

## Portland State University Submission for APPA 2021 Sustainability Award

### Section 1: Innovation, Creativity, and Originality

PSU's Green Revolving Fund (GRF) was created in 2013 with a \$500,00 seed from the State of Oregon for capital improvements. While revolving funds, and in particular "Green" revolving funds, are not unique to colleges/universities, PSU's approach to the fund has proven to be innovative, creative and original. Since its inception, PSU has focused on making our GRF by developing innovative creative approaches to growing our fund, project concepts, project selection, and increasing engagement and educational opportunities.

The GRF is a creative way for PSU to ensure that we will always have a source of financing projects, even when budgets are tight. This dedicated fund provides a formal and more secure commitment that ensures cost-savings efficiency projects will be funded. Using this funding mechanism has also helped us transform expenses into investments, by highlighting that energy and other efficiency projects make the PSU money over time therefore the upfront costs are actually investments into the future of the University, rather than just an expense that helps avoid costs. Additionally, it has also helped streamline projects, providing our Facilities and Property Management and Capital Projects and Construction teams with dedicated funds for energy and water efficiency projects, rather than having to seek out more complex funding sources.

Since 2013, PSU has been growing our fund using creative funding approaches. One such funding approach is our [travel offset program](#), which was designed to help mitigate the greenhouse gas impacts of PSU business travel. Travel has been documented as a major contributor to greenhouse gas emissions, from airplane flights, ground transportation, to the emissions embodied in the lodging and food services that make up a business trip. At PSU, business travel is approximately 12% of our total greenhouse gas emission and an area that PSU has been working towards making lasting impacts. While business travel is a necessary part of an institution of higher education, PSU's travel offset program is an innovative way to mitigate those impacts by setting aside funds to lower our campus' greenhouse gas emission through efficiency improvement on our campus. In its current interaction the travel offset program is voluntary and works by charging a 2% fee of a department's total travel expenses. These funds are then allocated to the GRF and used towards energy efficiency projects on campus. To date, 19 departments participate in the program and there are discussions about making this a required fee for all university business travel.

PSU's project selection process and criteria has also changed recently to not only promote energy and water efficiency but to further align our GRF with PSU's institutional mission and goals. In addition to return on investment criteria, prioritizing deferred maintenance, and sustainable benefit a list of preferred project selection criteria was established. These include:

- Racial equity - prioritizing improvements in buildings and spaces using a baseline equity assessment of PSU's building performance and demographics.

- Impact - maximizing funds across projects that serve the greatest number of constituents
- Encourage education - create opportunities for the campus community to learn about best practices in energy conservation and supporting a healthy learning environment.
- Inform and Innovate - implement projects that provide data to inform future campus sustainability efforts.
- Promote PSU's institutional vision - leveraging existing sustainability programs and contributing to PSU's growing reputation as a leader in campus sustainability
- Economies of scale - maximizing avoidable funds and minimizing disruption by selecting projects which coincide with existing construction and maintenance work.
- Measurement and verification - using existing mechanisms for verifying actual energy savings after project implementation.

Additionally, the GRF also opened up the project proposal process developing a [form](#) for students, staff and faculty to pitch project proposals. This form can be used to pitch ideas to the committee that are fully scoped out or to propose an idea that needs some help to scope out. Since introducing this form we successfully completed a project that replaced all of the Department of Biology's aging refrigerators and freezers, with Energy Star appliances which resulting in a significant energy savings of 25,787 kWh of electricity. In the past individual departments would be responsible for replacing their own appliances, but this allowed us develop an innovative and creative way to fund the project that benefit the University's general funds and the Department of Biology.

As mentioned above, the Green Revolving Fund itself is not necessarily original, but PSU's approach to running this program has a lot of originality. Beyond the already mentioned project criteria and unique funding opportunities, PSU has taken important steps to prioritize racial equity in our project selection. In 2020, an analysis was run looking at the racial demographics of our campus community to understand what buildings our BIPOC (black, indigenous, people of color) student, staff, and faculty spent time in and compared that to the building's performance. This helped us create a baseline of buildings that efficiency projects should be prioritized and this work has also helped create the mechanisms to run this analysis for a variety of scenarios including comparing demographics to deferred maintenance to help prioritize capital project requests.

Another aspect of the GRF that sets us apart from others is that we leverage our existing programs. One program in particular that has had a strong impact on the GRF is our [living lab program](#), which engages students and faculty in campus-based applied sustainability projects in partnership with operational staff. This program brings together the academic and operational side of PSU, empowering students, faculty and staff to apply creative and innovative approaches to campus-based research questions or challenges and advance and inform campus sustainability goals. One project in particular that really highlights this connection is a project that was developed by our Facilities and Property Management team, who needed to find a solution in one of our research buildings that had a high demand on our campus loop HVAC system. A group of students in Materials and Mechanical Engineering program, conducted a study of the laboratories in the building to help design a cooling enhancement that would

deliver supplemental cooling to those labs that required extensive cooling loads. This project had a huge impact on our HVAC loop system, providing an annual savings of 176,800 kWh of electricity and 14,600 therms of natural gas for a total energy savings of \$25,380. The GRF committee approved this project with the help of the design and analysis that these students provided.

Another part of the living lab program is the Green Building Internship (GBI) that gives two students (one from Architecture and one from Engineering) the opportunity to spend the summer working on projects to help inform and improve campus operations. These projects often provide the necessary analysis to inform GRF project. This year our GBI's focused on the electrification of campus, providing a very detailed analysis of what it would take PSU to decarbonize our energy system but eliminating our reliance on natural gas a renewable source of energy. This work resulted in several projects that the GRF is currently scoping to fund in the coming year.

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### **Section 2.A – Sustainability (Economic Benefit)**

Institutions of higher education are continuing to face budget cuts while energy costs are continuing to increase. This year in the Pacific Northwest we have seen a significant increase in energy costs, as climate change has brought about less predictable and extreme weather conditions and droughts have continued to have massive impacts on water and energy.

PSU's GRF provides a source of funding to continue to prioritize efficiency projects as we see budgets are tight and there are reduced capacities to fund capital improvement projects. The benefits of this type of funding goes beyond one-time investments transforming expenses into investments by recapturing cost savings from projects that reduce energy and resource use.

Since inception, PSU has invested over \$2M in efficiency projects resulting in an accumulated annual savings of over \$287,000, that's roughly a 14% return on investment with an average project payback of 5 years. This return on investment is paid back into the GRF until full project investment is recovered, yet the University still sees the annual savings to the utility accounts.

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### **Section 2.B – Sustainability (Environmental Benefit)**

PSU has made great strides in improving the environmental performance of our buildings, but we still have numerous gaps to fill as we continue to be stewards of our environment. The GRF provides the mechanism to fill these gaps even during budget constraints.

Building energy makes up more than 40% of PSU's total carbon emissions. Using the GRF to specifically address these environmental impacts has proven to make a huge impact. Since the inception of the GRF, PSU has reduced our energy consumption by 14%. Though not all of this is attributed to GRF projects, the GRF has reduced consumption by 1.8M kWh of electricity and 175,000 therms of natural gas. To date, these projects have resulted in approximately 2,000 metric tons of CO2 reduction annually, making a significant impact on our climate action goals to be carbon neutral by 2040.

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### Section 3 – Adaptability and Transferability

A GRF program such as PSU's can easily be adaptable by other institutions. GRF's have grown in popularity over the last decade and there are examples at several institutions of higher education, hospitals, government agencies and school districts. There are several resources through the [Sustainable Endowment Institute](#) and the [US Department of Energy](#).

While there is an initial cost to develop a GRF program, the benefit of the revolving fund is that it continues to feed back into itself eliminating the need to find continued funding mechanisms. Institutions just need to commit to a set amount and the fund will sustain itself. The fund can start small and institutions can find creative ways to grow the fund (or decide to keep it small). PSU started with \$500,000 and has grown the fund via other mechanisms, as mentioned previously. Additionally, PSU has committed to adding a small amount each year based on the savings in the annual utility budget, after GRF funds have been repaid. This is another example of a creative way to grow the fund that won't have a huge impact on current budgets. Institutions could easily adopt all or some of PSU GRF and apply it to their institution. With the resource available, it is easy to implement with or without customization.

PSU prides itself on sharing information with our community and peers. We keep a detailed [website](#) that highlights our approach to our GRF as well as details on [projects](#). We are also a part of the [Billion Dollar Green Challenge](#), which encourages universities and others to invest a combined total of one billion dollars in self-managed green revolving funds that finance energy efficiency improvements. The Challenge launched in 2011 and PSU is one of 58 participants who collectively have committed \$122M to date. As a participant we also share our GRF process via their website.

Additionally, PSU is always happy to meet with other institutions and provide information on our processes. In recent years we've been working with Oregon Health and Sciences University to help them develop a small GRF, meeting with several groups over the last few years.

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### Section 4 – Institutional and Community Benefit

The GRF provides several direct benefits to the University including:

- Financial benefit - through direct savings in our utility budget
- Environmental benefit - through reduction in greenhouse gas emissions
- Engages and educates our campus community through hands on experience
- Helps create a culture shift by strengthening our commitment to our sustainability goals
- Creates a programmatic approach that formalizes a program that sustains itself, rather than relying on just one-time investments
- Helps convey PSU reputation as being a leader in sustainability

As noted throughout this document the GRF provides a huge benefit to our constituents. As an institution of higher education, it is our job to set an example and provide educational opportunities to improve our community and communities beyond. The GRF is one project that not only helps PSU do its part in reducing our financial and environmental impacts, but also supports our students, staff, and faculty in becoming leaders of change.

PSU maintains a [GRF website](#) which includes a [list of projects](#) that clearly describes the project and provides information on financial savings as well on carbon savings from each project. Additionally, PSU is working on updating our [Sustainability Dashboard](#), to include information on our GRF projects, including detailed analysis of efficiencies found in buildings where projects have been implemented.

All of the energy savings and analyzed before and after projects to ensure that projects are performing as expected and support this with detailed documentation of project analysis. PSU strives to be transparent and provide our students and faculty with information to further their education and research hence the development of our [Sustainability Dashboard](#). While we don't have the GRF page built out on our dashboard yet, anyone can see our individual building utilities to see savings where projects have made impacts.

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### Section 5 – Management Commitment and Employee/Student Involvement

PSU's commitment to the GRF is well documented with our initial investment of \$500,000 of funding from the State of Oregon for capital improvements, which can be found on our website [here](#). Using this money to seed our GRF was the administration's initial commitment to making this a priority at PSU. Additionally, administrators have also committed to this work via their voluntary enrollment into our [travel offset program](#).

PSU has a longstanding commitment to be carbon neutrality, becoming a signatory of the [Second Nature Climate and Carbon Commitment](#) and developing a [Climate Action Plan](#) that sets a goal of being carbon neutral by 2040.

Additionally, PSU states, “we are dedicated to collaborative learning, innovative research, sustainability and community engagement,” as part of our [mission statement](#). The GRF aligns with this institutional goal by providing a hands-on learning opportunity for students to engage in learning and research. The GRF also leverages partnerships with community organizations such as the [Energy Trust of Oregon](#), who helps embed a culture of energy efficiency through leadership and incentives to reduce energy consumption.

The GRF works to keep stakeholders engaged by hosting an annual brainstorming session with people from a variety of departments within Finance and Administration. Additionally, stakeholders are engaged in the GRF via our living lab program. Employees at the University are encouraged to engage in the GRF by submitting project ideas via our [GRF project request form](#). Additionally, the GRF along with several of our sustainability programs are highlighted in our New Employee Orientation, letting staff know that we want to collaborate on projects.

As part of our [Annual Report](#) we include annual updates on the GRF. Additionally, we are working on developing a section of our [Sustainability Dashboard](#) that would focus on GRF projects and their direct impacts to our efficiency work. In the meantime, we have all [projects](#) posted on our [GRF website](#) and our utility information on our dashboard for so you can see the efficiency savings overtime.



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### Section 6 – Documentation and Analysis

When developing a project, a detailed analysis is included. This not only helps inform current projects but also drives continued improvements. In the past couple of years PSU has focused on benchmarking on building conditions and demographics to help us make more equitable decisions when planning GRF projects. As we move forward, PSU will continue to use the tool mentioned above to continue to drive future performance improvements

For smaller projects, such as small LED projects or restroom upgrades, an in-house analysis is conducted benchmarking current energy/water consumption, how the new fixtures will likely change consumption, and an analysis once fixtures are installed to see if savings have been achieved.

For larger projects, PSU often works with a consultant through the Energy Trust of Oregon to perform customized [studies and incentives](#). Additionally, PSU has utilized [GRITS](#), a platform for planning, tracking, and sharing energy, financial and carbon data. While PSU isn't utilizing this tool currently, we are looking into using this tool in the future to help analyze the impacts of our GRF project. Additionally, PSU uses [SIMAP](#) (sustainability indicator management & analysis platform) to help inform our carbon reductions impacts of our GRF projects.

#### List of documentation

Beyond the links provided above PSU can provided the following documentation:

- Individual project analysis (internal or through Energy Trust of Oregon studies)
- GRF funding tracking (including incentives, payback schedules, travel offset funding, and utility savings funding)

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### **Abstract:**

In 2013, Portland State University (PSU) Green Revolving Fund (GRF) as part of [The Billion Dollar Green Challenge](#) to develop a programmatic approach to funding efficiency projects across campus. The fund started with \$500,000 seed from the State of Oregon for capital improvements and has since grown to \$1.5M. The GRF mechanism is simple and a circular program: we identify projects on campus, finance the project, repay the loan from utility savings, and reinvest the savings into new projects.

In recent years, several programmatic changes have been made to further embed this work in PSU's mission and sustainability goals. This work has included an integration with our Living Lab Program that engages students and faculty in campus-based applied sustainability projects in partnership with operational staff. Also, there has been an increased push to engage more stakeholders, opening up the project proposal process to all students, staff and faculty. And finally, this last year there was a focus on ensuring racial equity by developing a benchmarking platform to analyze racial demographics and our building performance to help prioritize projects.