	C02 emissions per lb of food waste in Garbage Truck (lbs C02/lbs Food)	0.01	
48			
49	# of Garbage Truck trips Necessary to haul our NAU Food Waste	-	Through Dec. 13, 2012
50	Estimated total C02 emissions of these comparable hauling trips (lbs of C02)	0	Through Dec. 13, 2012
51			
52	Average Density of our Food Waste (lbs/32 gallon bin)	120	(reported by compost technicians)
53	Gallons in Cubic yard	201.974	
54	Number of our bins in a cubic yard	6.3116875	
55	Density of food waste (lbs/cubic yard)	757.4025	(reported by compost technicians)
56			Note: Commercial Food waste reported as 910 lbs/yd

Total Food Waste Hauled by Truck (lbs)	85,282	Through Dec. 13, 2012
Average Food Waste/Truck Mile (lbs/mi)	85.1968032	Through Dec. 13, 2012
Average C02 emissions/lb of food, by truck	0.01035664	
Total Food Waste Hauled by Bikes (lbs)	10063	Through Dec. 13, 2012
Average food waste/bike mile (lbs/mi)	17.9376114	Through Dec. 13, 2012
Average C02 reduction/lb of food, by bike	0.0491901	
Total C02 Reduction from Velo (lbs)	495	
Net NAU Composting Transport Emissions	388.235294	Through Dec. 13, 2012
NAU Transport C02 Savings (In comparison to Garbage Truck)	341.69995	Through Dec. 13, 2012
Net NAU C02 reduction (Transport, equipment, composting)	162,457.85	Through Dec. 13, 2012

Appendix D

WATER BOTTLE REFILL STATION LOCATIONS

Building Number	Name	Number of Water Stations	Location	Number of Bottles Saved	
1	Gammage	1	1st Floor	3,765	
4	Morton Hall	1	East Hallway	7,917	
5	Residence Life Offices (North Hall)	1	Main Lobby	6,955	
10	Old Main	1	3rd Floor	438	
16	Communications	1	1st Floor	11,447	
18	Liberal Arts	1	South Lobby	2,625	
29	Aspen Crossing Learning Community	1	Main Lobby	1,394	
33	HRM - Eugene M. Hughes	1	East Entrence	5,693	
38	Cowden Learning Community	1	1st Floor	65,400	
42	Sechrist (Campus Tours/Admissions)	1	1st Floor	5,623	
44	Tinsley Hall	1	Northeast Entrance	81,283	
45	Wilson Hall	1	Main Lobby	40,367	
46	Allen Hall	1	Main Lobby	3,417	
48	Reilly Hall	1	Main Lobby	48,856	data collected 4/4
51	Babbitt Administrative Center	1	Main Lobby	6,121	
53	Gabaldon Hall	1	3rd Floor	3,704	
55	Mountain View Hall	1	Main Lobby	58,380	
61	Learning Resource Center	1	South Wall near Restrooms	35, 340	
62	McConnell Hall	1	Main Lobby	68,398	
64	DuBois Center	1	East Entrance by Peaks Food Court	7,592	
65	SBS	1	2nd Floor Southeast Stairwell	20,594	
81	W. A. Franke College of Business	1	2nd Floor	8,351	
81	W. A. Franke College of Business	1	4th Floor	10,827	
82	Southwest Forest Science Complex	1	Main Floor	8,579	
91	Centennial	1	Main Hallway	3,437	data collected 4/17
	Total	25		481,163	

Appendix E

WINDOW FARM

The NAU School of Hotel and Restaurant Management is one of the leaders in the Customer Service industry and, as such, it is an important place to teach students about sustainability. This vertical, hydroponic growing system allows for year-round planting, harvesting, and the educating of students. With the future of the business world relying on a Greener Economy, it is important to prepare students for the rapidly changing world. Through creative means and time-tested methods, there is a desire to help the world have a brighter future. This project was approved with a budget of $2,536.00.

RESIDENCE HALL ENERGY COMPETITION

Students were involved in identifying behavior changes and what motivates people in this energy competition in the residence halls. Ten randomly selected residence halls competed in a competition to reduce their energy consumption. The winner would receive a grand prize. This project's goal was to educate and motivate students to reduce their energy use in an engaging way. This project was approved with a budget of $1,500.00 in October 2010.

FREE COMPLIMENTS

The student ambassadors in the Office of Sustainability support a 'Free Compliments' initiative on campus that help to grow recognition of the office and the student ambassadors in a positive light which gets students excited about sustainability and will present the opportunity to gain support for future sustainability efforts. This project was approved with a budget of $460 on November 18, 2011.

SLOW FOOD FILM FESTIVAL

Slow food NAU hosted a Flagstaff Food Film Festival on February 18th and 19th of 2010. The festival showed educational and inspiring films that are pertinent to the issues and realities of our current food system. The event also included a keynote speaker, Mark Winne, author of "Closing the Food Gap" and "Food Rebels, Guerrilla Gardeners, and Smart Cookin' Mamas: Fighting Back in an Age of Industrial

Agriculture" and was followed by a book signing. This project was approved with a budget of $1650 on January 19th, 2011.

ZIMRIDE/RIDE SHARE

Zimride is an interactive way to plan for carpooling/ride sharing that allows you to learn about the individuals before you decide to commute together ensuring that the ride share experience is enjoyable for everyone involved. Using Zimride you are able to offer or request rides for commutes, road trips, and popular events. If you have a car you can split costs by offering rides. If you don't have a car you are able to find rides where you need to go. There have been 64.15 metric tons of CO2e saved to date with the implementation of the Zimride system at NAU.[5]

BIKE POWERED CHARGING STATION

This project designed, constructed, and installed a bicycle-powered charging station to demonstrate the concept of a human-powered renewable energy system. The system generates electricity when a student pedals the bicycle, which allows the student to charge their electronic device with the appropriate charger provided at the charging station. This provides students with a way to understand and compare the amount of energy required to power an electronic device like a cell phone with the amount of energy they are able to produce pedaling a bicycle. The budget for this project was $2,900, and the project was approved on November 18, 2011.

NAU RECYCLING

Through the placement of three different types of recycling containers across campus, conducting a campus wide opinion survey, and launching an environmental education campaign, the introduction of this recycling project is highly visible. Project organizers worked closely with building managers and administrators, capital assets staff, and the student population to disseminate information about the variety of containers and the "Keep It Clean" message during the pilot phase of the program. The approved budget for this project was $20,125.79 on February 14th, 2011. This project requested an addendum to their original proposal of an additional $1,310 for the recycling decals that would be placed on all of the chosen bins.

[5] Data collected on April 23, 2013.

VELOCOMPOSTING

Velcomposting is the newly envisioned bicycle-composting program. This project collaborates with SSLUG, the student organization that manages the garden behind the SBS West building. Velocomposting reduces NAU waste and carbon emissions, builds soil for sustainable food production, and actively engages students in community and sustainability work. This project was approved with a budget of $7,273.11 on February 17, 2012. Carbon reductions saved from the VELOComposting program have been quantified within the Local FARE project.

EARTH WEEK ADVERTISING

The Green Fund was one of the sponsors of the annual event, NAU Earth Week.

WEATHERIZATION AND COMMUNITY BUILDING (WACBAT) INTERNS

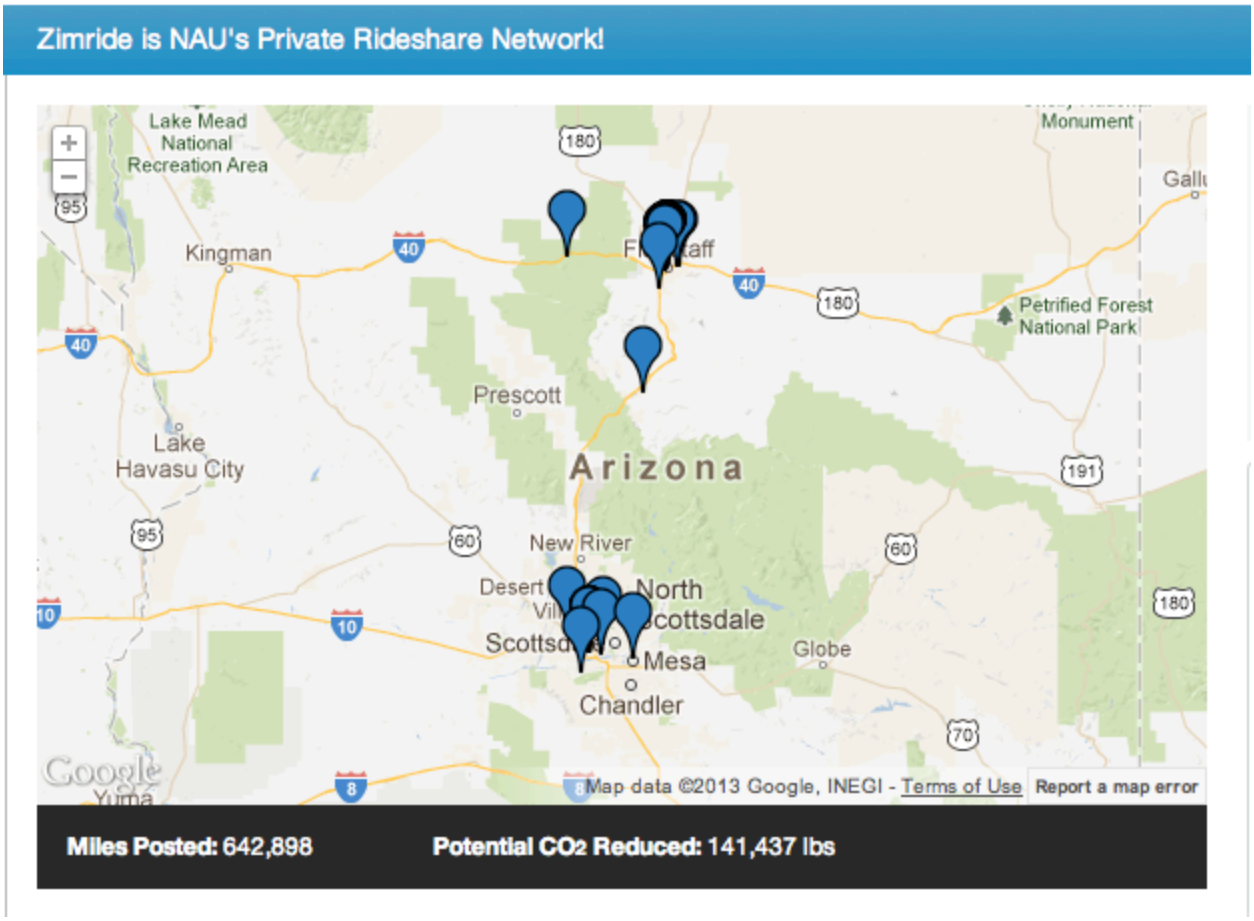
The four Weatherization and Community Building Action Team (WACBAT) student interns assist in the rapid expansion of the work that WACBAT is doing both on and off campus. WACBAT is a student group whose goal is to nurture student leadership by engaging students on campus and in the community around sustainable technology and practices that will lower NAU's and Flagstaff's carbon footprints. This project was approved with a budget of $12,800 on August 29th, 2011. The Green Fund Committee approved WACBAT's addendum to redistribute $1,200 amongst the interns on February 17th, 2012.

STUDENT CONNECTIONS

This Green Fund Initiative supports a new student internship with the Landsward Institute. This intern maintains and expands Student Connections Online, an "opportunity" resource for NAU students from any major who are interested in sustainability and the environment and to support development of new environmental and sustainability internships for NAU students across campus. This project's budget was $9,354 and was approved on February 2nd, 2011.

Appendix F

Zimride/ Ride share portal. Data taken on April 23, 2013.



FOR MORE INFORMATION PLEASE VISIT:
HTTP://WWW.GREEN.NAU.EDU/PROGRAMS/GREENFUND/ABOUT.ASPX