

2015 Water Innovation Forum

Examples from the US craft
brewing sector.

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Cool things currently happening in US craft breweries

- Waste to energy
- Water reuse
- Fuel cells
- Small MBR systems
 - Membrane BioReactor
- Awesome, but out of reach for most companies
- What options are more approachable?



Side streaming

- Create 2 waste streams
- Relatively low strength wastes go down the drain and in to the sewer
- High strength wastes are separated at the source and trucked off site
 - Land application as fertilizer
 - Nitrogen source for commercial compost operations
 - Pet or livestock feeds
 - Added direct to municipal anaerobic digester for methane potential



Side streaming

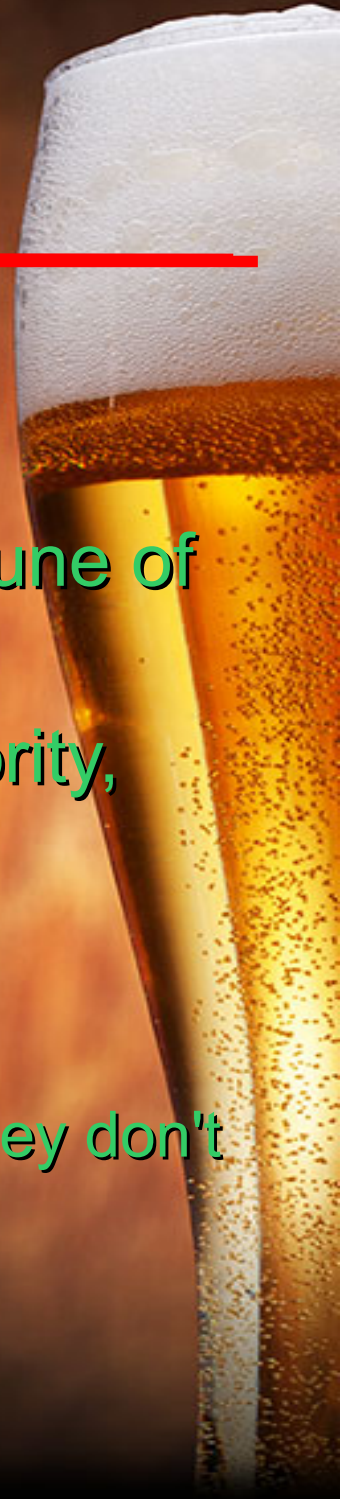
- In a brewery, typical sources of side stream material are:
 - Spent grain & hops
 - Trub
 - Lauter tun plate rinsings
 - Spent yeast
 - Fermenter blow off
 - Returned beer in kegs
 - Push water/beer at start/end of packaging runs



Side streaming

- Case Study #1

- Existing brewery in California is currently surcharged for excess BOD and TSS to the tune of \$350,000 US per year
- I recommended side streaming as a high priority, easy money project.
 - Cost to implement is <\$20,000.
 - Saves over \$200,000 per year.
 - Received luke warmly. They're growing so fast they don't have time to do anything but make beer!



Side streaming

- Case Study #2
 - Proposed brewery in a small town in Idaho
 - Total capacity of municipal treatment plant is 160 kg/day of BOD
 - Projected effluent from brewery without side streaming is 55 kg/day BOD (16% of total load)
 - Project is denied
 - Projected effluent with side streaming is 13 kg/day BOD (4% of total load)
 - Project is approved



Side streaming

- It is more work
- More space is needed
- Odor control can be a problem
- Not needed if there is no enforcement
- Not needed if no surcharges
- Not recommended if cost of hauling is higher than savings of reduced surcharges



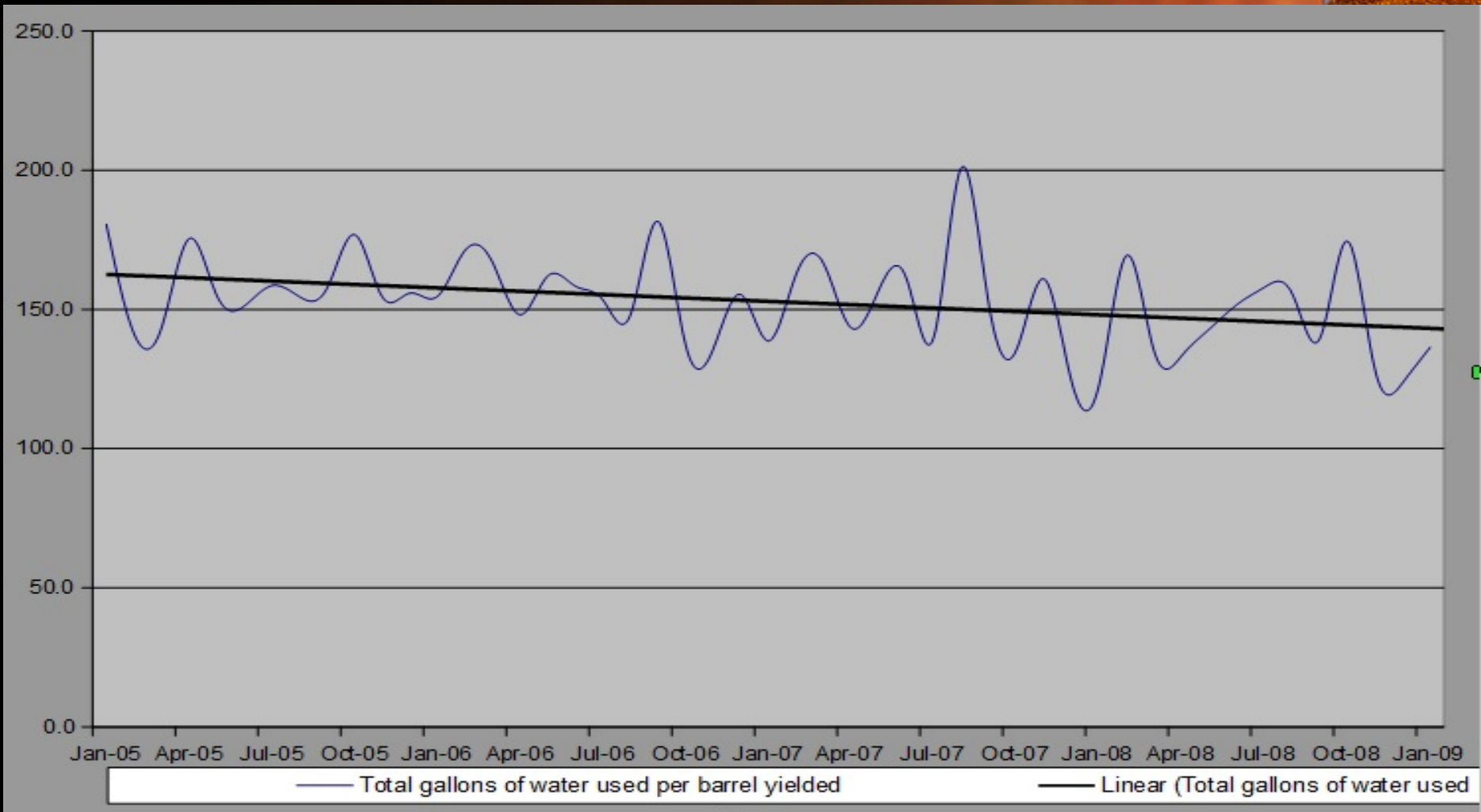
Utility Tracking

- High value and minimal effort
- Start by entering your utility usage data in to a spreadsheet.
 - Data will come from bills
 - Enter all of the data, even if you think you don't need it.
 - OK to use past bills to get a jump start
- Update monthly



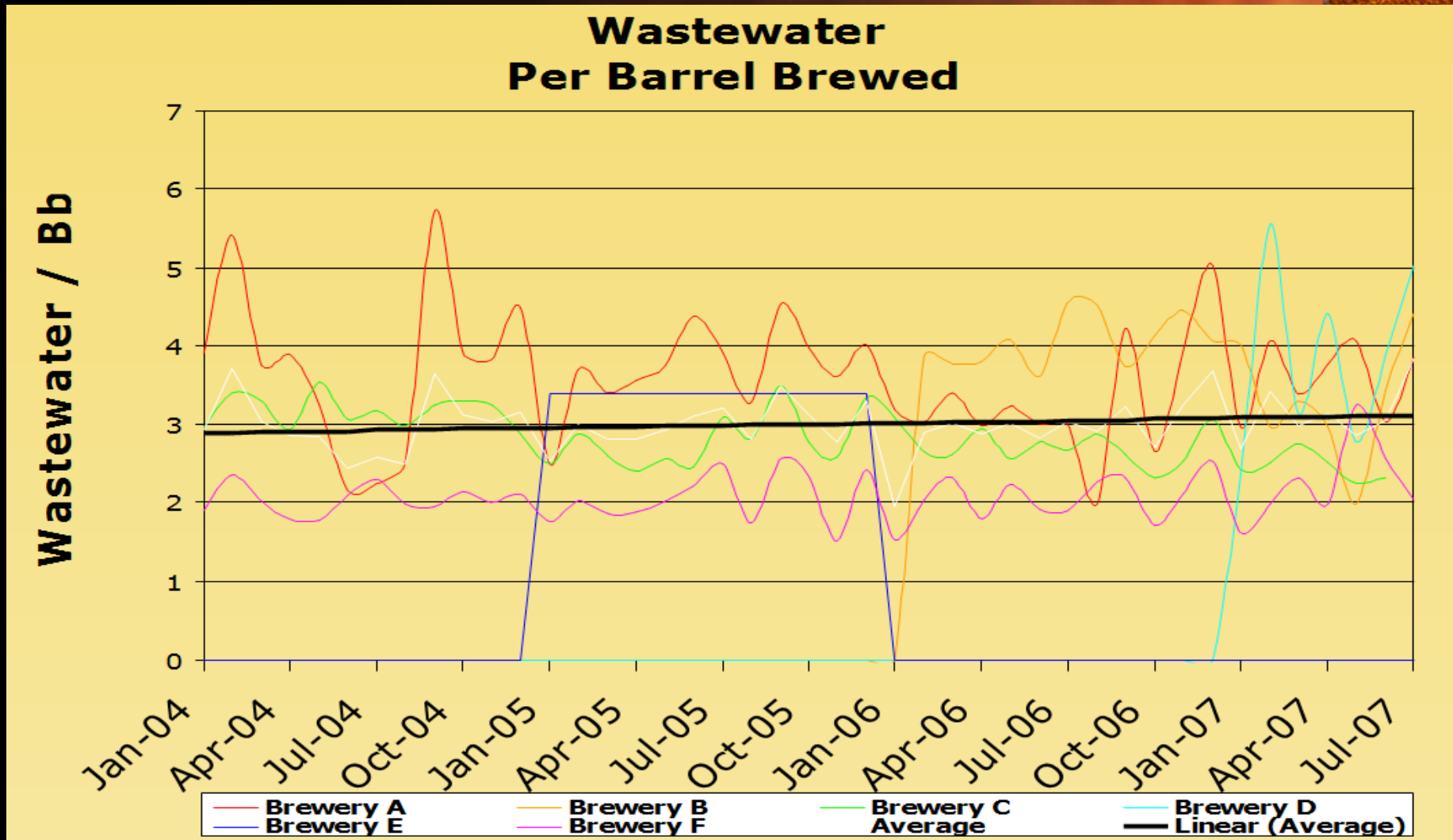
Utility Tracking

- After awhile, your data might look like this:



Utility Tracking

- You can share data and come up with this:



Utility Tracking

- You can do this for everything.
- What gets measured gets done.
 - Water/unit
 - Wastewater/unit
 - KwH/unit (or joules)
 - Horsepower hour/unit
 - Caustic/unit
 - People, wages, hours/unit
 - Cost, income, profit/unit



Utility Tracking

- Get employees involved
- What kinds of waste do they see everyday?
- Create process improvement forms
 - Offer a weekly free lunch, at random, from people who submitted
 - Go after the projects that have the lowest capital requirement and the highest return first.



Utility Tracking

- This creates a culture of continual improvement within your company.
- This can become Best Management Practices for your company.
- Next steps could be lean manufacturing, 5S, and the Toyota Production System.



Utility Tracking

- Examples of low hanging fruit to greatly improve efficiency:
 - Side streaming
 - LED lighting improvements
 - Variable speed air compressor
 - Insulation
 - Stack economizer on boiler
 - Speed door on coolers
 - Winter air in coolers
 - Air compressor exhaust in to building in winter



Financial Analysis

- It's pretty easy to come up with a list of projects
- Just because a project is cool or interesting doesn't mean it's a good project.
- Making beer and running a brewery are 2 different things.



Financial Analysis

- Not all projects will be water related
- How to determine which projects to fund?
- Several factors
 - Safety
 - Quality
 - Capacity
 - Financial performance
 - Internal Rate of Return (IRR)
 - Net Present Value (NPV)



Financial Analysis

- Both IRR and NPV look at net cash flow of any project
- IRR
 - Can be simply calculated in Excel
- NPV
 - Looks at present value of money compared to future value of the same money
 - Can also be simply calculated in Excel
- Higher is better for both calculations



Closing thoughts

- The Brewers Association is currently tracking utility usage for brewers and asking for more participation
- The BA Sustainability Subcommittee
- Growth without efficiency is like turning the water higher while the drain gets bigger.



Thank You!

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