Welcome to the Shenandoah Brewery

DEQ Valley Region VEEP Workshop
December 6, 2017

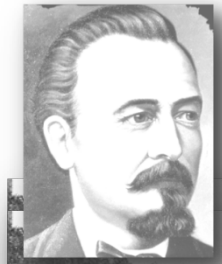
MillerCoors
A MOLSON Coors COMPANY

WINNING AS ONE

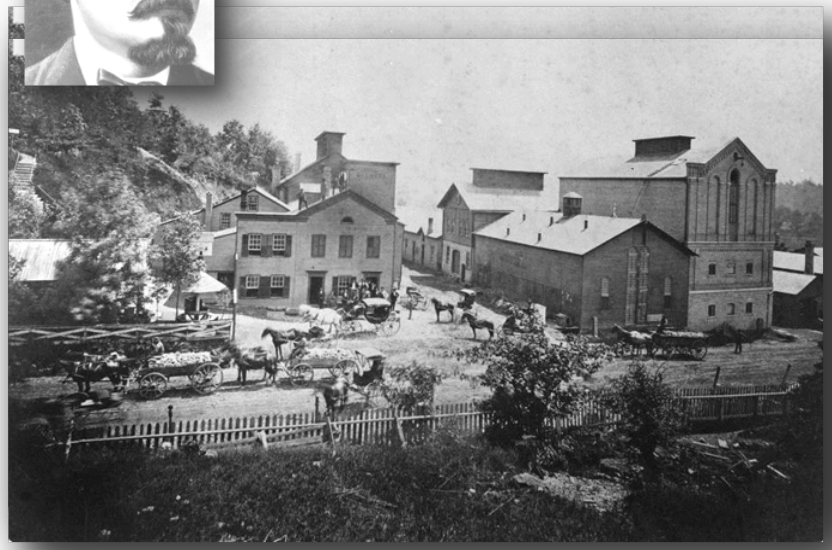
A Rich History: Our Founding Families

Miller Brewing Company

- Founded in 1855 in Milwaukee, Wisconsin by Frederick J. Miller
- Built on a philosophy of uncompromising **Taste & Quality**



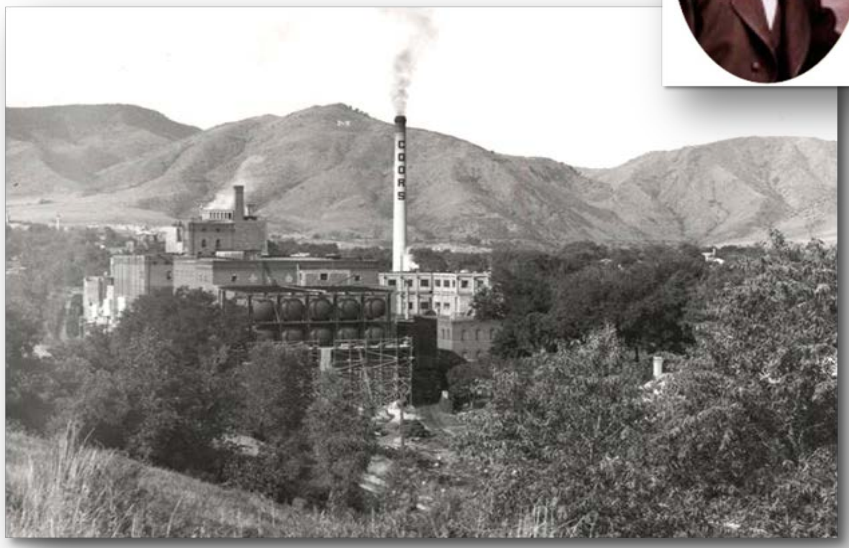
2008:
#2 Brewer in US
$3.94 billion in sales



Coors Brewing Company

- Founded in 1873 in Golden, Colorado by Adolph Coors
- **Quality & Innovation** are the cornerstones of Coors success

2008:
#3 Brewer in US
$2.65 billion in sales



We Stand for Quality Beers, Ciders, Hard Soda

Great People

Changing the Way America Enjoys Beer

Shenandoah Beer Brewed and Package Mix (2017)

45%

#1 MillerCoors Brand

35%

#2 MillerCoors Brand

9%

#1 Craft Brand In US, #5 MC

5%

#3 MillerCoors Brand

5%

#4 MillerCoors Brand

Shenandoah Brewery

- 1,800 acres
- Opened in 1987 – packaged 1.6M bbls in 1988
- 2007: 100,000 sq. ft. Brewing Expansion – annual capacity of 8.2M bbls
- Only U.S. brewery with OSHA VPP Star Worksite status
- Most modern, large-scale brewery in the United States
- World’s largest producer of American Light Lager


Fermentation
Brew House
Packaging
Utilities
Warehouse
Business Center
Waste Water Treatment Plant

SUSTAINABILITY AT MILLERCOORS DEFINED:

MAKE A POSITIVE AND MEANINGFUL IMPACT ON THE SOCIAL, ENVIRONMENTAL AND ECONOMIC ISSUES THAT AFFECT OUR BUSINESS, EMPLOYEES AND OTHER STAKEHOLDERS

Brewing Highlights

- Total Process: 14 days
- 2 brew streams in 1 Brewhouse
- Brew House Capacity: 120 brews per week
- Brewing Cycle: 6 hours
- Final Aging Capacity: 12 M.V.'s/5,000 bbls ea
- Fermenting Capacity: 40 F.V.'s /3,000 bbls ea

Packaging Highlights

	Bottles	Alum	Cans	Kegs
# of Lines	2	1	3	1
Speed per minute	1200 (BPM)	850 (BPM)	1,800/2,100 (CPM)	500/hr (UPH)
Percentage	26%	11%	50%	13%

WINNING AS ONE

Warehouse Highlights

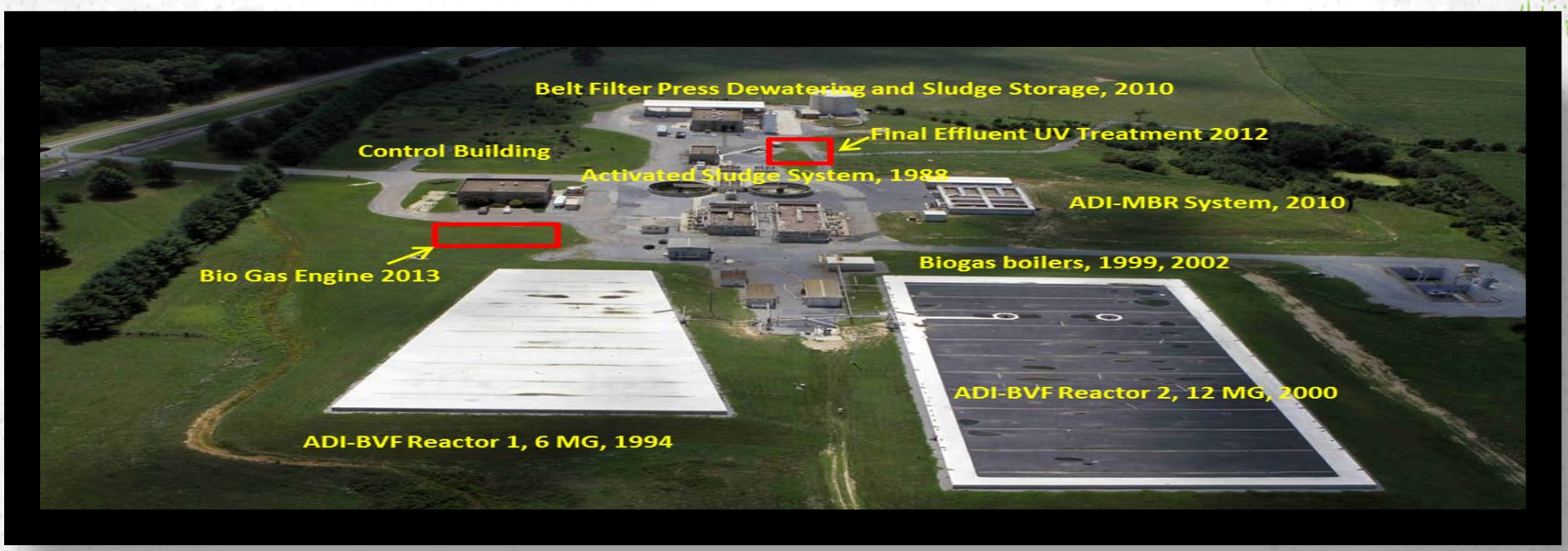
- 157,000 sq. ft. Distribution Center – can hold 3 days production
- Case pallet working capacity: 12,400 pallets
- Cold storage capacity: 17,000 kegs
- Capable of loading: 200 trucks per day, 7 railcars per day

Utilities Highlights

- 4 MW Demand @ 13.8/25kV supply
- All electrical power
- Three groundwater wells in two geologic formations.
- 9k CFM of compressed air
- 7000 tons of refrigeration capability (170k lbs.- Ammonia)
- Up to 150k LBs/Hr of steam – Natural Gas Boilers

Waste Water Highlights

- Advanced WWTP with MBR technology treating avg. 1.0 to 1.5 mgd. Wastewater. Plant design = 2.5 mgd.
- Jenbacher generator – 1.4 megawatts capacity. Burns methane to produce electricity. Can generate up to 15% of total electrical load of plant.
- That's enough green energy to power 610 average U.S. households for one year!



Jenbacher Greenhouse Gas & Cost Savings

- Saved $307k or $108k better than budget YTD
- Reduced Greenhouse Gases - 5.69 kgCO2e/hl 19.4% Reduction YOY

Shenandoah Brewery VEEP Highlights

- VEEP - E3 Member since 2007.
- EHS Management System
  - Shenandoah – Knowledge Center
  - Corporate EHS Management System – EHS Way
- Developed EHS programs (Program Champion, Awareness, Training, Compliance, and Self-Assessments)
- Sustaining by Leading – Beyond Sustainability
  - FEWER (Fuels, Energy, Water, Emissions Reductions)
  - Sustainability Councils
  - Communicating Sustainability Performance
  - Sustainability as Requirement for Employee Onboarding

Sustainability Council Key Message

KEY MESSAGES – June 2017

Share this information with your teams:

- Our next Sustainability Council Meetings will be
  - Wednesday, July 26 – 6:15 am & 7:15 am
  - Friday, July 28 – 6:15 am & 7:15 am

- Purchased Electricity (SHIP metric) was BT / OT / AT last month
- In May we set a new MillerCoors overall energy record at 75 MJ/HL!
- In May we set a new Shenandoah water record and got below 3.00 BBL/BBL for the first time at 2.94 BBL/BBL!

- NOTE - Sustainability Councils are responsible for making sure 1 copy of this Key Messages slide is posted on team VPM board

MillerCoors

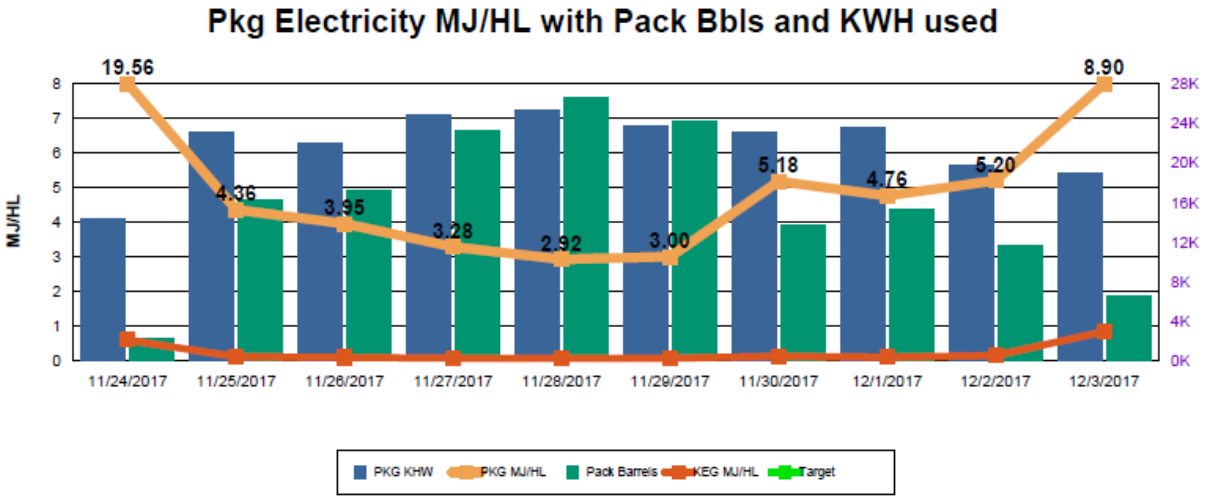
Initial when your team has reviewed this information

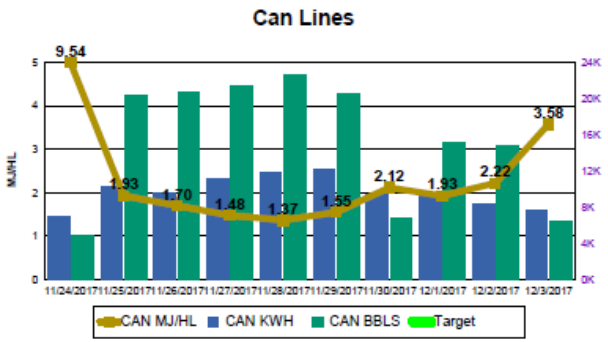
(Contact your team's Sustainability council, your leader, the Utilities Unit Manager or any member of the FEWER team for questions)

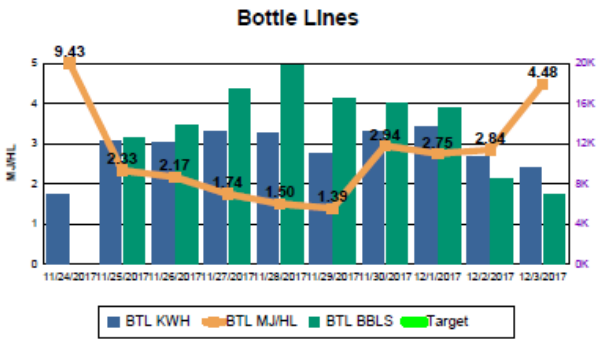
A	B	C	High Life	Blue Moon	Gold	Keystone	Rad	Silver

Packaging Electricity Metric Graphs

PACKAGING SUSTAINABILITY METRIC Graphs







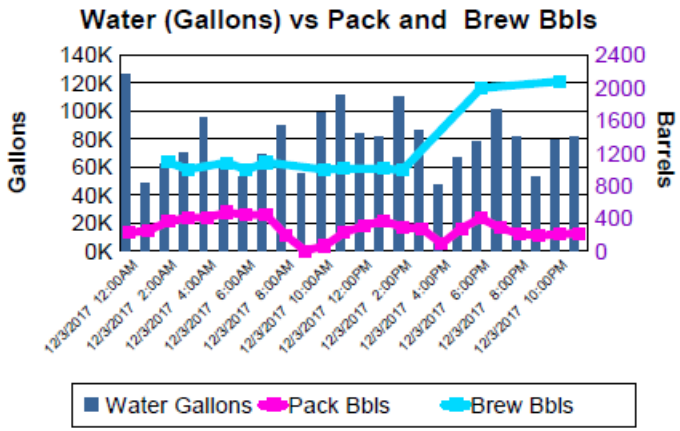
Water Sustainability Metrics 12/3/17

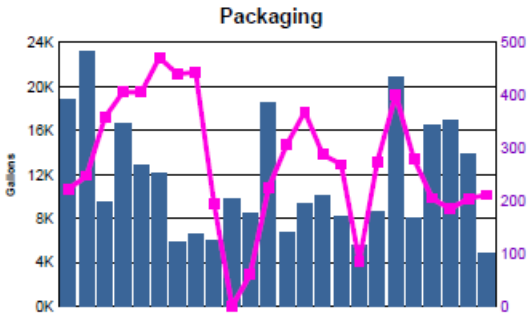
12/4/2017

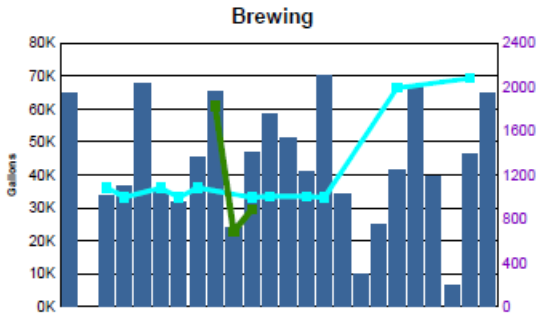
SHENANDOAH Sustainability Metrics

12/3/17
12/3/17

		WATER
WATER	**Plant**	1,888,636
	PlantEffluent	1,250,010
	Brewing	1,006,655
	Cond	232,094
	BrewWater	*453,618*
	BlendWater	*54,994*
	Packaging	278,047
	Utl	350,519
	PackBbls	*6,560*
	BrewBbls	*13,308*







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BY 2020:
IMPROVE WATER-TO-BEER RATIO OF
3:1

Trim Ammonia Compressor

- Initial set up (3) 700 TR Compressors and (1) 1000 TR Compressor
- Replaced (1) 700 TR Compressor with a smaller 475 TR Compressor
- Once all four of the machines were sequenced by our Utility Technicians we started to reap the full benefit of the project
- Savings of 750,000 KWH/Year or 2,700,000 MJ/Year

HVAC Once Thru Cooling Replacement

- Systematic replacement of nearly every HVAC once thru cooling application in the entire plant
- Technicians identified every once thru cooling application in the plant
- Using the flow rate of the water and its frequency of use we were able to prioritize the order
- Savings of 12,000,000 Gallons/Year

Brew Kettle Optimization

- The portion of the brewing process taking place in the Kettle is extremely energy intensive.
- This is the process where Hops and other flavors will be added to the Wort
- Significant reduction in the steam required to complete the process taking place in the Kettle while still imparting the proper flavor profiles and removing the VOCs
- Savings of 36,000,000 MJ/Year

Sparge Water Heat Exchanger

- Sparge water, required for the brewing process, was our highest temperature water on site.
- Therefore it drove the temperature that we kept our hot water tanks.
- We installed a heat exchanger at the sparge water point of use
- Thereby allowing us to lower the overall temperature at which we hold our hot water tanks
- Savings of 8,000,000 MJ/Year and 4,000,000 Gallons/Year

Additional Initiatives

- Landfill Free – NSF Certification
- Load Weight Production – Maximize the allowable weight of tractor trailers on the road.
- Re-purpose of roofing materials to reduce erosion control.
- Foundering member of the Shenandoah Pure Water Forum.
- Launched an outreach campaign focusing on our Sustainability efforts “We Stand for Watts not Waste. Recycling Water to Create Clean Energy”
- Annual Great Water Month project – Each September
- Board member of SV Pure Water Forum and VIRGINIAforever.

SHENANDOAH BREWERY

Thank You

Questions?

WE STAND MillerCoors FOR BEER

WINNING AS ONE