“Waste Not Want Not”
Sustainable Home brewing

Dan Schreffler

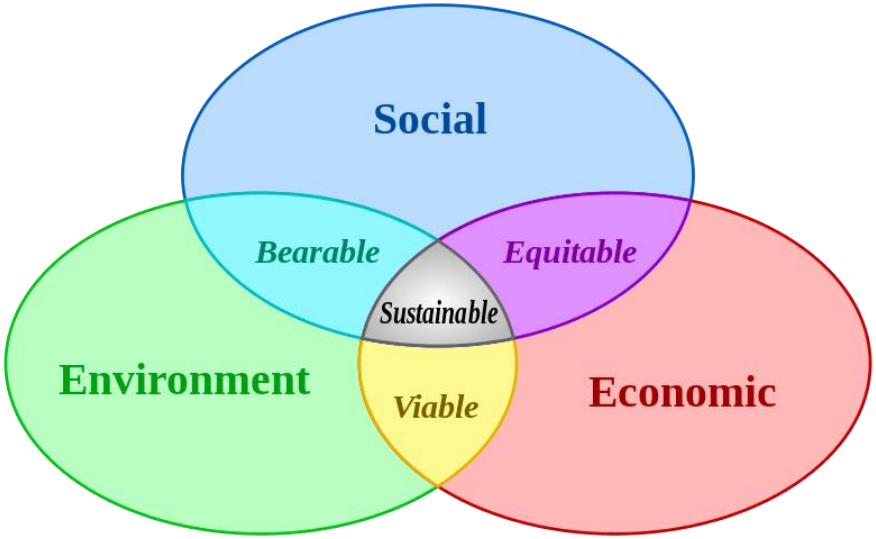
Wyoming Valley Homebrewers Club

NHC 2013

“Waste Not Want Not”

“Waste Not Want Not”

Sustainable Brewing – not just "green"



https://en.wikipedia.org/wiki/File:Sustainable_development.svg

- Broad, Long term view
- Always tradeoffs
  - Bearable
  - Viable
  - Equitable
- Brew unto others...
- Relax – its a hobby!

Many Commercial Craft Breweries Promoting Sustainability

... sustainability means recognizing the impacts associated with our operations and making a conscious effort to reduce them. We are committed to leaving the smallest footprint possible without jeopardizing our high standards for quality. We strive to maintain a healthy balance between environmental stewardship, social equity, and economic stability. By engaging in an active sustainability program, we intend to leave a better world for future generations.

... dedication to not only serve the best food and beer we can, but to also make sure that those products are as safe and sustainable as they can be. Along with this, we want the atmosphere we provide to reflect our values. That is why we dedicate so much time and effort into sourcing our food locally and making sure our energy comes from sustainable sources such as wind and solar power.

Applying to Home Brewing Process

- Before you Brew
  - Budget
  - Equipment
  - Brew planning
  - Ingredients
- Brew Day
- Fermentation
- Packaging, Storage, Serving

Before You Brew - Budget

- How much money and time can you spend on equipment and supplies annually/monthly?

- "Want to spend" vs. "Can spend"

- Track – like you should with all your household expenditures
- Knowledge is power to choose

Before You Brew - Equipment

- Big savings in $, material and energy by not buying something you will not use!

- Try before you buy
  - Take advantage of local club or home brew shop brew events like “Learn to Homebrew Day”
  - Try out first on borrowed or shared equipment

Used twice before thrown back in its ebay box in frustration!

Repurpose, don't rush to customize - think multitask vs. unitask

- Stock pot for boil kettle
- Ferment in 5 gallon buckets – can clean, and sanitize equipment in buckets.
- Ice chest as mash tun, fermentation temp controller, and, oh my, a cooler!

Before you brew - Equipment

- Research to get value and not cheap
  - Understand total cost of ownership over time. Are initial savings offset by frequent replacement, fuel and electricity costs?

- Keep it simple, control the gadget addiction
  - Gadgets can be a fun part of the hobby, just avoid trying to keep up with the Joneses
  - Start off with brew-in-a-bag, or extract brewing

Ok, but this is still cool!!!

Before you brew – Planning

- Align beer style with the seasons
- Learn proper cleaning and sanitation practices
- Don't buy what you do not have real plans to use.
- Scale to what meets your needs
- Settle on a few house yeast strains and re-pitch.

Before you brew – Where to Brew?

- Heating season – stay inside
  - capture water vapor and heat by brewing inside, reduce energy for home heating and humidifiers .
  - Less mash tun and boil kettle heat loss than brewing outside.

- Cooling season – get outside!!!
  - Don’t waste the A/C, dehumidifiers energy

Before you brew - Ingredients

We brew with all-natural, whole-food ingredients sourced as locally and as organically as possible. We tread lightly: most of our equipment is secondhand or salvaged, we compost spent grain, we grow ingredients, and we obsessively recycle heat during the brewing process.
•shawneecraftbrewingcompany.com

- Using good, fresh ingredients, and knowing what's in them
- Organic
  - reduce pollution and conserving water and soil quality.
  - significantly fewer pesticide residues on produce and showing up in our bodies
  - Note: no published studies regarding residual chemicals in beer
- Downside:
  - Cost: about 40-50% more for grains, about 20% more for hops
  - Variety: Not all grains and hops available organically.

➢ Read labels - getting organic ingredients from across the globe negates some of the environmental benefits.

Organic Home Brew

Organic variants of recipes from *Brewing Classic Styles*

Baltic Porter #96

- No organic Lublin hops, used organic German Spalt
- No organic Special B, upped chocolate and carafa II
- Prior batch is in second round NHC 2013

Munich Dunkel - #92

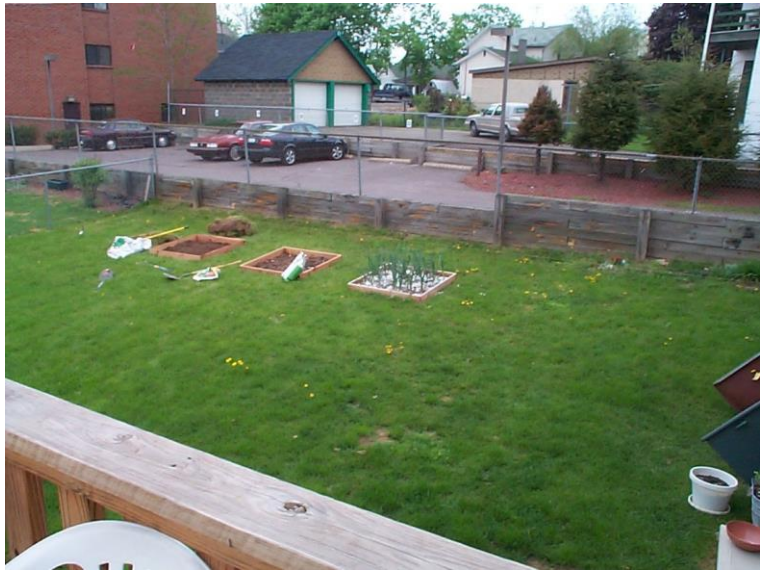
- No issues obtaining organic ingredients
- A bit out of style, but not an organic issue, a brewer recipe formulation issue!

You and Bees Make Ingredients

- Grown your own – hops, herbs, and fruit

- Help the honey producers
  - Create a safe haven for the pollinators
  - Transform yard from a bee food desert to a habitat

Boring, bee desert vs. Fun, human, bird & bee yard



Water as an ingredient

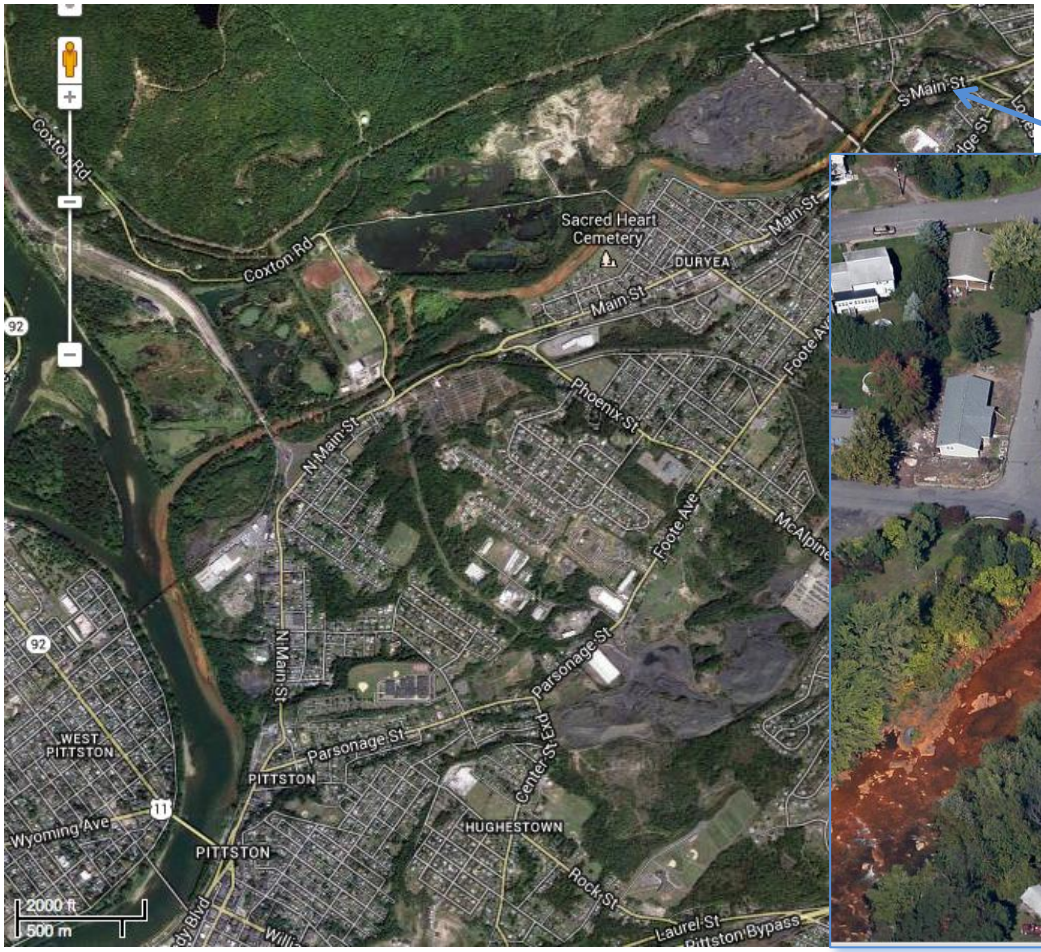
- Select water based on tests, taste and cost
  - Contact local water company or get it tested
- Bottled water better? Not necessarily
  - Municipal water supplies tested many times per month.
  - 30-40% of bottled water is filtered tap water
  - Cost per gallon: Bottled: $1.00; Filtered: $0.13; tap: $0.009
  - Packaging waste – 80% of bottles end up in landfill.

Alternatives to bottled water

- Campdem tablet ($K_2S_2O_5$) for chlorine/chloramines removal.
- Filter – but replace filter per schedule

Clean water = good beer

- Healthy streams and wetlands
- Protect brewing water supplies from pollution.



Yes! the river turns orange!

Applying to Home Brewing Process

- ✓ Before you Brew
  - ✓ Budget
  - ✓ Equipment
  - ✓ Brew planning
  - ✓ Ingredients
- Brew Day
- Fermentation
- Packaging, Storage, Serving

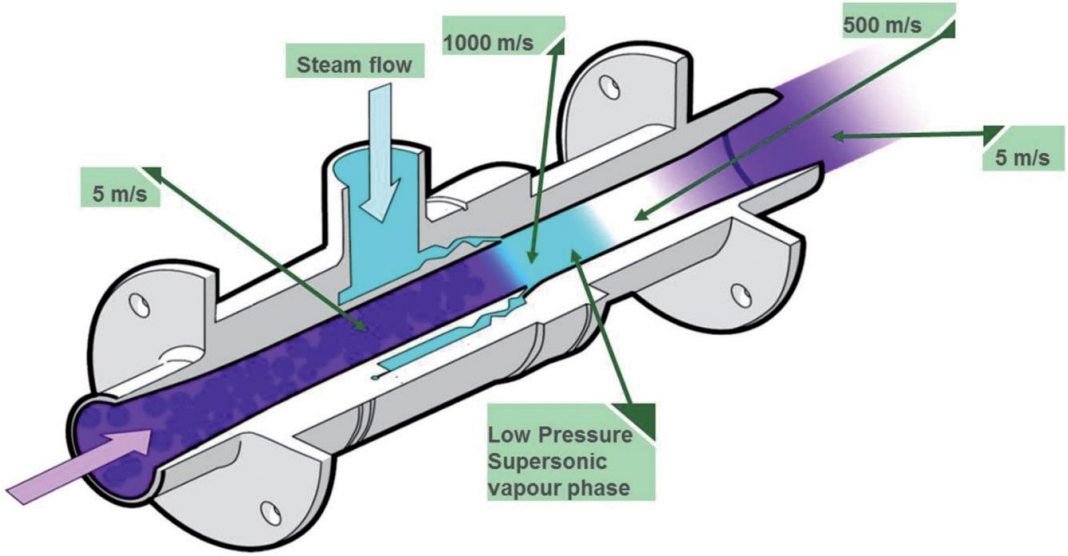
Brew Day Water Heating

- Utilizes a commercial “on demand” water heater for their strike water.
- Electric elements in HLT, boil kettle
- www.breakerbrewingcompany.com

- Start with “tankless heater” water.
  - Filtration before the heater if needed.
  - Get water tested first if concerned about lead.
- Electric – renewable energy

Brew Day Water Heating

- Centralized, highly efficient natural gas boiler used for heating all brewing water
- Direct steam injection wort boiling
- www.sbcbeer.com

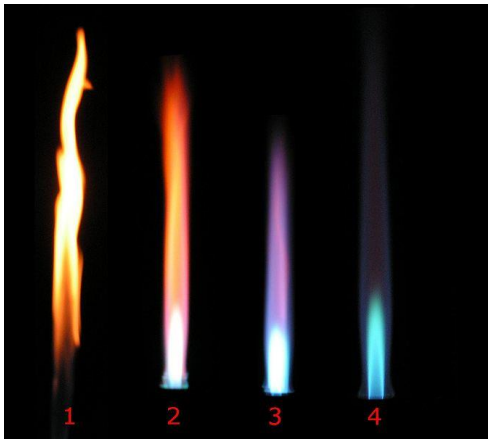


PDX reactor –

http://www.sbcbeer.com/wp-content/uploads/2012/10/bbii_5-12_s_52-541.pdf

Brew Day Water Heating

- *“Isn't the whole point to heat wort not the atmosphere.”*, Blichmann engineering



http://commons.wikimedia.org/wiki/File:Bunsen_burner_flame_type

- Homebrew gas burners only 20-50% efficient
  - Adjust gas flow and air mix
  - Blue flame, touching the burner nozzles
  - Protect from wind

- Control boil off rate to reduce wasting heat/H_2O
  - Measure, get consistent
  - Dial into a 6-8% per hour

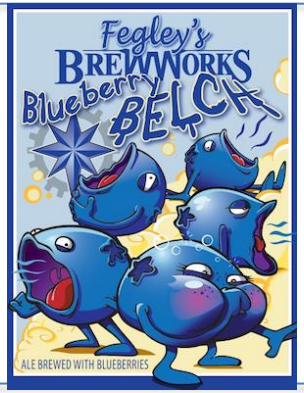
http://cdn.homebrewtalk.com/attachments/f11/28049d1308580915-blichmann-burner-10-gallon-boil-burner.jpg

Brew Day - Mashing

- Mash efficiency
  - Measure
  - Get consistency first
  - Then tune:

http://braukaiser.com/wiki/index.php?title=Troubleshooting_Brewhouse_Efficiency

Brew Day – Mash Grains



- "Upcycling" of spent grain
- Grains to the local famer
- Farm animals become menu items
- www.thebrewworks.com

- Don't landfill
- Make bread, cookies, muffins, dog treats
- Compost and mulch
- Give to local farmer

Brew Day Water Use - Chilling

- Ambient air “no chill”
- Initial H_2O from pool or rain barrel
- Move the IC or the wort
- Blichmann therminator
- Water capture and reuse
  - brew day wash and rinse
  - washing machine, rain barrels, pool, hot tub

Fermentation

- Do not waste the beer
  - Follow good cleaning and sanitation practices
  - Understand proper yeast handling

- No “secondary”
  - Let fermentation complete in the first vessel
  - Should not be a default for all beers
  - Age in a secondary only if style requires
  - Eliminate the need for additional equipment, water, and energy to clean up

Fermentation Temp Control

- Try to use ambient temps
  - Pitch a few degrees lower than your fermentation target
  - Water bath to maintain temperature.

- Retire that old refrigerator
  - Uses more energy and will be more costly over time.
  - Average cost per year to run based on manufacture date
    - 2001 – 2008: $90
    - 1993 – 2000: $120 (+$30/year)
    - 1990 - 1992: $163 (+$73/year)
    - 1981 – 1989: $230 (+$140/year)
    - before 1980: $280 (+$190/year)

http://www.energystar.gov/index.cfm?fuseaction=refrig.calculator&screen=1 (upright 19-21 cu")

Packaging, Storage, Serving

- **Patience**! Don't keg, bottle, serve a beer before its time.

- Planning revisited ... align clean up for brewing, racking and kegging to help save water and chemicals

- A carboy/keg washer can save water and chemical vs. the typical fill and soak for each vessel.
- Of course the standard: reuse bottles
- Sustainable drinking! Share and moderation!

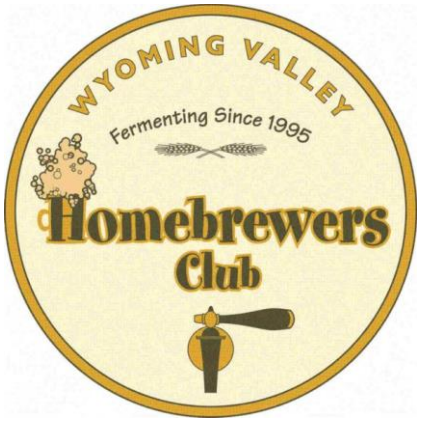
“Waste Not Want Not” Summary
Brewing for Sustainability

- **Think** about values, plan and **budget**
- 100% locally sourced, **organic** ingredients, home grown hops, filtered **tap** water
- “Brew in a bag” method during winter
- Mash and boil inside on electric stove with utility or homeowner provided **solar/wind power**
- Chill with IC and wort movement or CF; **Capture and reuse** water
- Repitch yeast and ferment in a single vessel at **ambient cellar temps**
- Spent grains made in dog treats, bread and rest traded with farmer for chickens, burgers and/or bacon!
- Package brew in **reused** bottle or kegs
- **Share** your homebrew with friends and family while **enjoying your backyard nature.**

Further Learning

- AHA NHC 2011 – presentations:
  - Denny Conn – Pragmatic Brewing,
  - Chris Graham - Brewing on a Budget.
- Zymergy Magazine - March April 2009
- AHA forum – you all rock!!!
- Brew Your Own Magazine – October 2008, May-June 2009
- Basic Brewing Radio
  - March 19, 2009 - Mash and Lauter Efficiency
  - April 23, 2009 - Brewing on a Budget
  - February 8, 2007 - Brewing Organic
- The Brewing Network
- Natural Capitalism, Hawken, Lovins & Lovins
- Sierra Club: pennsylvania.sierraclub.org
- Lackawanna River Corridor Association: www.lrca.org

Thank You!



- Wyoming Valley Homebrewers Club
- Scranton Brewer's Guild
- Local commercial brewers
- The vast and valuable information shared by
  - AHA and its members
  - Basic Brewing Radio
  - The Brewing Network
  - Brew Your Own (BYO) Magazine

Waste Not Want Not

Questions?

Comments?

Ideas?

How was the organic beer?

Contact:
beer@solarrat.com
www.wyomingvalleyhomebrewers.org