



CASE STUDY

Marble Distilling Co.

achieves Zero Waste distinction

SIEMENS

Connie Baker is on a mission to save the planet – one bottle of vodka at a time. And as the Founder and Head Distiller for Marble Distilling Co. in Carbondale, Colorado, Baker and her business partner and husband Carey Shanks may do just that.

"I love vodka. I'm fascinated by the fact that you can make it out of any starch that you can turn into a sugar," she says. After attending a 2010 course in distilling – which she thought would be a perfect entry point into a lifelong hobby – Baker decided to open her own distillery. She and Shanks spent the next five years studying, business planning, designing, and writing and trying recipes.

Through this extensive research process, Baker and Shanks toured dozens of distilleries for a first-hand look at how these businesses operate. But they also realized something that would change the course of their own business: "So much waste. Wasted water. Wasted energy," says

Shanks, whose background in sustainability made this observation particularly acute. "We saw our true differentiation," he notes.

And so, Marble Distilling began working on their vision: to become the most sustainable, Zero Waste distillery on the planet. Through this work, they not only opened their own business, they created their very own resource recovery system to support it.



Connie Baker, Founder and Head Distiller for Marble Distilling Co.



Achieving Zero Waste with WETS

In partnership with a team of engineers, Baker and Shanks designed and built their Water Energy Thermal System (WETS) to capture and reuse both water and heat generated through the distilling process. The system has been featured in a variety of publications, including *Popular Mechanics*.

A typical distillery, according to Shanks, uses millions of gallons of both hot and cold water, which in most cases is discharged into the sewer. But Marble's WETS captures hot water from the distilling process and stores it for reuse; pumps and heat exchangers capture energy for reuse in the domestic hot water and for heating the building, leaving cold water behind for reuse in the distilling process. And when there is excessive heat, it is used for exterior snowmelt in the Colorado Rockies; likewise, additional cold water is used to condition interior spaces for the distillery as well as the guest suites for their onsite Inn.

This innovative design saves Marble Distilling Co. more than 4 million gallons of water every year and recaptures enough energy each year to power 20 homes. That means Marble Distilling's operation is 83% more efficient than the Town of Carbondale's green code requirements, and they're saving more than 125 metric tons saved annually versus ASHRAE Standard, 2015.



Creating a world-class customer experience

The Marble Distilling site is far more than a distillery. The 7500-square-foot building, which Baker and Shanks designed from the ground up, has become an entertainment destination and features the Marble Bar, a tasting room, a private club, and outdoor patio. It’s also home to an onsite luxury Inn, directly above the distillery operation. In fact, it’s the only Inn in the world that’s housed within a working distillery.

“The world is moving in the direction of experiential opportunities. For us, it’s not as much about customer service as it is about customer experience. We want all of our

customers to feel like royalty,” says Shanks. Baker continues: “From the moment a guest checks in, we want them to be a part of what’s happening here at Marble. So we explain our mission, processes, and what we can achieve.” And at Marble Distillery, that means everything must be buttoned up – right down to the conditioned comfort in every room.

In addition, Baker explains, “As the distiller, production is my number one concern on a daily basis. We constantly have a mash tun, two stills, five fermenters, and lots of other equipment constantly running. That means we’re generating a lot of heat but requiring a lot of cooling all the time.”



Turning vision into reality with the right controls partner

To open the building, Baker and Shanks had worked with a controls engineer to make their vision a reality; everything from the WETS approach to distillery operations were part of the process engineering discussions and implementation. “We knew going in, of course, that we were building a first-of-its-kind system, so there would be bugs,” Shanks says.

But a few years after opening, and managing a stream of tweaks, repairs, and adjustments, according to Shanks, “it was getting out of control. We discovered that our processes weren’t as efficient as they could be, in part because some of the pumps weren’t on command the way we needed them to be.” Marble Distilling was ready for a new partner, and ultimately, a plumber introduced Shanks and Baker to Siemens Solution Partner, Holbrook Service.

Holbrook Service consulted with the Marble Distilling team to understand their goals and how sustainable processing was simply part of who they are. “Their primary goal was – and is – to recover and reuse heat generated through their processes and to conserve as much water and energy as possible. But in reality, they were still losing water and not maximizing heat recovery,” explains David Carpenter, Controls Engineer for Holbrook Service.

In addition to maximizing the resource efficiency of the distilling process, Baker explains how maximizing the team’s efficiency was also important to Marble’s operation: “If you’re running around controlling the stills, condensers, and fermenters and manually turning on the valves, you would need a team of five people,” to run the production process.

Ultimately, Carpenter recommended a holistic approach to overcoming the challenges they faced.

Objective	Approach
Reduce number of manual processes to achieve greater energy and resource efficiency	Siemens valves and actuators installed to automate and better control the distilling process; heat exchangers
Gain better control of comfort for Marble Distilling Inn suites; overcome high-temperature room patterns (based on trend data) and outdated temperature controls	Desigo Control Point touch panel in each suite to provide guests control over their environmental comfort with an easy-to-use graphical display; addition of DXR controllers to enable room automation
Run distilling processes overnight without having someone physically onsite to monitor the distilling process	Remote services enabled by Desigo Control Point reduce need for onsite labor



In part because Marble Distilling had some challenges with how the processes worked in practice compared to the design intent, Carpenter recommended implementing the various solutions through a phased approach:

<p>PHASE 1: secure control over Marble Distilling’s heat exchangers and valves; add automation system programming for greater control</p> <p>1</p>	<p>PHASE 2: add Siemens stainless steel ball valves, actuators, and controls to more fully automate the distilling process</p> <p>2</p>	<p>PHASE 3: gain control of field devices with the addition of Desigo DXR controllers, piping, and heat exchangers; additional programming to address BTUs</p> <p>3</p>	<p>PHASE 4: add more room controls for comfort; add UV lights to fan coils to enhance disinfection efforts in response to COVID-19 pandemic</p> <p>4</p>
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Maximizing comfort and energy efficiencies

As each phase wrapped up, Carpenter notes that Marble Distilling realized significant improvements along the way. “After the first phase was complete, the Distillery was conserving thousands of gallons of water each month. By adding the control valves in phase 2, heat recovery was more efficient, saving about \$400 per month in gas bills,” he says. The Siemens ball valves were selected for their long-term reliability, easy operability, and best-in-class specifications, and because they are less susceptible to contaminants.

With Desigo Control Point touch panels in each room of the Inn, Baker is thrilled with the guests’ response to the experience. “When they walk in the door, they can push a button on the panel and change the room’s temperature, control the fireplace, open the shades – all of it. And because we’ve explained our processes – and how, for example, the heat we recover from the distilling operation gives them hot water – our guests leave here feeling as though they’re part of our mission to save the planet,” says Baker.

Another advantage of Desigo Control Point, according to Baker, is how Marble staff can control individual guest rooms remotely. “If we get a call from a guest that their flight was

delayed, we can log in from our phone to have the room ready for them at midnight so we’re not constantly burning energy for no reason; it also saves us an extra trip over to the Inn. But when the guest arrives, the room is ready,” she notes.

That same functionality makes it easy for Holbrook Service to offer remote support to Marble Distilling. “Everything installed is IP-based, which allows us to remotely access their platform to do any reprogramming or adjustments that might be needed without an unnecessary service call,” says Carpenter. “Having Desigo Control Point built on a web interface is a huge asset for all of us.”

In addition, when Marble Distilling guest rooms are empty, the team can place each room into economy mode, which saves them the operating costs associated with heating and cooling, as well as additional load on the rest of the equipment. The DXR controllers have also enabled a tighter deadband, meaning the guest rooms stay much closer to their setpoints: “Not only is that more comfortable for the guests, it’s also easier on the equipment. We’re not actuating the valves as much, and not ramping up and down the fans dramatically – and that saves wear and tear on the equipment too,” Carpenter says.





Creating the most sustainable distillery on the planet

Marble Distilling has so much data available that Shanks calls it a game changer: "It's a key component. We can extract data from the units and the BACnet system to understand and monetize the value we've gained from these improvements. We can see the carbon footprint reduction, our energy and utility cost savings, operations and maintenance improvements. All of the systems we've implemented with Siemens and Holbrook have helped us do that. We can clearly demonstrate what we're doing to conserve resources here, and very importantly, we can show the financial benefits to such a system.

Beyond visualizing and building on the efficiencies built into the processes, Marble Distilling collects and analyzes process data –available within the automation system – so they can

improve production yields, enzymes, and runtimes. And this is only the beginning. As they look to the future, Marble remains dedicated to maximizing their energy and resource efficiency, including an upcoming solar energy project. In fact, they recently announced that, by 2022, they plan to achieve Net Zero.

At the end of the day, Shanks says that a typical distilling operation will use 100 bottles of water to make a single 750ml bottle of vodka. But at Marble, their Zero Waste approach means they're using just one bottle of water. "This is where Siemens and Holbrook have helped us tighten up our system and make it work as efficiently as possible. Today, we're able to say that we are the most sustainable distillery on the planet," concludes Shanks.

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