

ENVS 471 Winter 2016

Clean Energy B

Support for a Wind Powered Western



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All students that participated in the survey

Survey Volunteers

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Executive Summary

The clean power or clean energy project is an ongoing endeavor that began in the fall of 2015. After reviewing Western's current policy of purchasing renewable energy credits and researching alternatives to meeting WWU's carbon neutrality commitments, the clean power team concluded that it would be best for western to build its own clean energy facility. Picking up the torch at this point, the clean energy project was split into two groups for the Winter 2016 quarter, the Clean Energy A and B teams. Clean Energy A tackled how to finance a utility scale installation of wind turbines while Clean Energy B crafted a survey to assess student willingness to pay regarding a potential new clean energy fee. This fee would be dedicated solely to helping fund or fully funding the wind turbine installation.

Conducting the survey was not only a meaningful step toward understanding the financial feasibility of the project, but an important opportunity to gather student feedback. The preliminary feedback gathered from our survey we will help inform the development of an effective renewable energy campaign. In this proposal, we will be discussing and analyzing our survey creation, methods and results as well as offer suggestions regarding the next best steps towards a cleaner energy campus.

Introduction

History was made this last December when the Paris Climate Conference came to a close and the world officially entered into the age of renewable energy. Over one hundred nations, and thousands of individuals from across the political and religious spectrum gathered to discuss a problem so grand that the world could agree that it required a planetary community solution. In the history of humanity, there is nothing that the entire world has agreed on. This is why tackling climate change is possible. It is not a particularly easy problem to solve and it will not happen without the constant commitment of everyone from individuals to the highest forms of government, but at least there is hope knowing we share a common goal. Climate change is everyone's responsibility, and especially for those who are in a place of leadership.

Across the world, universities have historically acted as epicenters of change and progress, reflecting and transforming society and today continue to play an important role as transformative leaders (Astin 2000). It is now time for Western Washington University, as a prominent institution characterized by its rich culture of sustainability, to act on our climate commitments and respond to the growing renewable energy needs that will allow our nation and planet to achieve freedom from fossil fuels.

Western's first step toward achieving this goal was in 2005 when the university began purchasing Renewable Energy Credits (RECs) to offset carbon emissions from Western's electricity consumption. This was made possible by a student Green Energy fee approved in 2005 by the student body. At the time, RECs were chosen because they are a cheap and easy way to invest in renewable energy and offset carbon emissions. But they do not actually supply the school with electricity from renewable energy nor directly increase renewable energy capacity. If we are to reach our ambitious carbon neutrality goals, we cannot rely on RECs alone. With a quickly shifting energy economy, it may now be the right time for Western to take further action.

*For more detailed information regarding Western's CAP commitment and RECs, please reference the Clean Power proposal from Fall 2015 (Crossfield & Mertens, 2015)

Statement of Need

If Western is to achieve its ambitious carbon neutrality goals as stated in its Climate Action Plan from 2010, large infrastructural change will be necessary. The Fall 2015 Clean Power team suggests that the construction of a large renewable energy facility, likely in the form of a large scale wind turbine installation in Eastern Washington, would be necessary and the best fit for Western to meet those goals. The next step to making this dream a reality was to fully understand the options regarding how to finance such a large project and consider how financing would be affected by student involvement. The research provided by the Clean Energy teams will further elaborate the proposal originally presented by the Fall 2015 Clean Power team.

Case Study

Throughout our research, we could not find any instance in which a student body voted to implement a fee strictly dedicated to the creation of clean energy on the scale we are suggesting. Most universities that have taken on large energy projects have done so with the help of large endowments or through purchase agreements with energy producers. Western Washington University does not have such an endowment. Other universities, such as Appalachian State University or University of Vermont, to name a few, have successfully allocated student green energy fees toward the construction of single wind mills or patches or solar panels on top of academic buildings. In situations where universities have been involved with the construction of large renewable energy installations, private companies have volunteered to construct the renewable infrastructure in exchange for long term purchasing agreements. While purchase agreements could be a part of our financing options, it would likely not be pursued without the support of students. Because we were interested in understanding the power of student financial input, we looked to our own institution to find examples of large projects funded by students. The largest fee currently paid by students is for our REC center, which fully funded its construction and continues to fund its operation. The current \$99 fee was approved by students in 2003.

REC Center

Cost:	\$24-\$25 million dollar bargain building-- this includes the cost of construction and all equipment and furnishings
Fee History:	Fee started at \$80 (2003)- was not enough to make payments, committee approved to bump it up to \$85 the next year. The Rec center fee is currently at \$99, but did not increase throughout the entire recession
Fee allocation:	Half of the fee goes towards bond and a mandatory maintenance reserve account payment. The other half covers new equipment and basic rec center functions and maintenance
Total Funding:	4 million a year in fees plus \$500,000 in supplemental revenue from passes, space rental and additional memberships
Current utilization:	(89%-->95%) averagely 92% of students who pay the fee have used the rec center at least once
Student involvement:	There is a Rec Center Advising Committee made up of students, staff and faculty that take part in decision making regarding the allocation of fee funds. Since this building is funded with a fee, it does not have to accommodate other interests on campus as it is its own entity.

If we were to adopt this method of financing for the renewable energy project, students would be allowed to participate in the management of the renewable energy facility. This could be extremely empowering regarding areas of education, internships and job opportunities. Students

would have a tangible stake in the future of energy. The Wade King recreation facility is a symbol of the power students have to support large infrastructural projects on campus and on behalf of the university.

The Rec Center and its fee did not come to be without some controversy. In an article from the Western Front printed in 2004, the year following the implementation of the fee, it was documented that many students felt it unfair that they should pay for a facility they would never use. The social service offered by the Rec Center was something which the voting student population believed would benefit the WWU community. Not everyone will always be informed or interested in the complex benefits such social services provide. With the construction of the the Wade King rec center, students can now benefit from the opportunity to exercise. Exercise reduces stress, anxiety and depression, boosts self esteem, improves sleep, builds energy levels and improves overall health. This opportunity is further enhanced by the fee which incentivises students to use what they pay for, and according to the stats, most students have at least once. The Rec center not only promotes a mentally and physically healthy student body, but enhanced Western's offerings as a desirable and fundable institution. Prior to the rec center, the only recreational space available to the general student body was often occupied by physical education classes and intercollegiate sports teams. When it comes down to it, the cost per quarter for the construction and operation of the Rec center is less than most Gyms in Bellingham, supports numerous jobs and supports the community health of our university.

The success of the rec center suggests that the construction of renewable energy infrastructure financed by a new student fee is completely reasonable and more than possible. Like the gym, constructing a wind farm in Eastern Washington has complex social benefits that many students may not recognize when presented with the opportunity to pay more for their education. Unlike the gym, increasing renewable energy capacity is a much more abstract project. Despite this, creating renewable energy has a very clear correlation with acting on climate change, something which students are eager but unsure how to do. Even without the potential academic and professional opportunities provided by the project, many students are already aware of the serious problems we face and are eager to aid in the transformation of our energy economy. As we will discuss further, based on our survey results, many students appear to understand and recognize the urgent need to act on climate change for the sake of the environment and our ability to be resilient. For many, this fee is an opportunity for them to act. There is little doubt that students want to contribute something, but the amount they are able or willing to contribute is contrasted with the heavy financial burden many students already face. The financial life of students when the rec center fee was passed was much different than it is now. This is important to consider.

Survey

Methods

Considering the nature of the information we hoped to collect, we sought the advice of the loveable and generous Gene Meyers, who spearheaded the bus pass proposal and conducted the bus pass survey in 2005 that provided evidence of student support for its implementation. Hoping to conduct an equally valuable survey, we used the same contingent valuation (CV) method as used for the bus pass survey. The CV method is often used when attempting to assess 'willingness to pay' (WTP).

As Meyers et al. stated in his 2006 paper, a CV method provides opportunity for respondents to be informed about the topic, makes it possible to estimate the level of economic benefits the project provides to students and is representative of actual voting. When using the CV survey format, respondents must be informed meaningfully about the good, the range of alternatives, the method of payment and the level and method of provision. Using this survey method, we did our best to provide the respondent with valuable information regarding alternatives, benefits and considerations regarding the construction of a renewable energy facility for our campus. Following the model of the bus pass survey we also created seven different surveys each containing a different price value for the potential fee ranging from \$25 to \$145. This method offers a take or leave it situation that more closely represents the results of a referendum. Following questions regarding the potential fee we asked students to write in reasons for their answers. Contingent valuation surveys also include important demographic questions that add detail for purposes of analysis. We did not however follow the CV method as specifically as it likely would need to be to be labeled as such. The ways in which our survey does not follow CV methods will be discussed later.

Our survey informed students about:

- Western's climate goals
- What our research team has proposed is our best method of meeting those goals, which is a wind turbine installation
- The general alternatives to building an energy plant of some sort
- Information regarding current student energy fees
- Benefits to student contribution

*See support documents for survey form

We surveyed over the course of three different days of the week in three different locations on the Western Washington University campus. These three days were spread out over three weeks in February during Winter quarter of 2016. By surveying in different locations we hoped to capture a varied audience regarding class and major, which tends to be concentrated in various parts of the campus. As a generalization, more freshmen and humanities majors tend to flow through Red Square, whereas more seniors in the sciences tend to flow through South campus.

Survey Day 1: February 2015 Tuesday

Location: Communications Lawn
Length: 9:30am-1:30pm (4 hours)
Computers: Four
Weather: Cloudy with sunbreaks, no rain (outside)
Incentives: Candy
Other details: One to two people were present at all times asking students to participate in the survey. We had a recycled paper bag sign promoting our survey explaining that student input was needed and appreciated. Soul music was provided.
Respondents: ~118

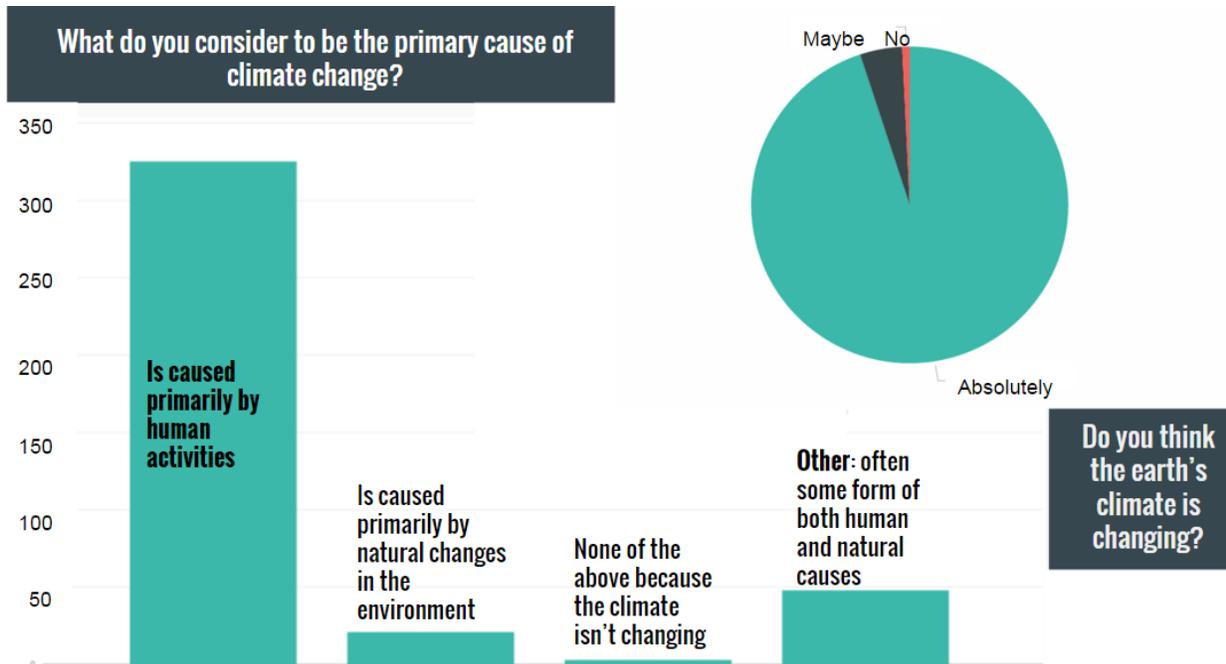
Survey Day 2: February 2015 Thursday

Location: Viking Union
Length: 11:00am-4:30pm (5 ½ hours)
Computers: Seven
Weather: Sunny/Cloudy mixed, no rain (inside)
Incentives: Candy
Other details: One to two people were present at all times asking students to participate in the survey. We had two white signs with black writing promoting our survey and student involvement. No music provided.
Respondents: ~112

Survey Day #3: Friday, February, 26th 2015

Location: Red Square
Length: 10:00am-4:30pm (6 ½ hours)
Computers: 4-6
Weather: Sunny and then cloudy (outside)
Incentives: Candy
Other details: One to two people were present at all times asking students to participate in the survey. We had one really bright orange sign and one small white sign promoting our survey and student involvement. Soul music was provided.
Respondents: ~167

Results/Discussion



1. Do you think that the earth's climate is changing?

Over 90% of respondents think that the earth's climate is changing.

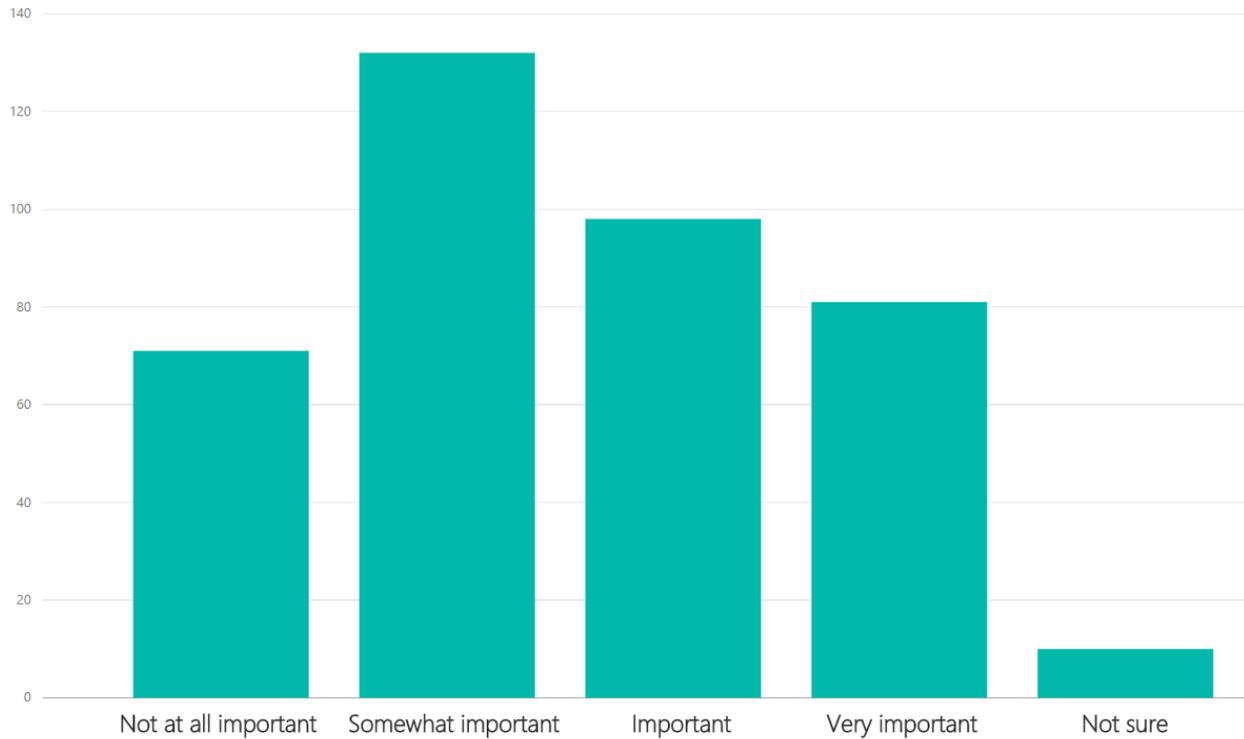
Given this data, we know that convincing students of climate change is not a priority.

2. What do you think is the primary driver of climate change?

The results show that ~80% of the ~400 survey respondents understand that climate change is caused primarily by human activities. Those who responded other, which made up ~12.5% often noted that it was a combination of natural and human factors.

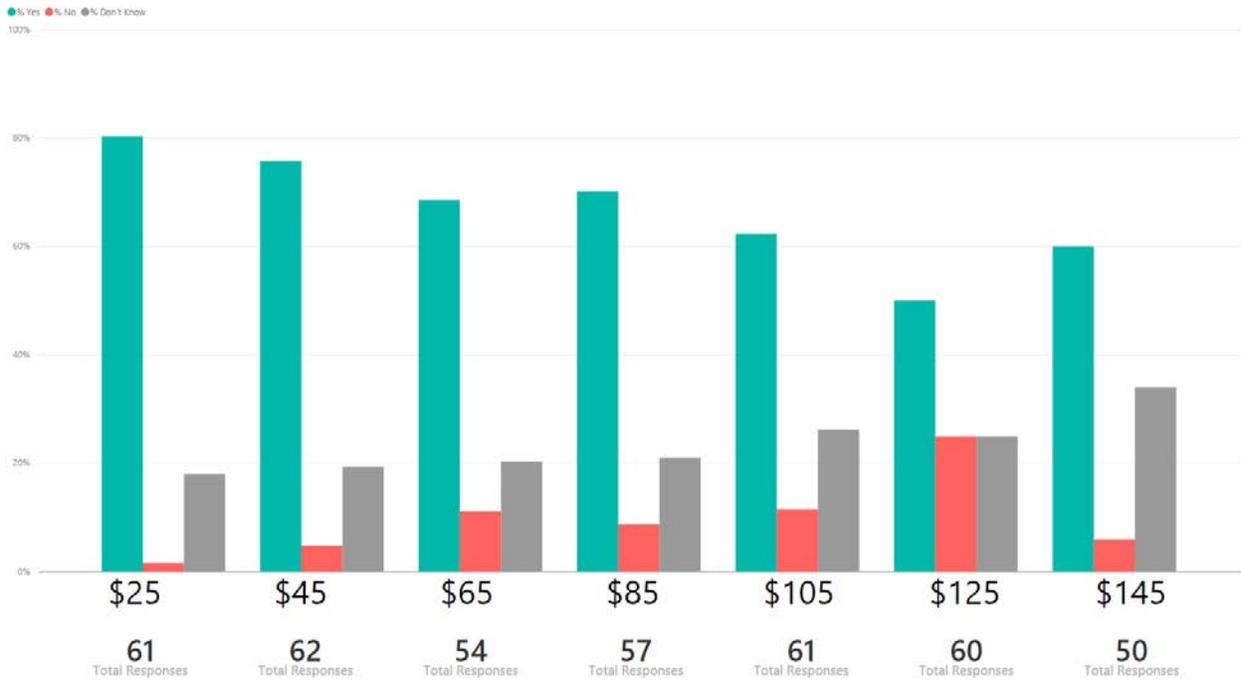
Given this data, we know that promoting the idea of human responsibility for climate change is not a priority. However, promoting the idea that students have a responsibility to act is an alternative task.

3. Contributing to the construction of a wind or solar farm in Eastern Washington would add an additional \$25 (\$45, \$65, \$85, \$105, \$125, \$145) per quarter to tuition and fees, which represents an [0.9%, 1.7%, 2.4%, 3.2%, 3.9%, 4.7%, 5.4%] increase in annual student costs. How important a consideration would this cost be to you?



I think this question confused respondents so I am not sure how to analyze it. It was included on Gene's buss pass survey and it is meant to clarify how 'big of a deal' this fee would be to them financially, but I believe students likely interpreted it in different ways. Perhaps what we can take away from this is that how students spend their money is an important consideration for them. Students who responded that considering this additional fee was not important likely felt that it was an insignificant addition to their academic cost in relationship to the total cost or to other fees. To have a greater understanding of this information, we would need to correlate it with the price of the fee asked of them. We were unable to do this at this time, but it is possible for future analysis.

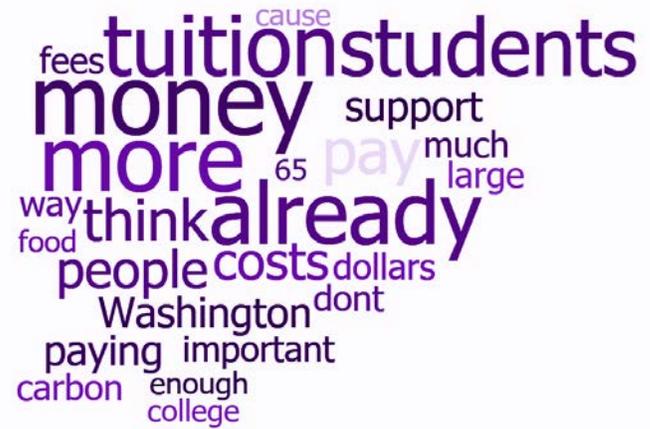
4. Would you support the proposed Zero Carbon Commitment Fee of \$25 (\$45, \$65, \$85, \$105, \$125, \$145) per quarter?



The basic trend in the graph above shows a generally decreasing support with increasing fee cost. The fee with the most support was the \$25 fee with support by 80% of respondents. The fee with the least amount of support was the \$125 with support by only 50% of respondents. While the \$145 fee had a higher percentage support, fewer respondents answered maybe. The higher fee resulted in more strict yes and no answers, whereas up to the \$125 fee, maybes increased with fee value suggesting that they may be swayed after being further informed.

Based on this data, students are generally willing to pay a new fee toward a clean energy facility.

5. We are interested in why you answered the way you did. Please take a few seconds to help us understand the main reasons for your choice.



Yes

No

The word clouds above represent the most often used words in the responses to the above question. The size of the text correlates to how often the word was used by respondents.

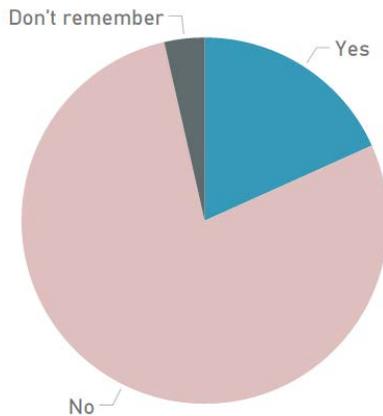
Those who responded **yes** described climate change as a serious issue and felt that the fee was a straightforward way to make change. Many described feeling that the fee should be supported even though tuition is costly because the issue is so important. Recognizing that they pay nearly \$100 for the REC center, many students felt that funding clean energy was at least as important if not more than a gym. Some students humorously recognized that because it was not their money, they could easily support the fee.

Those who responded **no** felt that our education is expensive enough already and the students should not be saddled with the responsibility of funding Western's renewable energy infrastructure. Some students felt that because their parents paid for the education they could not make that decision. Many students simply acknowledged that they were poor and could not afford a large fee even though they supported the project. Some simply felt that the project was not the right answer.

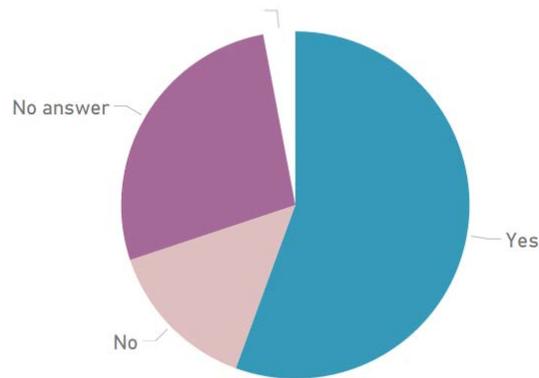
For more detailed responses, reference the **final survey data spread sheet** for full answers to this question.

6. Did you vote in last years AS elections? 7. Are you planning to vote in this year's upcoming election?

Did you vote in last year's election?

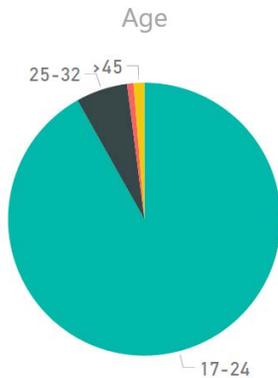


Are you planning on voting in next years election?



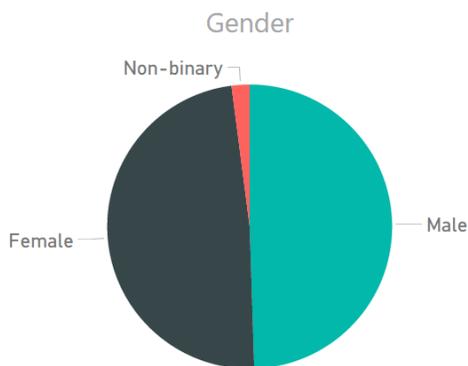
The data shows that most students who participated in our survey did not vote in the last AS election. Slightly more than half plan on voting in a future election, but perhaps this survey was a reminder to do so. Those who did not take the survey may be more likely to be represented by the first graph. This data shows the great need to increase voter turnout. We did not provide an opportunity for students to reflect on why they do or do not vote, but this would have been helpful information moving forward. I imagine based on this data that if students were informed of the important voting opportunity they had involving a potential new fee, they would be more likely to vote.

Demographics



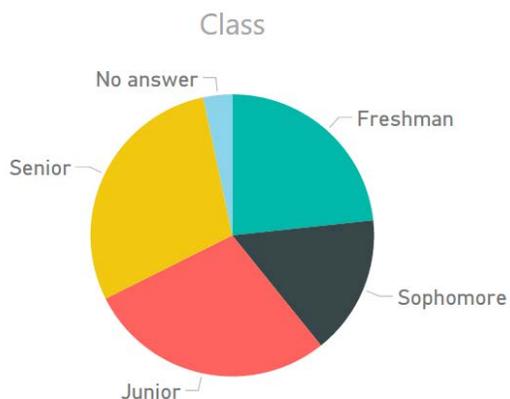
Age

Most respondents were between the ages of 17-24. Looking back we could have benefited from dividing that age group up more.



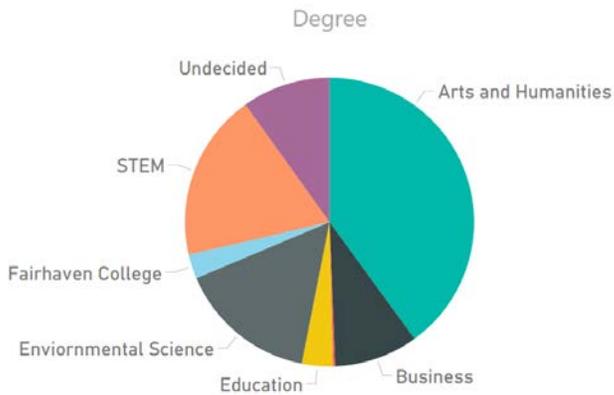
Gender

Respondents were equally split between male and female with a few non-binary respondents as well.



Class Standing

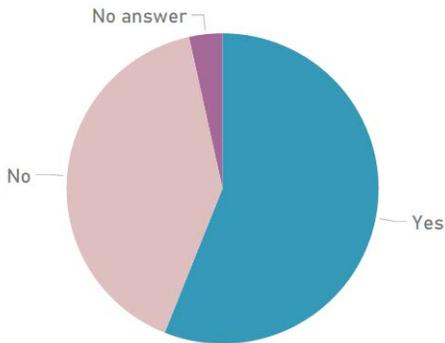
Class was also divided fairly evenly amongst the four major classes. The senior category may be slightly weighted due to a technical glitch where graduate or other types of students did not have an 'other' option during part of our survey process. No answer is likely due to graduate or other student class standings.



Degree concentration

There were a variety of majors among the respondents, which have been bundled into the classification of Undecided, STEM, Fairhaven, Environmental Science/Studies, Education, Arts and Humanities and Business. The data shows that the majority of respondents were majors in the Arts and Humanities. Of course, this may be due to the fact that this category includes many majors including Visual Art, Performance Art including Music, Theater and Dance, Design, History, Philosophy, Community Health, Communications, Anthropology, Language Studies, Writing, and Political Science.

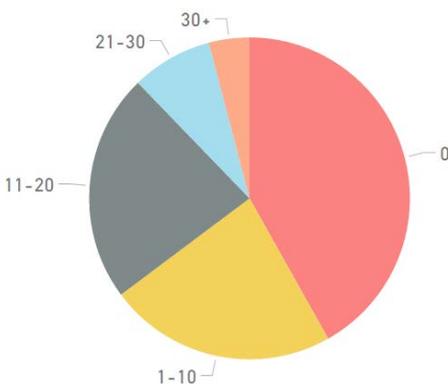
Did you receive financial aid this year?



Financial aid

About half of students receive financial aid while the other half do not.

How many hours do you work per week?



Work

Many students do not work at all. About 25% work between 1-10 hours and another 25% work between 11-20 hours. Fewer students work more than 21 hours.

Considerations

Differences in Survey Methods

The way in which our survey differed from a CV format was both in the way we presented information and how our survey was distributed. Because we were interested in assessing support for a conceptual project instead of one that has been thoroughly studied and investigated, our survey offered a description of the goal of the project instead of details regarding the energy facility itself. Had we fully followed the method of contingent valuation, we would have laid out in clear detail how the project would work, the details of how alternatives would work and how we would pay for the project. Since project possibilities and financing options would change based on how much students would be willing to contribute, we could not include such details.

The other major difference between our survey and the bus pass survey from 2005 was that we did not distribute it through e-mail but instead conducted it in person using computers. Our intention was to distribute our survey using both methods to minimize the effect of biases of each method as advised by John Kreig from the office of survey research. But due to various bureaucratic roadblocks and lack of availability on the official WWU survey schedule, we were unable to distribute e-mail surveys. Using only the in-person computer survey method reduced the number of respondents we could expect. Instead of close to a thousand respondents, we only were able to collect about four hundred. That being said, we were still able to gather a significant number of survey responses for the survey to be valuable.

Biases

- a. Music-- or lack of music could affect concentration or music type could affect the way the students respond or whether they took the survey or not.
- b. Halo effect-- unconscious evaluation of survey based on who is present conducting it (Nisbett & Wilson, 1977)
- c. Location-- most seniors tend to be around south campus and freshmen tend to be on North campus.
- d. Time of year/quarter-- financially strained time of year due to the fact that many have not been working since the summer-- poor. Winter time people do not want to hang out outside. Middle of the quarter there are midterms and people are busy and stressed.
- e. Day of the week-- Students attending classes only M,W as opposed to being on campus on T,Th as well, time of day (being hungry changes the way people will respond)
- f. Time pressure-- Some students are in a rush to get to another location/class.
- g. Working students --often are getting to work and do not have time to take the survey
- h. Survey format-- not exactly mimicking CV format may discount its quality slightly
- i. Not enough knowledge/exposure of the issue-- some may not choose to read the information provided to them.
- j. Single distribution method- will result in biases associated with the distribution method

Moving Forward

Weighing Worthy Causes

The cost of education is already exorbitant and an issue that is increasingly a point of tension across the United States spurring protests and discontent. It is extremely reasonable that students would feel that being asked to take on the partial responsibility of building a clean energy facility is inappropriate considering the current atmosphere. However, having already been strapped with the financial burden of their education, taking on the financial burden of saving the planet may not be an unfamiliar task. That being said, it is extremely important that we do

our best to truly gather wide reaching support for this project before we commit students to another large fee. This will take a thorough and thoughtful ongoing campaign. There are always worthy causes for caring people to stand for and Western students are more than likely to support such a fee increase, but making this fee work for students and the planet is the task we have before us. How do we spend such a generous contribution meaningfully and wisely?



Western students protesting high tuition in March 2015 (Green, 2015)

Thoughts moving forward

- What are various ways we could assess a new fee that may be more flexible or reflective of financial status?
- How does student contribution affect student involvement?
- What are the benefits of adding a windmill on campus as a symbol to remind us of our commitments and of our potentially far away project?
- What are the well-researched details of the possible alternatives to a wind turbine installation and the pros and cons associated with them? Why aren't they the best option for Western?
- What do we gain by choosing options that may not have as quick of financial pay back but may have more fulfilling cultural, community and academic opportunities associated with them?
- How can we set up our project to allow students to be the most involved possible throughout the construction and maintenance of the renewable energy facility?
- How can we use the funds that come back in to fuel future energy projects? Could these projects extend to the global community or an international sister community?
- How can this project be set up so that it can evolve quickly and adjust to the world that is shifting around us?

Summary

Our Survey Data shows that students are already aware of the serious threat of climate change and show a willingness to take on the responsibility of financially contributing to a project that would help greatly reduce the human impacts that contribute to climate change. Because of this, future campaigning should be centered around informing students in detail about the proposed project and how their contribution would give them more leverage to influence our energy future and education. Future campaigning should also include informing students about the importance of voting on referendums even if they do not vote for student leadership positions. Even if there was a high rate of willingness to pay, the small amount of students that do vote do not represent the greater student body. This fee is more than a financial means, it's a community decision to act on climate change. It is very important that we get a large turn out to support the fee increase or we may see backlash moving forward. What we gathered from one of our interviews with Mieko Ozeki (see support documents) was that the more open and communicative we can be throughout the whole process, the more successful we are likely to be moving forward.

Western has not only dedicated itself to the goal of climate neutrality by 2050, which will take extraordinary commitment to change, but having aligned itself with the goals outlined in the President's Climate Commitment (Brief A.G.G.I, 2009) must also be willing to transform itself as an institution of higher education to reflect the quickly changing needs of society. WWU is responsible for equipping students with the knowledge and skills required to be resilient in the face of constant change and for providing the community with the education and research needed to create and maintain a sustainable society. It is undoubtedly a tremendous feat of leadership to construct additional renewable energy infrastructure for the university and the community at large, but we also believe that the heart of university responsibility lies in preparing students for the challenges we face as a society. This project is not only a feasible and financially acute answer to our carbon neutrality goals, but an opportunity to become a progressive and desirable academic institution. In the wise words of our POTUS, Barack Obama, "Our future is what we build it to be. The jobs and industries of the 21st century will be centered around clean renewable energy" (2011). No matter how this project unfolds, it is necessary that we move quickly and thoughtfully toward carbon neutrality. The support exists from the student body to act. We just need more research regarding how best to do so that offers resiliency and opportunity for Western students and the planet. We know that constructing a wind turbine installation is a powerful answer to how we will accomplish this, but we need thorough details regarding all of our options before we can convince our community that it is our best option.

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