

# Amber O'Brien

## Harnessing the Internet for a Sustainable Glass Industry

by Colleen Bryan

Amber O'Brien has modest hopes for contributing to her chosen field of glass art. She aims to archive the knowledge of the generation that founded the Studio Glass movement in a way that informs current artists on sustainable practice. Her goal is to communicate that knowledge in a forum that is easily retrievable, globally accessible, and addresses the fundamental problems of future glass artists.

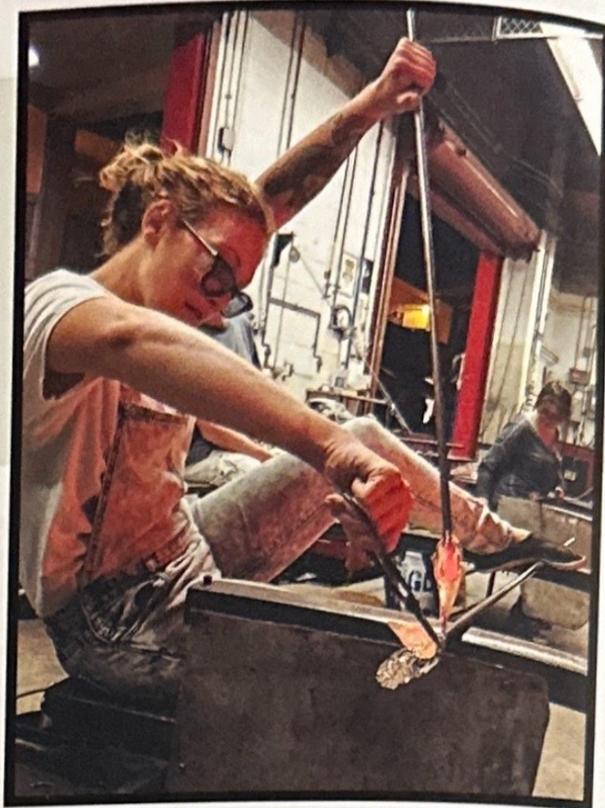
O'Brien's quest started simply enough. As a glass student at the University of Hawaii (UHM) at Mānoa under the mentorship of Rick Mills, professor and director of the glass art program, she was steeped in that state's goal of achieving energy independence by 2020. She secured a grant through the university's Undergraduate Research Opportunities Program to investigate energy efficiency solutions in university glass art programs, such as the UHM Glass Area. That investigation led her to create a baseline database of current technologies to document their comparative energy efficiency for glass shops and studios. It also included a trip in 2016 to the 45th Annual Glass Art Society Conference in Corning, New York, where she was drafted onto a Green Panel to introduce her project to a broader audience. The response was hungry and enthusiastic. As a result, O'Brien expanded the scope of her investigation beyond the University of Hawaii to the glass industry at large.

"The level of support and generosity in the industry was amazing. After the panel, many people reached out to offer information and resources I'd never heard about." In addition to her database organizing the information for easy retrieval, she also established a website at [GlassArtEnergy.org](http://GlassArtEnergy.org) as an educational resource on sustainable practices across the industry.

### Living in a Complicated Time

"We live in a complicated time for glassmaking. We are trying to transfer knowledge between generations of glassmakers even as the underlying forms and technologies are being replaced."

O'Brien observes that the founders gained visceral familiarity with their equipment and materials through their need to build, calibrate, and test their own. They learned through making and apprenticeships to masters. As problems arose or discoveries were made, they communicated through written articles, snail mail, in-person gatherings, and by telephone.



Amber Cowen glassblowing in the hot shop.

One example helped O'Brien find the answers she needed to move her work forward. "*The Independent Glassblower* was a newsletter disseminated to glassmakers throughout the country in the 1980s and 1990s. The author received questions and answered them scientifically and correctly. Rick was a subscriber and shared his copies with me. I was surprised at how many of my own questions were answered there." Publication of the newsletter stopped in the late 1990s, and all the information it contained is locked in that format and generally unavailable.

The current generation of artists orders manufactured equipment and COE-rated glass, minimizing mistakes and speeding production but transmitting less intimate granular knowledge to the users. This generation does most of its learning and communication over the Internet. Skyrocketing costs for both energy and materials render earlier expectations about mastery or profitability over time obsolete. Environmental concerns and globalization further the complexity of working in glass today.

O'Brien insists that her generation not disparage the knowledge of previous generations of glassmakers. "We admire the work of our predecessors who spent the time and had the opportunity to learn about glass firsthand. They learned in preparation to teach, not to perfect their methods and forget them. Our way of knowledge acquisition relies on the fast-paced information transfer of the Internet." However, the scores of YouTube videos and websites on the Internet tend toward quick how-to hacks and marketing.

Artists sometimes attempt to use blogs to mirror earlier step-by-step development or Q&A, which often devolve into online scrapbooking. Most frustrating, from O'Brien's perspective, is the tendency to re-create the wheel, for lack of an elegant way to pass along what is known. "All of the information on which the foundation of the Studio Glass movement was built is not easily available to new and emerging glassmakers. What is available is highly dispersed and has not been screened for credibility."

## A Website with a Mission

The purpose of GlassArtEnergy.org is to curate and centralize what is known and to enhance the education of glassmakers in the transition to a sustainable industry. O'Brien targeted her website specifically to be user-friendly and accessible to glassmakers who don't have a formal university education. However, centralized information is beyond what is generally retrievable through university classes, libraries, or elsewhere in the glass art industry. "Having a central online archive makes research easier and sparks the curiosity that is the basis for change."

Rather than republishing, reproducing, or redistributing paper versions, the website provides links to a PDF that viewers can pull up on a smartphone and download. There are also links to other relevant websites. Examples of information that is currently reachable through clicks on GlassArtEnergy.org include:

- A DIY video on how to build your own electric furnaces
- Published papers on equipment and recuperation, plus research into solar, wind, landfill methane, and hydroelectric power sources
- Links to the Glass Manufacturing Industry Council, which hosts annual symposia on energy efficiency throughout the larger glassmaking industry.

O'Brien has compiled and maintains an index that attributes the source, including the author, title of the article, issue, volume number, and year of publication. "I am not claiming rights to any of this material. Rather, I am trolling for high-quality information and am making it centrally accessible where it is more likely to be read by a new generation of artists. I like to think that I am using the power of the Internet for good!"



*Having gaps between the furnace opening and the door allows heat to escape, thus consuming more energy during operations.*

## Focus on Energy

How does capturing historical knowledge relate to energy efficiency? The artist says, "To maximize energy efficiency, everyone in the community needs to understand studio equipment maintenance and be aware of innovation and exploration being done so artists can choose equipment and materials that bring the best value in terms of function, cost, and sustainability."

O'Brien emphasizes that curbing energy use is not only good for the larger environment, but also for the artist's bottom line. "The glassmaking industry struggles financially due to rising fuel costs, overhead, materials, and the price of replacing and repairing equipment. Lowering your energy costs can go a long way toward making a studio financially feasible."

## Sustainable Practices

The kind of information O'Brien has gathered and curated falls into three broad categories—sustainable practices, renewable resources, and innovative technologies. The category of *sustainable practices* entails being more efficient in the studio by understating one's equipment, calibrating it to achieve greater energy efficiency, and properly maintaining it. For the artist who is setting up a new studio, it can mean selecting more efficient equipment from the outset. Some choices, such as consolidating furnace and glory hole functions, can save money and energy over what is required for separately firing each. This approach was used by old-school Italian craftsmen and is reflected in some contemporary equipment designs.

This category also includes glass recycling. "Glass is infinitely recyclable. Many studios and states highlight glass recycling. The State of North Carolina, for instance, emphasizes glass recycling across the glass industry."

Sustainability goes beyond mechanisms to processes as well. To be more energy efficient, O'Brien counsels: "Target your processes toward your product. If you are going to make small things, use a small furnace or kiln rather than heating more spacious ones. Lower the temperature for the glory hole when it isn't in use. Only melt as much glass as you are planning to use. The money you save leaves more time for you to make art."

In her own glass work, O'Brien emphasizes sustainable practices. "When I do kiln forming, I only use recycled window glass from condemned buildings. I have also worked to simplify my kiln program to get the same results with the most efficient timing schedules."



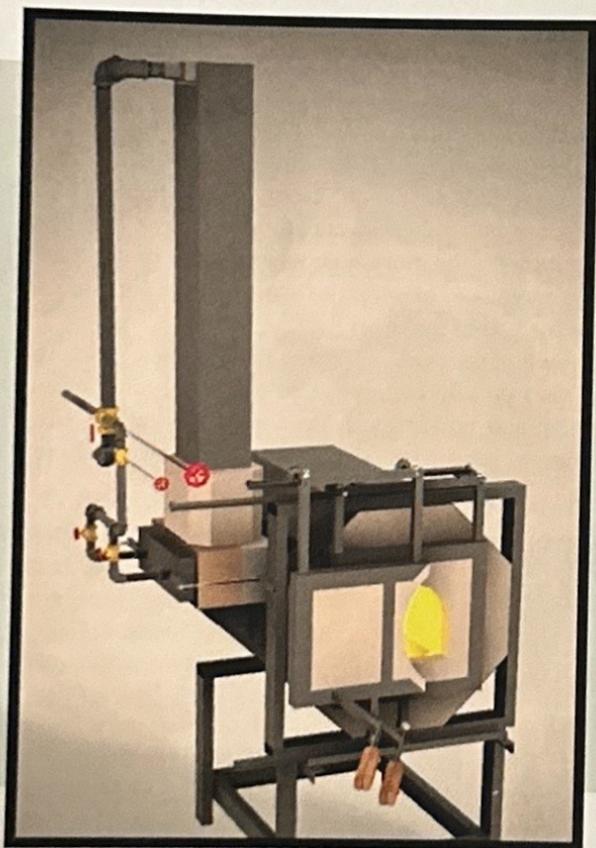
*By eliminating gaps between the furnace opening and the door, the heat is held inside the furnace, reducing the amount of fuel required to maintain the melting point of the glass.*

## Renewable Resources

The category of *renewable resources* encompasses the range of renewable power sources, including solar, wind, landfill methane, and hydroelectric. The breadth of examples suggests exciting possibilities that can emerge from the specific options available to a given studio location. For instance, a studio in Oregon operates on hydroelectric power from a dam down the street. A public access studio in North Carolina uses methane from a nearby landfill. A facility in Oaxaca, Mexico, uses methane gas produced on-site from cow and pig manure to heat three furnaces, three glory holes, and annealing ovens. Each renewable source can be used to light and heat the studio or any attached homes as well as run equipment. Each source, however, presents its own challenges that must be addressed with design. For instance, if methane is the locally available renewable power source, it is important to take recommended safety precautions and procure the proper permits.

Old technologies, including recuperation, channel discharged furnace heat to warm the studio and preheat incoming air used for combustion. O'Brien's website links to a PDF summary of qualitative research on recuperation, as well as to many suggested refinements.

Renewable resources also extend to materials as well as fuel sources. Some glasses melt at lower temperatures than others, so some studios are choosing those with an awareness of the associated energy savings. They are also adopting more refined melting processes.



*Recuperation is an important aspect of energy efficiency in the studio. The use of heat recovery has been of interest to glass artists since the beginning of the Studio Glass movement. Obvious advantages of recuperation are reduction of greenhouse gas emissions and reduced fuel consumption, which thus lowers operating costs.*

## Innovative Technologies

The previous two classifications lead naturally to the third category, *innovative technologies*. O'Brien notes that traditional equipment—furnaces, annealers, glory holes—often can be adapted to run on renewable sources of electricity.

Some equipment conversions from fossil fuel to renewable power pose special challenges for reinvention. For instance, a continuous, consistent flow of energy to the center of a glory hole is necessary to maintain combustion, but it can be hard to sustain as doors are constantly opened and closed. Electric glory hole elements create radiant heat that can be plagued by undesirable hot elements create potential for contact with the glass at the center. Hot spots and have is under way regarding electric glory holes, and links to those are provided on the website. O'Brien reports that the Corning cruise ship features a patent-pending electric glory hole in its glass studio.

Spiral Arts and Wet Dog Glass are two top equipment manufacturers exploring such adaptations. "Wet Dog has worked tirelessly to create more energy efficient, better performing, higher quality equipment that costs less and can be amortized from energy savings. Annual energy savings that can pay for new equipment is exciting for artists trying to outfit a new studio."

Finally, state-to-state variation in regulating various renewable power sources poses a formidable hurdle to studios attempting to innovate. New studios must navigate a permit process before opening, and existing studios must comply with local regulations as they retrofit to improve sustainability. These hurdles can be daunting, especially for alternative power sources that are unfamiliar to regulators. As an example, it took several years to obtain permits for the landfill methane project at the Jackson County Green Energy Park in North Carolina. The permit process can be expedited by shortening the regulators' learning curve with the research and data on renewable resources and energy transfer that has been amassed in other places. GlassArtEnergy.org provides a platform for studio operators and glassmakers to network among themselves about nearby power sources, potential hurdles, next steps, applicable resources, the kinds of questions that will be asked, and how to go about getting answers.

"Having easy click access to information about what is going on and networking with others who have been down a particular path or who are investigating a given option help spread that information farther and faster. It raises the consciousness of people building a new studio and can provide crucial information to address the concerns of regulators."

## Curating for Credibility

When new glassmakers need to know something, they tend to say, "Okay, I'll just YouTube it." But the quality of what they find is uneven. "People raised in the Internet era often don't distinguish between primary and secondary resources. Therefore, they may not recognize how much useful knowledge is lost as they move farther away from the originator. Nearly everything available on the Internet now is secondary or tertiary. We have a disconnect between credible information and easily accessible information and need to learn how to test the credibility of information about glass in this new forum."

On the GlassArtEnergy.org website, O'Brien sought to curate credible resources by posting or linking only to information that has been published and that comes directly from a primary source that is well versed in glass. That led her to resources as *A Glass Blower's Companion*, an early resource on glass equipment design by Dudley Giberson. She also discovered a 2006 article

published by Worcester Polytech in Murano, Italy, assessing the technology available for increasing energy efficiency in glass furnaces. Their comparative research proved the potential to save 35 percent in gas consumption depending on which technology one chose. "I uploaded the entire 80-page research report and bibliography onto the website as a PDF. This kind of research gets us beyond the anecdotal stories of one studio doing great things and toward a broader survey of what different approaches are being tried."

Going forward, O'Brien envisions the website as a hub for information exchange over the Internet. She would like it to be a communal effort across the glass art community. "Information changes as technologies improve, challenges shift, and uses expand. We need an interactive flow of information across the art glass community that constantly refreshes itself with that new information."

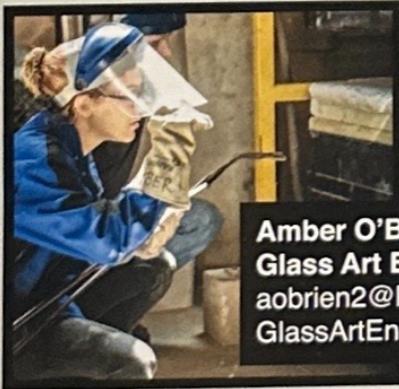
Beyond the original generation of studio glass pioneers, O'Brien sees that her generation will still need a common meeting place, even as artists themselves are dispersed across the globe. "If we are to assure that studio glass art does not fade and become an artifact of lost history, we must see our movement as something that is fluid, encompassing the founders, current artists, and future generations. We need to see ourselves as part of that flow. Changes to our consciousness and toward sustainable practices now will enable future generations to continue making glass."

### On the Horizon

O'Brien received a follow-up grant from UHM's Undergraduate Research Opportunities Program to present the findings from her original research at the 46th Annual Glass Art Society Conference at Norfolk, Virginia, in 2017, where it was enthusiastically received. She has begun to create a contact network and a process for reaching out and welcoming new people from the glass art community onto the website, and the artist is a bit amazed at how little traditional barriers of language and nationality hamper the discussion. "Glass is a universal language. Combustion is combustion."

The steeper challenges are mundane ones, but the depth of material that is available to gather is not a problem. "There is so much information that people are unaware of." But O'Brien has yet to secure ongoing funding for the labor-intensive activity of identifying, assuring credibility, and curating primary sources so that end users can easily, quickly pluck the specific information they seek. There is also the ticklish task of negotiating with primary sources to use materials they might have hoped to monetize with royalties. Still, O'Brien is undaunted. "I feel like a super hero with the mission of using the Internet for good in my chosen world of glass art."

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