



Clean Energy Grant Application

EVERGREEN

THE EVERGREEN STATE COLLEGE

Please read the grant application guidelines prior to submitting your proposal. We will not consider incomplete applications. Completed applications should be e-mailed to the coordinator at cleanenergy@evergreen.edu before the deadline. For questions regarding the application process, contact the coordinator.

Project Title	Aquagen Gas Generator: A Clean Energy Alternative for Metal Shop	
Project Lead	Name:	Christian Jacks Johnson
	E-mail:	
	Phone number:	
Student, Staff, Faculty, or Student Group: <i>(staff and faculty please name department)</i>	Bob Woods, Metal Working	
<i>Students only</i>	Class standing:	Freshman
	Faculty or Staff sponsor:	Bob Woods
Campus Location	Art Annex: Metal Shop	
Date	04/23/12	

Abstract	<p>The 1500 Aquagen Gas Generator is a mid-sized machine using electricity to convert H₂O into a unique proprietary gas called Aquagen, that is a hydrogen/oxygen/water-vapor blend. This new clean energy technology was discovered/invented by Denny Klein, who founded Hydrogen Technology Applications out of Clearwater, Florida. When this gas is ignited it burns at a stable state and can range from 259 to 10,000 degrees F. This machine is used to perform standard brazing, soldering, cutting and welding processes with metals and alloys such as steel, copper and bronze, and can also perform unconventional metal and glass working techniques such as aluminum/bronze fusing.</p> <p>This technology produces gas that is used on-demand at low pressures of around 15psi. When combusted the gas turns back into water vapor, producing no toxic fumes or carbon emissions. The Aquagen Gas Generator can out-perform typical gases such as oxy/acetylene by cutting, welding and brazing up to 30% faster and using only one gas. The Aquagen gas is safe and dissipates into the air. Not being stored at high pressure, Aquagen is derived from water and is very cost effective; running 3/4 a gallon of distilled water will produce enough gas for 8 hours of continuous use.</p> <p>This new technology is an economically and ecologically sound alternative to oxy/acetylene and is in step with the mission of the Clean Energy Committee's support of energy efficiency, renewable energy, and resource conservation at Evergreen. Aquagen is a promising technology for its applications in the metal shop and implications in sustainable energy use. This gas has been tested and researched as a viable alternative for fossil fuels not only in metal fabrication, but also in automotive technologies and electricity production. Already being used as a hybridized fuel with gasoline and diesel in automotive combustion engines, and in natural gas and coal fired furnaces producing electricity, Aquagen is the leading fuel source evolving standard practices into clean and sustainable industries.</p> <p>As we move further into the green revolution, Evergreen will be on the cutting edge of sustainable fuels if Aquagen is incorporated into the metal shop. As new developments in Aquagen change the world's reliance on fossil fuels to friendly fuels, Evergreen can potentially be on the learning curve and promote research and investigation into the viability of this new technology and its wide-ranging uses.</p>
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CEC Vote: (for office use only)

Proposed Motion	
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Moved:		Second:		
Yes:	No:	Abstain:	Absent:	Recusal:

Please respond to the following sections below. We ask that you present your proposal to the Clean Energy Committee to answer further questions about your project. If your project is funded we require you to publicize your work, and provide the committee with documentation, and a final report.

- If you require more space, please submit any additional documentation with your application.

Areas affected by proposed project: The committee reserves the right to have grant proposal reviewed by an authorized representative from affected areas prior to full review. Please refer to the grant guidelines to see if your project requires authorizations. Contact cleanenergy@evergreen.edu if you have any questions. Be sure to give yourself enough time to communicate with staff and faculty before the deadline. When you receive authorization, type the name of the representative below. Authorization will be verified.

Affected Area		Approval Required	Approval Received
Faculty / Staff Sponsor	Bob Woods	Always	<input checked="" type="checkbox"/>
Director of Facilities		<input type="checkbox"/>	<input type="checkbox"/>
Environmental Health & Safety Officer		<input type="checkbox"/>	<input type="checkbox"/>
Campus Land Use Committee		<input type="checkbox"/>	<input type="checkbox"/>
Academic Budget Dean		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Student Activities Advisor		<input type="checkbox"/>	<input type="checkbox"/>
Science Operations Manager / Organic Farm Manager		<input type="checkbox"/>	<input type="checkbox"/>
Residential and Dining Services		<input type="checkbox"/>	<input type="checkbox"/>

Timeline

- Provide an estimated timeline listing the length of time from start to finish and detailing the length of time that each component will take.

1. Design	No design time	4. Research / Construction	04/02/12--06/08/12 Writing research report to be done end of week 10
2. Approval	04/25/12--05/15/12 estimated 20 days for approvals	5. Present / Report	06/11/12--06/15/12 during evaluation week
3. Procurement	05/20/12--06/10/12 estimated 21 days to purchase and receive	6. Follow-up	06/15/12--07/20/12 Follow up in summer quarter

Detailed Project Description

Please include:

- Project goals
- Definition of sustainability and the relationship of the project to this definition
- Longevity and/or permanence of the project results on campus
- Location, including any concerns that may arise from the chosen site
- Previous experience directing projects of this nature
- If applicable, comparisons to similar projects at other campuses

Description	<p>The main goal is to acquire the 1500 Aquagen Gas Generator for the purpose of use in the metal shop and continued documentation, study and research into different applications of Aquagen at The Evergreen State College; setting up a station in the metal shop to train metal students interested in using Aquagen in their studies and future careers in metal working with sustainable fuels; researching the viability of Aquagen Generator compared with standard welding practices such as oxy/acetylene welding; using the proprietary gas Aquagen to perform conventional metal techniques such as brazing, soldering, cutting, welding and fusing; while documenting the effects of using Aquagen gas to perform unconventional metal welding techniques such as fusing dissimilar metals, treating steel to prevent oxidation, strike-coloring copper, and glass blowing.</p> <p>As research continues with permission and support from sole proprietor Hydrogen Technology Applications, another goal is developing tests for viability of Aquagen as a new fuel source in standard combustion engines and natural gas and coal fired furnaces with little or no modifications to existing systems. The Aquagen gas is light and dissipates into the air. When combusted it turns back into water and produces no toxic fumes or carbon emissions, defining it as a safe, clean, alternative fuel source. Aquagen is a gas made from the electrolysis of water, using only electricity and water in very moderate amounts.</p> <p>Clean burning, economical, safe and practical make Aquagen the most sustainable welding gas on the market. Faster than oxy/acetylene, this gas has proven to lighten the work time, create a safer environment, and save resources. The money saved in using Aquagen instead of oxy/acetylene will pay for the cost of the machine in a short time. The 1500 Aquagen Gas Generator can make a semi-permanent home in the metal shop (being a mid-sized machine it will not take much room) and provide invaluable skills for students interested in sustainable metal crafting. The Aquagen gas also provides a unique way of melting and crafting glass and could also be easily moved to the glass studio for experiments or research. Eventually the Aquagen Generator could have a designated lab space for pure research and investigation into the physics and chemistry of alternative, clean fuels.</p>
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Campus Connections (Please select all that apply):

	Research	Implementation	Education
Renewable Energy	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Resource Conservation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sustainability Strategies	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**Impact on Campus Sustainability Goals:
Energy, Environmental, Social and Economic Impact**

- How does your project align with the Climate Action Plan or the goal of zero waste and carbon neutrality by 2020?
- How is your project consistent with the mission of the Clean Energy Committee?

<p>Impact on Campus Sustainability</p>	<p>The 1500 Aquagen Gas Generator is very affordable. Running continuously for 8 hours on 3/4 gallon of distilled water, this gas is much more efficient than oxy/acetylene, which uses one tank of oxygen and one tank of acetylene in an 8 hour period. Even if Aquagen was only used part of the time and students were still trained to use oxy/acetylene the results of saving resources and energy are considerable.</p> <p>The environmental impacts of Aquagen are negligible when compared to oxy/acetylene. Aquagen is non-toxic and has no carbon emissions. Even when factoring in the carbon footprint of using electricity and distilled water to create Aquagen, oxy/acetylene is much more expensive and polluting. The difference is that one uses fossil fuels, while the other uses water. The water-based gas will always be much safer for the environment.</p> <p>This technology of Aquagen will not only save money, resources, time, and energy, but the sooner Aquagen is incorporated into the metal shop, the sooner Evergreen moves one step closer to carbon neutrality and zero waste and pollution by 2020</p>
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Outreach and Education:

The Clean Energy Committee strives to fund projects that will be highly visible and have a positive impact in the lives of the Evergreen students responsible for the clean energy initiative. Approved proposals will be required to publicize their project in press releases and/or presentations, including mention of sponsorship by the Clean Energy Committee. It is also expected that you will present your work at the Synergy Conference, the Science Carnival, or another public presentation approved by the committee. With that focus, please address the following:

- visibility of the project to students and the greater evergreen community
- role that students will play in the project
- opportunities for involvement in classroom curriculum
- media outreach opportunities
- any additional information on methods the project will use to educate and engage students and the public about clean energy technologies and resource conservation.

<p>Outreach and Education</p>	<p>In the spirit of Evergreen, Aquagen gas in this educational setting will shine a flame forward into the future of sustainable fuels. To help this technology be received by the student body and faculty, there will be workshops designed to teach not only metal shop students, but all students and faculty who choose to attend. Those who are present for the workshops and demonstrations of the Aquagen Gas Generator may not be able to immediately gain proficiency in the use of this tool, but will leave the workshop or demonstration educated in the possibilities and potentials of the alternative fuel source Aquagen.</p> <p>In the metal working programs, the students will have the ability to use the Aquagen gas to learn first hand the differences between this technology and other more typical welding practices. The students can then choose to use this new technology to fabricate metal projects that meet the requirements of the program in which they are enrolled, and finish in less time.</p> <p>There will also be demonstrations and seminars provided that are open to the public and will include media recordings of the demonstrations. This will encourage our community and higher learning organizations to start discussions, feedback, and even clubs around sustainable fuel sources such as Aquagen. There will also be a chance for students to record video and audio training programs for the use of Aquagen gas in educational and professional settings.</p>
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Budget and Fundraising

Please include:

- A detailed budget for the full project costs, including initial costs and life-cycle operation and maintenance costs.
- Detail both the specific budget items and the total funding amount being requested, and include support documentation.
- If the Clean Energy Committee does not fund the full requested amount, will the project be able to move forward?
- List any grants or other sources of funding that have been obtained or applied for. If these funds are limited to a certain component of the project, please specify
- NOTE: Preference will be given to those projects that seek additional funding from other sources. This priority is given to encourage cost sharing and to allow the funds available to support a greater number of sustainability projects on campus.

Budget	<p>The cost of purchasing the 1500 Aquagen Gas Generator, including out-of-state taxes, is \$10,840.00 USD</p> <p>The shipping cost to receive this product in freight is \$655.11</p> <p>The cost of operating the Aquagen Gas Generator will fluctuate depending on its use. It will be a smaller figure to begin with and grow as it is used more.</p> <p>The cost of operating per hour is \$0.62, that is \$0.12 for distilled water every hour and \$0.50 for electricity every hour.</p> <p>If Aquagen Generator is running 8 hours per day and five days a week for the whole year, including summer quarter, the figure would be \$1,300.00 per year. This is a high estimate and would include any Independent Learning Contracts.</p> <p>This is very new technology and nothing is known about maintenance and repairs because nothing has failed or needed maintenance yet. There is no scheduled maintenance of this product, so the \$1300.00 per year figure more than covers any unforeseen maintenance and repair.</p> <p>In the case of a new technology, the budget will need to be assessed regularly to assure proper funding is allocated.</p> <p>The total cost of purchasing, shipping, running, and maintaining Aquagen Gas Generator for one year is \$12,795.11</p> <p>There is also the Noosphere Award that is a grant currently being proposed for purchasing the Aquagen Generator in school year 2012-2013.</p> <p>There are also fund-raisers that are being developed to achieve approval through Provost.</p> <p>If the Clean Energy Committee does not fund the full amount it is likely the purchasing will happen next school year rather than this year.</p>
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Cost Summary Including Tax

Goods and Services	\$655.11 for shipping
Equipment	\$10,840.00 for Aquagen Generator
Labor and Maintenance	\$1,300.00 for H2O, electricity and maintenance
TOTAL PROJECT COST ESTIMATE	\$12,795.11