

BioGlass Member Eddie Bernard— Making Eco-efficiency a Reality

by Shawn Waggoner

Eddie and Angela



STARworks Garden in front of STARworks Biofuels refinery

Eddie Bernard has a long history in developing and fine-tuning glassmaking equipment. A native of Louisiana, he began working with stained glass under Craig McCullen in Lafayette at the age of 15. At age 17 he worked with Paulo Dufour, the son of Paul Dufour, who started the first MFA program in stained glass in Baton Rouge at Louisiana State University (LSU). He later attended Rochester Institute of Technology (RIT) and in his third year started rebuilding the equipment in the glass shop. By the end of his fourth year, RIT awarded him for his equipment expertise to the tune of \$1,800, which he used to finish school. He graduated a semester early and went to Corning, New York, to help get the Studio of the Corning Museum of Glass up and running. There he met Fred Metz of Spiral Arts and learned quite a bit more about equipment building. The Studio hired him as a technician and teaching assistant for Bill Gudenrath, assistant to the Artist-in-Residence and stained glass department founder and teacher. After four months, he returned to New Orleans, Louisiana, where he focused on building his first company, Wet Dog Glass, LLC, which he founded during his last semester of college in 1996.

Since 2007, Bernard has played a vital role as organizer and/or panel member at all of the Glass Art Society (GAS) Conferences that have featured panel discussions on how to make glass art more sustainable. He also attended Penland's Glass Technicians Summit held in February 2009 and is one of many involved glass artists/technicians seeking to reduce his carbon footprint.

"One disturbing trend is that attendance at these meetings and conferences that focus on Green Glass is shrinking," says Bernard. "At the 2007 GAS conference, the room was overflowing. The next year's Portland conference was also well attended. But at the following conference in Corning, attendance dwindled to about 90 people compared to 300 the previous year. When speaking with other panel members, the one reason we could pinpoint was that glass prices went down, and perhaps concern went down with them."

Wet Dog Glass, LLC—From NOLA to STAR

In 2002, Bernard and another employee learned HTML and built the first Wet Dog Glass website. Bernard and wife Angela decided to start a glass studio and found a 7,000-square-foot space to house Conti Glass. The studio allowed local glass artists to rent time and make their own work, something that was relatively unavailable in New Orleans at the time. The studio hosted demonstrations in glassblowing for the 2004 GAS conference in New Orleans, after which GAS asked Bernard to be on its board of directors. At night Bernard worked at Conti, and during the day he worked at Wet Dog Glass, finishing up the glory holes for the Tacoma Museum of Glass—the last project to be shipped from that location.

Wet Dog Glass is a leader in glass studio systems. The company builds its own control panels and designs and builds combustion and safety systems. Bernard often travels to install and start up glass studios. When Hurricane Katrina hit, Wet Dog had 13 employees and shipped products to Japan, China, Australia, Mexico, Italy, India, Cayman Islands, Bermuda, and just about every state. Eventually Wet Dog Glass expanded its interests and ventured into other industries as well, supplying combustion and safety components for several large factories, including a microbead factory in India.

Katrina, the hurricane of all hurricanes, impacted everything in its path, and Wet Dog Glass was no exception. Bernard turned down a big contract for the Toledo Museum of Glass—an order for several glory holes, annealing ovens, furnaces, and many accessories.

"I knew about this studio plan for four years and wanted so badly to get the job, because it was where the Studio Glass movement was born. It was a huge honor for us, and when I decided to step out of the bidding process, I was informed that they had, in fact, made the decision to hire us. All the jobs we had to let go of because of Katrina equaled nearly a million dollars."

After Katrina, Conti Glass was resurrected as a nonprofit organization called New Orleans Creative Glass Institute (NOCGI). "Now it belongs to the community, and we like it that way," says Bernard. NOCGI transferred all physical assets to Young Artists, Young Aspirations (YAYA) in 2011 and was dissolved as an organization. NOCGI had fulfilled its mission, and YAYA offers even more, with programming for high school student too.

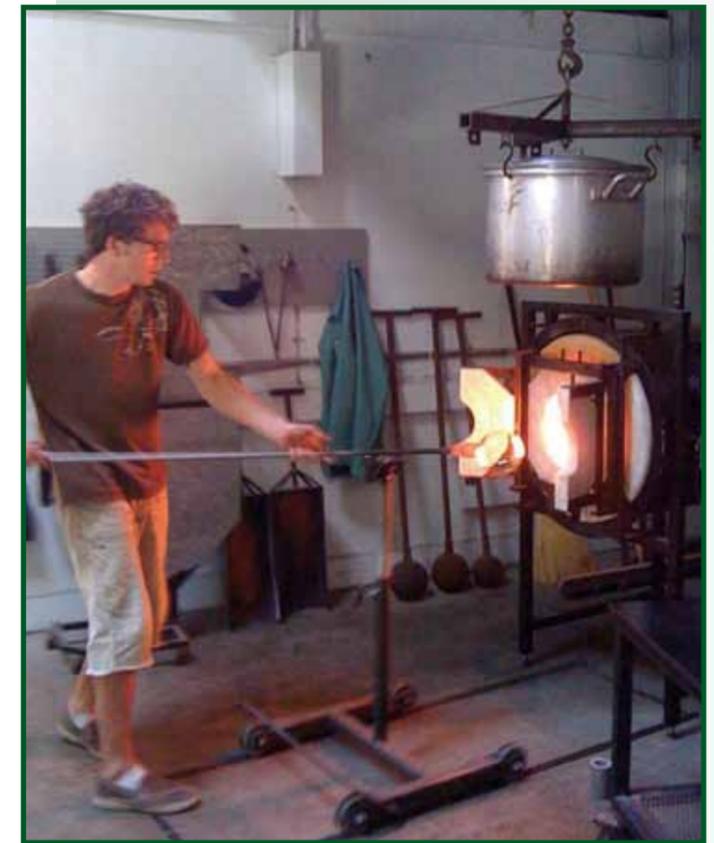
Prior to the hurricane, Wet Dog Glass was in need of a larger working space. After Katrina when they decided to go back into business full swing, Bernard realized New Orleans didn't have any available, affordable space. The cost of living in the Crescent City had skyrocketed. They were looking at Columbus, Georgia, when they discovered a project called STARworks, in Star, North Carolina. The project is managed by a nonprofit organization named Central Park NC (CPNC), of which Eddie is currently a board member. CPNC is transforming a 187,000-square-foot former textile mill to create STARworks Center for Creative Enterprises. The STARworks project provides a focused means of growing and developing creative enterprises and individuals for placement in the downtowns of small communities. STARworks asked Eddie and Angela to visit its site and judge if the space would be suitable for a hot glass studio, for which they had received a grant to build in this region of North Carolina known as Central Park. After the Pittsburgh GAS Conference, Eddie and Angela drove through Star on their way home to New Orleans.

"We hadn't considered moving out to the country, but when we started looking around, we discovered many potters as well as a diverse population attracted to the area because of the pottery tradition. We asked if there was a part of the building that might be suitable for us, and they showed us this dark, decrepit area. They said if we'd move there, they'd try to find the money to fix it up. In one day, we made the decision to move to North Carolina."

The STARworks Studio

STARworks wanted Bernard and Wet Dog Glass to build a studio for them. This community access studio plays an important part in the energy conservation picture and is run by STARworks in collaboration with Wet Dog Glass employees. Wet Dog Glass has been permitted to experiment with the studio to increase heat reclamation and efficiency.

In 2009, STARworks set up a biodiesel refinery that used waste heat from the studio's 250-pound furnace for all the process heat required for waste veggie settling tanks and methanol reaction. Regrettably, STARworks hasn't made biodiesel in at least a year due to difficulties in obtaining feedstock in their rural area. The furnace has a recuperator that preheats combustion air for the furnace to roughly 650°F. The exhaust exiting the recuperator is still 1200°F, which is enough to use for another process. A manifold directs the exhaust heat from the top of the recuperator to either a batch preheater or the biodiesel heat exchanger. The batch preheater allows the glassworkers to preheat their batch to 500°F when charging and put that heat (stored in the batch) directly back into the furnace. This reduces melt time from an hour and 20 minutes for a 35-pound charge to an hour and 15 minutes for a 50-pound charge. It also reduces thermal shock on the furnace.



Nick Fruin, STARworks Glass Studio coordinator boiling water while blowing glass in an experiment to see just how much can be done with glory hole waste heat.

When the refinery is in operation, glycol circulates in a closed loop through the biodiesel heat exchanger and an insulated 550-gallon glycol storage tank. This tank stores heat gained from the exhaust overnight, and each time a batch of biodiesel is processed, 400°F glycol will circulate through four tanks of locally collected waste vegetable oil and methanol.

“Our small glory hole has a hoist hanging over it, and we actually brew beer directly over the glory hole. Even with all the doors closed, we can heat 7.5 gallons of water from 70°F to 170°F in an hour and 15 minutes. This is just enough time for the mashing process to be completed before needing the second pot of hot water. The water we use to cool the wort and wash containers goes into plastic drums and is ultimately used to water our community-supported organic garden,” says Bernard. “We are in the process of setting up a 2,600-gallon tank between two roofs to collect rainwater, and at that point we will simply circulate the rainwater from the big tank through the beer in a copper tube to cool the beer from boiling to 80°F and return it to the storage tank. Effectively, we will have reduced our cooling water down to a net use of zero. We collect all-brown, non-twist-off bottles and bottle our beer in them.”

The exhaust from the furnace waste heat is cooled to around 290°F as it goes through the glycol heat exchanger. There is a greenhouse to which warm water could be sent in an insulated water pipe. If the exhaust is cooled to below 122°F, the water created in the combustion process can be harvested. Sixteen percent of the product of combustion is water that is actually created in the combustion process when hydrogen and oxygen atoms bond to form the water molecule.

“In locations where water is a dwindling resource, harvesting this newly created water could be very beneficial,” says Bernard. “We will use that water wherever possible after doing a chemical analysis on it. Essentially we could filter it and use it in the cold shop, for flushing toilets, for the garden, for mixing refractories, and many other uses.

“Another main product of combustion obviously is CO₂, and a long-term idea might be to carbonate our beer using that CO₂. Many of these ideas have come from or been inspired by the discussions we have at the GAS conferences.”

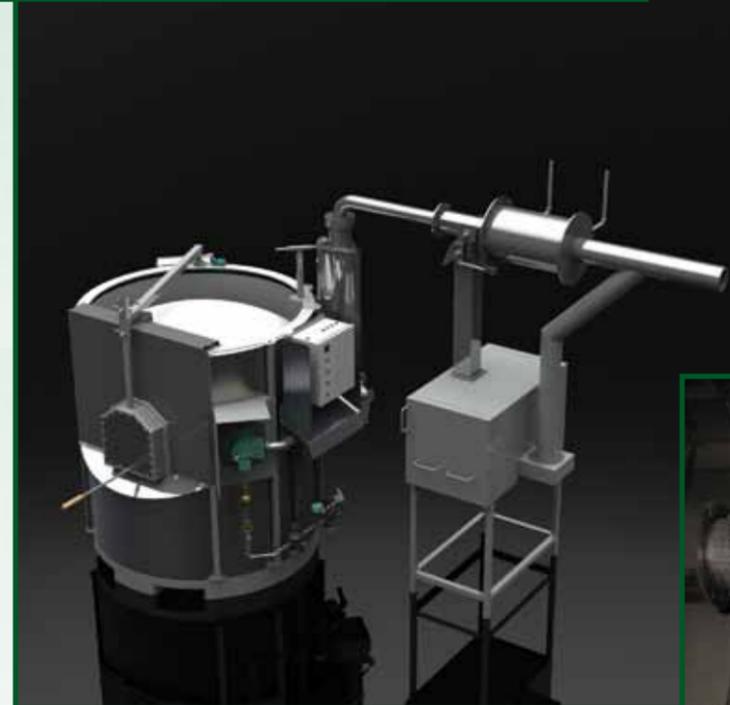
Bernard has begun to use a superior insulating material called Microporous in his furnaces. Its insulating value is about three to four times that of ceramic fiber. Because of the cost, it’s used in parts of the furnace that are intrinsically thin or that would lose more heat than other parts, such as the door, the entire front face, and on top of the arch.



Students using STARworks Glass’ three-port glory hole



The biodiesel refinery, which operated until early 2011



A round day tank with a batch preheater and an air-to-water heat exchanger above



The air-to-water heat exchanger, which uses furnace exhaust to heat a 500-gallon water tank

Can the Average Studio Achieve Eco-efficiency?

To the average studio owner or reader of this article, the goals presented here might seem a bit lofty and out of reach. It was exactly that notion—that all of this was very theoretical—that inspired Bernard to try to make it a reality. “To that end,” says Bernard, “we have invested in monitoring and analysis equipment such as a combustion analyzer, power meter, lots of thermocouples, infrared thermometer, and a data logging system. All the equipment in our shop communicates with a central brain through Ethernet cables, so we really can get a sense of the performance of our equipment.

“We want to try to do this, because we realize there are very few examples. When people ask how to do some of these things, as technicians we want to be able to tell them. We are developing a heat exchanger people could retrofit to the front of their glory holes to create a water heater.”

On the most basic level, Bernard says any studio can start “going green” by reducing through better work habits, using better insulation profiles or better seals on doors, and better gas/air mixtures. Small studios and individual artists can buy locally and reuse materials such as metal and glass.

“We paint the insides of our furnace and glory hole skins reflective silver to reflect heat inward. Where our customers have a renewable electric source such as water or wind, we recommend electric furnaces,” says Bernard.

While involved with rebuilding in the city of New Orleans post-Katrina, the waste Bernard saw in the construction process inspired his interest in being more environmentally frugal in his business. He began by asking, “Why can’t the glass studio become the power source for the building?” and continues by searching for ways to make that a reality.

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Visit www.wetdogglass.com to learn more about the company’s products and design services.

Find out more about Bernard’s connection with BioGlass and the organization’s work to help the glass art community find greener ways to work in the March/April 2012 issue of Glass Art.