Lessons Learned

Water Saving Ideas for the Commercial Sector From Breweries and Distilleries

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Five Water Conservation Principles that all Large Business Have in Common

1. Water is on the radar screen

2. Metering & benchmarking

3. Progress takes many forms

4. Many uses are the same

5. Sources of Assistance
Texas Stats

STATE CRAFT BEER PRODUCTION & SALES DATA, 2013

TExAS

$ 2,316.2 Million Economic Impact (RANKS 2°)
129 Impact per Capita (RANKS 34°)

96 Craft Breweries (RANKS 8°)

848,259 Barrels of Craft beer produced per year (RANKS 7°)
1.5 Gallons per 21+ Adult (RANKS 21°)

0.5 Breweries per Capita* (RANKS 42°)

*per 100,000 21+ Adults

NUMBER OF BREWERIES PER YEAR

2011 2012 2013
And the craft beer industry is growing fast
Austin Locals
## A Partial List of Austin Breweries

<table>
<thead>
<tr>
<th>Brewery Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>(512) Brewing Company</td>
<td>Black Star Co-op Pub &amp; Brewery</td>
</tr>
<tr>
<td>Adelbert’s Brewery, LLC</td>
<td>Draught House Pub &amp; Brewery</td>
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<tr>
<td>Austin Beerworks, LLC</td>
<td>Kamala Brewing at the Whip In</td>
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<tr>
<td>Circle Brewing Company</td>
<td>North by Northwest Restaurant and Brewery</td>
</tr>
<tr>
<td>Hops &amp; Grain Brewing</td>
<td>Pinthouse Pizza</td>
</tr>
<tr>
<td>Independence Brewing Company</td>
<td>Uncle Billy’s Brew &amp; Que</td>
</tr>
<tr>
<td>Infamous Brewing Company</td>
<td>Bull Creek Brewing</td>
</tr>
<tr>
<td>Jester King Brewery</td>
<td>Last Stand Brewing Company</td>
</tr>
<tr>
<td>Live Oak Brewing Company</td>
<td>Zilker Brewing Company</td>
</tr>
<tr>
<td>South Austin Brewing Company</td>
<td>The Austin Beer Garden Brewing Company (ABGB)</td>
</tr>
<tr>
<td>Thirsty Planet Brewing Company</td>
<td></td>
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<tr>
<td>Other Spirits Companies in Austin</td>
<td></td>
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<tr>
<td>----------------------------------</td>
<td></td>
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<tr>
<td>Treaty Oak Distilling</td>
<td></td>
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<tr>
<td>Republic Tequila</td>
<td></td>
</tr>
<tr>
<td>Paula’s Texas Spirits</td>
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<tr>
<td>Garrison Brothers Distillery</td>
<td></td>
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<tr>
<td>Dripping Springs Vodka</td>
<td></td>
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<tr>
<td>Deep Eddy Vodka/Deep Eddy Sweet Tea Vodka</td>
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</tr>
<tr>
<td>Dulce Vida Organic Tequila</td>
<td></td>
</tr>
<tr>
<td>Tito’s Vodka</td>
<td></td>
</tr>
<tr>
<td>Texas Saké Company</td>
<td></td>
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</tbody>
</table>
To Make Beer, MillerCoors Helps Farmers Save Water
Jul 2, 2012 by Scott

Beer industry raises a glass towards cutting water consumption
By Bruce Kennedy
Published August 17, 2012

Brewing Features
CONSERVING WATER: THE FIGHT TO PROTECT BEER’S MAIN INGREDIENT
All About Beer Magazine - Volume 34, Issue 6
November 24, 2013

Breweries across the world strive to decrease beer's water footprint
And yes there is a Texas Distilled Spirits Association
Example from MillerCoors

MillerCoors Sets New Record For Water Conservation
MillerCoors is using less and less water to brew its beers, according to the 2013 MillerCoors Sustainability Report released today. The nation’s second-largest brewer decreased water use by 6.1 percent to a record low 3.82 barrels in 2012. By comparison, some U.S. breweries use as much as 6.62 barrels of water to produce a single barrel of beer.[1]

MillerCoors Sets New Record for Water, Energy Conservation
MillerCoors water and energy use reached record lows last year, according to the 2014 MillerCoors Sustainability Report, Great Beer, Great Responsibility, released today. The nation’s second-largest brewer is now using an average of 3.48 barrels of water to brew one barrel of beer, a 9.1 percent decrease from 2012. For comparison, some U.S. breweries use more than 6 barrels of water to produce a single barrel of beer. MillerCoors decreased its energy use by 15.6 percent from 2012, saving 1.6 billion mega joules of energy over the course of 2013. With these reductions and others, MillerCoors surpassed all the environmental stewardship goals it set out to achieve by 2015.

The Fort Worth plant now uses 3.2 barrels of water to create one barrel of beer, a 9 percent reduction from three years ago.
MATERIALITY MAP

WE REVIEW OUR MATERIALITY ASSESSMENT EVERY THREE YEARS. THE NEXT REVIEW WILL OCCUR IN 2014.

IMPACT TO MILLERCOORS BUSINESS

IMPORANCE TO MILLERCOORS STAKEHOLDERS

* Responsibility
  * Water Stewardship
  * Post-Consumer Recycling
  * Community Investments
  * Energy and Carbon
  * Safety
  * Diversity and Inclusion
  * Packaging
  * Zero Waste to Landfill
  * Supply Chain
  * Ethical Business Practices
  * Taxes and Regulations
  * Supplier Diversity
  * Volunteerism
  * Our People

LOW

MEDIUM

HIGH

Other Environmental and Social Issues
Texas Water Foundation Tour of MillerCoors Brewery in Fort Worth, Texas

Please save the date, Thursday, October 23, 2014 to go "On The Road Again" with the TWF! We’ll travel to the Metroplex area for an informative visit to the MillerCoors Brewery for a tour of their Award-Winning Water & Land Conservation/Sustainability Programs! More exciting details and your invitation to follow soon!

For more information or early RSVP, email TWF@texaswater.org
Brewers Association
Water and Wastewater: Treatment/Volume Reduction Manual
Examples from Restaurant and Hotel Industries

Hilton Family of Hotels

**Water:** a number of initiatives, especially in the back of the house

• A large amount of a hotel’s water consumption comes from laundry and housekeeping. Hilton has worked with its suppliers to identify sustainable solutions for laundry and housekeeping practices. This includes improving laundering technologies (saving up to 45% of water and 43% of energy while extending linen life by up to 40%). Further, Hilton has developed sustainable housekeeping supplies that can **reduce the amount of water used in cleaning processes by up to 30%**.

• Hilton has identified **new types of towels that are lighter weight** and more durable than standard towels. This means that hotels can launder more towels per load and the product will last longer than standard towels, thereby **requiring fewer loads of laundry** and producing less waste over time (and saving money!).

• Many hotels have invested significant effort **to engage employees** in reducing water consumption.

• Installation of **water restrictors and displacement devices** has been a common practice for hotels in recent years.

• A number of properties are implementing innovative solutions for **water reuse** such as rain capture and other water-efficient technologies such as smart irrigation.
Metering & benchmarking
From the MillerCoors Sustainability Report

ANNUAL WATER-TO-BEER RATIO

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Water-to-Beer Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>3.48:1.0</td>
</tr>
<tr>
<td>2012</td>
<td>3.82:1.0</td>
</tr>
<tr>
<td>2011</td>
<td>4.07:1.0</td>
</tr>
<tr>
<td>2010</td>
<td>4.11:1.0</td>
</tr>
<tr>
<td>2009</td>
<td>4.11:1.0</td>
</tr>
</tbody>
</table>

= 1.0 barrel
Beverage Industry Environmental Roundtable

**Figure 10: Brewery (Beer Only) Water Use Ratio Performance**

- **N=318**
- **Range (2012) - 3.12 - 6.18 L/L**
- **Improvement = 11%**

**Figure 13: Distillery Water Use Ratio Performance**

- **N=84**
- **Range (2012) - 13.27 - 129.62 L/L**
- **Improvement = 3%**

**Figure 16: Winery Water Use Ratio Performance**

- **N=25**
- **Range (2012) - 2.17 - 14.61 L/L**
- **Improvement = 20%**
Brewing Water And Wastewater Sources

- Water to mills (process) B1
- Moisture in malt (process) B2
- Underfed water (process) B3
- Splurge water (process) B4
- Blending water (process) B5
- Water in syrup (process) B6
- Transfer water B7
- Running water B8
- Cleaning water B9
- Water in spent grain (waste) B10
- Evaporation B11
- Water in wort to cellars (process) B12
- Water in trub (waste) B13
- Wastewater B14
Do you have a process diagram?
Examples of Water Balances

- **Line Cleaning**: 24%
- **Vessel Cleaning**: 19%
- **Beer**: 21%
- **Packing**: 10%
- **People (restrooms, bar, etc.)**: 13%
- **Line Cleaning**: 24%
- **Brew Pub**: [CATEGORY NAME] [PERCENTAGE]
Do You see a Pattern Here?
Analysis of Gallons per Room for Hotels in Austin, Texas FY 2011

Gallons per Room per Day

Full Svc. Hotel - N=27
Limited Svc. Hotel - N=40
Motel - N=53
Summary of Audits of 30 Large Facilities with Cooling Towers in Downtown Fort Worth Texas

Water Management, Inc.

Courthouse  Hotel  University  Offices  Hospital

- Other
- Irrigation
- Domestic
- Cooling
Eleven Office Buildings in Austin, Texas

- Cooling Tower: 53%
- All Other Uses: 47%
66 New York Hotels in 2013
AMI – Portfolio Manager Data Base

Gallons per Square Foot per Year

Percentile

LOW 10 20 30 40 50 60 70 80 90 113 200

HIGH
Benchmarking Energy and Water Use In Commercial Buildings

The Star indicates benchmarking water use.

SB 700 requires that the **Texas State Energy Conservation Office (SECO)** to benchmark energy and **water** use in State Facilities and State supported Institutions of Higher Education.
If you don’t measure it, you can’t manage it!
Progress takes many forms
The Seven Questions

- How much?
- Where?
- When?
- How?
- Who?
- Why?
- What other way?
Ranking of Possible Measures

1. Adjust equipment
2. Modify equipment or install water saving devices
3. Replace with more efficient equipment
4. Water reuse/recycle
5. Change to waterless process
Joseph Black, Scotch Whiskey and Thermodynamics

So the next time you lift a glass of Scotland’s Finest, remember Joseph Black, the frugal distillers and how they advanced the science of thermodynamics.
Cleaning Hoses, Tanks, Kegs and Pipes
Recirculating Clean in Place Systems
Static Spray Ball
Rotary Spray Head
Rotary Jet Head

Coverage:
- **Means**: Cascading, Swirling fan, Index Pattern
- **Effect**: Partial, Partial to full, Full
- **Action**: Low, Medium, High
- **% Resources used**: 100%, 70-75%, <50% in most cases
Water Reuse Can Take Several Forms
Energy is in the game too.
Many uses are the same
Many are also Restaurants
Cooling Towers at a Scotch Distillery and a Brewery
Keeping it Cold
Sources of Assistance
Texas Tax Incentives

Property Tax Exemptions
Tax Relief for Pollution-Control Properties – can be used to exempt projects that reduce pollution. Water conservation projects could include all forms of on-site reuse, conservation practices that reduce wastewater volumes and similar activities subject to TCEQ approval. The exemption is filed through the local property tax office that must agree to the exemption.

http://www.tceq.state.tx.us/airquality/taxrelief

Sales Tax Exemption
The Texas Comptrollers Office exempts sales tax on the purchase of materials and equipment for rainwater harvesting, water recycling and reuse and certain limited types of water saving devices.

What Full Service WASCO’s Offer

- Detailed auditing of ALL water uses
- Water and sewer use and cost analysis
- Analysis of energy savings associated with water conservation
- Product and system recommendations
- Turnkey pricing
- Implementation (design-build)
- Financing
- Measurement and verification of savings
Two Guidebooks You Need to Get

http://www.epa.gov/watersense/commercial/bmps.html

Water Management, Inc. Locations

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**Dallas/Fort Worth Office**
1201 N. Watson Rd.
Arlington, TX 76006
817-652-2640 (p)
Exhibit 1. Long-term trends in the Consumer Price Index (CPI) for utilities (1913-2013). The index is set to 100 for 1982-1984 except for telephone and wireless services, where the index is set to 100 for 1997. Year (*) indicates start of series.
We are all in this together!