“I just listened to that inner voice. By the way, it’s always a good move to listen to that inner voice... if it doesn’t lead to a crime.”

- Lisa Kudrow
Objectives

• Brewing & Hop Industry Updates
• Annual BA Hop Survey Results
• Hop Stocks Reports Analysis (new for 2017)
• Review 2016 pound and acre forecasts & project 2017 pound and acre needs relative to inventory and net exports
2016 U.S. Brewing Industry Update

- Total U.S. beer production volume down ~0.5-1.0%
- Total number of U.S. breweries tops 5,000 for first time ever
- Craft volume growth slowed further to ~<10% to ~25-27 MM barrels total volume
- Craft brewer PPB hopping rates (2015 beer production year) increased significantly from 1.39 to 1.50 pounds per barrel (+7.9%)
- Medium hopping rate brewer rate nudged up from 0.42 to 0.43 pounds per barrel
U.S. Brewery Count

Number of Breweries, 1873 - 2015

Number of Breweries by State

Sources: Brewers Association and Beer Institute

http://bottlinginthepines.wordpress.com
Craft Beer Production
2001 - 2016

US Craft Beer Production Volume (MM US BBL)
2016 U.S. Hop Industry Update

- Total PacNW (WA, OR, ID) acres increased from 44,900 to 52,100 (+16%)
- Total U.S. production increased from 80.4 MM to 89.0 MM pounds (+10.7%)
- Total U.S. yield decreased from 1810 to 1710 pounds per acre (-5.2%)
- Licensed acres increased from ~9,300 (21% of total ac) to ~13,000 (25% of total ac)
Aroma Hop Acreage as % TTL US Acres

2003: 25.3%
2004: 22.2%
2005: 22.2%
2006: 20.3%
2007: 18.1%
2008: 19.8%
2009: 20.9%
2010: 26.0%
2011: 31.9%
2012: 41.6%
2013: 62.7%
2014: 70.4%
2015: 76.6%
2016: 83.1%
Objectives

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BA Member Hop Usage Survey

• Annual Survey in July

• Nine Years of Data collected 2008 - 2016

• Look back to production years 2007 – 2015

• Only includes craft volume as defined

• A SURVEY, so the results shown are NOT totals: “Actual Mileage May Vary”

BA Annual Hop Survey + USDA National Hop Reports + BA BIPS Survey + USDA NASS Hop Stocks Reports => This presentation
US Brewing & Hop Usage
Summary

• Hopping rates measured in ‘16 survey increased +7.9% over ‘15 surveyed rates from 1.39 to 1.50 PPB

• 2016 shortfalls in different varieties from 2015
Hopping Rate PPB Change YOY

YOY Change in PPB

Production Year

- 2009: 17.9%
- 2010: 5.8%
- 2011: 8.0%
- 2012: 1.3%
- 2013: 5.1%
- 2014: 2.1%
- 2015: 7.9%
- 2016: 5.0% (est)
Contract Or Die

Craft Brewer Contracting Behavior

- 78.6% in 2008
- 84.1% in 2009
- 83.0% in 2010
- 89.0% in 2011
- 92.8% in 2012
- 92.0% in 2013
- 96.6% in 2014
- 95.8% in 2015
- 96.0% in 2016
Craft Brewer Hop Usage By Beer Production Year

MM Pounds


6.0 6.4 8.6 11.8 12.0 14.4 17.7 25.1 29.4

Millions
# Craft Brewer Hop Usage

## Top Ten Varieties

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
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<tbody>
<tr>
<td>Cascade</td>
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<td>Chinook</td>
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<td>Simcoe</td>
<td>Chinook</td>
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<td>Willamette</td>
<td>CTZ</td>
<td>Chinook</td>
<td>Simcoe</td>
<td>Simcoe</td>
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<tr>
<td>Simcoe</td>
<td>Simcoe</td>
<td>CTZ</td>
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<tr>
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<td>Amarillo</td>
<td>Hall Mitt (Ger)</td>
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<td>US Golding</td>
<td>Crystal</td>
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<td>Mosaic</td>
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<tr>
<td>Crystal</td>
<td>Willamette</td>
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<td>Crystal</td>
<td>Crystal</td>
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<tr>
<td>Amarillo</td>
<td>Saaz (CZ)</td>
<td>Citra</td>
<td>Magnum (Ger)</td>
<td>Hall Mitt (Ger)</td>
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</tr>
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<td>Ahtanum</td>
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<td>Saaz (CZ)</td>
<td>CTZ</td>
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</tr>
</tbody>
</table>
Varieties Drive Volume Growth

Total Number of Varieties Used By U.S. Craft Brewers

- 2008: 90
- 2009: 88
- 2010: 92
- 2011: 97
- 2012: 105
- 2013: 114
- 2014: 132
- 2015: 135
- 2016: 125
Shortfall By Brewers

% of Respondents Reporting Shortfall in Variety 2015

- Citra: 14.5%
- Amarillo: 10.5%
- Mosaic: 7.9%
- Simcoe: 7.9%
- Cascade: 5.3%
- Centennial: 5.3%
- Galazy (AU): 5.3%
- Motueka (NZ): 5.3%
- Nelson Sauvin (NZ): 2.6%
- Ela (AU), Rakau (NZ): 1.3%
Shortfall By Gap Size

Shortfall Pounds as % of Total Pounds Consumed in 2015

- Tahoma: 4400%
- Triple Perle: 338%
- Riwaiva (NZ): 273%
- Cashmere: 23.8%
- Citra: 20.8%
- Vanguard: 14.0%
- Meridian: 12.0%
- Nelson Sauvignon (NZ): 6.2%
- Motueka (NZ): 5.6%
- Wakatu (NZ): 2.9%
High & Medium Hopping Rate Users Defined

High Hopping Rate Users (1.50 pounds per bbl):
• All Brewpubs
• All Microbreweries (craft or otherwise)
• Craft Regional breweries
• Breweries owned by larger companies (Goose Island, 10 Barrel, Elysian, St Archer, etc)

Medium Hopping Rate Users (0.43 pounds per bbl):
• 10th and Blake
• Shock Top
• Boston Beer, Yuengling, Minhas, other craft
• Regional Breweries such as N Am Breweries, August Schell, etc
High & Medium Rate Hop User Consumption (Beer Production Year)

[Diagram showing consumption trends from 2008 to 2016, with high user consumption in blue and medium user consumption in red. Key values include:
- 2008: High 19.4, Medium 0
- 2009: High 22.9, Medium 0
- 2010: High 29.6, Medium 0
- 2011: High 34.4, Medium 0
- 2012: High 19.4, Medium 0
- 2013: High 22.9, Medium 0
- 2014: High 29.6, Medium 0
- 2015: High 34.4, Medium 0
- 2016: High 38.8 (est), Medium 0]
Objectives

• Brewing & Hop Industry Updates

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• Review 2016 pound and acre forecasts & project 2017 pound and acre needs relative to inventory and net exports
U.S. Hop Stocks Analysis

Hop Stocks – United States

Million pounds

USDA-NASS September 2016 Hop Stocks Report
Definitions and Assumptions

- Each Crop lasts one year, starting in September and ending at the end of the following August.
- September stocks represent “Carryout” of previous year crop.
- Treat inventories on an accrual or running basis.
- Controlling stocks for crop size is crucial.
Thinking About Stocks

Additions: Growers - September-October

Removals: Brewing, Net Exports - All Year
U.S. Hop Stocks Analysis

September Total Hop Stocks (1,000 Pounds)

USDA-NASS September 2016 Hop Stocks Report
U.S. Hop Stocks Analysis: The Size of the Bucket

September Total Stocks as Proportion of Prior Year Crop Pounds

USDA-NASS September 2016 Hop Stocks Report
U.S. Hop Stocks Analysis: How Full Is the Bucket

September Total Stocks YOY Difference as Proportion of Prior Year Crop Pounds

-4.4% 8.9% 16.5% 22.3% 6.1%
-1.7% 6.9% 0.0% 19.0% 0%
-9.3% -1.8% -3.5% -3.1% -9.9%
-9.3% -14.7% -20.8% -14.3%
-20% -30% 0% 10% 20% 30%

USDA-NASS September 2016 Hop Stocks Report
U.S. Hop Stocks Analysis: Who’s Doing The Lifting

September Dealer & Grower Stocks Less Brewer Stocks
(1,000 Pounds)

Dealer Held Inventory Era (Since 2013)

Brewer Held Inventory Era (Prior to 2013)

USDA-NASS September 2016 Hop Stocks Report
U.S. Hop Stocks Analysis: Who’s Doing The Lifting

September Dealer & Grower Stocks Less Brewer Stocks As A Proportion of Prior Year Crop

Dealer Held Inventory Era (Since 2013)

USDA-NASS September 2016 Hop Stocks Report
Objectives

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• Review 2016 pound and acre forecasts & project 2017 pound and acre needs relative to inventory and net exports
High & Medium Rate Hop User Consumption 2015 - 2016

2015:
85% of 34.4 MM pounds = 29.4 MM pounds

2016:
85% of 39 MM pounds = 33 MM pounds US hops

3.6 MM pounds
1879 pounds per acre (3 yr avg)
⇒ 2000 acres of the 2015 crop are already spoken for in the US; what about overseas?
## 2016 Acreage Needs

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>+2000</strong></td>
<td>Craft and Medium User Growth in 2015</td>
</tr>
<tr>
<td><strong>+1170</strong></td>
<td>Net Export Growth of ~2 MM pounds at 1713 pounds per acre</td>
</tr>
<tr>
<td><strong>0</strong></td>
<td>Assume No Change in Adjunct Lager Volume and Hop Consumption</td>
</tr>
<tr>
<td><strong>3170</strong></td>
<td>Total New Acres Needed In 2016 **</td>
</tr>
<tr>
<td><strong>7224</strong></td>
<td>Total Actual New Acres In 2016</td>
</tr>
<tr>
<td><strong>4054</strong></td>
<td>Surplus 2016 Acres</td>
</tr>
</tbody>
</table>

**2016 Additional Acres If Craft Growth were 12%:**
960 more acres, leaving 3,100 Surplus
All High & Medium Rate Hop Users Consumption 2016 - 2017

2016:
85% of 39 MM pounds = 33 MM pounds US hops

2017 (assume 5% vol growth, 1.6 PPB craft):
85% of 43.4 MM pounds = 37 MM pounds US hops

4 MM additional pounds
1700 pounds per acre (assume yield drop)
⇒ 2350 new acres of demand
## 2017 Acreage Needs

<p>| | |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>+2350</td>
<td>Craft and Medium User Growth in 2016 (assume all aroma, 7% craft volume growth)</td>
</tr>
<tr>
<td>+1460</td>
<td>Net Export Growth of +2.5 MM pounds at 1713 pounds per acre (assume mix of aroma and alpha exports, no yield change)</td>
</tr>
<tr>
<td>-4054</td>
<td>Surplus Acres Carried Into 2017 (assume all aroma)</td>
</tr>
<tr>
<td>-244</td>
<td>Total Net New Acres Needed</td>
</tr>
<tr>
<td>~5400</td>
<td>Potential Planned New Acres (assumes 1500 ID, 1500 OR, 2000 WA, 400 MI)</td>
</tr>
<tr>
<td>-5644</td>
<td>Surplus 2017 Acres (alpha AND aroma)</td>
</tr>
</tbody>
</table>
Takeaways For 2017

• 2016 Craft volume rose ~<10% to ~26 MM bbls
• Craft hopping rates rates grew 7.9% to 1.50 ppb in 2015 and possibly grew 6.7% to 1.60 in 2016 (scan data)
• U.S. craft brewers continue to use 85% U.S. grown hops
• Craft brewers likely consumed ~33 MM pounds of U.S. hops in 2016
• All High and Medium hopping rate brewers likely consumed ~39 MM pounds of hops in 2016, and will consume ~43 MM pounds in 2017 (37 MM U.S.)
• Barring a yield catastrophe or significant external market changing event, current U.S. acreage is likely sufficient to meet demand for 2017 crop; additional net acres are likely to create a supply surplus
www.brewersassociation.org