



• NIWOT, COLORADO •

# Powder Keg Brewing Company

RMAEE Fall Seminar  
Brewery Efficiency  
Opportunities



# Agenda

- ① Who We Are
- ① About Me
- ① About Our Brewery
- ① Opportunities Implemented
- ① Challenges



# Who We Are

- **Brewpub in Niwot, CO**
- **Opened July 2014**
- **Focused on our immediate community**
  - Live Music
  - Local food
  - Local artist on display
  - Community education
  - Limited Distribution
  - Focused on growlers and re-usable packaging



# About Me

- **Philip Joyce, Owner/Head Janitor (CEM, LEED AP)**
- **University of Colorado BS Mechanical Engineering**
- **4 years at EMC Engineers/Eaton**
  - Commissioning/RCx



# About our brewery

- **200 BBL/year projected production year 1**
- **Fully Electric 5HL (4.25BBL) brewhouse**
  - 25kw HLT
  - 60kw Boil Kettle
- **160MBH Hot water pre-heater**
- **2HP Glycol Chiller**
- **100sqft walk-in**
  - 1/4HP condensing unit



# Opportunities Implemented: The Brewhouse

- ⦿ **Why electric?**
  - ⦿ Offset with wind/solar credits
- ⦿ **Demand is our enemy**
  - ⦿ Turn chiller off during brewday
  - ⦿ Avoid running HLT and Kettle simultaneously
- ⦿ **Gas water heater**
  - ⦿ 98% thermal efficiency
  - ⦿ Condensing
- ⦿ **Motors**
  - ⦿ VFD wort transfer pump
- ⦿ **Reclaim knock-out cooling water**
  - ⦿ 140-160F water reclaimed
  - ⦿ Use for cleaning, second batch or next brewday





# Opportunities Implemented: Refrigeration

## ⊗ Oversized Glycol reservoir

- Can keep fermenters at temp for 48 hours comfortably
- Turn off chiller during brewday

## ⊗ Walk-in cooler

- Sized as small as possible
  - Yes, it's a pain in the ass
- LED lighting
- ECM evap fan motors
- Turn it off 10 hours per day
  - Off 2pm - 8pm: avoid demand
  - Off 6am-10am: avoid brewery coincident use
  - Only see max of +/- 2F beer temperature





# Opportunities Implemented: Cellar

## ⊗ Controls

- Control valve feedback: Glycol circ pump off when no calls for cooling

## ⊗ Reuse CIP Chemicals

- Cleaning chemicals are expensive!
- 3-4 uses before new batch is made





# Opportunities Implemented: Taproom/Public areas

## ⊗ Appliances

- ⊗ All energy star certified
- ⊗ Low flow sinks & toilets

## ⊗ HVAC

- ⊗ Evap cooling
- ⊗ Condensing furnaces
- ⊗ System balancing

## ⊗ Windows/Envelope

- ⊗ Alpen R-19, operable windows
- ⊗ Attic insulation R-60
- ⊗ R-22 garage door
- ⊗ Natural lighting in brewhouse via windows and skylights



# Challenges

## ③ CASH!

- Very low operating budget

## ③ Utilizing Rebates

- We were lucky that we were “new construction/significant renovation”

## ③ Time

- I’m a busy man...

## ③ Process

- Beer is our product and quality/operability comes first!

## ③ Measurement

- Use utility bills vs. production
- Convince breweries to do it!



# Questions?

**Philip Joyce**  
**Owner/Brewmaster**  
**[phil@powderkegbrewingcompany.com](mailto:phil@powderkegbrewingcompany.com)**