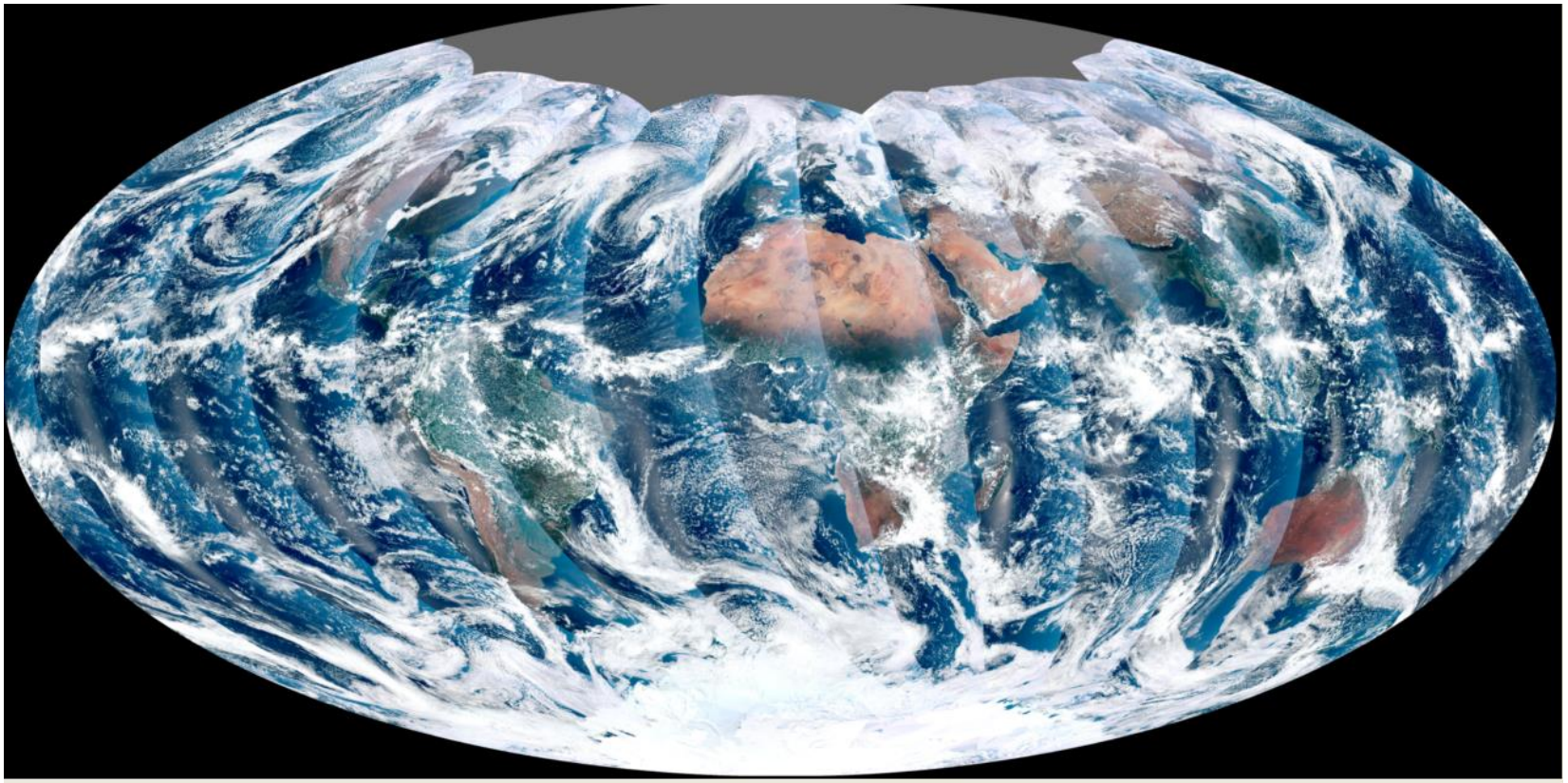
Winery Water Conservation

John Nagle
Environmental Manager



E&J. Gallo Winery

“We never know the worth of water till the well is dry.”
— Thomas Fuller

Gallo's Water Initiative Drivers

- Significant Environmental Aspect
- California Sustainable Wine Practices
- Capacity constraints
  - Construction of new ponds.
  - Faster waste water processing

Sonoma Winery

- **Phases approach to characterize winery waste water (www) for all processes.**
  - **Water metering**
  - **Sample and analyze process www**
  - **Implementation & Education**
    - **Investigation and innovation of cleaning processes.**
    - **Education of Employees**
    - **Bottling Line Sanitation Water Recycling project**

WWW Characterization

Blue print for quick implementation

- Winery Waste Water Characterization

  http://www.wineinstitute.org/winerywaterguide

- Portable ultrasonic meters, DEREX INC rental

  Bottling, Barrels, Press, Cellars

- Analysis of process specific effluent

  ph, tss, temperature, bod, cod, metals, conductants.

- Development of potential water saving projects
- Employee campaign

  Culture of conservation

Water Goals

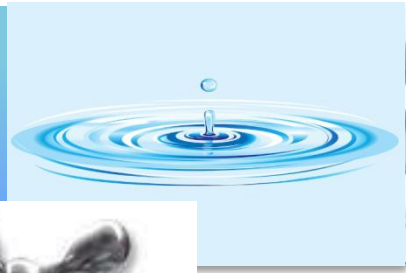
- Reduce size and cost of www treatment.
- Reduce Water Consumption in 2010 by 25%
- Target a 4:1 ratio gallons of water used to gallons of wine produced
- Identify and develop sequential water reclaim and reuse for specific impactful processes.
- Sustain or improve sanitation while conserving water
- Identify future opportunities

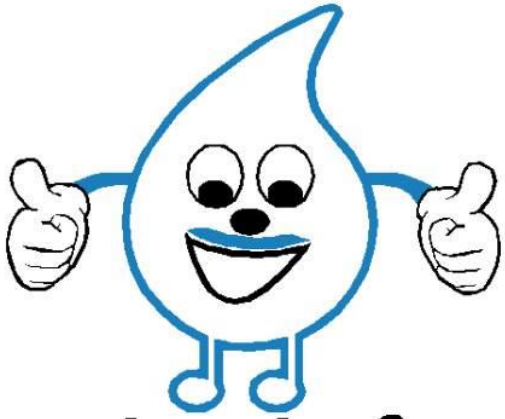
Tactics

- Awareness Training
  - Sustainability Walks
  - Water Conservation Talks
  - Conservation Postings
- Practices
  - Increase usage of nozzles
  - Increase usage of pressure washers
- Processes
  - White Press Sanitation
  - Bottling Sanitation
  - Barrel water reuse

Save a Little, Saves a Lot!

Awareness





Do your Part to Save Water!

Awareness

Flow Rates

- 3/4 “ hose — 35 gpm
- ¾” hose with nozzle — 10 gpm
- Pressure Washer — 3 - 6 gpm
- 2” Hose — 200 gpm

Education and Enlistment

Save a Little, Saves a Lot!

Water Facts:

¾ inch hose, 35 gpm
¾ inch hose with a nozzle, 10 gpm!
¾ inch hose with a pressure washer, 2 to 4 gpm

2 inch hose, 200 gpm
Rinsing a line for 10 minutes, 2,000 gallons!

Cost to process 1,000 gallons of waste water, $24
Total waste water in 2009, 30 million gallons
Total water processing cost 2009, $720,000

Do your Part to Save Water!

Practices

Nozzle Inventory

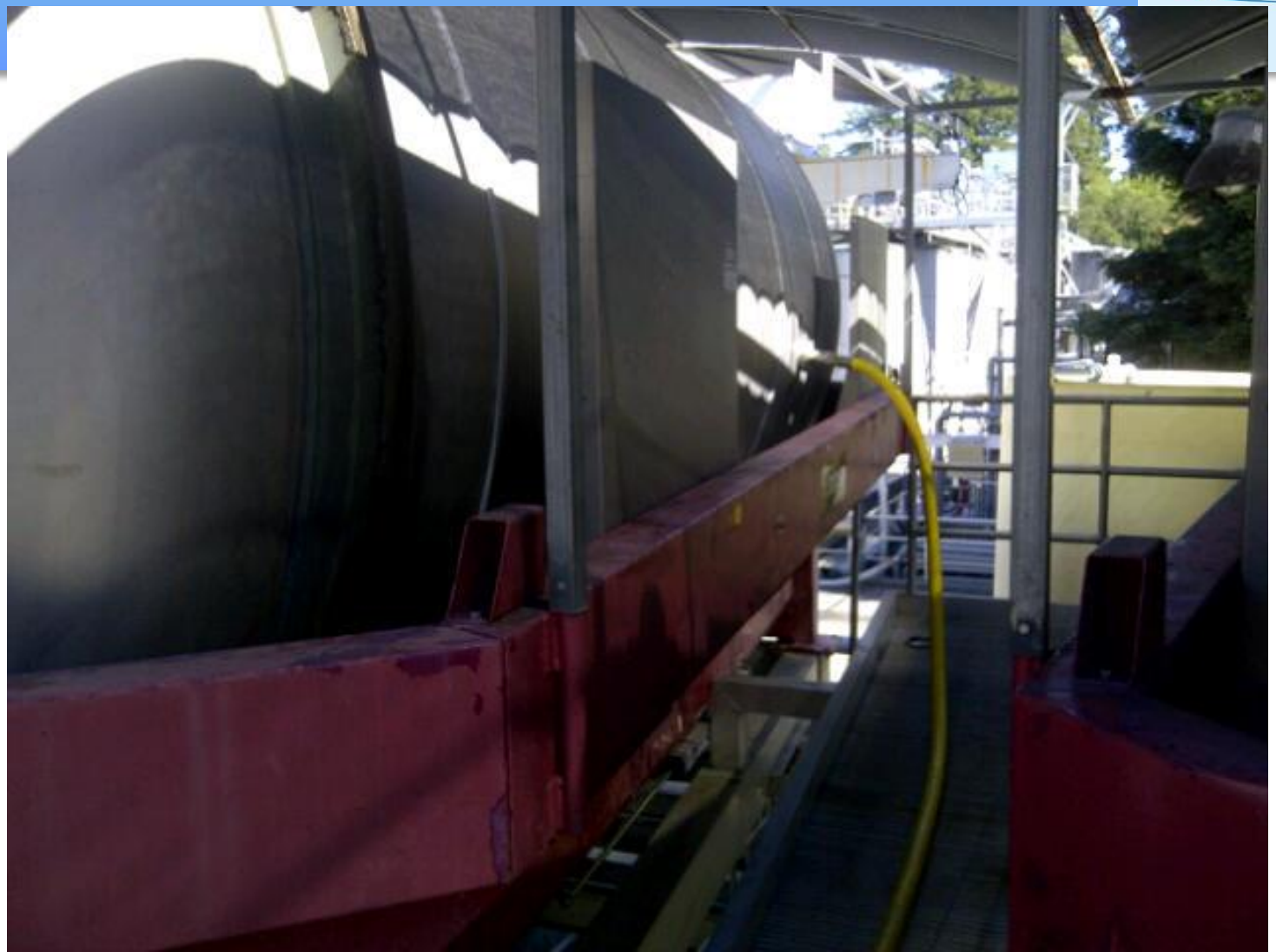
- # of hose drops in winery 220
- # of nozzles available 122 (55%)
  - Re-locate existing nozzles to high use areas
  - Research improved low cost nozzle
    - Purchased 40 new nozzles
    - ½ cost of current nozzle

Practices

Pressure Washer Use

- Maximize use for weekly sanitation, harvest
- Tool of choice for EGVM trailer washing
  - Research hot water pressure washer
    - Demonstrated 2 models with positive feedback
  - Research pressure floor washer
    - Purchased floor washer (used on floors and belts)

Processes



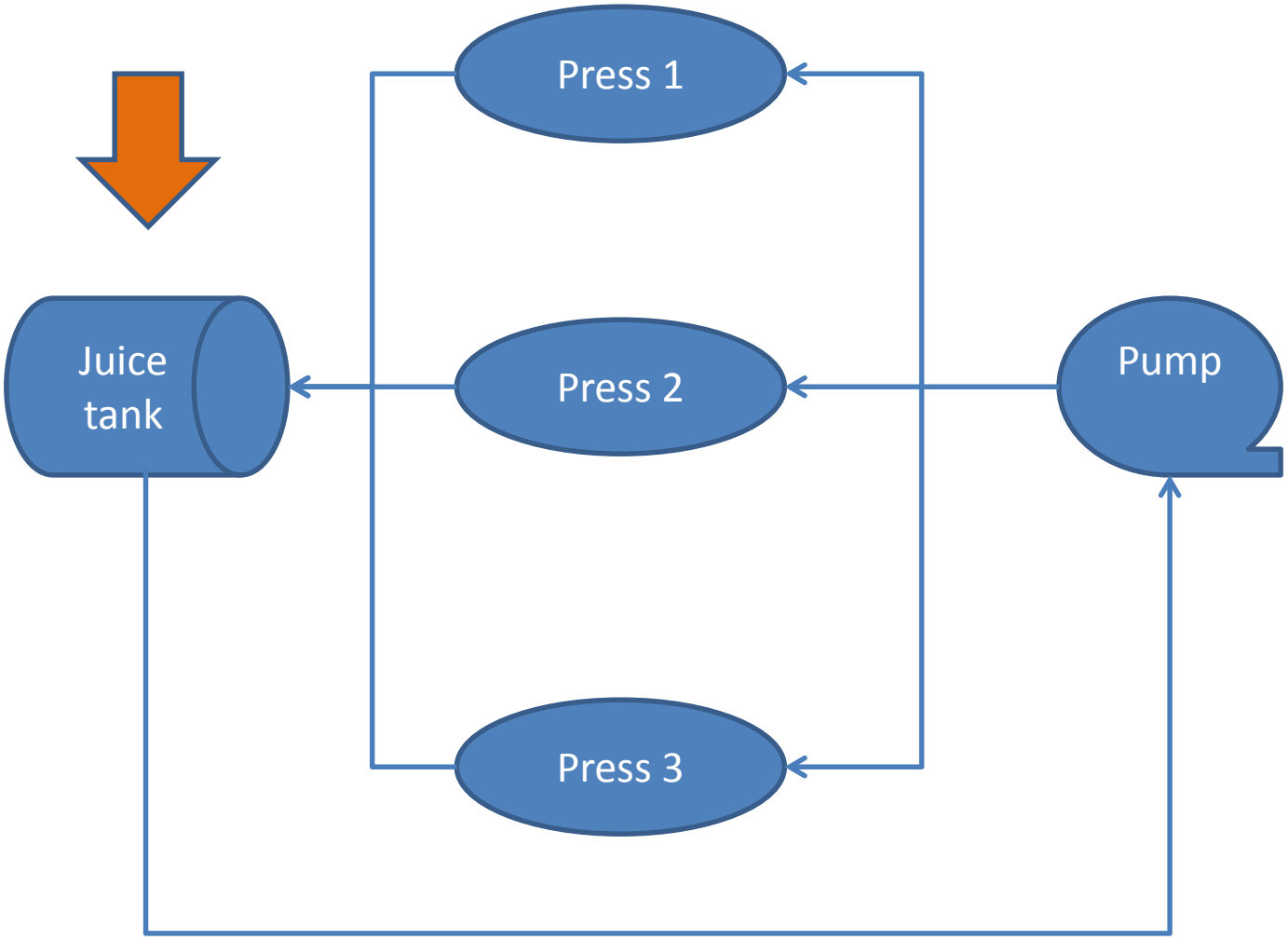
Processes

White Press Sanitation

- Create Circulation Process

Metrics to clean 12 Presses		
	Original Process	Circulation Process
Water	15,000 gal	3,000 gal
Sterox	32 bags	8 bags
CLO2	24 gal	30 gal
Time	24 hrs	8 hrs

White Press Flow



White Presses

3 tank
Sterox
Rinse
Chlorine dioxide

Bottling

Mono Block

- Bottle pre-rinse
- Nitrogen purge
- Cleaning and Sanitation

Bottling Line Sanitation

Past Practice

- 10,000 gallons hot water consumed during both Startup & Shutdown Sanitation
- All water was single pass
- Annual Water Usage:
  600,000 gallons

Bottling Line Sanitation

Process Improvement

- Plumbing modification to allow closed loop circulation
- Modification will allow hot water and chemical circulation
- Reduce hot water usage to less than 1,000 gallons
- Return hot water to hot water storage tank
- Anticipated Annual Water Usage: <30,000 gallons

Bottling Line Pre Rinse

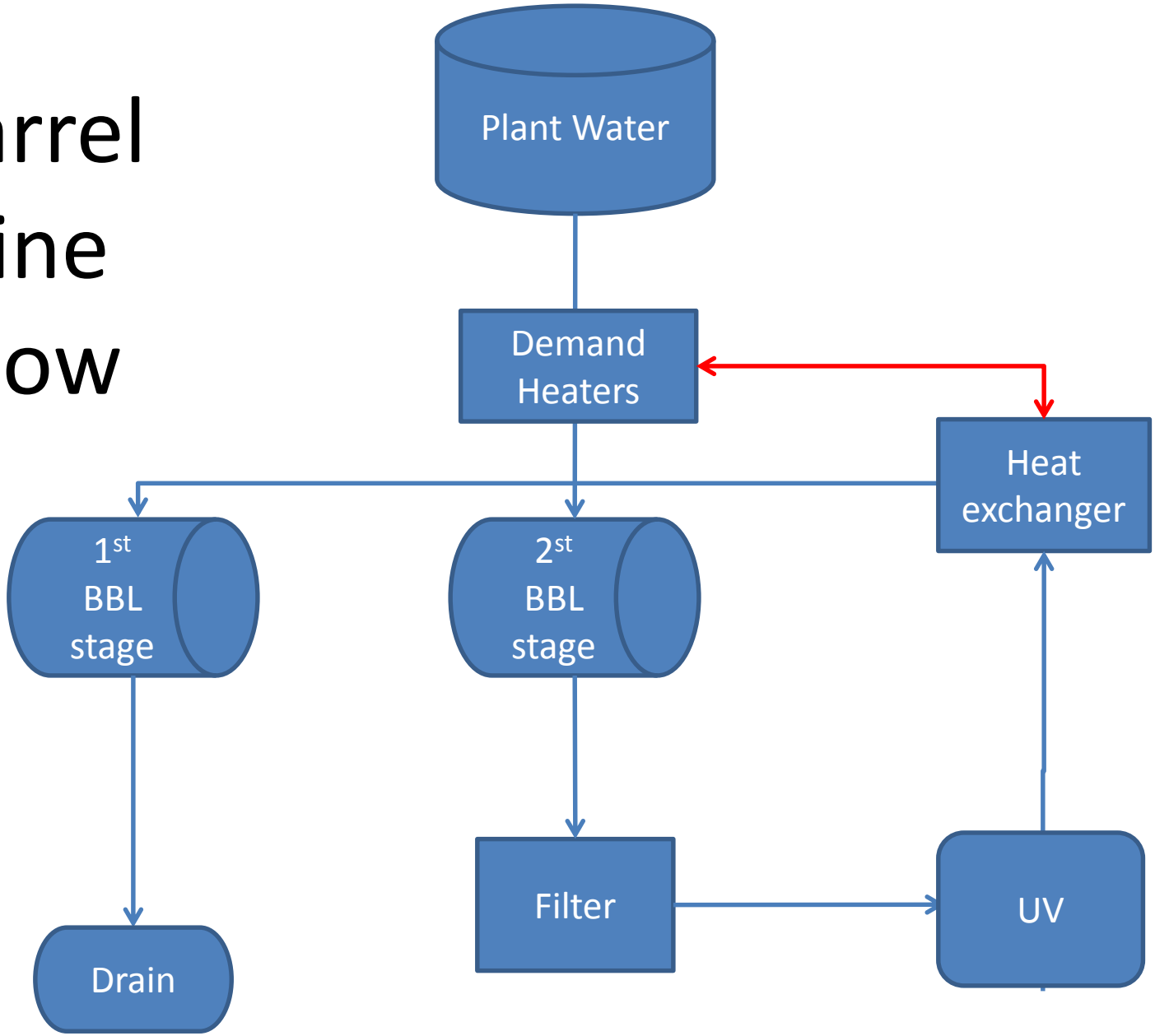
- Testing showed pre nitrogen air blast worked as well as water to rinse bottles.
- In 2012 we eliminated the use of water in the bottle rinser. This resulted in a 1 million gallons savings.
- A 97.25% reduction in bottling operations water use since start of the project.

Barrel Line

Barrel Line Reclaim

- Retrofit with 250 psi pump and 4.5 gal/min/ nozzles
- Capture the water from the sanitation stage.
- Filter, reheat and sanitize the water.
- Reuse in first stage, flushing barrels of solids.
- 50% or 400,000 gallons water use reduction annually.
- Demand hot water heaters allowed the boiler set point to be reset at 140^{o}F instead of the past set point of 210^{o}F.
- Reduce propane use at the winery by 50% with a slight increase in electrical use. 62,000 gal propane reduction.

Barrel Line Flow



Barrel Line

Water Reduction Actions

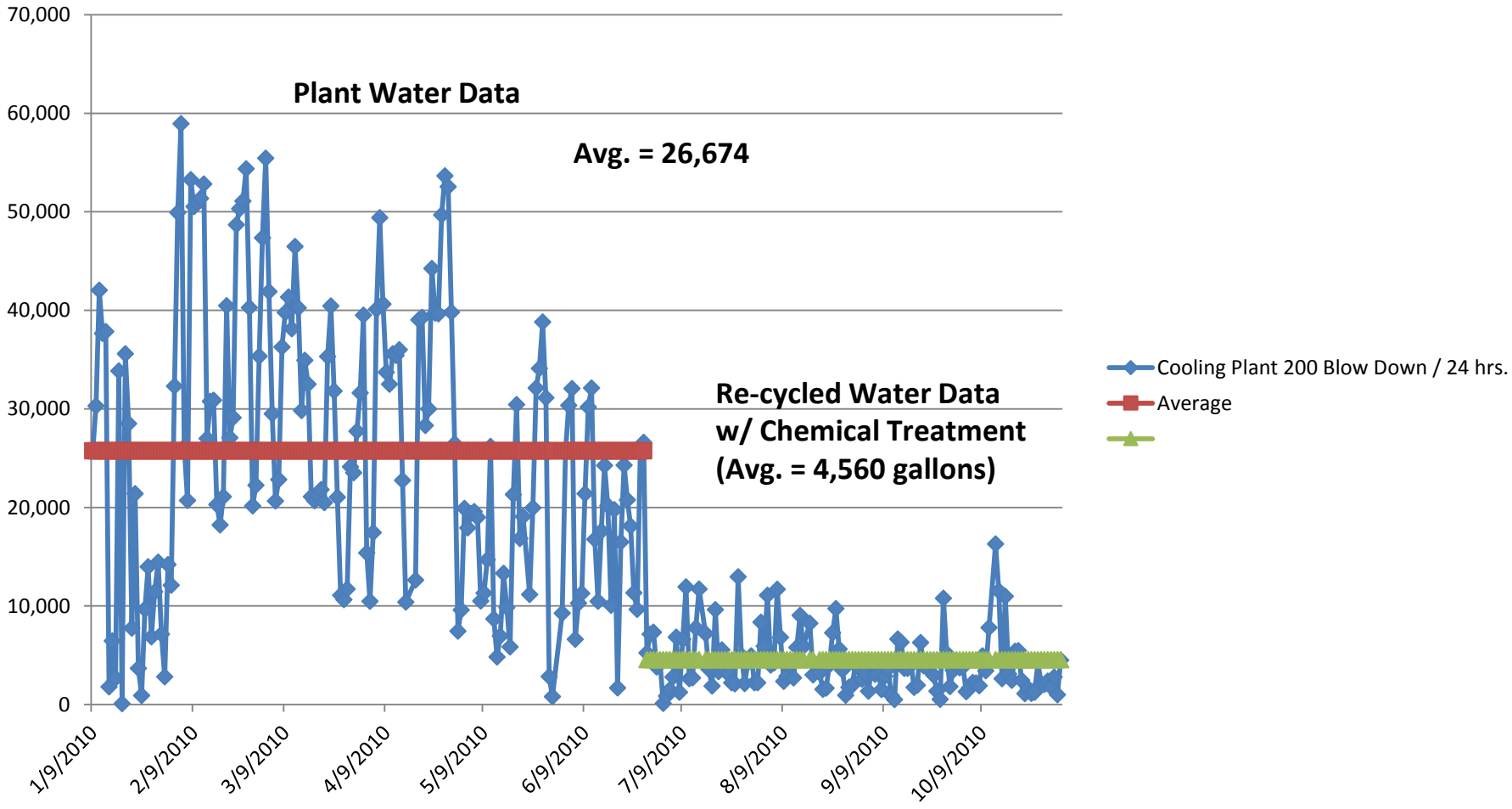
- Removed drain pans under conveyors
- Replicated white press chemical circulation
- Relocated drain holes for easy wash out
- Modified must lines for closed loop circulation of sanitation solutions
- AirPig: push wine with a water plug, pushed by air.

Rinser Water Reclaim

- Total Capital Cost = $67,950
- Savings = $39,296/yr.
- IRR = 26.4%
- Reclaimed CLO2 solution used for cooling tower makeup water at Ammonia Plant

Rinser Water Reclaim Unit

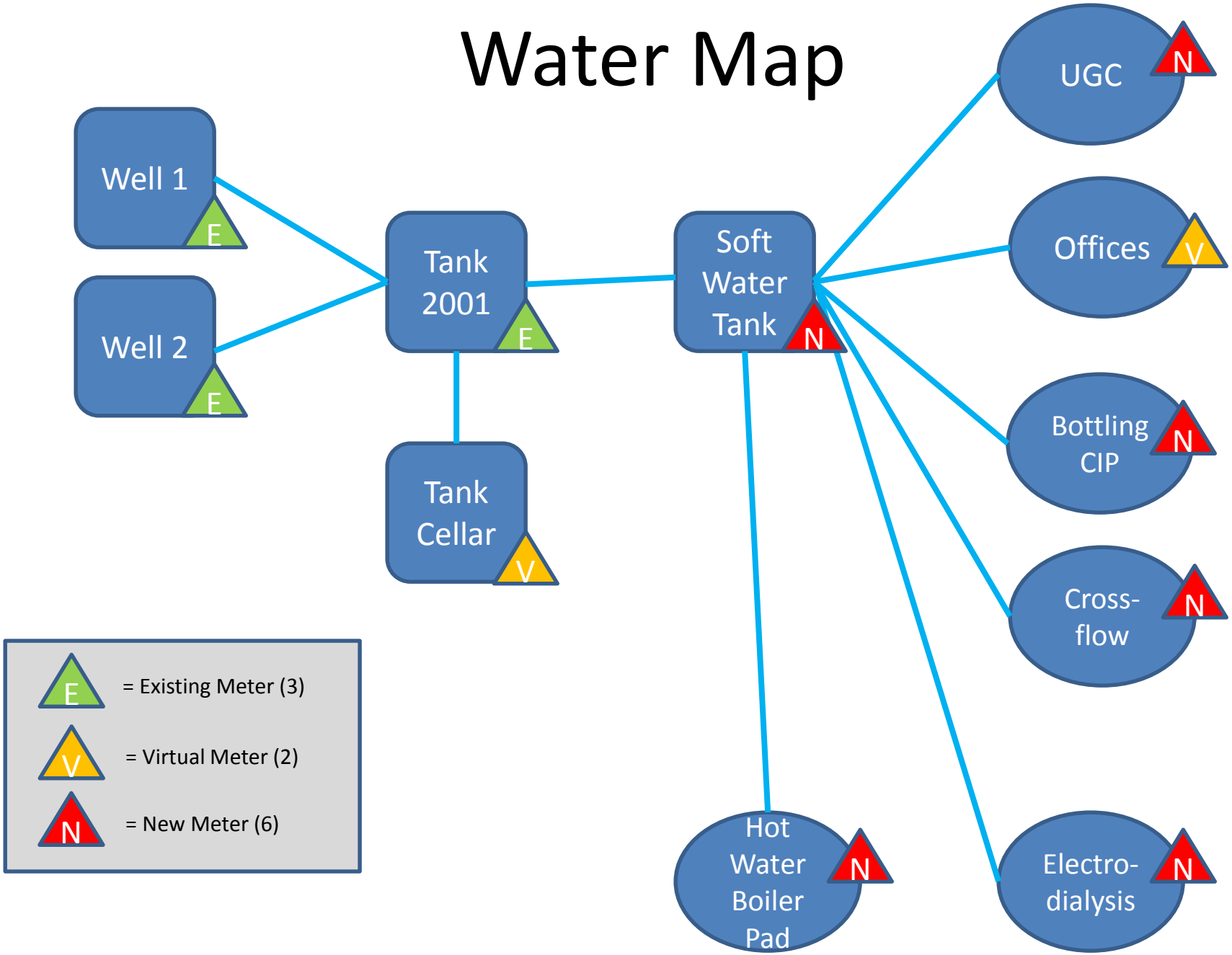
Ammonia Plant 200 Cooling Tower Makeup



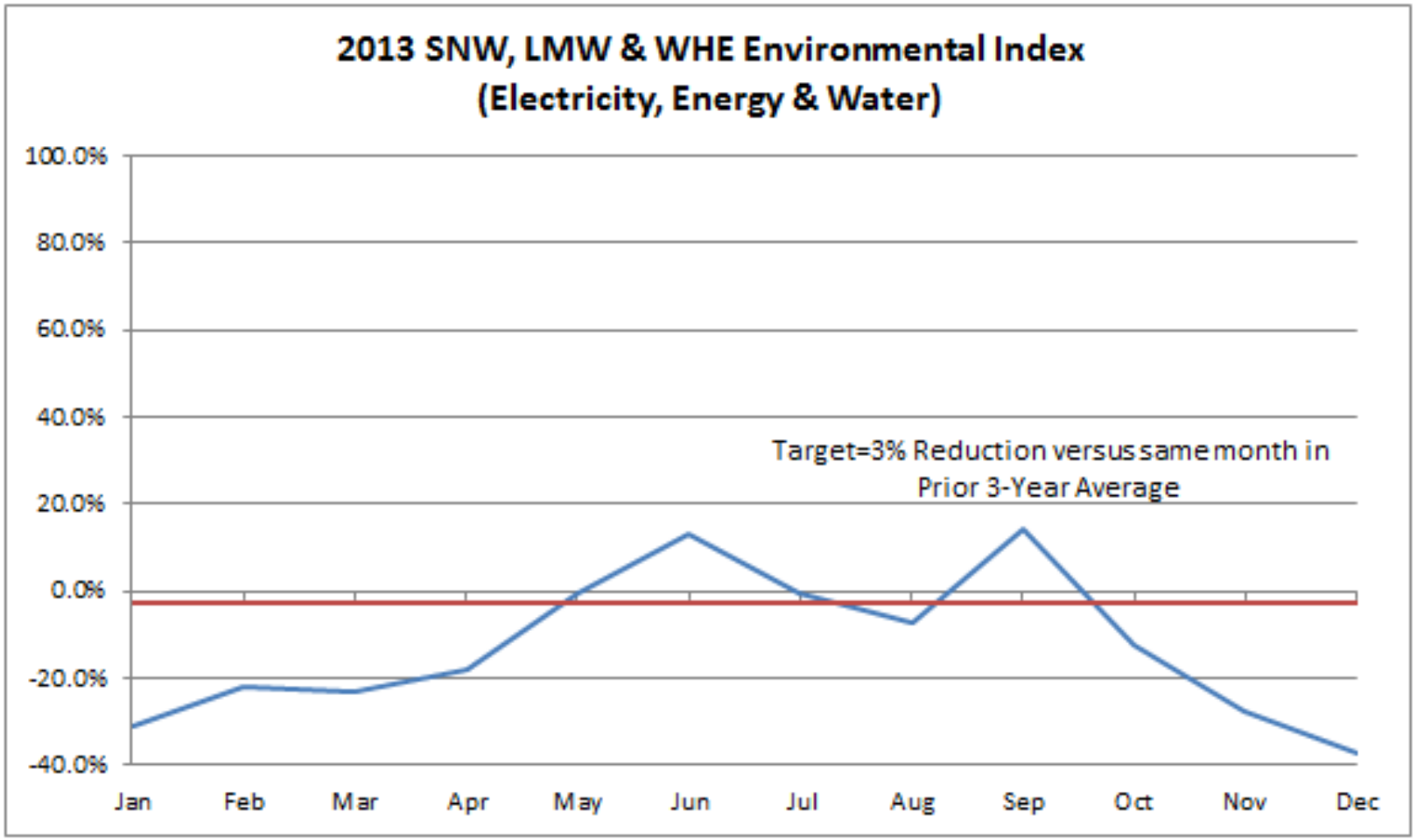
Measuring

Meters!

Water Map


Well 1
E
Well 2
E
Tank 2001
E
Tank Cellar
V
Soft Water Tank
N
UGC
N
Offices
V
Bottling CIP
N
Cross-flow
N
Hot Water Boiler Pad
N
Electro-dialysis
N
E = Existing Meter (3)
V = Virtual Meter (2)
N = New Meter (6)

KPI


2013 SNW, LMW & WHE Environmental Index
(Electricity, Energy & Water)
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
-20.0%
-40.0%
Target=3% Reduction versus same month in Prior 3-Year Average
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

Creative Water Sources

- Two Rock Vineyard irrigated entirely from Tertiary treated recycled water from Llano Rd. treatment plant.
- Triple win
  - Environmental
  - Social
  - Economic

Creative Water Sources

- Regulatory definition of Recycle Water is Urban POTW effluent.
- Processed winery waste water is not recycled water, it is a source of water.
- Turn the end of the pipe back into the winery.

“Just as water is the foundation of life, it must also be the foundation
of design in the built environment”

-Betsy Damon