

SUNY Cobleskill
Expanded Investment and Performance Fund
White Paper

Title: SUNY Cobleskill Waste to Energy Facility: The Power of SUNY Cobleskill

Executive Summary: SUNY Cobleskill proposes a unique flagship energy project that focuses on implementing campus sustainability and applied student learning in the fields of waste management and renewable energy, while advancing energy independence and economic development in New York State. The vision is to make the SUNY Cobleskill a zero waste facility, by converting the waste generated on campus by students, faculty, dining services, facilities, and the campus farm into a synthetic gaseous fuel (that combusts cleaner than natural gas) to fuel generators, producing enough electrical energy (400 kW) to power at about 25% of the SUNY Cobleskill campus.

The project will combine a new rotary gasification system with a currently funded anaerobic digestion system to convert a wide variety of non-hazardous wastes into a flammable gas. The patent pending rotary gasification technology was fully developed on the SUNY Cobleskill campus by faculty, staff, and students participating directly in the Environmental and Energy Technologies (EET) curriculum. Implementing this project will greatly enhance student interest and enrollment within this curriculum.

This student-focused project addresses the SUNY Excels Performance measures:

Enrollment and Retention Rates– Students will be involved in all phases of the project, including scaling the existing gasifier to a larger workable design, fabrication, assembly, trouble-shooting and start-up. This activity will increase interest from current students and attract students for future enrollment.

Capacity (STEM) – EET students and those from the Agriculture Engineering department have a wide variety of hands-on skills in which they will regularly need to apply STEM concepts learned in the classroom.

Applied Learning – Hands-on learning are the hallmarks of an education at SUNY Cobleskill and this project will involve applied learning at all phases of the project.

Scholarship and Discovery - Students will work with a patent-pending technology and will also have the opportunity to provide input and ideas to related components, such as the feedstock delivery system, or waste sorting systems. Students will also be involved in identifying optimal waste mixes for enhanced energy output.

Project Lead The Way (PLTW) and Odyssey of the Mind – SUNY Faculty will use this project as a means to partner with local school districts to inspire high school students to pursue STEM concepts and encourage enrollment in the EET curriculum. High school students will participate in mini-projects that focus on innovation and applied learning to develop problem solving skills.

Commercialization- The desired end result of this project is that by building and operating this demonstration unit, investors will take notice and become interested in commercializing the technology. The role that students will play going forward will be determined at that point.

Amount of Funding Requested: \$600,000 SUNY2020

The current funding for the digestion project administered by the SUNY Construction Fund is \$5M. The main infrastructure for the digester and electrical power generation equipment will be installed using this funding. The gasification system will be joined to the digester and additional power generation capability will be added. Engineering, fabrication, and installation of the gasification system will be performed by the campus using faculty, staff, and students. The proposed budget for the gasification portion to be joined to the digester is \$600,000.

Type of Funding: SUNY 2020 Fund

This is a capital expenditure request to fabricate and install a gasification system on the SUNY Cobleskill campus grid.

Matching Funding:

\$5,846,000 was awarded to SUNY Cobleskill for design and construction of the anaerobic digester.

Impact of the Proposal on the Institution and the SUNY System: Funding will allow SUNY Cobleskill to be a working model of sustainability and technical innovation among the State University campuses and private institutions. All of the campus waste will be used for a beneficial purpose (energy, recycling, or agricultural use), allowing students to work with facilities to implement waste sorting and recycling programs on the SUNY Cobleskill campus. Students will also coordinate agricultural waste management as part of the campus farm.

Students will work under the direction of experienced faculty and will participate in process design, energy balances, mechanical design, instrumentation, and automation. This project is projected to further the development Environmental and Energy Technologies curriculum development and significantly enhance enrollment. The system will be fully automated, minimizing the requirement of human intervention.

| Metric | Year One | Year Two | Year Three |
|--|-----------------|-----------------|-------------------|
| Number of students participating in the gasification project | 4 | 8 | 11 |
| Number of students enrolled in the EET program | 28 | 36 | 41 |
| Number of students graduating from the EET program | 14 | 21 | 30 |
| Tons of waste diverted from landfill | 600 | 600 | 600 |
| Percent of electrical costs off-set by project | 25 | 26 | 28 |
| Students working on the gasification/digester program | 10 | 15 | 20 |

Attachment

Timeline of Activities

| Date | Action Item |
|--------------------------------|--|
| December 2015 | Award announced |
| January 2016 | Design team assembled, including students and faculty. Project orientation conducted. |
| Feb 2016 – May 2016 | Meeting with SUNY Construction Fund representatives and design consultants to match anaerobic digester components to gasification system, including waste delivery and sorting. Student teams developed. |
| June 2016 – August 2016 | Design parameters finalized and digester siting and design completed. |
| September 2016 | Student design and fabrication teams identified. Regular design team meetings begin. |
| Oct 2016 – Dec 2016 | Student design and fabrication teams continue to meet and progress toward final product. |
| Jan 2017 – May 2017 | Fabrication commences with student teams. Testing and troubleshooting commence in late spring |
| June 2017 – August 2017 | Fabrication and testing continues. Installation team identified, training begins. |
| September 2017 – December 2017 | Installation of gasification system begins. Operations teams are identified and training commences |
| January 2018 | Installation of system complete. Operations teams assemble and begin feedstock sorting, gas and energy output analysis. |