Practical Improvements

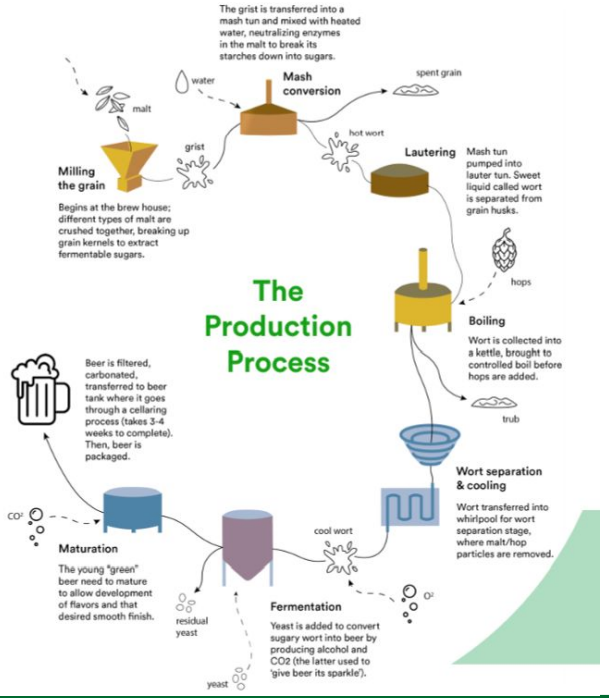
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NEW ENGLAND
environmental
finance center

GREEN CRAFT BEVERAGE
BETTER BEV
RECOGNITION

Topics of Discussion for Today

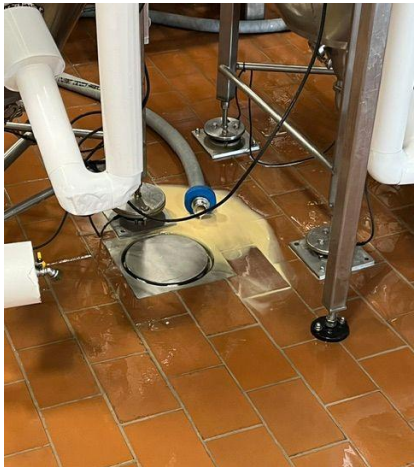
- Wastewater
- Byproduct Side-Streaming
- Waste Management and Reduction
- Process Optimization
- Energy Efficiency
- Recognition



Source: Sustainable Brewing: Examining the Finger Lakes Brewing Industry (2018). Cornell Sustainability Consultants.

Wastewater – Background

- Byproducts are not wastewater
- Potential concerns for infrastructure and treatment
  - Flow
    - Volume
    - Slugs
  - pH
    - Concern is when it's outside of 5-10 S.U. (typically)
  - Biological Oxygen Demand (BOD)
  - Total Suspended Solids (TSS)
  - **Dissolved Oxygen (DO)**
- You won't know the specific concerns of your municipality unless you ask



Wastewater – Suggested Action Items

1. What goes in mostly goes out. Focus first on clean water hitting the floor
   a. Start a log that lives on the floor
   b. Examples
      i. Rinsing solids down the drain
      ii. Tank rinses
         1. Pulse rinse first and final rinses, and use a timer
         2. Validate pH on final rinse
         3. Standardize
2. Get to know the people who deal with what you put down your drain
   a. Bring them a case of beer and tour the plant
   b. Find out what their concerns are on the plant level (they speak a different language than pretreatment coordinators)



Side-Streaming – Background

Why byproducts should not be disposed of with wastewater:

	BOD*	TSS*	DO
Cold Trub	199,000	35,000	<50 ppb
Hot Trub	85,000	8,500	5 ppm
Finished Product	220,000	41	<50 ppb
Wort	151,000	1,510	10 ppm
Yeast	220,000	41	<50 ppb

Source: Maine Beer Company

Why byroducts should be repurposed:

- These materials are rich in organic nitrogen and serve as a stable plant nutrient
- Essential oils from hops serve as a natural crop protector
  - https://pmc.ncbi.nlm.nih.gov/articles/PMC10534220/
- Spent hops and yeast can be used as an additive for growth promotion in beef cattle, improving the feed to growth ratio
  - https://www.mdpi.com/2071-1050/18/11/5449

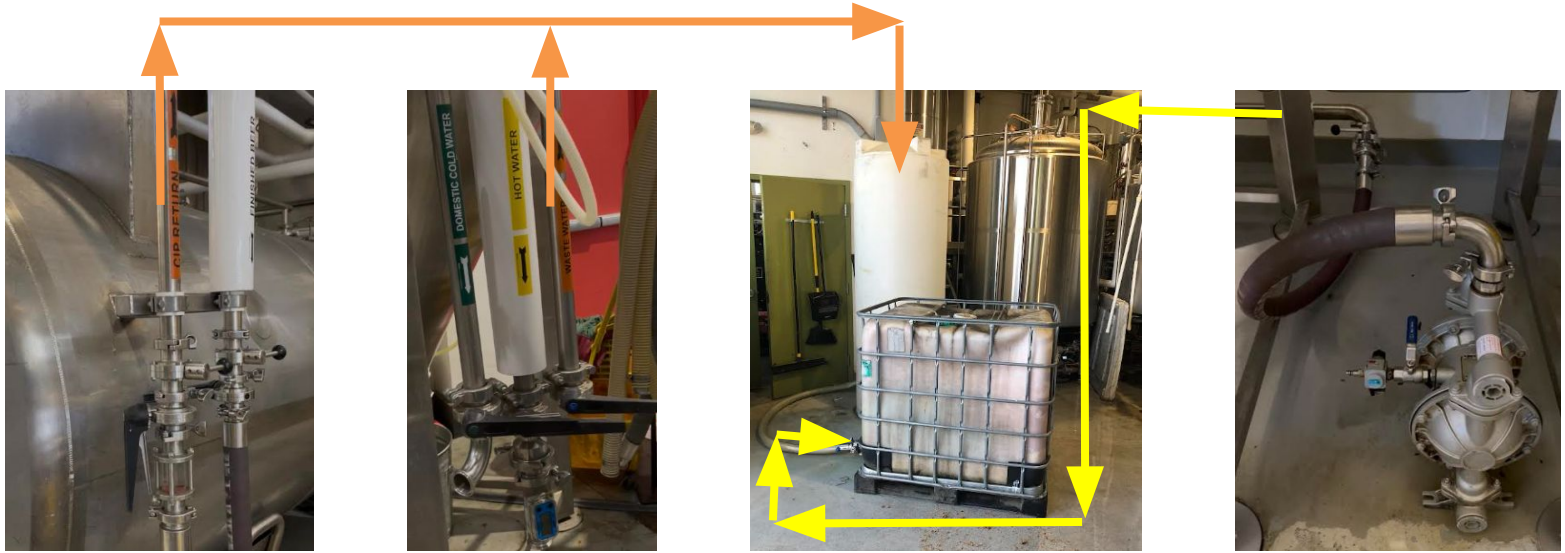
Side-Streaming – Suggested Action Items

1. If possible, add hot trub to spent grain
   a. Pump onto grain bed and let the grain screen the solids
   b. Let sit long enough for the liquid to drain out
   c. Make sure you give your farmer a heads up
2. Invest sweat equity into your community
   a. Start a conversation with a farmer that has a manure lagoon and a liquid manure spreader
   b. Talk to farmers at your local farmers market and offer free fertilizer (bring samples if possible)





Wastewater and Side-Streaming Collection



Bissell Brothers, Portland, ME. High/Low pH slugs from CIP (orange) and byproducts (yellow) captured. Byproducts pushed out using a diaphragm pump and pressure then vacced out and hauled to a digester. CIP slugs pushed using pump and neutralized prior to discharge.

Waste Management and Reduction – Background

- We ain’t makin’ any more land to bury our mistakes
- Most brewery waste can’t go into mixed recycling
  - Grain bags
  - Shrink wrap
  - Shrink wrap cores
  - PakTechs
  - Keg caps
  - Label backing and most labels
  - Bottle caps and loose can ends
  - Pallets
- Source separate is good, but elimination or reuse is better



Waste Management and Reduction – Suggested Action Items

1. Replace trash bags with used grain bags
   a. This is a visible commitment to reducing waste and saves money
2. Eliminate plastic cups in your tasting room
3. Crush post production cans and drop off with redemption
4. Commit to a number of hand packed cases per can run that include reused PakTechs and flats
5. For beer that will be sold on site, use reusable pallet wraps (canned/bottled beer), bands (kegs), and rugged, flat pallets (DIY?)









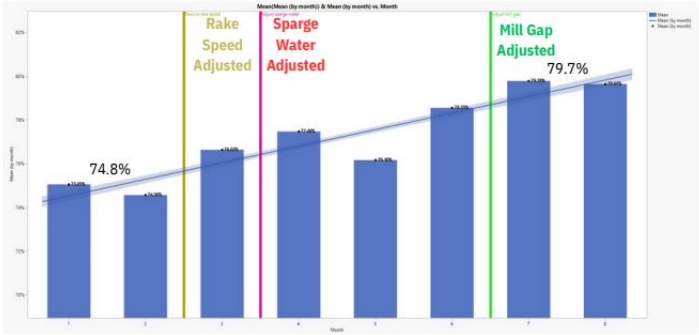
Process Optimization – Background

- It takes ~$7 in sales to make up for $1 in money squandered
- Packaging the same amount of beer with fewer inputs typically translates to resources and time saved
- Examples:
  - Increasing yield
  - Reducing loss
  - Improving dry hopping procedures
  - Reducing CO2 used in brite tank purging
  - Improving CIP procedures
- For any process, ask yourself, “What am I trying to accomplish, why am I doing it this way, and how can I improve?”



Process Optimization – Suggested Action Items

1. Start with the lauter tun and set a realistic goal (ex: increase brewhouse efficiency by 5% with no additional inputs)
   a. Rake speeds
   b. Sparge water
   c. Mill maintenance and gap settings
2. Focus on draft sold on site
   a. Track tasting room loss and why
   b. Training staff
      i. Pouring consistency across lines and staff
      ii. Breaking bad habits (courtesy pours)
   c. Reducing can pours

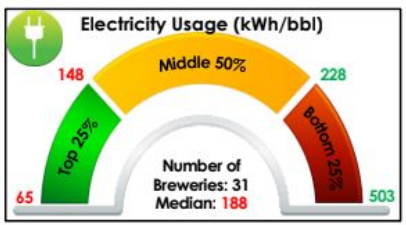


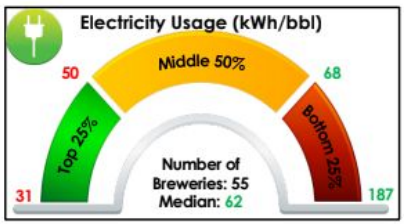
Graph 2: Tracking Efficiency Gains Associated with Individual Process Changes

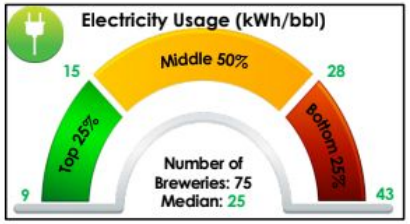


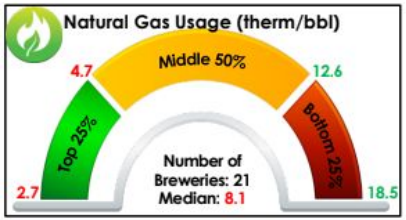
Energy Efficiency – Background

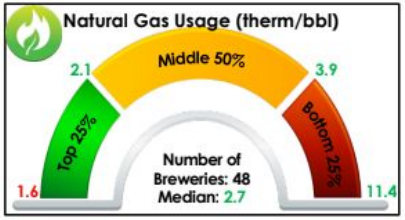
- It takes ~$7 in sales to make up for $1 in money squandered
- When talking efficiency, we're talking about support systems
  - Steam generators
  - Hot water systems
  - Chillers
  - Walk-ins
  - Air compressors
  - HVAC
  - Lighting
  - Pumps
  - CO2 vaporizers

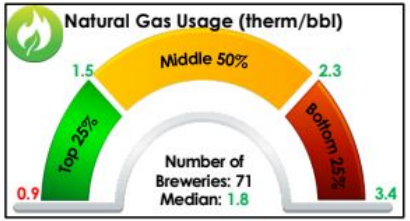












0-1,000 1,000- 10,000 10,000- 100,000

Efficiency – Suggested Action Items

1. Install a voltage controller on each draft chiller pump
    a. Saves $300-400/yr
2. Start with one system
    a. Compressed air
        i. Settings (2 PSI = 1% efficiency)
        ii. Zero loss condensate drains
        iii. Leak detection (use soapy water)
        iv. Isolation when not in use
    b. Production hot water
        i. HLT schedules and settings
        ii. Boiler schedule
        iii. Knock out optimization (eliminate HLT overflows)
    c. Cold storage
        i. Settings (38F+ for tap room, 50F cold storage)
        ii. Door seals and alarms
        iii. Strip or air curtains

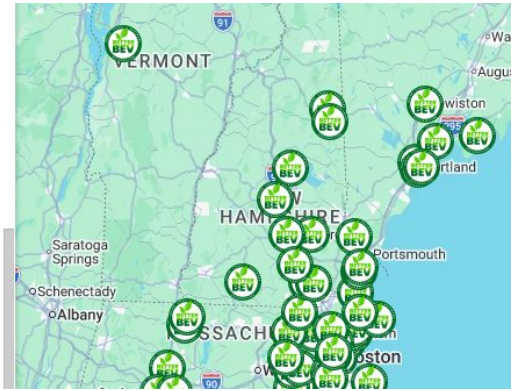


Recognition – Background

- Recognition is a low hanging fruit opportunity to get a better sense of your operational opportunities and show off what you're already doing
- It's free
- It demonstrates that you take your environmental responsibility seriously
- It's a great way to engage employees and customers

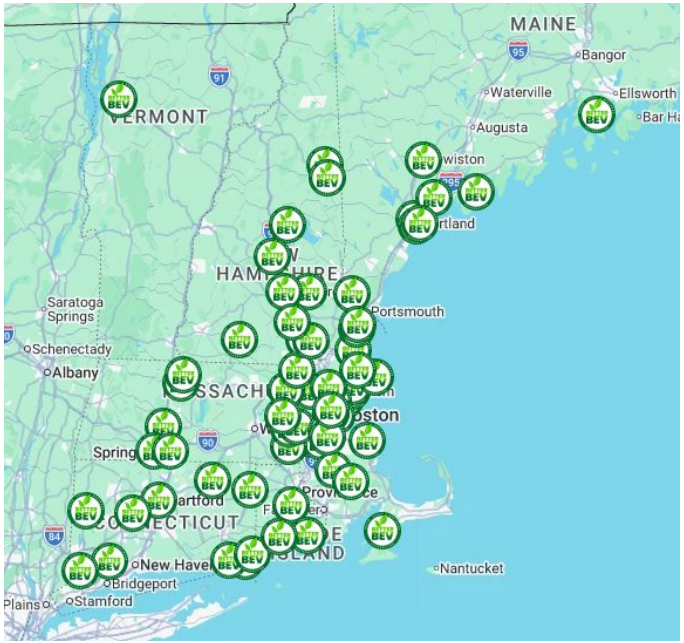
- Black Flannel is lonely on that map ->

- NH - Throwback Brewery
- NH - To Share Brewing Company
- NH - Tuckerman Brewing Company
- NH - Vulgar Brewing Company
- PA - Tannery Run Brew Works
- RI - Apponaug Brewing Company
- RI - Grey Sail Brewing
- RI - Newport Craft Brewing
- RI - WiinterHawk Vineyards
- VT - Black Flannel Brewing and Distilling



Recognition – Suggested Action Items

1. Complete the BetterBev assessment form (<1hr)
   a. https://form.jotform.com/241194060450144
      i. Found at www.betterbev.org
2. Make your environmental commitments real commitments
   a. Realistic
   b. Measurable
   c. Actionable
   d. Publishable
3. Add these commitments and recognition status to your website



Thank you! Questions?

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