



**The Ohio State University, Platinum Report (2018)**



April 29th, 2016  
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## **Executive Summary**

AASHE STARS is a sustainability framework that provides a method for higher education institutions to measure their sustainability performance. Institutions self-report data in a variety of categories that results in a score that is classified as a Bronze, Silver, Gold, or Platinum rating. As of 2016, The Ohio State University's AASHE STARS submission earned a Gold rating. The university has recently implemented a set of sustainability goals that commit to improving its future sustainability outlook. One of these goals is to achieve a Platinum rating by 2018, which will be supported through the progress of other sustainability goals. To aid in reaching this goal, research objectives were established to gather baseline knowledge, determine what credits needed to be prioritized, and propose the best method to gain the most points in AASHE STARS.

Ohio State's 2016 AASHE STARS submission earned an overall score of 72.53 points. In order to receive a Platinum rating, Ohio State must increase this score to 85 points by 2018. To reach this goal, Ohio State needs to focus on credits in heavily weighted areas where performance is lacking. The main areas of focus in this report are Academic Curriculum and Learning Outcomes, Food and Beverage Purchasing, Building Energy Consumption, Landscape Management, Purchasing, Waste Minimization and Diversion, and Water Use. Focusing on these core areas will provide the university with the greatest opportunity to attain a Platinum rating by 2018.

In order to estimate where the university will stand for each credit by 2018, research was conducted to obtain the data necessary to make accurate projections. Past growth rates along with data points from the university's sustainability goals were inputted into equations provided by AASHE to establish an approximate score for 2018. After determining an approximate score

for each of the core areas, it was estimated that The Ohio State University would receive a score of 83.93 points. This projection falls short of the 85 points needed to attain a Platinum rating.

If the university is truly committed to attaining a Platinum rating by 2018, there is a drastic need to accelerate its progress in the aforementioned core areas. Many barriers exist to attaining a Platinum rating, including the fact that most of the previously mentioned sustainability goals have an end date of 2025, which means that only marginal progress will be achieved in those areas by 2018. In order for Ohio State to achieve a Platinum rating, it is crucial to implement sustainability coursework into survey courses while also accelerating the progress of the university's other sustainability goals.

## **Introduction**

The Association for the Advancement of Sustainability in Higher Education, known as AASHE, is an organization that empowers higher education institutions to effectively drive sustainable change within their respective institutions through various methods. One of the most effective methods AASHE employs, and the focal point of this study, is the Sustainability Tracking, Assessment & Rating System, known as AASHE STARS. AASHE STARS is a self-reporting framework that allows higher education institutions to measure their sustainability performance. By gathering and reporting data for indicators in the overarching categories of Academic Curriculum, Engagement, Operations, and Planning and Administration, each institution earns a score that is categorized into a rating of Bronze, Silver, Gold, or Platinum (with Platinum being the highest rating). As of 2016, The Ohio State University has attained a Gold rating, but has set a goal to achieve Platinum by the 2018 AASHE STARS submission. By achieving a Platinum rating, The Ohio State University has the ability to position itself as a leader in the movement towards a sustainable future and act as a role model for other institutions.

To achieve this goal, Ohio State must focus its attention on the most heavily weighted AASHE STARS scoring areas. Focusing on these categories will improve performance exceptionally and help the university reach its goal.

The goal of the research conducted for this report is to determine the feasibility of achieving a Platinum rating by 2018 and to recommend where the greatest need for focus lies. In order to do this, it was imperative to consider the university's sustainability goals, which are a set of goals the university has committed to that will directly affect the operations of the university and its corresponding AASHE point totals. Additionally, the following set of research objectives was formed to help achieve the research goal.

1. Establish baseline knowledge
2. Determine the areas within AASHE STARS where Ohio State scored the lowest and the feasibility of achieving points for each of these credits in order to decide which credits should be prioritized.
3. Create comprehensive proposals to obtain full points for the Learning Outcomes and Pest Control credits.
4. Project the points each credit will have earned by 2018 based on Ohio State sustainability goals and historical trends.
5. Evaluate whether the goal of attaining a Platinum rating is feasible and communicate the newly generated information to decision makers.

By completing the research objectives and taking the university's sustainability goals into account, recommendations and projections were able to be made. The recommendations that were deemed to be the most critical to achieving a Platinum rating were the implementation of sustainable learning outcomes into freshman survey courses and increased rates of improvement

across all operations. The final projection of this report determined that Ohio State would receive a score of 83.93 points by 2018 if all recommendations and projections are implemented perfectly, which is 1.07 points short of achieving a Platinum rating. Without a drastic increase in improvements across all of the core areas, this report concludes that achieving a Platinum rating by 2018 is unlikely.

## **Methods**

In order to accurately project the 2018 scores for each credit, various steps were taken to collect data and information. The first course of action was to make contact with university officials to gather data, conduct interviews, and determine what has been previously done to address the university's sustainability goals as well as what barriers occurred throughout the process. A channel of communication was also established with other capstone groups working on projects that coincided with sections of AASHE STARS where Ohio State needs improvement in. Once these channels were established within the university and other student groups, a benchmarking analysis was administered by gathering data from other AASHE STARS institutions excelling in categories that Ohio State could improve. Furthermore, a gap analysis was conducted using the current AASHE STARS data and the university's 2025 sustainability goals. By utilizing the data provided from university officials and the university's sustainability goals, it was then possible to forecast scores for 2018. In order to forecast these scores, past growth rates were found from the data provided by university officials and were used in conjunction with the university's sustainability goals to estimate future growth rates and ultimately determine values for 2018. In order to estimate future growth rates, the following equation was used:

*Equation 1:*

$$g=(V_F / V_B)^{1/n} - 1$$

In this equation  $g$  represents the growth rate,  $V_F$  represents the future value,  $V_B$  represents the baseline value, and  $n$  equals the number of years between  $V_F$  and  $V_B$ . In order to project a growth rate based off the university's sustainability goals,  $V_F$  was represented by the desired completion year of each goal (most often 2025) and the data that would result from being successful. Once the growth rate was found, it was inputted into a separate equation that could be used to find the 2018 values. The equation used to make these projections is as follows:

*Equation 2:*

$$V_{2018} = V_B (1 + g)^n$$

In this equation,  $V_{2018}$  represents the projected 2018 value,  $V_B$  represents the baseline value,  $g$  represents the growth rate, and  $n$  represents the number of years in between  $V_B$  and  $V_{2018}$ . Once the 2018 value was properly attained, 2018 AASHE scores were estimated by comparing the data to each credit's respective scoring criteria.

## **Data Analysis**

### Academic Curriculum (AC 1):

The Academic Curriculum credit examines how many sustainability courses are available at an institution. In order to earn all 14 points, 20 percent of all courses at an institution must include a sustainability component. Incremental points are awarded based on the percentage of course offerings that are sustainability courses and/or courses that include sustainability components. Institutions must also have at least 90 percent of academic departments offer at least one course that includes a sustainability component. In 2016, The Ohio State University earned 6.54 points out of 14 because out of almost 12,000 courses, only about 1,000 were

sustainability courses or courses that included a sustainability component. Out of 227 academic departments at the university, 101 offered at least one sustainability course or a course that includes a sustainability component (“The Ohio State University”, 2016). A major barrier to achieving points in this credit was the data collection method, as it was a challenge for the staff at Energy Services and Sustainability to find an accurate method to report sustainability courses (Heinen, 2016).

In order to increase points received on this credit, reporting techniques used by other universities were studied. Pennsylvania State University created a survey for faculty members to complete when a new class based in sustainability is created (“Courses”, 2010). The University of Indiana created a designation checkbox for sustainability that is submitted to the Registrar’s Office when faculty provide course information on upcoming courses (“Brethova, 2016”). These efforts are great examples that could allow Ohio State to accurately report sustainability courses and maximize the points received for the Academic Curriculum credit. Based on the positive trend of an increasing amount of sustainability courses, implementation of the proposed sustainability module that will be discussed in the Learning Outcomes section, and creating a better reporting technique, it is projected that The Ohio State University will earn 8.55 Academic Curriculum points in 2018, which is an increase of 2.01 points from the 2016 submission.

Learning Outcomes (AC 2):

Institutions where all students graduate from programs that have adopted at least one sustainability learning outcome earn the full 8 points for the Learning Outcomes credit. The sustainability learning outcomes can be achieved on an institutional level (e.g. covering all students), division level (e.g. covering one or more schools or colleges within the institution), program level, or course level. Out of almost 11,000 programs offered at Ohio State, only 2,400



students graduated from a program that adopted a sustainability learning outcome (“The Ohio State University”, 2016). As a result, Ohio State earned 1.75 points out of 8 in 2016.

In order to increase points earned in this credit, other institutions with existing university-wide sustainability courses and learning outcomes were researched, including the University of Georgia and Northern Arizona University [See Appendix B]. Research was also conducted on previous attempts to incorporate university-wide sustainability courses and learning outcomes at The Ohio State University. Previous attempts included a general education course requirement, an ‘S’ designation checkbox on transcripts that must be completed by taking a sustainability course, online voluntary modules, freshman survey classes, and orientation programs [See Appendix B]. Based on the information collected, it is recommended that all freshman survey courses be amended to include a sustainability module along with a sustainability learning outcome. This route should be chosen because it is the least expensive and extensive way to create a university-wide sustainability learning outcome. It is also the most realistic method and serves as a stepping stone to incorporate sustainability into more of Ohio State’s curriculum.

Amending the survey class curriculum is the best way to incorporate sustainability because the sole purpose of a survey class is to help freshman become successful college undergraduates, and part of becoming a successful college undergraduate is learning how to become a sustainable member of society. The Ohio State Sustainability Curriculum Committee could serve as a university champion and could create a full length sustainability lecture module for survey courses. Interns could also be hired within the school to create and present these sustainability modules. The content of the lecture would be focused on sustainable campus behavior (i.e. recycling habits, energy and water use, and carbon footprints). It would be an important step towards creating a sustainable environment and it would also further Ohio State’s

efforts to reach its Teaching and Learning Sustainability Goal by the desired completion date of 2025. The Teaching and Learning Sustainability goal includes “delivering a curriculum that provides Ohio State students at all stages of instruction – from General Education to professional and technical programs – with opportunities to understand sustainability holistically, framed by the environment, science, technology, society, the economy, history, culture, and politics” (“Ohio State Sustainability Goals”, 2015).

Twelve colleges currently offer survey classes, not including the Exploration Program survey classes. There are 169 survey classes offered annually and 10,531 students participating in those classes (“Course Catalog Search”, 2016). If the four largest colleges (Arts and Sciences, Exploration, Business, and Engineering) implement the module, over 80 percent of the freshman students would be reached [See Appendix A & B]. According to this proposal it is projected that Ohio State would earn 6 points in 2018, which is an increase of 4.25 points from the 2016 submission.

Limitations to this proposal will be the push-back colleges have on this amendment. If a college has to add content to its survey course, it may have to remove existing content to accommodate this addition. This proposal will also raise questions as to why sustainability should be included, and not other civil education programs (ex: sexual assault, mental wellness, financial responsibility, etc.). A final limitation of this proposal is the issue of the amount of time and resources it will take for implementation.

#### Food and Beverage Purchasing (OP 6):

Currently, Ohio State is receiving .44 out of a total of 4 points for Food and Beverage Purchasing (“The Ohio State University”, 2016). By 2018, it is projected that sustainable food purchasing will be at 19.15 percent, resulting in a total of .766 points of the total 4 points

available. This .326 point increase was determined by finding the growth rate using Equation 1, and then using Equation 2 to determine the percentage by 2018. Using the AASHE STARS technical manual to calculate the AASHE score for food and beverage purchasing, the point value of .766 was determined (“The Ohio State University”, 2016). By using the 2018 forecasted percentage, past data beginning at 2012, and the university goal of 40 percent by 2025, the trend of sustainable food purchases within the next 10 years was able to be visualized (Gillund, 2016).

*Figure 1: Ohio State Sustainable Food Purchasing*



There were several barriers to these methods. One barrier was a lack of response from university officials in order to determine how they plan on increasing sustainable food purchasing. Another barrier was the lack of access to data because many of Ohio State’s purchasing decisions are privatized and not available to the public.

#### Building Energy Consumption (OP 8):

The Ohio State University is currently receiving 1.58 points out of 6 total points in the category of Building Energy Consumption (“The Ohio State University”, 2016). This is a category that the university has prioritized, as there currently is a sustainability goal to reduce total building energy consumption by 25 percent by 2025 from the baseline year of 2008 (“Ohio

State Sustainability Goals”, 2015). In order to achieve this goal, there is a need for a 1.47 percent decrease in building energy consumption per year. If successful in this venture, the university will receive 1.76 points by 2018 (an increase of 0.18).

There are many uncertainties in these projections for building energy consumption, which is a significant barrier when attempting to project whether the university will achieve a Platinum rating by 2018. Two of these uncertainties are the future of energy management at Ohio State and the equation AASHE uses to determine points. The university is currently in the planning stages of privatizing utilities through a comprehensive energy management plan. This decision will essentially give comprehensive control of electricity and electrical infrastructure to a private company, which will be held accountable to achieve the university’s sustainability goals. However, since this deal has not been finalized, total stagnation in attempts to reduce energy consumption has occurred. This stagnation makes it difficult to determine when efforts will resume again and, if they do, at what pace. The equation AASHE uses to determine points is also an uncertainty as it requires many variables that change on a yearly basis and are often unpredictable, (Ex: total degree days and total building space) [See Appendix C for equation]. Due to these uncertainties, the projection of 1.76 could fluctuate greatly by 2018.

#### Landscape Management (OP 10):

Currently, Ohio State is receiving 1.58 out of 2 possible points in Landscape Management (“The Ohio State University”, 2016). In order to receive the entire 2 points, it is advised that Ohio State adopt an Integrated Pest Management (IPM) plan. As a whole, an IPM plan is simply a policy that advocates for the responsible use of pesticides and harmful chemicals across campus. While the Landscape Services Department at Ohio State does not currently have plans to integrate such a plan, they have stated that they will examine and

consider any IPM proposals submitted. The adoption of such a plan would bolster Ohio State's Land Management score for the 2018 AASHE STARS submission. Pending current proposals, a full IPM plan will net the university 2 points by 2018.

Potential barriers for adopting an Integrated Pest Management plan include the willingness of university staff to assist in the coordination and adoption of such policies. Additionally, AASHE policy and scoring has provided an extremely limited amount of guidance in efforts to formulate such a plan.

Electronics Purchasing (OP 12)/Office Paper Purchasing (OP 14):

Currently, only 13 percent of Ohio State's total electronic purchases are of EPEAT (also known as Electronic Product Environmental Assessment Tool) Gold standard and all paper purchased is only 30-49 percent post-consumer recycled ("The Ohio State University", 2016). As a result, Ohio State is currently earning .37 points of the 1 point available in electronics purchasing and .51 points of the 1 point available for office paper purchasing ("The Ohio State University", 2016). In order to achieve the university's 2025 sustainability goal of developing university-wide standards for targeted environmentally preferred products and fully preferable products and services, it is projected that a 10 percent increase in EPEAT Gold standard electronics must be purchased per year as well as a 10 percent increase in 100 percent post-consumer recycled paper purchased per year (Gillund, 2016). This 10 percent per year increase would result in receiving .67 points of the total 1 point available for electronics purchasing and .81 points of the total 1 point available for office paper purchasing for the 2018 submission ("The Ohio State University", 2016). These scores were determined using the AASHE STARS technical manual [See Appendix C for equation].

The main barrier to this analysis was the confidentiality of the data. Multiple parties were contacted to gather information for this credit, but it was difficult to get a response. Upon the rare occasion where contacts actually responded, they often did not have the data or information that was needed.

#### Waste Minimization (OP 22):

In terms of waste minimization, The Ohio State University is currently receiving 1.18 out of 5 possible points (“The Ohio State University”, 2016). While the university has no sustainability goal set in place to minimize waste, the growth rate of generated waste from 2012 to 2015 was only .19 percent while the growth rate of total campus users was .70 percent (“The Ohio State University”, 2016). Using these growth rates, it was projected that the university will receive 1.28 out of 5 points by 2018 (an increase of 0.1 points).

The main barrier to waste minimization is that the university has expressed little interest in working towards minimizing waste production. In order to achieve a greater increase in points for this credit, there is a need for the administration to commit to lowering its waste production in relation to total campus users and perhaps make it a sustainability goal.

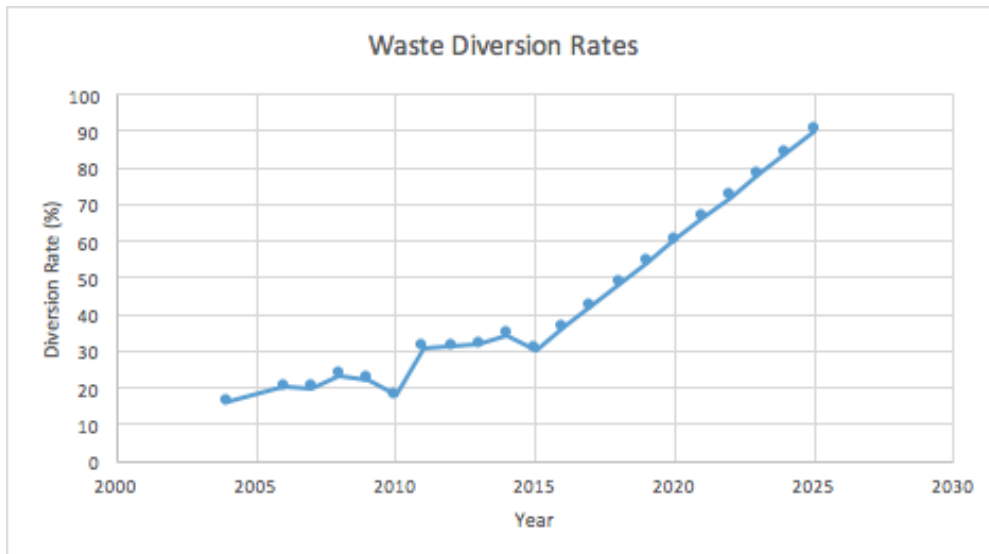
#### Waste Diversion (OP 23):

The Ohio State University has a sustainability goal to achieve zero waste by 2025, which is defined by a diversion rate of 90 percent or greater (“Ohio State Sustainability Goals”, 2015). If the university achieves this goal, it will receive full points in Waste Diversion in 2025. Currently, the university is receiving 0.91 out of 3 total points in this area (“The Ohio State University”, 2016). If the university is successful in staying on track to achieve its sustainability goal, there will be a 48.28 percent diversion rate by the year 2018. This diversion rate will give the university 1.45 points out of 3, which is an increase of 0.54 points. In order to determine this

point total, Equation 1 was used to determine a growth rate of 11.46 percent (consistent with the university’s sustainability goal), which was then inputted into Equation 2 to calculate the increase in waste diversion rates Ohio State will experience by 2018 given the current 30.4 percent diversion rate. This diversion rate was then inputted into the AASHE equation, which delivered the projected score [See Appendix C for equation].

It is important to note that there are some barriers to this analysis and the waste diversion process. This calculation was done with the university’s sustainability goal in mind, which implies an 11.46 percent growth rate. As shown in Figure 2, this could be an issue as the growth rate in waste diversion from 2004 to 2015 was only 5.95 percent (Gillund, 2016). This means that in order for the university to reach their sustainability goal, they must increase waste diversion efforts by 63.3 percent. It is possible to achieve this goal, but there is a definite need for urgency within the administration.

*Figure 2: Ohio State Waste Diversion Rates*



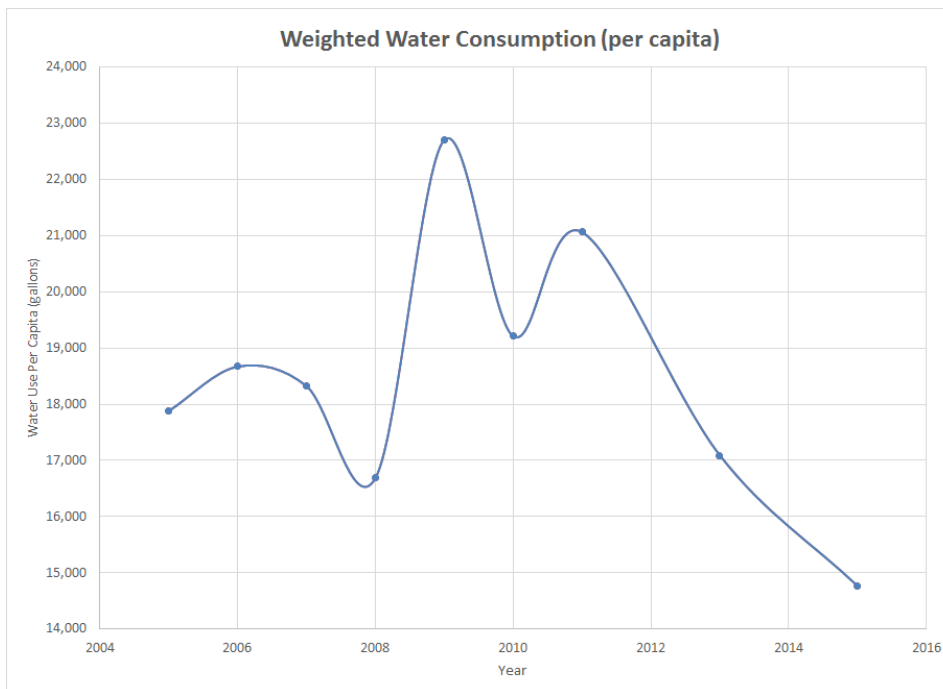
Water Use (OP 26):

In the category of water use, Ohio State is currently receiving 1.98 out of a possible 4 points (“The Ohio State University”, 2016). While there is not an explicit water reduction goal

for 2025, the current goal states that Ohio State is aiming to reduce potable water consumption by 5 percent per capita every 5 years, while also resetting the baseline every five years (“Ohio State Sustainability Goals”, 2015). As it currently stands, Ohio State is reducing potable water use at a rate of 1.9 percent per year according to data collected from the Office of Energy and Environment (Figure 3). Assuming the current reduction rate continues, Ohio State will be on track to surpass this five-year goal in 2018. As a result of this reduction, Ohio State will receive 2.28 out of a possible 4 points.

The main barrier to analysis of water use projections is the accuracy of the data. While there is comprehensive data dating back to 2005, there was not any data available for the years 2012 and 2014. Including data from both of these years would have provided a better picture of the university’s water use over the past decade; however, given that only two out of the last ten years are missing, there is a fair amount of confidence in the accuracy of this data.

*Figure 3: Ohio State Weighted Water Consumption (per capita)*





## **Recommendations**

The Ohio State University has positioned itself well to follow the recommendations of this study. Through efforts aimed at enhancing the university's performance in AASHE STARS, extensive targeting of areas of poor performance in the 2016 report may allow a Platinum rating to be attainable. A Platinum rating will only be attainable, however, if the university implements the following recommendations thoroughly. It is recommended that more research is conducted regarding the reporting techniques on sustainability courses for Academic Courses. Additionally, the Registrar's Office must be involved in order to accurately report courses. Furthermore, focusing on implementing an amendment to all survey classes by 2018 will eliminate a majority of the gap that currently exists between Gold and Platinum.

As a responsible steward to the environment, the formal adoption of an IPM plan is highly recommended, not only to receive more points, but also to ensure a sustainable future for Ohio State. Additionally, creating a more sustainable future will depend on the manner through which water, chemical, paper and electrical purchasing consumption is conducted, which could be improved through increased transparency. Finally, a Platinum rating will only be attained if there is an increased sense of urgency and implementation of the university's sustainability goals. The pace at which progress is currently occurring will not be sufficient enough to close the final point gap between a Gold and Platinum rating. As shown in Table 1, the current pace of progress with all of the previously mentioned recommendations included will earn the university a score of 83.93 points. By aggressively increasing the pace of progress, it may be possible to increase that score to the 85 points needed to achieve a Platinum rating.

Table 1: Ohio State AASHE Credit Breakdown

		Credit Title	TPP	2016	2018
<b>AC</b>	1	Academic Courses	14	6.54	8.55
	2	Learning Outcomes	8	1.75	6
	9	Academic Research	12	9.60	11
<b>EN</b>	12	Community Service	5	3.60	4
<b>OP</b>	1	Greenhouse Gas Emissions	10	3.54	5
	3	Building & Operations & Maintenance	4	1.50	2
	4	Building Design & Construction	3	2.02	2.5
	6	Food & Beverage Purchasing	4	0.00	0.766
	8	Building Energy Consumption	6	1.58	1.76
	9	Clean & Renewable Energy	4	0.33	1.1
	10	Landscape Management	2	1.50	2
	12	Electronics Purchasing	1	0.37	0.67
	14	Office Paper Purchasing	1	0.51	0.81
	15	Inclusive & Local Purchasing	1	0.43	0.73
	16	Life Cycle Cost Analysis	1	0.50	1
	17	Guidelines for Business Partner	1	0.50	1
	18	Campus Fleet	1	0.17	0.8
	19	Student Commute Modal Split	2	1.24	1.28
	20	Employee Commute Modal Split	2	0.41	1.02
	22	Waste Minimization	5	1.18	3
	23	Waste Diversion	3	0.91	1.45
	24	Construction & Demolition Waste Diversion	1	0.82	0.85
26	Water use	4	1.98	2.28	
28	Wastewater Management	1	0.00	1	
<b>PA</b>	8	Affordability and Access	4	3.10	3.1
	9	Employee Compensation	3	1.50	2
	13	Committee on Investor Responsibility	2	0.00	2
<b>TOTAL</b>				72.53	83.93

There are several limitations to this research and the corresponding recommendations. First, the timeline of the university’s sustainability goals does not match the timeline of achieving a Platinum rating by 2018. Most of the sustainability goals have a desired completion date of 2025, which means only marginal progress will be made in those areas by 2018. Additionally, there are uncertainties in the pace at which progress will occur upon the finalization of the comprehensive energy management plan. The private company that gains control of the university’s utility system could either increase or decrease the pace of progress. This is a virtual unknown that makes it difficult to accurately project future point totals. Finally, it was difficult to gather data sets from various university officials, which could possibly alter the results.

## **Conclusion**

In order to meet the goal of attaining a Platinum rating by 2018, The Ohio State University will need to accelerate implementation on all of the proposed changes and trends. There are gaps in current operational policies and standards, which have led to various inefficiencies that will make it difficult to achieve the sustainability goals the university has committed to. These gaps must be addressed in order to improve the future sustainability of the university. Through university-wide collaboration, The Ohio State University can potentially be successful in attaining a Platinum rating by 2018. By achieving a Platinum rating, The Ohio State University will benefit due to increased efficiency in operations and through the positive image it will receive as a role model for university sustainability. However, current projections predict that Ohio State will fall short of achieving a Platinum rating by 1.07 points. If Ohio State is serious about reaching the goal of achieving a Platinum rating by 2018, there must be a drastic increase in collaboration across the university as a whole. This collaboration should act as an extension of this study, and must occur between administrators who have the decision making control to improve operations and implement academic coursework amendments. Most notably, collaboration (as opposed to competition) must occur between the Office of Energy and Environment and the office of Energy Services and Sustainability, while the Sustainability Curriculum Committee must act as the champion to implement sustainable learning outcomes into university survey courses. If these groups can collaborate effectively, it may be possible to attain a Platinum rating through accelerated implementation of this study's recommendations. Without accelerated implementation of the recommendations, however, it is currently unrealistic for The Ohio State University to attain a Platinum rating by 2018.

## Literature Cited

1. Brethova, K. (2016, March 4). Indiana University Academic Curriculum [Email Interview].
2. Course Catalog Search. OSU.EDU. Retrieved March, 2016, from [https://courses.osu.edu/psp/csosuct/EMPLOYEE/PUB/c/COMMUNITY\\_ACCESS.OSR\\_CAT\\_SRCH.GBL](https://courses.osu.edu/psp/csosuct/EMPLOYEE/PUB/c/COMMUNITY_ACCESS.OSR_CAT_SRCH.GBL)
3. Courses. The Pennsylvania State University. (2010) Retrieved February, 2016. From <http://www.sustainability.psu.edu/learn/students/courses>
4. Gillund, T. (2016, February/March). Academic Curriculum, Data Needs, Waste [Personal interview].
5. Heinen, A. (2016, February 08). Academic Curriculum [Personal interview].
6. Ohio State Sustainability Goals. (2015, November 12) Retrieved January, 2016. From <https://www.osu.edu/assets/pdf/sustainability/sustainabilitygoals.pdf>
7. The Ohio State University Columbus, OH, US. (2016, January 22). Retrieved January, 2016, from <https://stars.aashe.org/institutions/the-ohio-state-university-oh/report/2016-01-22/>