



**MILLERCOORS' GOALS FOR WATER
SAVINGS AND APPROACH TO WATER
REDUCTION**

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Brewery Water Reduction - Overview

- **Corporate Goals and Score Carding**
- **Water Usage in the Brewery**
 - **Processes**
 - **Value**
- **Evolution of Water Reduction**
- **2013 Water Reduction Projects**
- **Water Re-Use**
- **Results**
- **Conclusions**



Corporate Sustainability Goals

- Energy Usage of 120 MJ/HL by 2015
 - Electricity
 - Steam
 - Vehicle Fuel
- Water Usage of 3.18 HL/HL by 2012
- Zero Waste to Landfill by 2015
- CO₂ Self-Sufficiency of 85% by 2015
- 50% Reduction in Green House Gas by 2020

**BHAG – 4th Brewery or Better in
MillerCoors**





December 2012

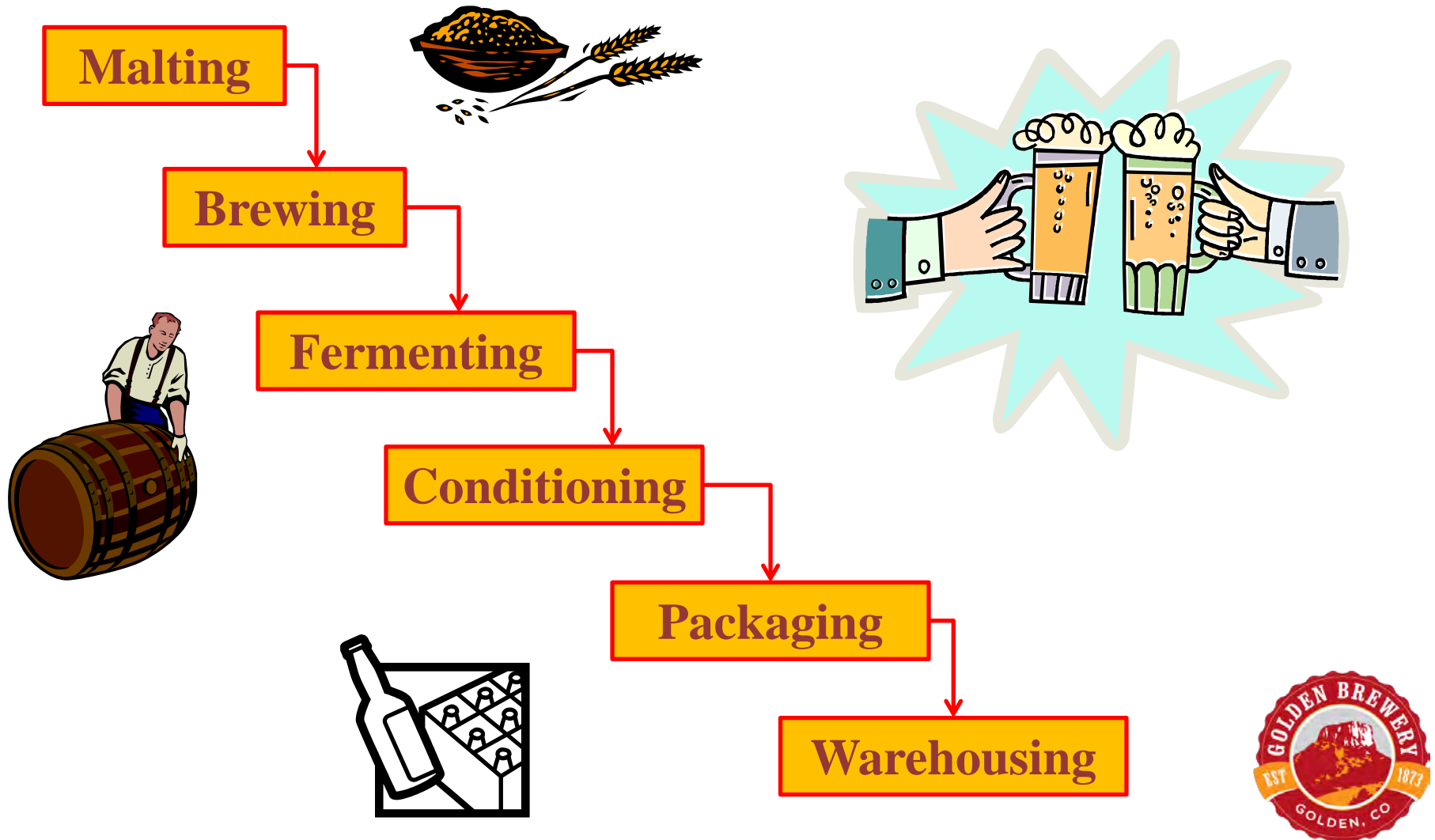
SIT Goals	2011	2012	2013	2014	2015
Water	4.07	3.83	3.57	3.38	3.18
Energy	154	143	136	128	120

Total Energy (MJ/hl)										FEWER	
	Monthly Indicator*	Mthly Actual	Mthly Stretch Target	Mthly Budget Target	Actual YTD 2012	YTD Stretch Goal	YTD Budget	STPY	% Change	People/Process	Tech
MillerCoors	↓	155	165	173	145	143	154	154	-5.7%		
Milwaukee	↓	138	154	156	133	138	140	147	-9.5%		
Fort Worth	↑	126	103	105	113	104	105	111	1.9%		
Eden	↓	162	175	165	141	156	163	170	-17.1%		
Albany	↓	134	142	156	130	132	145	140	-7.5%		
Irwindale	→	118	115	124	123	122	131	130	-5.2%		
Trenton	↓	137	160	184	145	143	164	156	-7.1%		
Golden	↓	252	288	307	226	215	229	234	-3.5%		
Shenandoah	↑	128	109	116	106	99	106	106	-0.3%		

Water (hl/hl)										FEWER	
	Monthly Indicator*	Mthly Actual	Mthly Stretch Target	Mthly Budget Target	Actual YTD 2012	YTD Stretch Goal	YTD Budget	STPY	% Change	People/Process	Tech
MillerCoors	↓	3.86	3.92	4.01	3.82	3.83	3.92	4.07	-6.0%		
Milwaukee	↓	3.63	3.68	3.75	4.07	3.85	3.92	4.77	-14.8%		
Fort Worth	↑	3.59	3.31	3.38	3.47	3.41	3.48	3.53	-1.8%		
Eden	↓	3.46	3.97	4.05	3.34	3.77	3.85	3.91	-14.6%		
Albany	↓	3.53	3.54	3.62	3.67	3.60	3.68	3.81	-3.6%		
Irwindale	↓	3.36	3.53	3.60	3.69	3.66	3.73	3.73	-1.1%		
Trenton	↓	3.56	3.98	4.16	3.56	3.55	3.71	3.76	-5.2%		
Golden	↓	5.35	4.85	5.01	4.63	4.56	4.71	4.82	-3.9%		NP
Shenandoah	↓	3.82	4.09	4.15	3.86	3.91	3.97	4.09	-5.8%		

Monthly Indicator	Monthly/YTD/Budget KPI	EWER - People/ Process & Technolog
High Usage Typical Usage Reduced Usage	*Monthly Indicator relative to 2009-2011 usage rates. Linear regression model factors include brewed, packed, weather, rainfall, electrical generation. Above Upper Target Between Stretch & Upper Target Stretch Reduction	Nothing Planned - NP <60% 60-80% >80%

Brewery Process Overview



Brewery Water Value

- **Value of Water**
 - Temperature**
 - Treatment**
 - Chemicals**

- **Beer!**
- **Condensate – Hot/RO**
- **Hot CIP water**
- **Ambient water – A Water, B Water**
- **Chemicals**
- **Cooling Water**
- **Wastewater**
- **“Clean” Wastewater**



High \$



Low \$



Evolution of Water Reduction

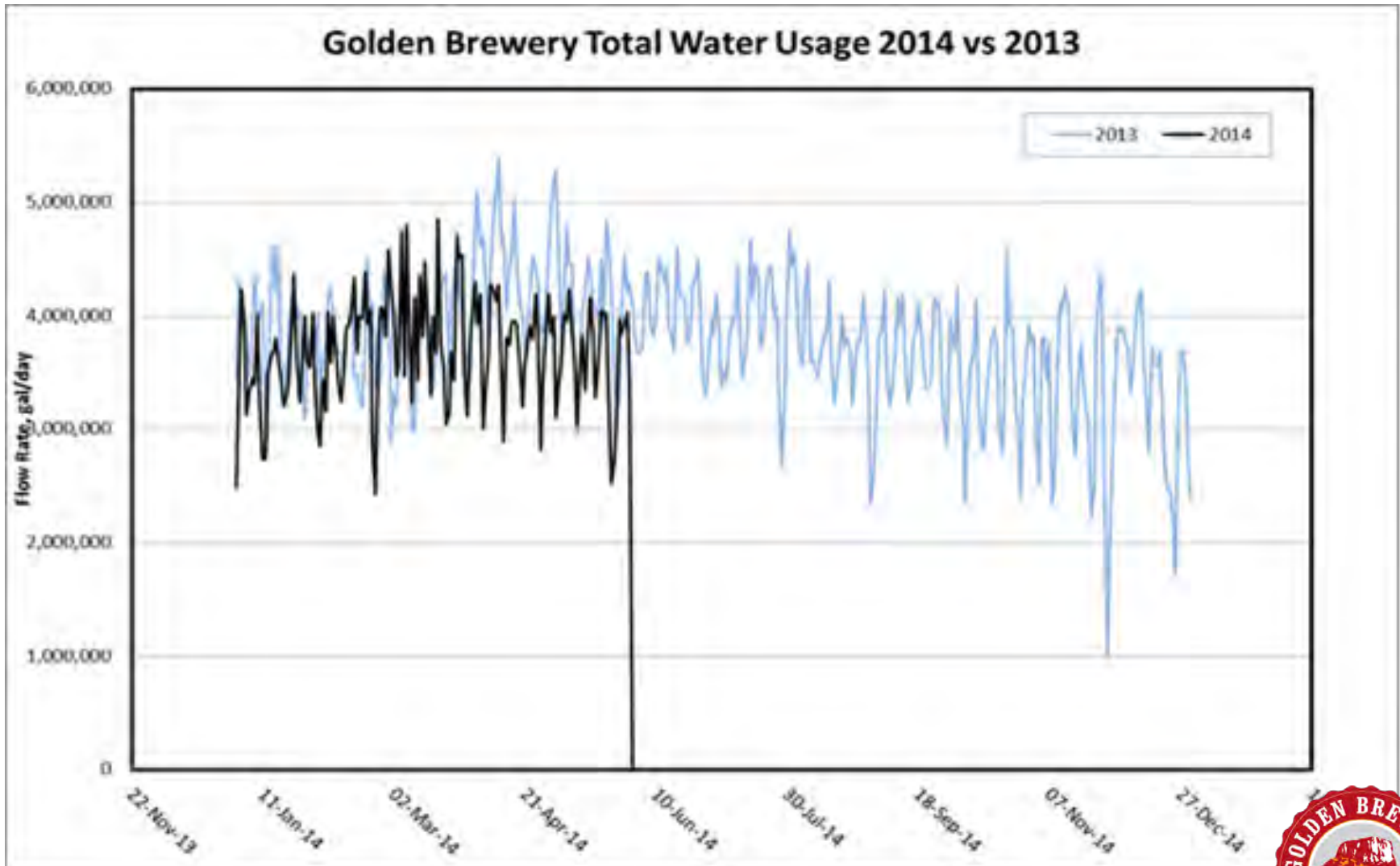
Where do we Start??

- I. Stop the Bleeding**
 - Leaks
 - Turn it off
- II. Process Changes**
 - Simple
 - Complex
- III. Focus on Energy**
 - Water Will Follow
- IV. Capital Projects**
 - Metering
 - CO2 Scrubber
 - Condensate/Flash Steam Recovery
- V. Water Re-Use**

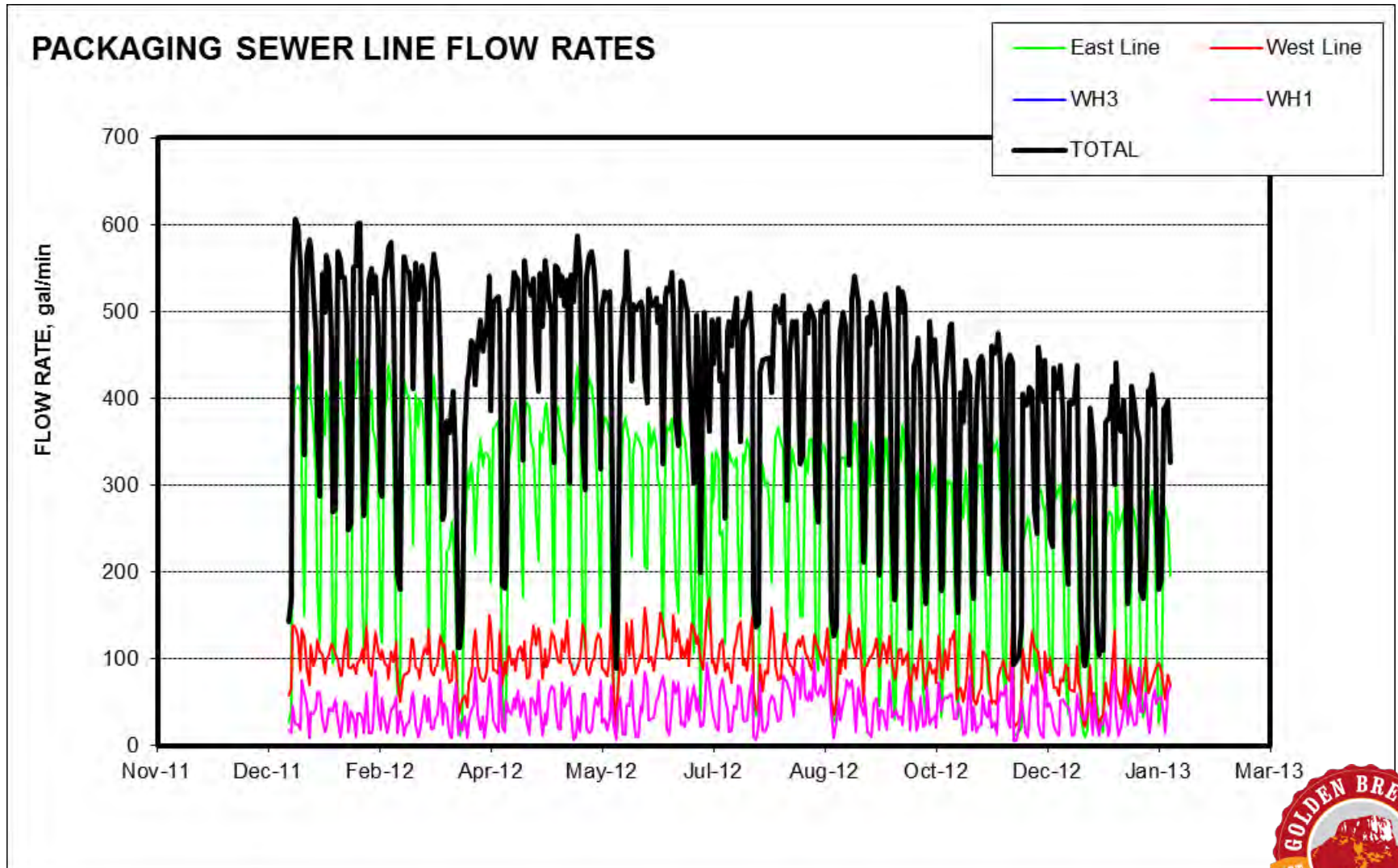




Savings Opportunities – Water and Wastewater



Savings Opportunities – Water and Wastewater



Golden Brewery Water Reduction - 2013

- Reduce Kettle Evaporation – 0.03 HL/HL
- Packaging Shut off B Water to Full Can Rinsers – 0.023 HL/HL
- C14 Fire Pump Seal Water Leak Repair – 0.02 HL/HL
- Aging Recovery of CIP Rinse – 0.015 HL/HL
- Brewing Shut off Dead Leg Bleeders DA Manifold – 0.004 HL/HL
- UOPS Correct Condensate Leak to GBL – 0.015 HL/HL
- **Prevent Hot A Water Overflow – 0.11 HL/HL**
- 4-Can Condensate Recovery – 0.001 HL/HL
- Facilities Turf Reduction Water Savings – 0.006 HL/HL
- Facilities Evaporative Cooling Reduction – 0.023 HL/HL
- Brewing FIT Water Savings – 0.059 HL/HL
- PWTP Waterless Dechlorination – 0.003 HL/HL
- C12 Hot Water Heater for Liquid Adjunct Pump – 0.016 HL/HL
- **UOPS B1 Cooling Water Evap Reduction – 0.044 HL/HL**
- C11 Cold Sanitization – 0.011 HL/HL
- YDP CIP Re-Use of Still Bottoms – 0.005 HL/HL
- Packaging Vacuum Pump Seal Water Reclaim – 0.005 HL/HL
- Gov Cellar – re-use sanitization water for flushing tanks and headers – 0.00057 HL/HL
- Brewing Hot Water Cycle Time Reduction – 0.025 HL/HL
- Brewing Reduce Wort Cooler CIP Flush Rates – 0.0028 HL/HL
- 7-Bottle Warmer Reduced Water Changes – 0.0005 HL/HL
- Fermenting CIP Pulse Cleaning – 0.024 HL/HL
- YDP B-Water Overflow Valve Corrected – 0.019 HL/HL
- C12 Basement Hot Water Heater Replacement – 0.01 HL/HL
- **UOPS C1 Cooling Tower Evap Reduction – 0.15 HL/HL**

1 HL/HL =
300 MG/Yr
600 gpm



Water Re-Use/Recovery Considerations

- **Food Plant Hygiene**
- **Simple Projects First**
- **“Clean” Re-Use First**
- **Look for “Dirty” Sinks**
- **Distance to Process**
- **Cooling Water**
- **Consider Energy**



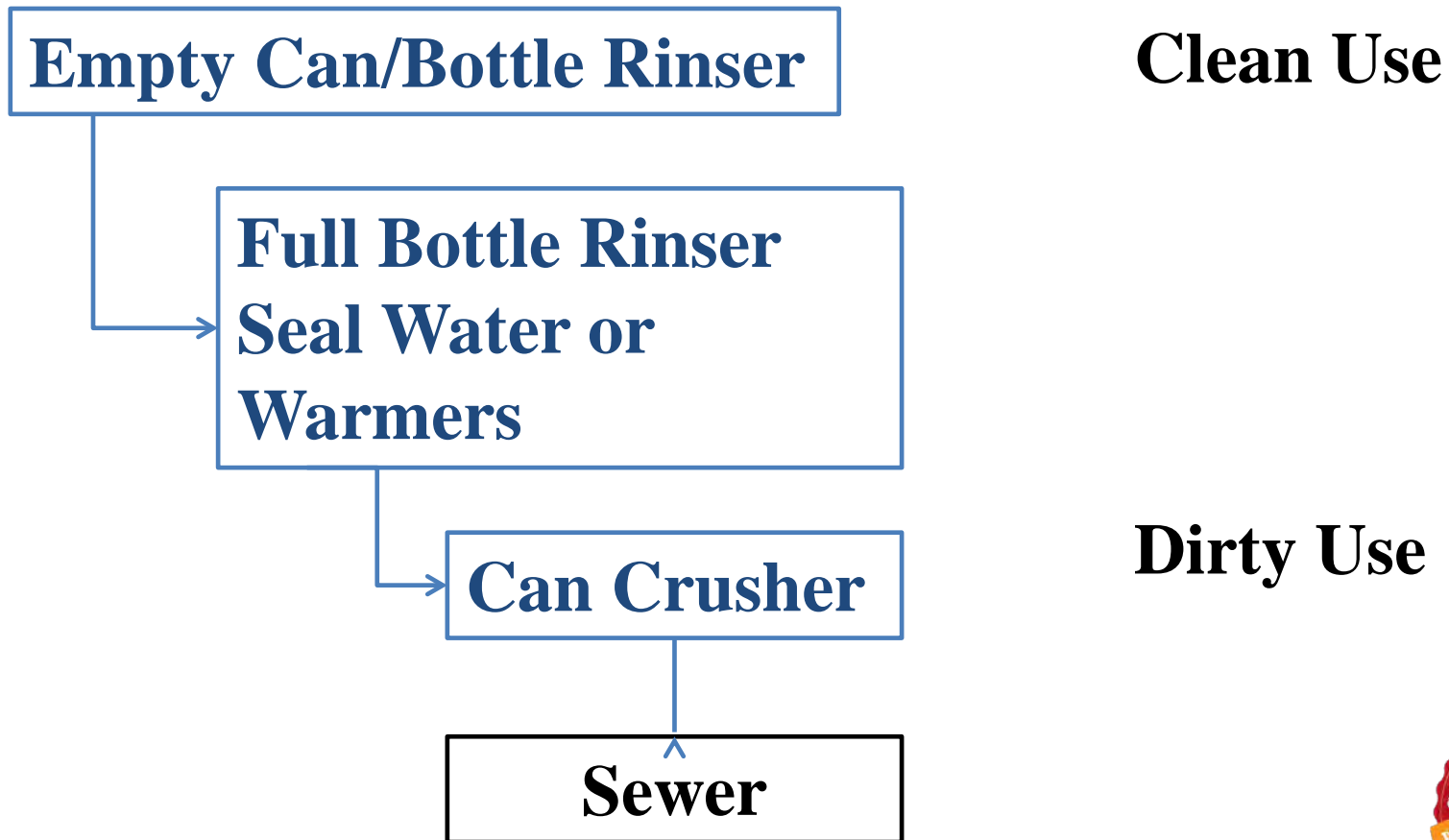
Water Re-Use/Recovery

- **YDP use of still bottoms**
- **Liquid Adjunct Pump
Recirculation**
- **Vac Pump seal water recirc**
- **CIP Pre-rinse**
- **Packaging Reclaim Cascade**
- **CO2 Scrubber Water – Re-Use for
Regen Steam Cooling Water**



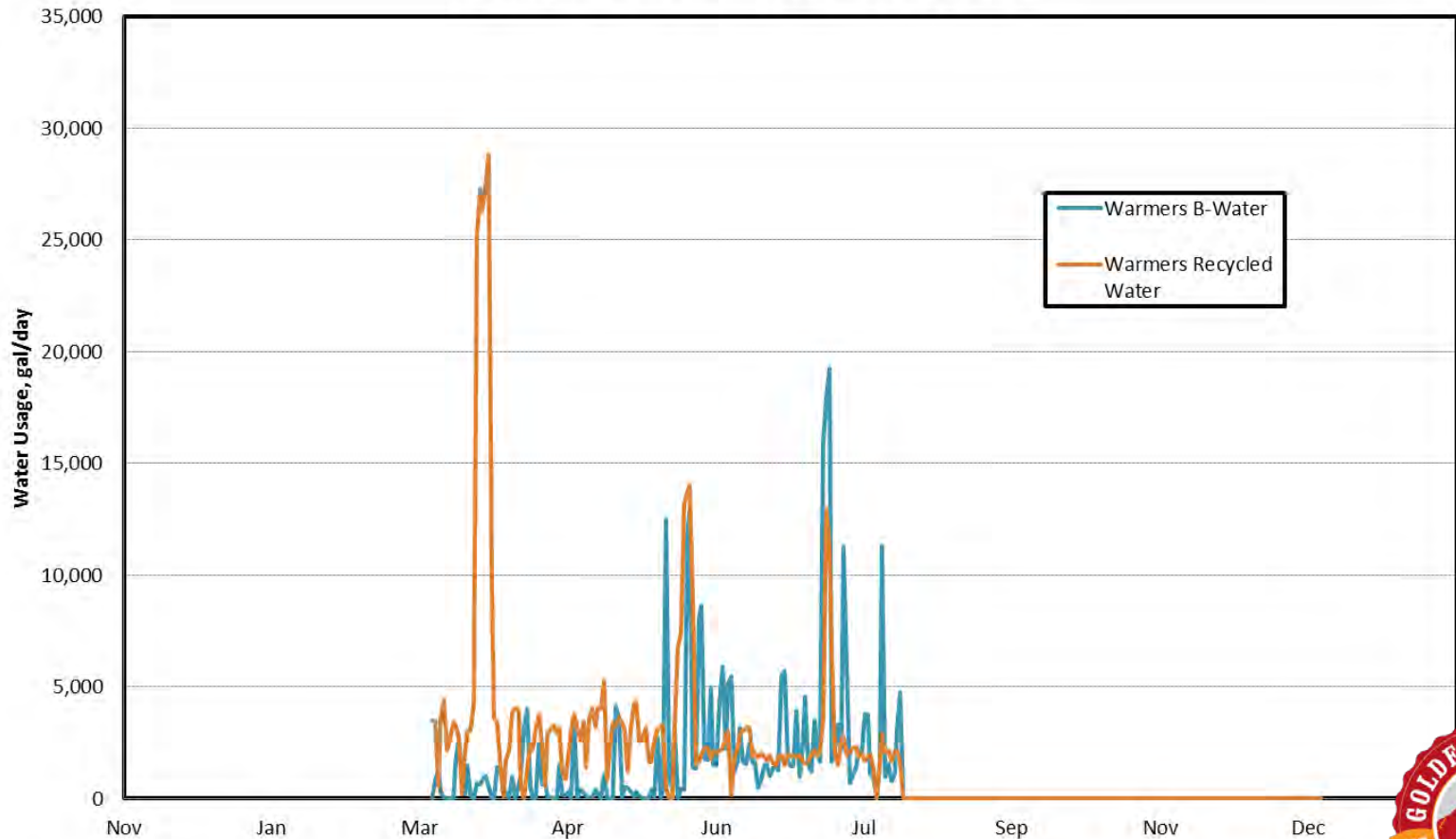
Water Re-Use/Recovery

Packaging Cascade



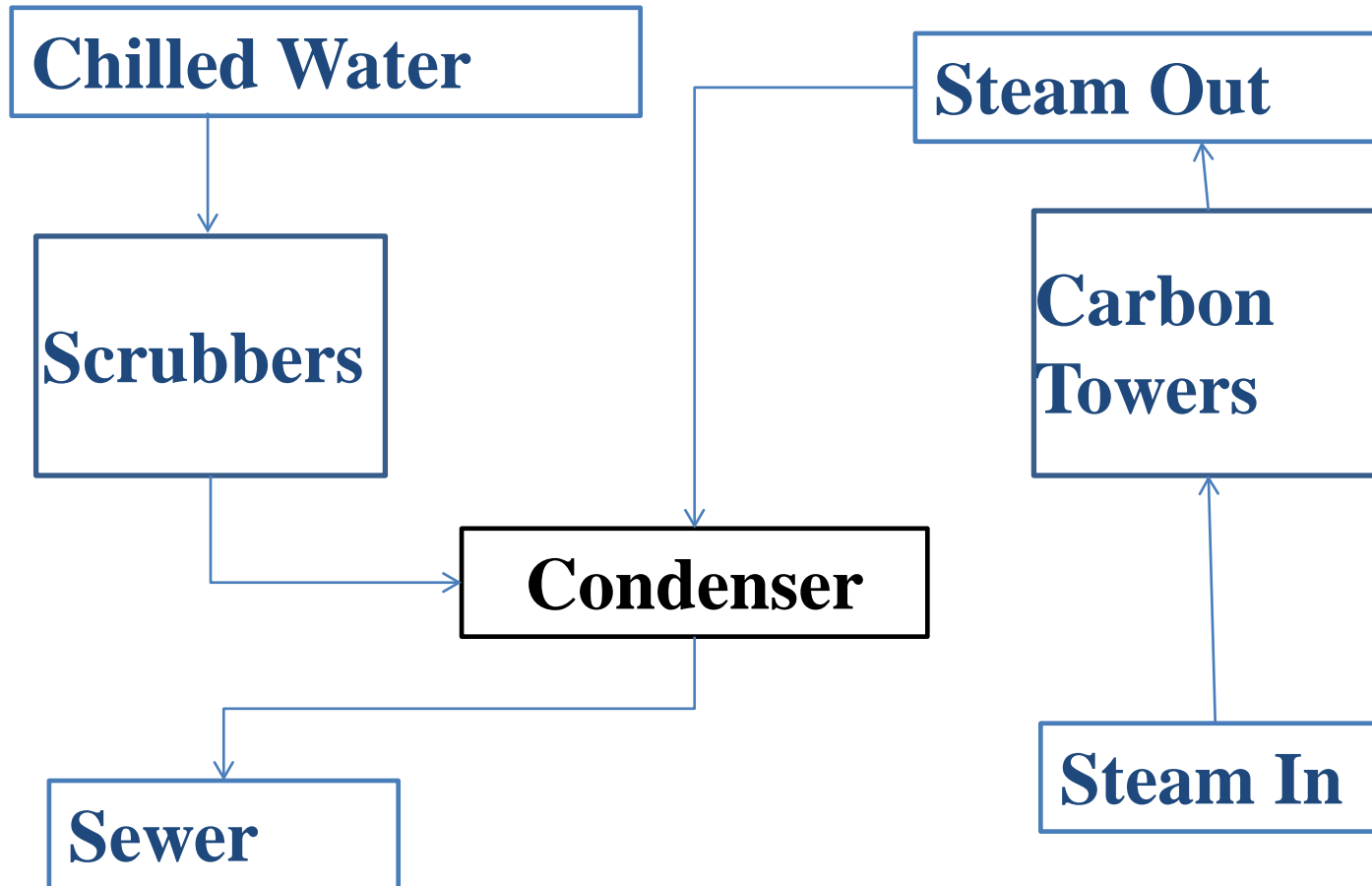
Water Re-Use/Recovery

Packaging Water - Warmers - 2014



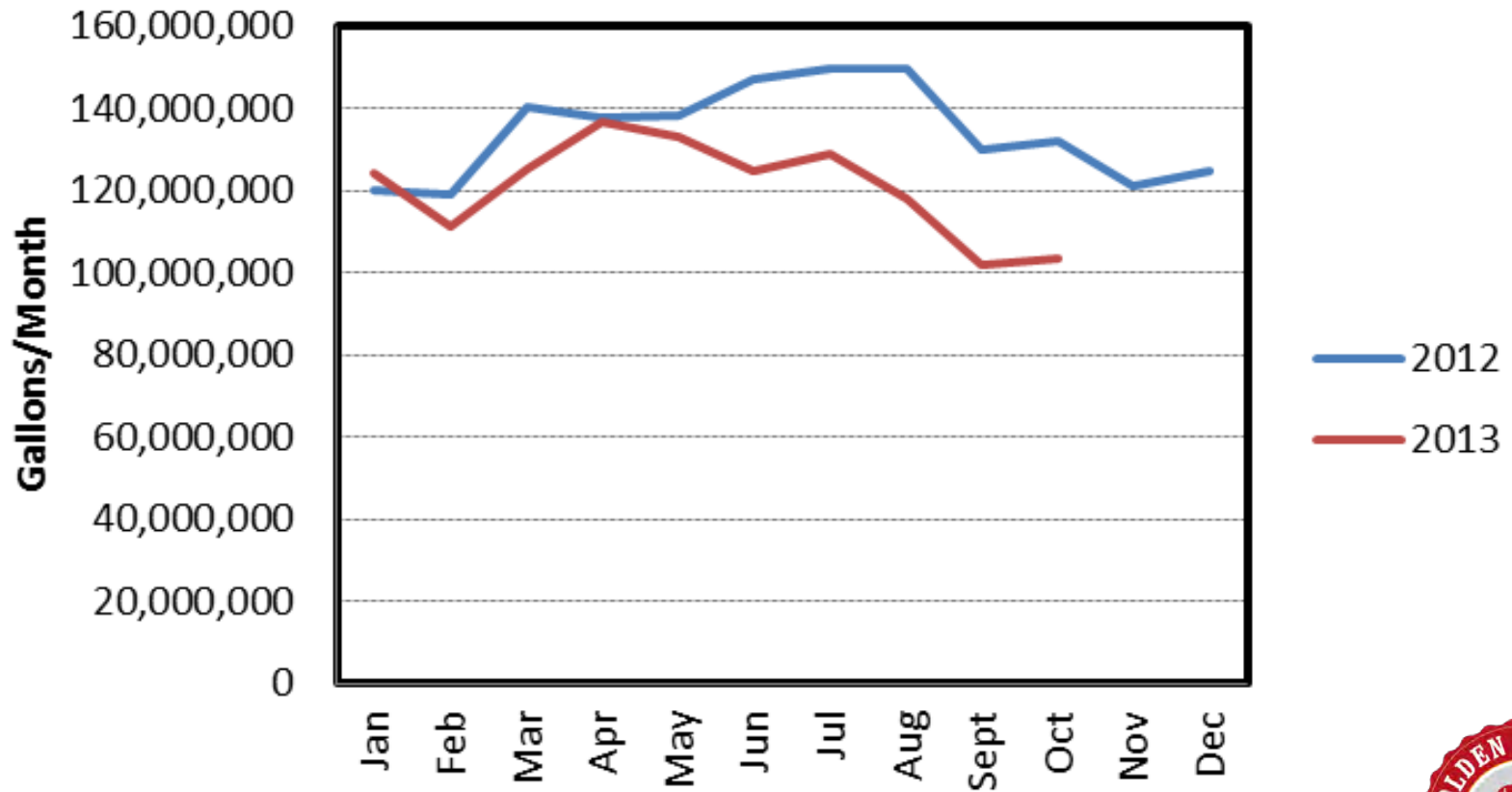
Water Re-Use/Recovery

CO2 Scrubber Cooling Water



Golden Brewery Water Reduction - 2013

Total-Water Reduction 2013 vs 2012





	2011 Actual	2012 Actual	2013 Actual	2014 SIT Goal	2015 SIT Goal	F20 Goal
Water	4.07	3.82	3.48	3.31	3.18	3.00
Energy	154	146	123	117	111	100

Total Energy (MI/hl)									
	Mthly Actual	Mthly SIT	Mthly Glide Slope	2014 Actual YTD	YTD SIT	YTD Glide Slope	STPY	% Change	BHAG
Albany	118	113	117	124	117	118	120	3.3%	115
Eden	111	110	112	141	131	135	141	0.2%	125
Fort Worth	94	91	94	106	100	103	107	-1.8%	97
Golden	119	108	112	146	129	134	146	-0.3%	130
Irwindale	91	105	107	101	103	105	107	-6.1%	100
Milwaukee	94	103	106	118	122	125	132	-10.7%	118
Shenandoah	82	92	95	92	99	102	104	-11.8%	96
Trenton	103	106	108	123	117	119	119	3.4%	115
MillerCoors	103	104	107	121	116	119	124	-2.2%	114

Water (hl/hl)									
	Mthly Actual	Mthly SIT	Mthly Glide Slope	2014 Actual YTD	YTD SIT	YTD Glide Slope	STPY	% Change	BHAG
Albany	3.39	3.29	3.36	3.30	3.32	3.39	3.51	-6.2%	3.20
Eden	2.99	2.88	2.97	3.09	3.01	3.06	3.09	0.0%	2.80
Fort Worth	3.23	3.14	3.20	3.21	3.09	3.15	3.27	-2.0%	3.07
Golden	3.58	3.50	3.56	4.00	3.80	3.87	4.12	-2.9%	3.75
Irwindale	2.86	3.12	3.19	3.09	3.19	3.26	3.32	-6.9%	3.15
Milwaukee	3.15	3.52	3.61	3.19	3.52	3.61	3.63	-12.3%	3.35
Shenandoah	3.40	3.31	3.51	3.38	3.37	3.56	3.52	-4.0%	3.29
Trenton	2.97	2.69	2.77	3.17	2.93	3.02	3.23	-1.7%	2.95
MillerCoors	3.21	3.18	3.27	3.34	3.30	3.38	3.49	-4.5%	3.22

Conclusions

- 1. Leadership**
- 2. Scorecarding**
- 3. Shared Learnings**
- 4. Start Simple – Build Momentum**
- 5. Process Changes**
 - **Minimum Cost**
 - **High Impact**
- 6. Capital Projects**
 - **High Cost**
 - **Impact Depends on Culture**



Golden Brewery Energy Savings Culture

“NEVER DOUBT THAT A SMALL GROUP OF THOUGHTFUL, COMMITTED PEOPLE CAN CHANGE THE WORLD. INDEED, IT IS THE ONLY THING THAT EVER HAS.”

Margaret Mead

