Sustainability Rating Systems for Universities. Are they useful?

– A case study from the initial implementation of STARS at Washington University in St. Louis

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A case study from the initial implementation of STARS at Washington University in St. Louis

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Executive Summary

The aim of this thesis is to present experiences and lessons learned from the initial implementation process of the rating system STARS at Washington University in St. Louis: mainly the strengths/opportunities can be used to overcome the weaknesses/threats that the STARS implementation may entail. Strengths and opportunities such as increased student involvement in processes such as assessing sustainability-contents of courses through evaluation-forms, internships etc. and cost-reductions due to reduced energy and purchasing costs, may reduce the threat of high STARS-participation cost. Also, a structured datasheet for easy tracking and follow-up of performance and mapping out in what areas to prioritize improved environmental performance enables good scoring as efficiently as possible. Forming a sustainability awareness committee may enable STARS-involvement of faculty members across the institution. The fact that not all institutions have to be rated in STARS, may cause the STARS-participating institutions to generally be the "best in class" ones and create high competition. Although, belonging to the group of "best in class" institutions is an advantage in itself - therefore communicating STARS participation is important for gaining valuable recognition. Based on findings in the analysis, as well as general experiences from the process, a discussion on whether the intended outcomes of STARS were lived up to in this case, it was shown that most of the intended outcomes were fulfilled.

1. Introduction

This chapter gives the reader an introduction to the research topic and discusses the importance of integrating sustainability in higher education. It ends with a definition of the purpose of this study as well as research questions.

1.1. Defining Sustainability and Sustainable Development

When speaking of rating systems for the advancement of sustainability in higher education, it is important to have a clear definition of what sustainability and sustainable development actually is. Probably, the most well-known definition is from *Our Common Future: The Report of the World Commission on Environment and Development (Chapter 2):* "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (UN Documents, 1987). When speaking of sustainability and sustainable development throughout this thesis, this definition is used.

1.2. The Importance of Sustainability in Higher Education

After numerous large campaigns and a Nobel peace prize to Al Gore in 2007, after the release of his awareness-raising film "An Inconvenient Truth" (Nobel Peace Prize, 2011), climate change and sustainability has reached the public eye. One may wonder, who is expected to take the first step of solving the problem? Well, leaders such as politicians, CEOs, scientists and journalists have a big responsibility and a lot of capability to steer society in a sustainable direction e.g. through informing the public, serving as role models, operating big corporations in sustainable directions. The majority of these leaders most likely have something in common: involvement with institutions for higher education. Sustainability illiteracy among future leaders is a great challenge in creating a sustainable future. Educating future leaders that can take responsibility and steer society in a sustainable direction, with abilities to solve difficult often cross-disciplinarian problems, is therefore a very important issue to deal with at institutions of higher education.

Today, most of the sustainability-related and -focused studies, are isolated as special courses or as modules in programs aimed for specialists. This separation of sustainable thinking from

traditional education may prevent many future professionals and leaders from creating sustainable and profitable solutions, products, services, etc. Not to say the least from demanding them on the market. There is a need for integration of sustainability in all academic disciplines, as well as incentives for developing a new type of curriculum which take sustainability into account, regardless of area of education.

> *"Education is not widely regarded as a problem, although the lack of it is. The conventional wisdom holds that all education is good, and the more of it one has, the better…. The truth is that without significant precautions, education can equip people merely to be more effective vandals of the Earth."* – David Orr (1994)

1.3. Sustainability Rating Systems for Higher Education

Since the U.S. News & World Report initiated its rankings of American colleges in 1983, publishers in other countries quickly followed with similar measures, providing prospective students. with information of performance, seeking to incentive improvement of quality in the higher education sector. Aside from media, rankings have been conducted by proffessional associations as well as governments. Having a high ranking gives an institution opportunities for marketing, as well as increased tuition fees, as prospective students' willingness to pay may increase with improved quality of education (Institute for Higher Education Policy, 2007). Also, incentives for quality improvement in the higher education sector benefits society at large, as mentioned in previous section. Because of all these interests - transparency, objectivity and consistent methodology are important aspects to consider, as well as using accurate indicators for measuring a university's performance.

Considering the direct impact that ranking and rating systems have on insitutions, as well as the indirect effect on society (see section 1.2) – integrating sustainability aspects in the process is an important factor for accomplishing a sustainable development. There are a number of sustainability rating and ranking systems existing in North America to date. Rating systems may be a good tool for assessing sustainability, first by identifying an institution's different environmental aspects, and as previously mentioned - gives an institution opportunities for marketing and an increased tuition fees.

According to Greener U, an organization focused on campus sustainability and energy solutions (GreenerU, 2011), the most prominent evaluation tool for sustainability in higher education in the US today, is the STARS rating system developed by the Association for the Advancement of Sustainability in Higher Education, AASHE. Another popular rating system is the Green Reportcard developed by the Sustainable Endowments Institute, SEI, and the Princeton Review's "Guide to Green Colleges". STARS and Green Reportcard differ in the sense that participation in STARS is on a voluntary basis, while the Green Reportcard selects institutions for rating, depending on the size of endowment (GreenerU, 2010). The Princeton Review sends out surveys to almost all 4-year institutions in the United States (Princeton Review, 2011b).

1.4. Purpose of the Study and Research Questions

This thesis is based on the author's experiences from an internship at Washington University in St. Louis (WUStL). At the time, WUStL participated in the SEI Green Reportcard, and inconsistencies were found in the previous ratings (see section 2.5), according to members at the Office of Sustainability, WUStL. STARS participation is voluntary (see section 1.3) and therefore support is needed from the executive leadership before signing up. During the internship, the main task was therefore to make an estimation on how the WUStL would score

in the STARS rating system. A presentation was given to the executive leadership, showing examples of inconsistencies with the Green Reportcard rating. A presentation was also given on STARS and an introduction on its functions, along with WUStL's estimated scoring in it. The purpose of this study is to present the main strengths, weaknesses, opportunities and threats that can arise at an institution initiating participation in STARS, based on experiences from the internship at WUStL which is aimed towards institutions approaching STARS participation. A case study is presented from the process; highlighting best practices, difficulties and other elements in the process. To get an understanding of how to deal with the strengths, weaknesses, opportunities and threats, and how to get the most rewarding STARS implementation, an analysis is conducted on how the strengths/opportunities can be used, to overcome the weaknesses/threats that the implementation may imply. Finally, an analysis will be done, to see how well the intended outcomes of STARS were fulfilled in this case. The following research questions are intended to be answered in this thesis:

- **How does the STARS rating system function?**
- **Learned from experience of the initial implementation process: What are the main strengths, weaknesses, opportunities and threats of the implementation of STARS at Washington University in St. Louis?**
- **How can the strengths/opportunities be used, to overcome the weaknesses/threats that the STARS implementation may imply?**
- **In this case: How well were the intended outcomes of STARS fulfilled?**

The first section in the thesis will give a detailed presentation of the STARS rating system which is based on the STARS Technical Manual, including background, development process of the credits, scoring, reporting and intended outcomes. To be able to understand the rest of this thesis, the reader must have information on how STARS is built up and functions. The second section will present the case study and practical experiences from the initial implementation process of STARS at Washington University in St. Louis, presenting different elements of the process. Finally, an analysis will be conducted on whether the intended outcomes of the STARS rating system were lived up to in in practice in this case study.

1.5. Methodology

A brief litterature-review of rating systems in general was done to get an understanding of rating systems for higher education in general. To get an understanding of the STARS rating system and its functions, data gathering was conducted mainly from the STARS Technical Manual, which is a comprehensive manual intended for usage by institutions signing up for STARS. In the manual, all credits in the rating system are listed with an explanation on how to calculate the scoring for each one of them. A datasheet listing all the credits was made in Excel at Washington University in St. Louis, and used for calculating the institution's overall score in the different categories. Data-gathering for all credits was made by asking faculty members and employees all across the institution, getting expertise in their respective areas of operation. For instance, for the data gathering in the OP sub-categories Buildings and Grounds, people working at the Facilities, Planning and Management Department were asked. For the PAE sub-category Investment (see section 2.1), the Chief Ivestment Officer was asked for information. In the case-study, the credits were divided into two categories: 1) easy credits and 2) demanding credits, which depended on the time and effort required for data-gathering. A SWOT-analysis was used to map out the strengths, weaknesses, opportunities and threats that STARS participation at Washington University in St. Louis would entail. Using the SWOT analysis it could be determined how to use the strengths/opportunities to reduce the likelihood and impact of the threats/weaknesses the STARS implementation would entail.

Based on the experiences from the implementation process, an evaluation was done on whether the intended outcomes of STARS were lived up to in this case.

2. STARS – Sustainability Tracking Assessment & Rating System

This chapter examines the different methodologies of sustainability assessment tools for higher education in North America, to give the reader an insight on typical indicators used. It also gives a detailed presentation of the STARS rating system, including background, development process, scoring and intended outcomes. This information is important for understanding the implementation process at Washington University in St. Louis in the coming chapters.

2.1. Methodology - Sustainability Rating Systems for Higher Education

The organization Greener U has made a guide to ratings, rankings and reviews (sustainability assessment tools) in North America, which complies a table of the top ten existing ones to date.

TABLE OF THE TOP TEN HIGHER ED SUSTAINABILITY RATINGS, RANKINGS & REVIEWS

NAME	SPONSORING ORGANIZATION	FREQUENCY	SAMPLE SIZE	FORMAT	# ITEMS / QUESTIONS	IS METHODOLOGY PUBLIC?
STARS	AASHE	Updated triennially; open to participation at will	170 charters members & growing	Rating & database	135	Yes; Technical Manual lays out detailed credits
College Sustainability Report Card	Sustainable Endowments Institute	Annual (Sept/Oct)	332 schools in 2010 report	Rating & database	In 2011 surveys Campus: 81 Dining: 30 Endowment: 9 Student: 4	Yes; Indicators and relative values on website, Scoring key not available
Princeton Review Green Rating	Princeton Review	Annual (Jul/Aug)	703 in 2011 edition	Rating	10	No; Publish questions in press release
Guide to 286 Green Schools	Princeton Review & U.S. Green Building Council	once so far	286	Review	10	No; Publish questions in press release
Sierra Cool Schools	Sierra Magazine	Annual (Aug/Sept)	162 in 2010 edition	Ranking & database	52 in 2010 edition	Yes; Scoring key on website
Campus Report Card	National Wildlife Federation	2001 and 2008	1068 schools in 2008 report	Review	2 surveys President: 75 Facilities: 101	Yes; Methods section of report
Green Jobs for a New Economy	Peterson's	once so far	448	Review	110	No
Greenopia College & University Rankings	Greenopia	Annual (Aug/Sept)	100	Ranking & database	Survey not available, 8 items online	Publish general guidelines only
Best Business Programs in Sustainability	Bloomberg Businessweek	Annual (Feb/Mar)	108	Ranking	Not available	No
Beyond Grey Pinstripes	Aspen Institute	Biennial	149 business schools in 09-10, 93% U.S. schools	Ranking & database	10 core questions, ~25 in introduction	Yes; on website

COLUMN CRITERIA

- Name of the evaluation
- Name of the sponsoring organization(s)
- Frequency of publication
- Size of the school sample (how many schools are evaluated)
- Format—is it a rating, ranking, review and/or searchable database of information?
- Number of items or questions in the survey (if survey is used) or the overall evaluation
- Whether or not the methodology is public and where it is located

Table 1. Top Ten Ratings, Rankings and Reviews in North America (GreenerU, 2010)

As one can see in Table 1, three of the presented sustainability assessment tools are classified as rating systems: STARS, Green Reportcard and the Princeton Review Green Rating. The three rating systems differ in many ways, and with only looking at the different types of indicators and methodology, one will discover that the STARS rating system is by far the most thoroughgoing one.

The 2010 Green Report Card covered a list of colleges and universities with the 300 largest endowments in the U.S. and Canada ($160M or more) from the source National Association

of College and University Business Officers (NACUBO) and public records. A school's overall grade derives from the grades received in nine equally-weighted categories: administration, climate change and energy, food and recycling, green building, student involvement, transportation, endowment transparency, investment opportunities, and shareholder engagement. A total of 48 indicators are used to evaluate performance within the categories. The nine categories cover the areas endowment management and campus operations (Greenreportcard.org, 2011).

The Princeton Review conducts several rankings for colleges and universities with different focuses, such as: which institutions are most politically active, which ones have the best social scene, most beautiful campus, etc. (Princeton Review 2011a). Princeton Review rates schools sustainability performance in their "Guide to Green Colleges" by sending out surveys with key questions to almost all 4-year colleges and universities in the United States. Based on the answers recieved from the institutions, they are rated in consideration of "1.) whether students have a campus quality of life that is both healthy and sustainable, 2.) how well a school is preparing students for employment in the clean energy economy of the 21st century as well as for citizenship in a world now defined by environmental concerns and opportunities and 3) how environmentally responsible a school's policies are" (Princeton Review, 2011b). A few examples of the questions that institutions fill out are "what is the percentage of food expenditures that go toward local, organic or otherwise environmentally preferable food?", "are new buildings are required to be LEED Silver certified or comparable?", "does the school have an environmental studies major, minor or concentration?", "what is a school's overall waste diversion rate?" (Princeton Review 2011b).

During the internship conducted by the author of this thesis, WUStL participated in both Princeton Review's "Guide to Green Colleges" and SEI's Green Reportcard and found them useful in many ways, but some concerns arised. The uncertainty of the institution's rating after filling in the surveys could cause worries, and in a few cases inconsistencies were found in the rating systems, mainly the Green Reportcard. In some categories, the institution was penalized compared to other institutions, and vice versa. Therefore, having a thoroughgoing and quantitative rating system to work with, such as STARS, was found very important.

2.2. What is STARS?

STARS is an internal assessment tool for tracking sustainability performance at institutions of higher education. It is in general considered to be the most comprehensive of existing rating systems for this pupose (Greener U, 2010). The Association of Advancement of Sustainability in Higher Education (AASHE) launched their first official version of STARS (1.0) in January 2010, which was pilot tested 2008-2009 by approximately 70 colleges and universities in North America. The latest version to date, STARS 1.1, was launched in February 2011 and is an update from the STARS 1.0. The STARS rating system evaluates sustainability performance in three main categories;

- **Operations (OP);** includes the sub-categories purchasing, climate, energy, grounds, buildings, transportation, waste and water.
- **Education and Research (ER);** includes the categories Co-curricular education, Curriculum and Research.
- **Planning administration and engagement (PAE);** includes the subcatgories human resources, diversity and affordability, coordination and planning, investment and public engagement.

A fourth category in which an institution may receive extra points is the category **Innovation**, recognizing innovative initiatives for sustainability. The institution is rated based on the number of points earned in all categories. Each of the three main categories can give a maximum of 100 points each, and consist of several credits that can give a different amount of points each. An institution can earn up to 4 innovation points which are additional to the main credits (STARS Technical Manual, 2010).

2.3. Development of the STARS Credits

The core of the STARS rating system is the credits. Therefore, it is important to formulate them well and take their potential sustainability outcome in consideration very carefully. The STARS credits were initially developed mainly from sustainability reports from businesses, campus sustainability assessments and other sustainability ranking and rating systems. The credits went through further development from the pilot testing period, through feedback from experts, as well as from various stakeholders. STARS credits were also examined by using four criteria. To simplify the process of developing credits, there are four gatekeeper questions that AASHE took in to consideration while developing all STARS credits:

1. Does the credit speak to improve environmental, social, and/or financial impacts?
The first criteria require that the credit leads to an advancement of social, environmental and/or economic performance, which can differ a lot between the various credits. A credit pertaining to sustainability in the curriculum would advance an institutions sustainability performance differently from an operations credit which pertains to sustainable technologies or LEED-certification.

2. Is the credit relevant and meaningful for diverse institutions?
A STARS credit must be applicable to most types of institutions of higher education. To avoid penalization for institutions that may not be able to undertake certain credits, these include an applicability criterion indicating that they do not apply for all types of institutions (for instance, credits regarding residence halls do not apply to institutions that do not have residence halls).

3. If the credit is based on the presence of a strategy, is a performance-based indicator unavailable or appropriate?
STARS performance credits seek to as often as possible be measured quantitatively (such as percentage of courses that are sustainability-related to all courses available at the institution). Being able to measure an institutions sustainability performance in numbers, facilitates performance tracking and setting tangible quantitative goals for continuous improvement. As for some credits, adoption of strategies may be the only way to go (for instance having a sustainability officer/coordinator). Depending on the appropriateness of methods for measuring performance, some credits have strategy indicators while others have quantitative ones.

4. Is the credit measurable, objective, and actionable?
Each credit must be objective, measurable, and actionable to ensure that the rating is correct (STARS Technical Manual, 2010).

After evaluation of credits considering the four criterias, each credit is selected a different type:

- **Tier One credits.** These are worth one or more points and do generally have a larger

impact on the institutions sustainability than Tier Two credits.
- **Tier Two credits.** These are worth 0.25 points each. Tier Two credits mainly recognize strategies that merit recognition or recognize strategies/actions that are already largely captured by a Tier One credit.

While allocating the points and dividing up the credits into categories, the main focus is the **impact** and not the **difficulty** of achieving the credit, which makes STARS participants focus on the credits with the largest impact, and facilitate a most meaningful sustainability impact as possible. The following questions were taken in to consideration during the phase of allocation of credits:

- To what extent does the credit contribute to improved environmental impacts?
- To what extent does the credit contribute to improved financial impacts?
- To what extent does the credit contribute to improved social impacts?
- To what extent are the re-educational benefits associated with the achievement of this credit?
- How many people are impacted (breadth)?
- How deeply are people impacted (depth)? (STARS Technical Manual, 2010).

2.4. STARS 1.1 Scoring and Ratings

AASHE stresses that STARS 1.1 gives credit to all institutions that participate in the rating system, therefore an institution may choose to sign up as a STARS Reporter after seeing their final score. A STARS Reporter recieves the same benefits as all institutions signing up for STARS such as receiving positive recognition through communicating STARS participation etc., as well as the ability to share data publicly, but not being rated. For institutions that wish to be rated after submitting data, the score is calculated based on the average of the percentage of applicable points the institution earns in each of the three categories. There are four different levels of scoring:

- **STARS Bronze -** minimum average of 25 percent
- **STARS Silver -** minimum average 45 percent
- **STARS Gold -** minimum average 65 percent
- **STARS Platinum** - minimum average 85 percent (STARS Technical Manual, 2010).
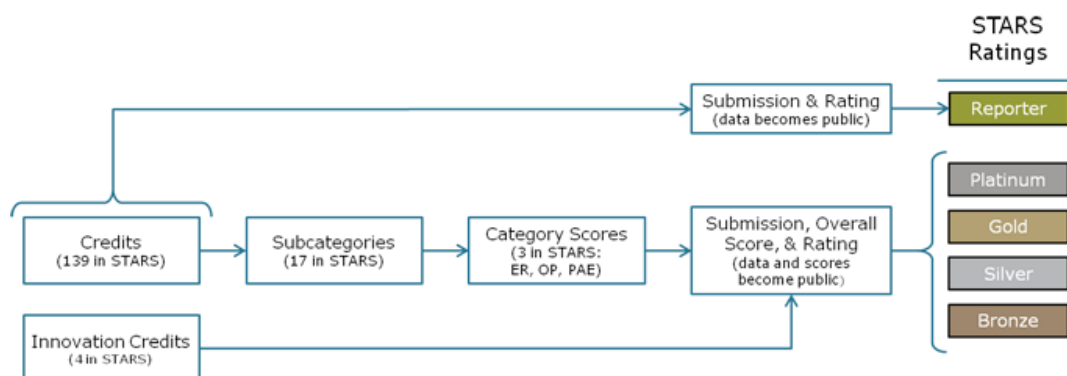

Fig 1. STARS Rating Levels

2.5. STARS Updates

AASHE works continuously with updates and improvements of the STARS rating system, which are based on feedback from participants and stakeholders. After major changes to the system, such as release of a new version (e.g. STARS 1.0), AASHE continuously works to improve STARS and welcomes feedback/comments/experiences to enable this. During the development process different updates are made:

- **Basic System Maintanance** - this involves clarifications and typo corrections.

- **Minor Substantive Changes -** these cover issues such as refining criteria or definitions within a credit or changing how points are calculated for individual credits. Minor substntial changes lead to a new version regarding reporting (e.g. Version 1.0 to 1.1), and generally occur once per year, if necessary.

- **Major Revisions -** these cover any issue, such as adding or deleting credits or changing how overall points are calculated, even adding requirements for third party verification. These updates lead to a whole new version of STARS (e.g., 1.0 to 2.0). (STARS Technical Development Proposal, 2010)

2.6. Intended Outcomes

The STARS Rating System is designed to incorporate all types of institutions of higher education in the United States and Canada, regardless of endowment, size or development stage of sustainability performance. It is intended to cover both long-term sustainability goals for institutions with existing highly achieving sustainability performance, as well as recognizing institutions initiating their first steps toward sustainability. STARS is aimed to:

- **Provide a framework for understanding sustainability in all sectors of higher education.**

- **Enable meaningful comparisons over time and across institutions using a common set of measurements developed with broad participation from the campus sustainability community.**

- **Create incentives for continual improvement toward sustainability.**

- **Facilitate information sharing about higher education sustainability practices and performance.**

- **Build a stronger, more diverse campus sustainability community.**

(STARS Technical Manual, 2010).

3. What does an Implementation of STARS Mean for an Institution?

This chapter presents practical experiences from the initial implementation process of STARS at Washington University in St. Louis, USA. It starts with an overall presentation of the institution and its surroundings and takes the reader through the different steps in the implementation process, highlighting difficulties as well as stages which proceeded smoothly.

3.1. Washington University in St. Louis

Washington University in St. Louis was founded in 1853 as an independent institution for higher education and is located in University City, St. Louis, Missouri, USA. It has more than 14,000 students and 13,000 employees. The University consists of two main campuses; the Danforth Campus, where the majority of the University's various programs are taught, and the Medical Campus, containing the Washington University School of Medicine and associated research centers, clinics and hospitals. The University is associated with 22 Nobel prize winners and has a US$ 706.3 million in research support, where by the majority comes from federal resources. The US News and World Report ranks Washington University in St. Louis as number 13 among all national university undergraduate programs, 1st among all schools of social work, and 4th among all schools of medicine. It also has a Top-10 ranking for 20 graduate programs. The Financial Times ranks the Washington University-Fudan University Executive MBA program as 1st in China and 7th in world (Washington University, Fast Facts, 2010).

Washington University in St. Louis is led by the chancellor as executive officer. Next to the chancellor, members of the Board of Trustees, the University Council and the Office of the Provost is the main leadership at Washington University. The Board of Trustees consists of circa 50 leaders from various professions from corporate, governmental and educational sectors and have an overseeing role to the University. They review and approve/disapprove decisions concerning management of endowment, annual budgets, investments, existing as well as new degree programs etc. (Washington University Board of Trustees, 2011). The University Council advises the chancellor and contribute to informed decision making, consisting of managers for various academic and administrative units at the University. The Office of the Provost works mainly with improving iniatives for curriculum, teaching, learning, research etc. (Office of the Provost, 2011). Washington University in St. Louis conducts research related to sustainability, in June 2007, it initiated the International Center for Advanced Renewable Energy and Sustainability, I-CARES, where research related to energy, environment and sustainability among various disciplines at the institution is conducted. I-CARES has regional as well as international partners (I-CARES, 2011).

In 2007, the chancellor at Washington University in St. Louis appointed the first Vice Chancellor for Sustainability. The position is aimed to provide the university with a strategy for advancing operational sustainability performance, as well as providing senior officials, administrators, faculty, staff and students with sustainability knowledge (WUStL Newsroom, 2007). The Office of Sustainability is located in the Facilities, Planning and Management Department, where the Vice Chancellor for Operations, Energy Manager, Grounds and Buildings Department etc. are located. The Office of Sustainability is the main coordinating body for all issues covering sustainability at the University, and is therefore managing the STARS participation. The initial data gathering for the STARS assessment was conducted by a student intern in collaboration with the Vice Chancellor for Sustainability. In 2008, the

Sustainable Operations Leadership Council (SOLC) was formed and consists of five subcommittees: Energy & Emissions, Buildings & Grounds, Dining Services, Materials Management & Purchasing, and Transportation. The SOLC worked through and created the Washington University Strategic Plan for Sustainable Operations (WUStL Strategic Plan, 2010). Another initiative conducted at the institution is the formation of the Sustainability Awareness Committee, aimed to engage faculty, staff and students in sustainability in their everyday lives at home and at work as well as sharing and development of best practices. The SAC consists of business managers, researchers, students, lab managers etc., and convene once per month. The SAC is a good forum for sharing information and receiving support for the STARS implementation at Washington University in St. Louis (Washington University Energy Awareness Committee, 2011).

3.2. Developing a Database for Calculation of Credits

When initiating the STARS implementation, a well-worked foundation that structured the credits, calculations and scorings found in the STARS Technical Manual seemed crucial for accomplishing a successful assessment of sustainability in the various areas covered by the STARS credits. It is good to have a comprehensive work-sheet that can preview the accomplishments to date, as well as defining areas in need of improvement. When presenting to the executive board at the University, one must also be able to visualize the estimated score in the rating system, which for a reputation-conscious institution, such as Washington University in St. Louis, this is one of the most important issues for receiving support from the executive board.

3.2.1. Credits and calculation of points

To easily be able to access the credit one is looking for, names of the credits (such as ER Credit 2) were set to one column. To ensure a good overview of the purpose and requirements of the credit, the rationale and definition of the criteria (as defined in the STARS Technical Manual) was set in a separate column. The total possible points were set in another column and summarized at the bottom of every category in order to visualize the total amount of points scored, compared to the amount available. Many of the STARS credits have an equation for calculation of their respective points, and this equation was found necessary to illustrate in the datasheet, for an understanding of how the scoring was calculated. The Earned Points-column was divided into three parts; "yes", "no" and "maybe", to easily be able to summarize the points received immediately (yes-column) as well as seeing the points the institution is close to receiving (maybe-column). If the summarized score of the immediately received points (yes-column) is not satisfactory enough, one can easily estimate the potentially higher score (add the maybe-points), which may boost an incentive for the institution to allocate resources/work harder to receive the maybe-points, and a higher grade. If an institution has a long way to go to live up to a certain criteria, these points are placed in the no-column. The following figure illustrates the scoring in the OP sub-category Buildings:

Fig. 2 Scoring in the OP Sub-category Buildings.

3.2.2. Visualize Accomplishments, Responsible Department and a To-Do List

Visualizing the institution's accomplishments was found important; it is satisfactory to see what one has achieved to date - and it entails an avoidance of re-doing things. In the same column a to-do list was created (in most cases what actions were required for the maybe-points to become yes-points). The main responsible department for the STARS assessment was the Office of Sustainability, but in order to create an accurate and long-term functioning assessment for the institution, concerned departments (such as Facilities Department which are in charge of waste management/buildings/grounds, etc.) must be involved in the process. This is important for estimating what is accomplished to date, what is feasible in the short term/long term and what may not work out at all. Assigning a responsible party for each credit before gathering data is necessary when reporting to STARS and therefore a responsible party-column was set for each credit. Tracking other institutions progress and leading examples is an important step for benchmarking as well as keeping up with the "best in class" institutions, therefore a column was dedicated to leading examples from other institutions.

Fig. 3. Illustration of the three columns Accomplishments/To Do, Responsible Party and Other School Examples.

3.3. Gathering of Data

The first step was filling in the spreadsheet with information already known at the Office of Sustainability. Typical credits where another responsible party other than the Office of Sustainability was needed to provide accurate information are divided into two categories; Easy Credits and Demanding Credits.

3.3.1. Easy Credits

The Easy Credits are in general Tier 1 credits that require brief contact with departments/administrators on campus and accurate information is not complex to gather. Note that all credits are more or less time consuming to gather, and the title Easy Credits only implies that these did not require any formal meetings or decision making for receiving data. Most of the Easy Credits are set in the Operations category and concern actions that are predominantly quantitative. Other Easy Credits were actions that were simply already taken at the institution such as the employment of a sustainability officer, having a Greenhouse Gas Emissions Reduction Plan, etc. For a full list of the Easy Credits and a brief explanation of the method for data gathering, see Exhibit 1 (appendix).

3.3.2. Demanding Credits

These are credits that in general required more time and effort and needed contacting of a responsible party more than once, or required a formal meeting, including some kind of decision making. These credits are to a larger extent qualitative, but also include a good number of quantitative credits, such as the ER Credit 6 and 7 which pertain to sustainability-related or sustainability-focused courses. Credit number and credit title followed by a brief explanation of the method for data gathering is found in Exhibit 2 (appendix).

3.3.3. Tier 2 Credits

Tier 2 credits are worth 0.25 points each and mainly recognize strategies that merit recognition or recognize strategies/actions that are already largely captured by a Tier 1 credit. This made the Tier 2 credits in general not very difficult to collect. Due to the small amount of points the Tier 2 credits are worth, the institution simply collected points if actions were already taken, and if not, no high priority was given to immediately achieve it. For a full list of credits and notes, see Exhibit 3 (appendix).

4. Analysis and discussion

In this section a SWOT-analysis has been conducted - mapping the strengths, weaknesses, opportunities and threats of implementing the STARS rating system at Washington University in St. Louis. A further analysis and discussion was made on how the strengths/opportunities can be used to overcome the weaknesses/threats that a STARS implementation may entail. Based on the findings in the analysis and general experiences, a discussion concerning if the intended outcomes of STARS were lived up was conducted. The discussion is an important step and may be valuable information for STARS developers for future improvement of the rating system.

4.1. SWOT-Analysis

In this section a SWOT-analysis has been conducted to map out the strengths, weaknesses, opportunities and threats of the case of Washington University in St. Louis initial implementation of STARS. Further, an analysis was made on how the strengths/opportunities can be used to overcome the weaknesses/threats that a STARS implementation may entail.

4.1.1. Strengths

STARS has a relatively low participation cost. Washington University in St. Louis participated in the pilot testing of STARS which makes the institution well-acquainted with the system. STARS is a well-developed system with support from academic people across the nation and it is transparent which makes it easy to track inconsistencies, incorrect credits or points, etc.

Consistency: many of the measuring factors in STARS are quantitative, which make actions measurable and easy to follow up as well as predicting the university's rating relative to other institutions. Quantitative measures may also eliminate risk for green-washing (appearing to perform well environmentally, without actually doing it – in this case measurable results eliminate the risk for this).

Regarding the data gathering for the OP credits, it was relatively easy to access accurate data for, and did not require a significant amount of resources or any formal decision making/strategy formulating. The location of the Office of Sustainability near to the Facilities, Planning and Management Department, simplified the data-gathering as well. Even though many credits required and will require more time and effort to collect data for (mainly in the PAE and ER categories), they engaged faculty members and staff across various departments at the institution. There was a positive response to the STARS rating system in general at the institution. The Sustainability Awareness Committee meetings were also a good forum for practice sharing and support for gathering of data, as well as for improvements for the STARS assessment.

The initial STARS rating assessment gave the institution an overall view of the sustainability performance. For instance, the importance of having a Sustainability Immersive Experience (ER Credit 12) or conducting an Employee Satisfaction Survey (PAE Credit 12) were lifted into the spotlight - which might not have been taken into consideration or been given priority without the STARS assessment.

The ability to prioritize: It was almost impossible to achieve any significant points for some Tier 1 credits within the time-frame for reporting (1 year), one example is the OP Credit 8 which refers to clean and renewable energy, due to the lack of supply in the St. Louis area. Having an Energy Management System which tracks the energy consumption and enables follow-ups for energy efficiency improvements is a realistic and feasible step for the institution in the right direction. In this case, the OP Tier 2 Credit 16 recognizes institutions that have this type of system, and can make up for some of the missing abilities to earn points in the OP Credit 8. In other words; if a Tier 1 credit may seem very difficult to achieve, smaller achievable steps recognized in the Tier 2 credits give recognition and may be easier to achieve.

Follow-up: The creation of the data sheet was very time consuming, but once accomplished, the gathering of data and calculation of points was done smoothly and the datasheet illustrates opportunities for improvement (visualizing the "maybe" points), and is easy to navigate through in meetings regarding current STARS performance, etc. The coloring in the various categories, as well as highlighting of the Tier 2 credits was found very useful. STARS is a very structured rating system and has a consistent method of calculating points. This makes creating a comprehensive and easy-to-follow datasheet possible.

4.1.2. Weaknesses

The thorough assessment in STARS is time consuming and may cost a significant amount of resources in working hours.

Since participation is voluntary, institutions in good need of a thorough sustainability-assessment, such as STARS, might miss out and participating institutions may be influenced by being only the "best in class" institutions. In other words, you might miss out on the entire "span" of institutions of higher education in this assessment.

Some credits that give a significant amount of points in STARS may not be of interest to the institution to improve their performance in, or could be very difficult to achieve. STARS does not adapt its rating to local conditions such as climate, supply of renewable energy, infrastructure, etc. Although it does take size of institution into account, this does not benefit Washington University in St Louis.

LEED- certification of buildings - Washington University in St. Louis has a goal in the "Strategic Plan for Sustainability" to "…build more sustainably by achieving standards equivalent to or exceeding LEED Silver for all new construction and major renovations of existing buildings, and pursuing LEED Gold or Platinum when appropriate" (WUStL Strategic Plan, 2010). During the initial implementation process of STARS, the institution was not receiving any significant amount of points, see Exhibit 3 (appendix), and did not see them coming in the very near future due to time consumption for the building process. One must have in mind that the current rating is very important, and the credits regarding buildings are worth a larger amount of points which are to good to miss out on. On the other hand, an institution like Harvard University with an impressive amount of LEED-certified buildings (Harvard LEED-submittals, 2011) definitely deserve recognition, in comparison.

Inventorying all courses across all teaching disciplines at the institution, estimating if they are sustainability related, or focused, was difficult at the initial STARS assessment. During the presentation of the STARS rating system for a group of executives at the institution, the Dean had a concerned look on his face and expressed that the process would take a lot of time and resources - although he was positive to the idea itself. One must also understand that the integration of sustainability across all curriculum and disciplines is the core of an institution's positive sustainability impact. As mentioned in the introduction, educating future leaders to become responsible decision makers is fundamental for achieving a sustainable development and this responsibility lies on institutions for higher education. It is not stated that a quantitative measure like this is the best way of integrating sustainability into courses, and the indicators (in this case the definition of a sustainability-related or –focused course) may not be the most high-qualitative and resource-efficient way of coping with the issue. The inventory of sustainability related and –focused courses across all departments and faculty – would require ER Credit 14 Incentives for Developing Sustainability Courses in charge initially, which is a decision for the chancellor to consider.

4.1.3. Opportunities

The demanding credits, Exhibit 2 (appendix), which required formal meetings with concerned departments at minimum, gave opportunities to the Office of Sustainability to improve its operations and increase involvement with other departments at the institution. This may in the long term increase support; financial resources allocated to its activities, as well as result in other types of support. Involving staff and faculty in sustainability across all sectors at the institution is a challenge initially, but crucial for long-term success. This may also push innovation; as a result of cross-disciplinary involvement in sustainability issues, as well as

stress to advance sustainability performance in new areas. Washington University conducts a lot of research related to sustainability and the environment, which is recognized in the STARS participation, and also gives incentives to grow. Forming a "Sustainability Awareness Committee" or similar, with various faculty members, staff, and students simplifies the implementation process of such a comprehensive assessment tool as STARS. It requires support from many areas within the institution as well as time for development of new and best practices. Meetings with a "Sustainability Awareness Committee" or similar, is an excellent opportunity to communicate the STARS participation and progress.

Recognition: Signing up for the STARS rating system has news value in itself and communicates that Washington University in St. Louis is dedicated to taking actions for sustaining its operations, both on and off campus. The drive for sustainability innovation may also create news value in the long term, if new solutions to address sustainability issues appear. Another important issue is that the "US News and World Report National Ranking for Universities" could take STARS performance into consideration in their future rankings. Washington University in St. Louis has a high ranking to date (US News & World Reports, 2011) , and are continuously working hard to keep up with competing institutions.

Participation in STARS is strongly supported by AASHE, and this opens up opportunities to increased involvement with the organization and could gain exposure through their network, as a frontrunner in sustainability (could also attract more students and researchers related to the field).

The STARS datasheet can be used as an inventory on how to work with the institutions environmental impact and sustainability performance. It could replace other documents and therefore save time and money.

STARS recognizes student involvement to a large extent, which is shown in this case, and participation in STARS promotes it. There are lots of opportunities for student involvement, such as course evaluations regarding sustainability, internship opportunities, student ambassadorship (e.g. communicate to prospective students about the institution) etc. Increased student involvement also gives opportunities for collaboration with corporations (e.g. energy companies or others interested in advancing their sustainability performance) for support of sustainability actions at the institution, as well as having student sustainability internships.

STARS allows the institution to collect data for one full year and it is also possible to apply for extension, which may create opportunities for advancement in some areas during the period of data gathering (i.e. work towards specific goals to achieve a higher rating and being able to accomplish these during the time of data gathering).

The system is transparent, which is especially good for credits such as OP Credit 1 and 2 which refer to LEED-certified buildings, where Washington University in St Louis has a good number of buildings that are LEED-certified. But this does not earn any significant amount of points, due to the low ratio compared to the total amount of buildings on campus. By publishing full data on-line, an interested party can actually see that the institution has a good amount of LEED-certified buildings on campus, despite the small amount of points received.

Improvement of quality: A lot of the STARS credits relate to the overall quality of the institution, e.g. working to get high scores in these will also result in an improved indoor air quality, more locally grown organic food in dining services, and more sustainable compensation for employees. The initial STARS rating assessment, performed by the author,

gave the institution an overall view of the sustainability performance. For instance, the importance of having a Sustainability Immersive Experience (ER Credit 12) or conducting an Employee Satisfaction Survey (PAE Credit 12) were lifted in to the spotlight - which might not have been taken in to consideration or given priority to without the STARS assessment. Involving staff and faculty in sustainability across all sectors at the institution is a challenge initially, but crucial for long-term success. This may also push innovation, due to cross-disciplinary involvement in sustainability issues as well as the stress to advance sustainability performance in new areas.

Cost reduction: Aiming to reduce the amount of single vehicles driving to campus does not only reduce emissions; Washington University in St. Louis had a struggle with lack of parking spaces, and if there is no reduction of transportation by car to campus, they will be forced to build underground parking spaces, which would cost about four times as much as above ground parking spaces. Other cost-reducing examples are: shrinking energy-bills by reducing energy-usage, purchasing wisely, limitations of plastic/paper cups in the cafeteria, food waste, etc.

4.1.4. Threats

There is a chance of getting an unsatisfactory rating, compared to other institutions.

A credit which gave great concern to the institution was OP Credit 8 "Clean and Renewable Energy" because of the lack of supply of renewable energy in the St. Louis area. This made a good score very difficult to achieve. An institution in, for instance, California where the supply of renewable energy is significantly larger than in Missouri (EIA Renewable Energy, 2011) would have a much easier time receiving these points.

If the system changes significantly (e.g. STARS1.0 to 2.0) the rating compared to other institutions could be unsatisfactory and inconsistent. The revisions of STARS are important for continuous improvement of the rating system, and secures its high-quality as well as keeping it up-to-date. Since the revisions are based on feedback from various stakeholders and institutions using STARS, it also contributes to fulfilling the intended outcomes "…common set of measurements developed with broad participation from the campus sustainability community" (see section 4.2.2.). However, a concern that may arise is the comparisons between institutions being rated in different versions of STARS. A bronze rating in STARS version 1.0 could be different from the same rating level in future version STARS 2.0.

The university board could find the STARS participation more resource costing than estimated, and consider to drop it.

As mentioned in the weaknesses, since participation is voluntary, institutions that know they might not perform well in STARS could choose not to participate. This could make the group of institutions participating in STARS be a click of only sustainability front-runners.

4.1.5. How can the Strengths/Opportunities be Used, to Overcome the Weaknesses/Threats that the STARS Implementation may Imply?

The likelihood of the threat that the university board would find STARS participation more resource consuming than estimated, may be reduced through taking advantage of the opportunity for increased student involvement (such as internships, etc.). Another opportunity is to involve corporations (e.g. energy companies or others interested in advancing their sustainability performance) for support of sustainability actions at the institution, in return the corporations get introduced to future employees and talents for future employment, thesis opportunities, etc. Participation in STARS also results in more support from AASHE – which opens opportunities to increase involvement with the organization and could gain exposure through their network, as a frontrunner in sustainability (could also attract more students and researchers related to the field. This could also mean increased resources and financial support). The resource cost of STARS participation may also be compensated through reduced costs due to advanced environmental performance (such as reduced energy bills, reduced purchasing costs, reduced transportation costs, waste minimization, etc.).

The threats most likely to appear in the ER-category seem to be the resource demands for evaluating the sustainability contents of each individual course. A cost-effective opportunity is to use student-evaluation forms at the end of a course, where the students get the chance to evaluate the sustainability contents of it. If successful, this would also give a qualitative and diverse sustainability evaluation, specially If students are focused on areas of education, other than sustainability. The demanding credits, Exhibit 2 (appendix), mainly in the ER and the PAE categories which required formal meetings with concerned departments, give opportunities for the Office of Sustainability to improve its operations and increase involvement of other departments at the institution. This may in the long term increase support; financial resources allocated to its activities, as well as other types of support (from internal as well as external stakeholders).

The scoring in OP Credit 8 Clean and Renewable Energy is threatened by the lack of supply of renewable energy in the St. Louis area, make a good scoring very difficult to achieve. An institution in for instance California where the supply of renewable energy is significantly larger than in Missouri (EIA Renewable Energy, 2011) would have a much easier time receiving these points. However, the opportunity of scoring well in other credits (mainly Tier 2 credits) related to this specific credit may weigh up for the insufficient scoring in OP Credit 8.

The threat of getting an unsatisfactory rating, is eliminated by the opportunity to improve the institution's performance (in some STARS credits) during the 1 year long reporting period (i.e. strategically work towards earning certain credits during the year to be able to get the best scoring possible).

The threat of penalization due to a different version of STARS (e.g. STARS1.0 to 2.0) the rating compared to other institutions could be unsatisfactory and inconsistent. The revisions of STARS are important for continuous improvements of the rating system, and secures its high-quality as well as staying up-to-date. Since the revisions are based on feedback from various stakeholders as well as institutions using STARS. They also contributes to fulfilling the intended outcome "…common set of measurements developed with broad participation from the campus sustainability community" (see section 4.1.2.). Since STARS is developed to a large extent by feedback from institutions participating in STARS – the likelihood that the change of version should be unsatisfactory for any STARS participant is reduced. Also, having developed a comprehensive datasheet for reporting and calculation of points and

credits gives great support in the reporting and calculation process which simplifies follow-ups and tracking of STARS performance (therefore also simplifies continuous improvements of it).

The fact that STARS voluntary participation may make the group of participating institutions to be only a click of sustainability frontrunners and create high competition, needs to be considered. On the other hand, belonging to the group of sustainability frontrunners is an advantage in itself. Communicating STARS participation shows that the institution is working towards improving its sustainability performance, regardless what the scoring is, compared to other STARS-participants. It is therefore important to communicate STARS participation to earn recognition as a sustainability frontrunner.

The uncertainty of quality, consistency and resource-effectiveness when inventorying all courses and evaluating their sustainability contents is a weakness. It is not certain that a quantitative measure like this is the best and most resource-efficient way of integrating sustainability in to courses. The indicators (in this case the definition of a sustainability related or focused course) may not be the most high-qualitative. However, the opportunity of using student-evaluation forms (see previous section 4.1.5) may improve the quality of evaluation of the sustainability-contents in the course if the definitions as in ER Credit 5, is clear.

4.2. Discussion of Intended Outcomes

This section discusses the fulfillment of the STARS intended outcomes as mentioned in chapter 2.6. during the initial implementation process of STARS at Washington University in St. Louis. To simplify and structure for the reader, a discussion regarding experiences and fulfillment of the intended outcomes will be conducted one by one.

4.2.1. Provide a framework for understanding sustainability in all sectors of higher education

The first intended outcome of the STARS rating system is to provide a framework for understanding sustainability in all sectors of higher education. In the process of rating the performance of WUStL for this case, it became clear that the implementation of STARS did provide a comprehensive framework for sustainability performance throughout the entire institution and various departments. Mapping sustainability performance indeed does require management of a large amount of data, and the structured approach was conducive in this respect. It mapped out the areas the institution had advanced in and where there was given priority for improvements. In this case it was clearly difficult for the institution to achieve a high performance in the PAE category, see Exhbit 3 (appendix). Having a responsible party for each credit enabled engagement from various departments at the institution, which is important for the overall sustainability performance. Also, STARS participation provided topics and a structured agenda for meetings with the Sustainability Awareness Committee.

The fact that STARS is a rating system gives an institution incentives to perform well. In an already highly-recognized institution as Washington University in St Louis, high performance in ratings and rankings are given priority. STARS has credits recognizing institutions that incorporate sustainability across all disciplines which triggers an institution to engage people from various departments.

4.2.2. Enable meaningful comparisons over time and across institutions using a common set of measurements developed with broad participation from the campus sustainability community

In the phase of presenting STARS for the university executives, consistency and measurement of performance on an absolute scale (not relative to other institutions performance, such as in the SEI Green Report Card) was an important point strengthening the decision to sign up for STARS. Being able to track improvements and performance in a consistent system is crucial for long term successful participation in the rating system. The high amount of quantitative credits and the transparency (i.e. institution's full scoring published online) of STARS make accurate comparisons to other institutions possible and prevents bias. Since the new versions and updates are to a large extent based on feedback from STARS participants (see section 2.4), which is important for improving the user-friendliness and accuracy of STARS. Since STARS is intended to continuously update and new versions will be released, when updating the rating system it is important to use a similar set of measurements.

4.2.3. Create incentives for continual improvement toward sustainability

Many of the credits give recognition for tracking improvements such as the OP Credit 7 regarding building energy consumption and OP Credit 17 regarding waste reduction. Measuring improvements relative to a fix baseline year enables consistent and measurable improvements throughout the institution. These are in general quantitative credits, but as some of the qualitative credits which incorporate strategy formulation, etc. indicate that the institution is committed to improve its sustainability performance in current area, this gives incentives for continuous improvement since it is in line with the institutions strategic plans.

4.2.4. Facilitate information sharing about higher education sustainability practices and performance.

The Sustainability Awareness Committee which was already formed before Washington University in St. Louis decided to participate in STARS, is a forum for this specific outcome. The STARS participation though, provides a structured map on the overall sustainability performance of the institution and serves as an excellent tool for tracking overall sustainability progress at the SAC meetings. The STARS website has resources such as discussion forums related to the different categories and credits in the STARS rating system, which allows participating institutions to exchange ideas and support one another in the process of data gathering or improving overall sustainability performance in the different categories.

4.2.5. Build a stronger, more diverse campus sustainability community.

As mentioned the cross-disciplinarity of the rating system incorporates faculty members and staff from various departments across the institution. Many credits in the STARS rating system require the involvement from various departments regarding sustainability issues; such as the ER Credit 5 Sustainability Course Identification which requires at least three faculty members that teach in different departments to set the definition of a sustainability -related and -focused course. The fact that STARS allows and support any type of institution for higher education regardless of endowment or size to participate contributes to a stronger, more diverse campus sustainability community. Having a large amount of diverse types of participating institutions, increases the amount of data in the STARS database, which builds a strong and diverse campus sustainability community.

4.3. Conclusions

Overall, working with the STARS rating system was found useful. The structured system, with the Technical manual to explain methodology for the different credits, as well as explaining the purpose of each one, made STARS a good system to work with. It mapped out new areas for advancement of sustainability performance. STARS can function as a foundation for setting new goals for sustainability performance, which may improve internal processes at the institution. The support that AASHE gives STARS participants (discussion forums, etc.) is helpful and may also in the future increase connections and relations to other universities working with STARS, through helping and advising each other.

The most difficult part to measure sustainability performance in was the Education and Research area, which also may come across as the most important area to perform in for an institution for higher education. The large amount of quantitative credits in STARS made the subjectivity of measuring sustainability contents in curriculum actionable and measurable. The research related credits were a bit less demanding, due to significant sustainability research already conducted at WUStL. Compared to the other rating systems presented in the thesis, STARS is the most consistent and comprehensive to work with and the number one choice at WUStL for long-term participation. Even though STARS is the most demanding of the rating systems to gather data for due to the large amount of quantitative credits, and also the only one that charges a participation fee, it is mainly the consistency and quality of the rating system that makes it an attractive and useful tool for sustainability assessment. It would also be interesting to see how the STARS rating system may be applied to other institutions around the world. In Europe, for instance, having institutions in different countries with different cultures, one may think that some adaptions for local conditions could be necessary to take into consideration.

5. References

5.1. Websites

David Orr, 1994, *The Leadership Factor: Implementing Sustainability in Higher Education,* http://secondnaturebos.wordpress.com/2010/07/06/the-leadership-factor-implementing-sustainability-in-higher-education/ 2011-04-23

EIA Renewable Energy, 2011, *State Renewable Electricity Profiles,* http://www.eia.gov/cneaf/solar.renewables/page/state_profiles/r_profiles_sum.html 2011-05-13

GreenerU, 2011, *About GreenerU - History,* http://www.greeneru.com/About/history.html, 2011-11-01

Greener U, 2010, *The GreenerU Guide to Sustainability Ratings an Rankings*, http://www.greeneru.com/resources/greeneru/GreenerU%20Guide%20to%20Sustainability%20Ratings%20and%20Rankings.pdf, 2011-11-01

Greenreportcard.org, 2011, *Green Reprtcard Methodology* http://greenreportcard.org/report-card-2011/methodology, 2011-04-21

Harvard LEED-submittals, 2011*, Harvard LEED-submittals,* http://green.harvard.edu/theresource/leed-submit/ 2011-05-20

IAU Prague Conference (September 10-11, 2003), *La Conférence de Prague de l'AIU, 10-11 septembre 2003 - Rapport général,* http://www.unesco.org/iau/sd/fre/rtf/dd_confprague3.rtf 2011-10-27

I-CARES, 2011, *About I-CARES,* http://icares.wustl.edu/about/index.php 2011-04-18

Institute for Higher Education Policy, 2007, *College and University Ranking Systems – Global perspectives and American Challenges,* http://www.ihep.org/assets/files/publications/a-f/CollegeRankingSystems.pdf, 2011-06-01

Nobel Peace Prize, 2011, *Nobel Peace Prize Laureates - 2007*, http://nobelpeaceprize.org/en_GB/laureates/laureates-2007/, 2011-11-01

Office of the Provost, 2011, *About the Provost*, http://provost.wustl.edu/node/4 2011-04-18

Princeton Review, 2011a, Princeton Review College Rankings, http://www.princetonreview.com/college-rankings.aspx 2011-11-04

Princeton Review, 2011b, Princeton Review Green Rating Methodology, http://www.princetonreview.com/green-rating-methodology.aspx 2011-11-04

STARS Technical Development Proposal, 2010, http://www.aashe.org/files/documents/STARS/Technical%20Development%20Proposal.pdf 2011-04-23

STARS Technical Manual, 2010, *STARS 1.0 Technical Manual - Administrative Update Two*, http://www.aashe.org/files/STARS_1.0_Technical_Manual_Admin_Update_2.pdf 2011-04-18

UN Documents, *Report of the World Commission on Environment and Development: Our Common Future - Chapter 2, Towards Sustainable Development* http://www.un-documents.net/ocf-02 2011-10-31

US News & World Reports, 2011, *National University Rankings,* http://colleges.usnews.rankingsandreviews.com/best-colleges/rankings/national-universities/page+2 2011-05-10

Washington University Board of Trustees, 2011, *The Washington University Board of Trustees*, http://boardoftrustees.wustl.edu/composition.html 2011-04-18

Washington University Energy Awareness Committee, 2011, *Washington University Energy Awareness Committee,* http://www.wustl.edu/initiatives/sustain/strategicplan-final/energyawareness.html 2011-04-18

Washington University, Fast Facts, 2010, *Washington University Fast Facts,* http://wustl.edu/about/facts/assets/pdf/FastFacts2010.pdf 2011-04-18

Washington University in St Louis Newsroom, 2007, *Washington University in St. Louis newsroom,* http://news.wustl.edu/news/Pages/9727.aspx, 2011-04-17

Washington University in St Louis Strategic Plan, 2010, *Washington University in St. Louis – Strategic Plan for Sustainability*, http://wustl.edu/initiatives/sustain/strategicplan2-final.html, 2011-04-17

5.2. Figures and Tables

Fig 1. STARS Rating Levels, *STARS Scoring,* https://stars.aashe.org/pages/about/scoring.html 2011-05-01

Fig. 2. Scoring in the OP Sub-category Buildings, created by the author of this thesis during the initial implementation process of STARS at Washington University in St. Louis, March 2010.

Fig. 3. Illustration of the three columns accomplishments/to do, responsible party and other school examples, created by the author of this thesis during the initial implementation process of STARS at Washington University in St. Louis, March 2010.

Table 1. GreenerU, 2010, *Top Ten Ratings, Rankings and Reviews in North America,* http://www.greeneru.com/resources/greeneru/GreenerU%20Guide%20to%20Sustainability%20Ratings%20and%20Rankings.pdf 2011-11-01

6. Appendix

6.1. Exhbit 1: Easy Credits

Credit number	Credit Title	Data Gathering
ER Credit 1	Student Sustainability Educators Program	Requires contact with student groups, which the Office of Sustainability has close connections with.
ER Credit 2	Student sustainability Outreach Campaign	ECOlympics is an ongoing competition at Washington University in St. Louis.
ER Credit 3		Requires contact with student groups, which the Office of Sustainability has close connections with.
ER Credit 4	Sustainability Outreach and Publications	Wustl.edu/sustain, food service info on sustainable foods, guide for commuters, etc. Operations in charge, Office of Sustainability responsible
ER Credit 8	Sustainability Courses by Department	Found in Course Catalogue
ER Credit 10	Undergraduate Program in Sustainability	Found in Course Catalogue
ER Credit 11	Graduate Program in Sustainability	Found in Course Catalogue
ER Credit 15	Sustainability Research Identification	Requires contct with research faculty

ER Credit 16	Faculty Involved in Sustainability Research	Requires contct with research faculty
ER Credit 17	Departments Involved in Sustainability Research	Requires contct with research faculty
OP Credit 1	Building Operations and Maintenance	Requires contact with Facilities Dept., which the Office of Sustainability has close connections with.
OP Credit 2	Building Design and Construction	Requires contact with Facilities Dept., which the Office of Sustainability has close connections with.
OP Credit 3	Indoor Air Quality	Requires contact with Facilities Dept. And Environmental Health and Safety Dept., which the Office of Sustainability has close connections with.
OP Credit 4	Greenhouse Gas Emissions Inventory	Requires contact with Facilities Dept., which the Office of Sustainability has close connections with.
OP Credit 5	Greenhouse Gas Emissions Reduction	Requires contact with Facilities Dept., which the Office of Sustainability has close connections with.
OP Credit 6	Food Purchasing	Requires contact with Bon Apetit, Dining Services and Aramark, which the Office of Sustainability has close connections with.

OP Credit 7	Building Energy Consumption	Requires contact with Facilities Dept. at Medical- and Danforth campus, which the Office of Sustainability has close connections with.
OP Credit 8	Clean and Renewable Energy	Requires contact with Facilities Dept. at Medical- and Danforth campus, which the Office of Sustainability has close connections with.
OP Credit 9	Integrated Pest Management	Requires contact with Facilities Dept. Planning and Management, which the Office of Sustainability has close connections with.
OP Credit 10	Computer Purchasing	Requires contact with Resource Management, which the Office of Sustainability has close connections with.
OP Credit 11	Cleaning Product Purchasing	Requires contact with Resource Management, which the Office of Sustainability has close connections with.
OP Credit 12	Office Paper Purchasing	Requires contact with Resource Management, which the Office of Sustainability has close connections with.
OP Credit 13	Vendor Code of Conduct	Requires contact with Resource Management, which the Office of Sustainability has close connections with.

OP Credit 14	Campus Fleet	Requires contact with Resource Management and Parking and Transportation Dept., which the Office of Sustainability has close connections with.
OP Credit 15	Student Commute Model Split	Requires contact with Parking and Transportation Dept., which the Office of Sustainability has close connections with.
OP Credit 16	Employee Commute Model Split	Requires contact with Parking and Transportation Dept., which the Office of Sustainability has close connections with.
OP Credit 17	Waste Reduction	Requires contact with Facilities Dept. Planning and Management, which the Office of Sustainability has close connections with.
OP Credit 18	Waste Diversion	Requires contact with Facilities Dept. Planning and Management, which the Office of Sustainability has close connections with.
OP Credit 19	Construction Demolition and Waste Diversion	Requires contact with Facilities Dept., which the Office of Sustainability has close connections with

OP Credit 20	Electronic Waste Recycling Program	Requires contact with Facilities Dept. Planning and Management, which the Office of Sustainability has close connections with.
OP Credit 21	Hazardous Waste Management	Requires contact with Facilities Dept. Planning and Management, which the Office of Sustainability has close connections with.
OP Credit 22	Water Consumption	Requires contact with Facilities Dept. Planning and Management, which the Office of Sustainability has close connections with.
OP Credit 23	Stormwater Management	Requires contact with Facilities Dept. Planning and Management, which the Office of Sustainability has close connections with.
PAE Credit 1	Sustainability Coordination	EVC for Administration/Office of Sustainability in charge.
PAE Credit 2	Strategic Plan	EVC for Administration/Office of Sustainability has developed a Strategic Plan.
PAE Credit 3	Physical Campus Plan	Requires contact with Facilities Dept. and EVC for Administration, which the Office of Sustainability has close connections with
PAE Credit 4	Sustainability Plan	EVC for Administration/Office of Sustainability has developed a

		Strategic Plan/Sustainability Plan.
PAE Credit 5	Climate Plan	Office of Sustainability in charge.
PAE Credit 6	Diversity and Equity Coordination	Requires contact with Office of the Chancellor and Special Asst. For Diversity Initiatives, which the Office of Sustainability has close connections with.
PAE Credit 7	Measuring Campus Diversity Culture	Requires contact with Office of the Chancellor and Special Asst. For Diversity Initiatives, which the Office of Sustainability has close connections with.
PAE Credit 8	Support Programs for Under-Represented Groups	Requires contact with Vice Chancellor for Students, which the Office of Sustainability has close connections with.
PAE Credit 10	Affordability and Access Programs	Requires contact with Student Financial Services, which the Office of Sustainability has close connections with.
PAE Credit 19	Community Sustainability Partnerships	Requires contact with Student Financial Services, which the Office of Sustainability has close connections with.
PAE Credit 20	Inter-campus Collaboration on Sustainability	Office of Sustainability in charge

6.2. Exhbit 2: Demanding Credits

Credit Number	Credit Title	Data Gathering
ER Credit 5	Sustainability Course Identification	Requires formal meetings with various faculty members and Executive Vice Chancellor for Provost and Deans.
ER Credit 6	Sustainability- Focused Courses	Requires formal meetings with various faculty members and Executive Vice Chancellor for Provost and Deans.
ER Credit 7	Sustainability-Related Courses	Requires formal meetings with various faculty members and Executive Vice Chancellor for Provost and Deans.
ER Credit 12	Sustainability Immersive Experience	
ER Credit 13	Sustinability Literacy Assessment	Requires formal meetings with concerned departments
ER Credit 14	Incentives for Developing Sustainability Courses	Takes time and negotiation with the Executive Board.
ER Credit 16	Sustainability Research Incentives	Requires formal meetings with concerned departments

ER Credit 17	Interdisciplinary Research in Tenure and Promotion	Requires formal meetings with concerned departments
PAE Credit 9	Support Programs for Future Faculty	Requires formal meetings with concerned departments.
PAE Credit 11	Sustainable Compensation	Requires formal meetings Executive Vice Chancellor for Administration, Chief Financial Officer, Vice Chancellor for Human Resources
PAE Credit 12	Employee Satisfaction Survey	Requires formal meetings Human Resources Dept.
PAE Credit 13	Staff Proffessional Development in Sustainability	Requires formal meetings Executive Vice Chancellor for Administration.
PAE Credit 14	Sustainability in New Empoyee Orientation	Requires formal meetings Executive Vice Chancellor for Administration.
PAE Credit 15	Employee Sustainability Educators Program	Requires formal meetings Executive Vice Chancellor for Administration.
PAE Credit 16	Committee on Socially Responsible Invstment	Requires formal meetings Chief Investment Officer and Chief Financial Officer.

PAE Credit 17	Shareholder Advocacy	Requires formal meetings Chief Investment Officer and Chief Financial Officer.
PAE Credit 18	Positive Sustainability Investments	Requires formal meetings Chief Investment Officer and Chief Financial Officer.
PAE Credit 22	Community Service Participation	Requires formal meeting with Community Service Office.
PAE Credit 23	Community Service Hours	Requires formal meeting with Community Service Office.
PAE Credit 24	Sustainability Policy Advocacy	Requires formal meeting with Office of Government and Community Relations.
PAE Credit 25	Trademark Licensing	Requires formal meeting with Dept. of Resource Management