

Earthly Labs™

CCBA Winter Conference

CO2 Capture Case Study
@ Roadhouse Brewing Company
"More than Just Great Beer"

Speakers:
Jon Courtois, Production Manager
Amy George, CEO

Earthy Labs Webinar

CO₂ Capture Case Study: Roadhouse Brewing Co.



CO₂ Capture Behind-the-Scenes @ Roadhouse Brewing

Speaker **JON COURTOIS - PRODUCTION MANAGER**

- Background on Brewery
- Market Drivers for Purchase
- Installation Process
- Solution Benefits

CO₂ Capture Solution Overview

Speaker **AMY GEORGE CEO- Earthly Labs**

- Denver Beer Co - Off-take Case Study
- The Alchemist Case Study
- Solution Overview
- Q&A



Roadhouse Brewing Background

First Wyoming CO2 Capture Site



HISTORY

Founded in 2012 in Jackson Hole, WY by Co-founders Colby Cox, Home Brewer & Entrepreneur, and Gavin Fine, Noted Chef & Restaurateur

In 2017 opened Production brewery and in 2018 opened the Pub and Eatery pushing our total annual production to 10kbbbls

Year-round – Wilson, The Walrus, Family Vacation, Highwayman - and Seasonal offerings, best known for hop forward IPA's and traditional Belgian styles

Distributed throughout the Intermountain West

Award-winning (Avarice and Greed, Siren Song, Family Vacation, Vervet Braggot)

Launched Seltzy Hard Seltzer in 2020



Sustainability Mission

Deep Commitment to Place, People & Environment



HISTORY

Achieved B Corp Status in 2018

2021 Won B Corp - "Best for the World (Top 5% of all B Corps - Patagonia to Sierra Nevada)

Environmental & Social Initiatives:

- On-site solar panel array to offset its electricity usage
- Chemical recycling
- Spent grain distributed to several local ranches
- Steam recapturing and recycling systems
- Nitrogen generator to eliminate the need to have nitro tanks shipped and reduced CO2 use
- CO2 Capture
- Supporter All Together Beer
- Teton County Search & Rescue Supporter



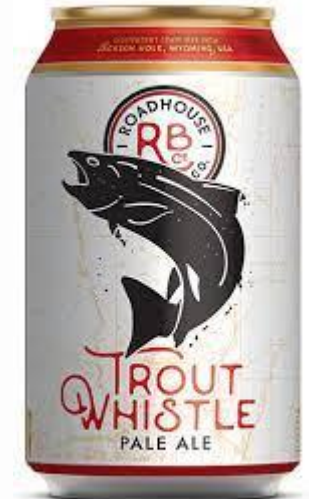
“Our company was born in the Teton Mountains. We built sustainability into our mission because we revere the natural beauty of this place we’re lucky enough to call home, and believe that as a business we have a responsibility to our environment, our people and our community,”

- President and COO Jody Valenta

Market Drivers for CO2 Capture

Advance Roadhouse Business Goals

- Reduce commercial CO2 needs and costs
- Reduce CO2 emissions to align with sustainability goals
- Reduce risk to potential shortages, given remote location
- Advance brand and market differentiation
- Leader in Wyoming craft beer industry



Roadhouse Installation

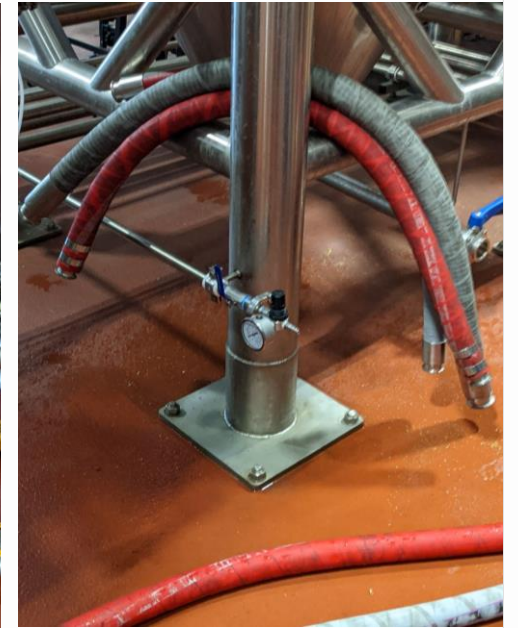
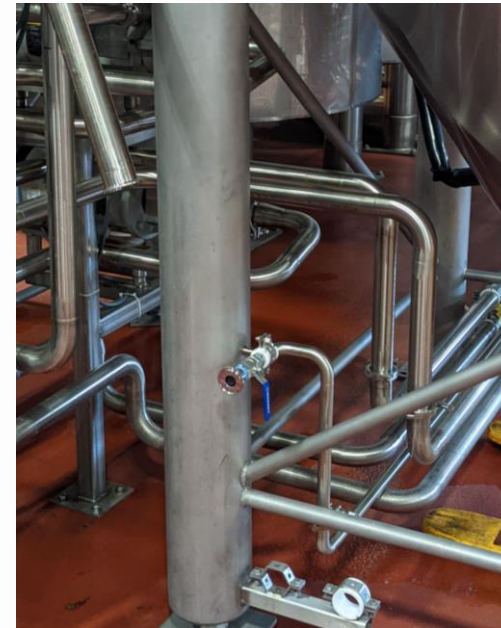
CO₂ Capture at Tanks to Foam Trap



**Focus Capture CO2 off
Fermentation Tanks**



**Foam Traps Capture CO2 at
Fermentation Tank Blow-off Arm**



**Stainless Pipe & Flex Tubing
Connects Tank to Foam trap to
CiCi - Tri Clamp fittings with ball
valves at each drop**

Roadhouse Installation

CO2 Enters at Back of Unit CiCi Unit



CO2 Enters at Back of CiCi Unit



**CiCi CO2 Capture Unit &
CO2 Tank Near
Fermentation Tank Cellar**

Fits into Small Space

**CO2 Storage on Scale
Monitoring Volume
Capture**

Roadhouse Installation

Installation Training & Customer Support



**Team Training in the Field
@ The Unit**

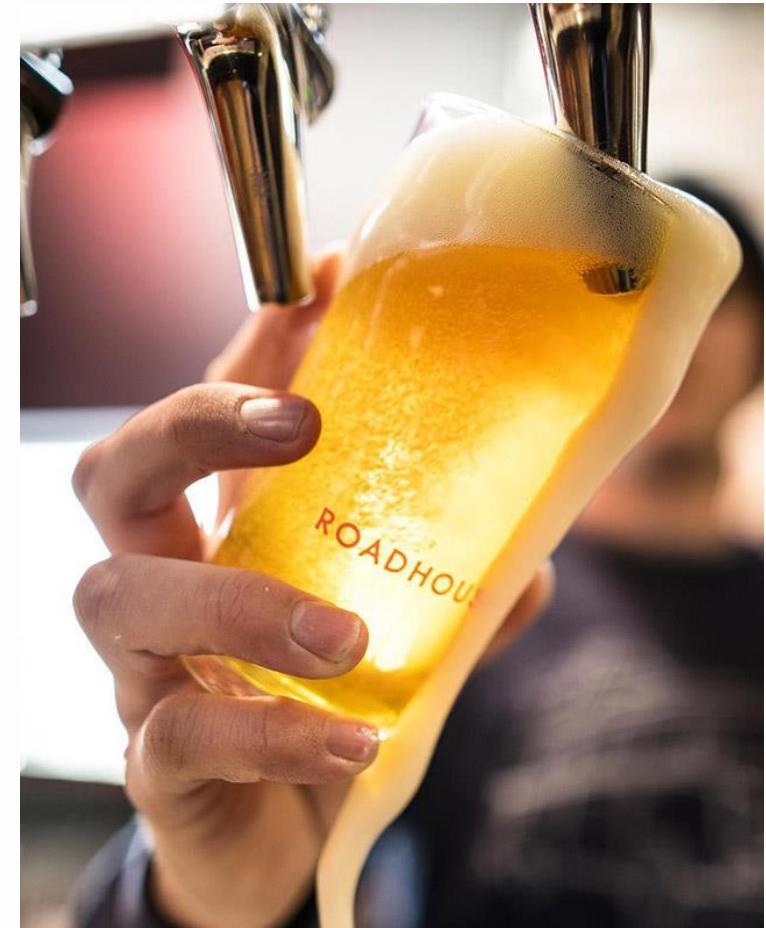
- **Main Equipment Arrives on 3-4 Pallets**
- **Installation Takes 3-4 Days (1 Day Travel)**
- **CO2 Capture Day 3**
- **Team Training Program Day 3-4**
- **Remote / Cloud-based Customer Support Post-install**
- **Maintain Activated Carbon Change Every 30 Days**
- **Recover CO2 Weekly, Use for Carbonation**

Roadhouse Quality Insights

Feedback on Sensory & Market



- Improved head retention and lacing
- Enhanced aromatics for finished beers
- Reduced levels of Dissolved Oxygen in packaged beer



Opportunity for Employee & Consumer Engagement

First Recovered CO₂ – Powered Beer in Wyoming



- Overall team engagement and excitement
- Improved sensory within the brewery
- Exciting to explain and demonstrate CO₂ recapture system during brewery tours

Announcement with Consumers

Driving Roadhouse Business Goals

Economic, Environmental & Quality Beer

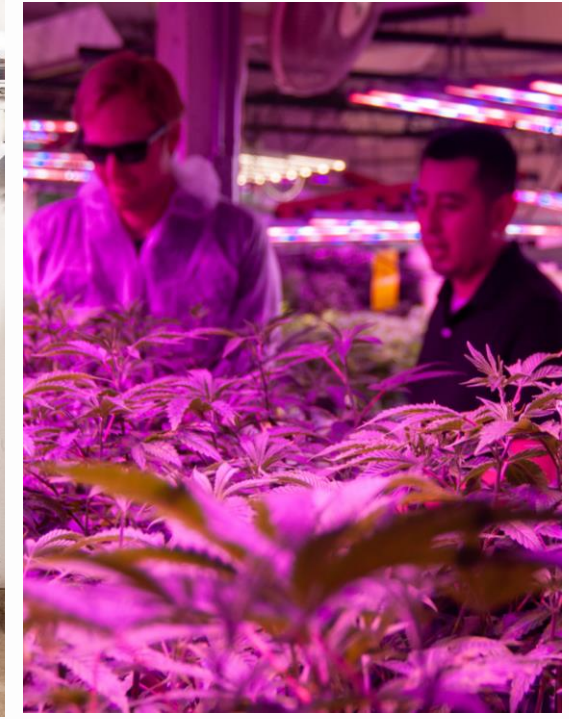


- ✓ Recovering CO2 Waste Every Week
- ✓ Use CO2 Weekly to Carb Beer / Purge
- ✓ Team Adopting Technology and Use
- ✓ Reducing CO2 Costs per BBL produced
- ✓ Driving Roadhouse customer loyalty and employee pride
- ✓ Differentiating product in market



Denver Beer Co. Case Study

Successful CO2 Exchange Pilot



EARTHLY LABS - CO2 EXCHANGE

- Captured, Sold and delivered CO2 to cannabis grower
- 16 Week Harvest Showed Recovered CO2 Made Healthy Plants, Increased Yield 2.7%, Potency and Terpenes
- Created branded "93 Hoppy Trees" - cannabis sold out first weekend one location

Recovered CO₂ Quality Assessment

Aroma + Head Retention + Taste



- Better Head Retention



Better Lacing



9 / 10 Brewers Preferred
Recovered CO₂



Powering
Award-winning Beers

"We had reclaimed (CO₂) gas in two of the three beers we won at GABF[®] this year."

– Charlie Berger, Co-founder

The Alchemist Background

First Vermont CO2 Capture Customer



HISTORY

Founded in 2003 in Waterbury, Vermont a Pub Brewery

Family owned and operated by co-founders Jen & John Kimmich

Expanded to a production brewery in Waterbury and in 2011 following Tropical Storm Irene

Expanded with the Stowe production brewery in 2016

Mission to provide good jobs to Vermonters, a welcoming gathering space for all, adding value to the community.

The Alchemist specializes in fresh, unfiltered IPA, with flagships double IPA Heady Topper and Focal Banger distributed throughout Vermont, and coveted and awarded around the world



Market Drivers for CO2 Capture

Advance The Alchemist Triple-bottom Line Goals



- Supply of CO2 challenged in rural Vermont
- Reduce waste and greenhouse gas emissions to align with sustainability goals
- Reduce price volatility risk
- Advance B Corp goals of continuous improvement
- Use natural ingredient we make every day
- Aligns with the Vermont customers' values



The Alchemist - CiCi Installation

CO₂ Capture at Tanks to Foam Trap



**Focus Capture CO₂ off
Fermentation Tanks**



**Blow-off Arm to Piping
Grundy**



**CiCi CO₂ Capture Unit Near
Fermentation Tank Cellar**



The Alchemist – Press Coverage Drives Brand Awareness, Demand & Loyalty



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other craft breweries, cideries and kombucha facilities.

"It's so important to us that we take every action we can to reduce our environmental footprint," Alchemist co-founder and head brewer John Kimmich said in a news release.

Kimmich said he and his team have been investigating how to recapture and reuse carbon dioxide since building the Stowe Brewery, which opened in June 2016. The CICI system moves the brewery one step closer to achieving carbon neutrality.

Juniper Creative Arts: [New mural](#)



The Alchemist recycles carbon dioxide in beer production

The Alchemist recycles carbon dioxide in beer production



Following national trend, Vermont brewery turns carbon emissions into beer bubble

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ENERGY & ENVIRONMENT

Following national trend, Vermont brewery turns carbon emissions into beer bubble

By Emma Cotton
Oct 13 2021

'Greener' beer: New system allows Vermont brewery to capture, reuse greenhouse gas

Share



Updated: 6:34 PM EDT Oct 28, 2021

Infinite Scroll Enabled

1K

Jack Thurston
New England Cable News Reporter



Driving The Alchemist Business & Sustainability Goals

Economic, Environmental & Quality Beer



- ✓ Recovering CO2 Emissions, Reusing Waste Every Week
- ✓ Use CO2 Weekly to Carb Beer / Purge, estimate 2 M Cans of CO2
- ✓ Team Adopting Technology and Use
- ✓ Reducing CO2 Costs per BBL produced
- ✓ Advancing B Corp mission
- ✓ Inviting industry to join us
- ✓ Differentiating product in Vermont market



Earthly Labs Carbon Capture Solution (Hardware)

Major Components Footprint



Foam Traps

(23.5" W x 32" H)
3' FV Blow off Arm



**Smart Foam trap /
Heat Exchanger**

(23.5" W & 72" H)
Distance from CiCi – 6'



CiCi System

(77.5" H x 38.11" W x
49.17" deep)



Dewar / Scale

(33" W x 33" L x 68" H)
Max Distance of Line -6'

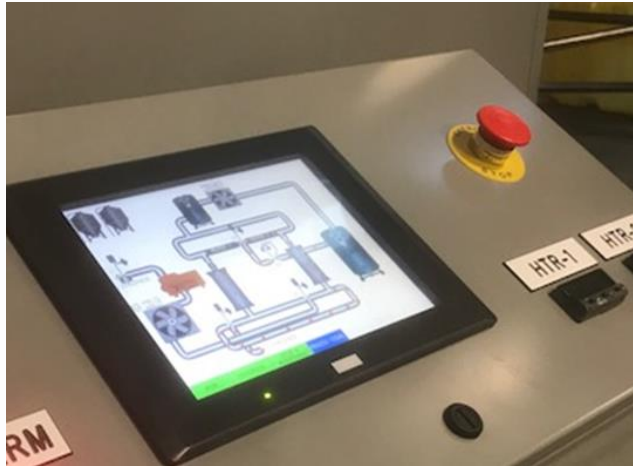


Vaporman

(30" W x 30" L x 48" H)
Max Distance of Line -6'

Earthly Labs Carbon Capture Software

Real-time Control, Monitoring & Alerts



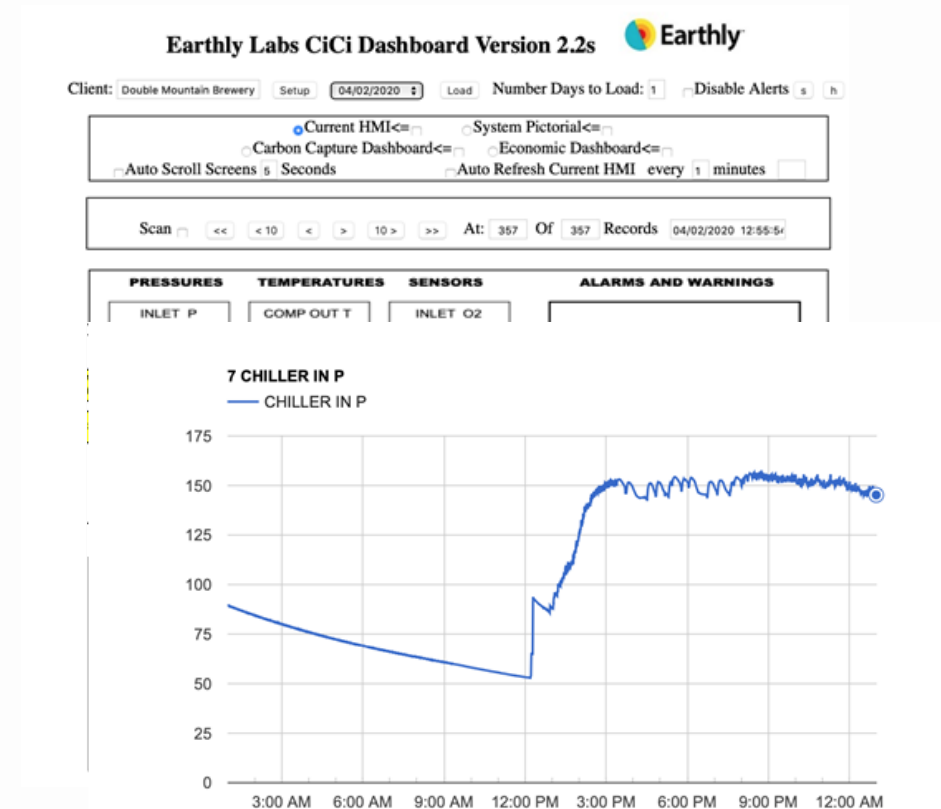
At-a-Glance Monitoring

- Real-time Oxygen Levels
- Pressures & Temperature
- Dewar Full Levels
- CO2 Capture Volume
- Alarms & Alerts



Mobile Dashboard

- Check Status from Phone
- Alerts & Notices Team



Trends

- Maintenance Troubleshooting

Q&A

Frequently Asked Questions

Jon - How to you maximize use in your facility?

Jon - How many foam traps do you need?

Jon - What is your team most excited about?

Jon - What does post-sale support & maintenance look like?

Jon - How much time does your team spend monitoring equipment?

➤ **REQUEST: FREE CO2 Assessment**

(& FREE SOCKS OR TUMBLER – Back of Room)



**Public Benefit
Corporation**

CONTACT JAMES CARY |
CA ACCOUNT MANAGER
james@earthlylabs.com



We have a shared global mission to cap the planetary temperature increase at 2°C.

To do so we must avoid 40B tons of CO₂ emissions by 2030.

Carbon capture is expected to provide at least 13% of this reduction, 5.2B tons

Earthly Labs' Mission:
Capture and avoid 1B Metric Tons



Thank you



Forbes

The New York Times

