



**Pollution
Prevention**



Big Gulp

**Lessons Learned on Providing P2 Tech Assistance
to Food and Beverage Manufacturers**

Wednesday, September 25, 10:00 -11:30 PDT

Webinar Housekeeping



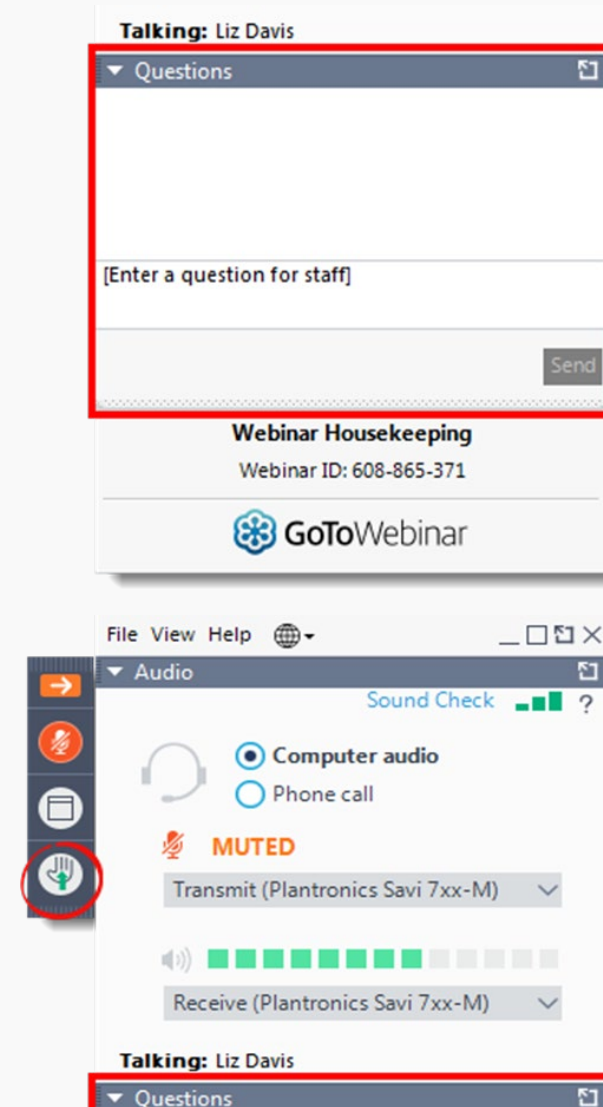
- **Technical Difficulties**: If you are having technical difficulties, you can:
 - visit www.gotowebinar.com and click on FAQs in the blue navigation bar on the left side of the page.
 - type in your technical issues in the Chat box and we can try to assist you.
 - Email Kathryn.harrison@erg.com
- **Slides**: The slides are available in the “Handouts” tab.
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Webinar Housekeeping



- Two options to submit questions:
 - **PREFERRED:** type your question into the Questions box in the Control Panel. You can do this throughout the webinar.
 - Click the “Raised Hand” icon and we will unmute you to ask your question verbally.*

*To ask a question verbally, please choose the “phone call” option in the Audio box of the Control Panel and enter the phone number, access code, and audio pin. This helps with sound quality.





Big Gulp: Lessons Learned in Food and Bev Tech Assistance



- Mackenzie Boyer & Rain Richards - Arizona State University School of Sustainability
- Josephine Fleming – CA Green Business Program
- Donna Walden – greenUp! and the NV Green Business Program

Water Conservation for Food and Beverage Manufacturers

Researchers: Mackenzie Boyer, Rene Villalobos, Treavor Boyer, Rain Richard



MARICOPA COUNTY INDUSTRIAL WATER USE ANALYSIS

>40,000 Companies in Maricopa County (MAG List)

>1,000 in GPEC Target Industries (NAICS)

383 Contacted

104 Participated

Hardness
External Operations
Reuse Expertise
Regulatory Environment
Pressure Leader
Salinity Leachate
Discharge Cooler
Home Ammonia Alum Filtering
Reuse
Cost Reduction
Cost Return On Investment
Landscape
Usage Temperature
Cooling
Reverse Osmosis
Bacteria



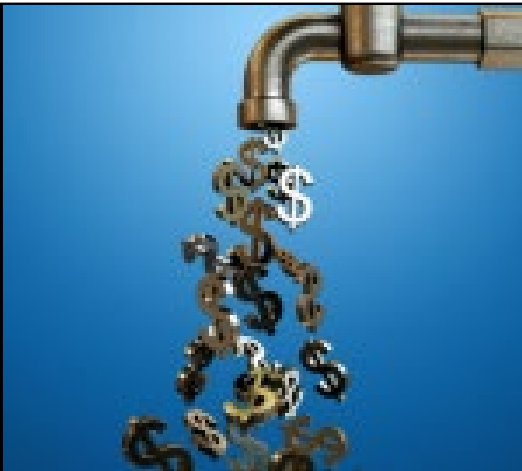
Water quality

- Hardness/salinity
- Influent variability



Cooling water

- Quantity and quality
- Blowdown and efficiency



Cost reduction

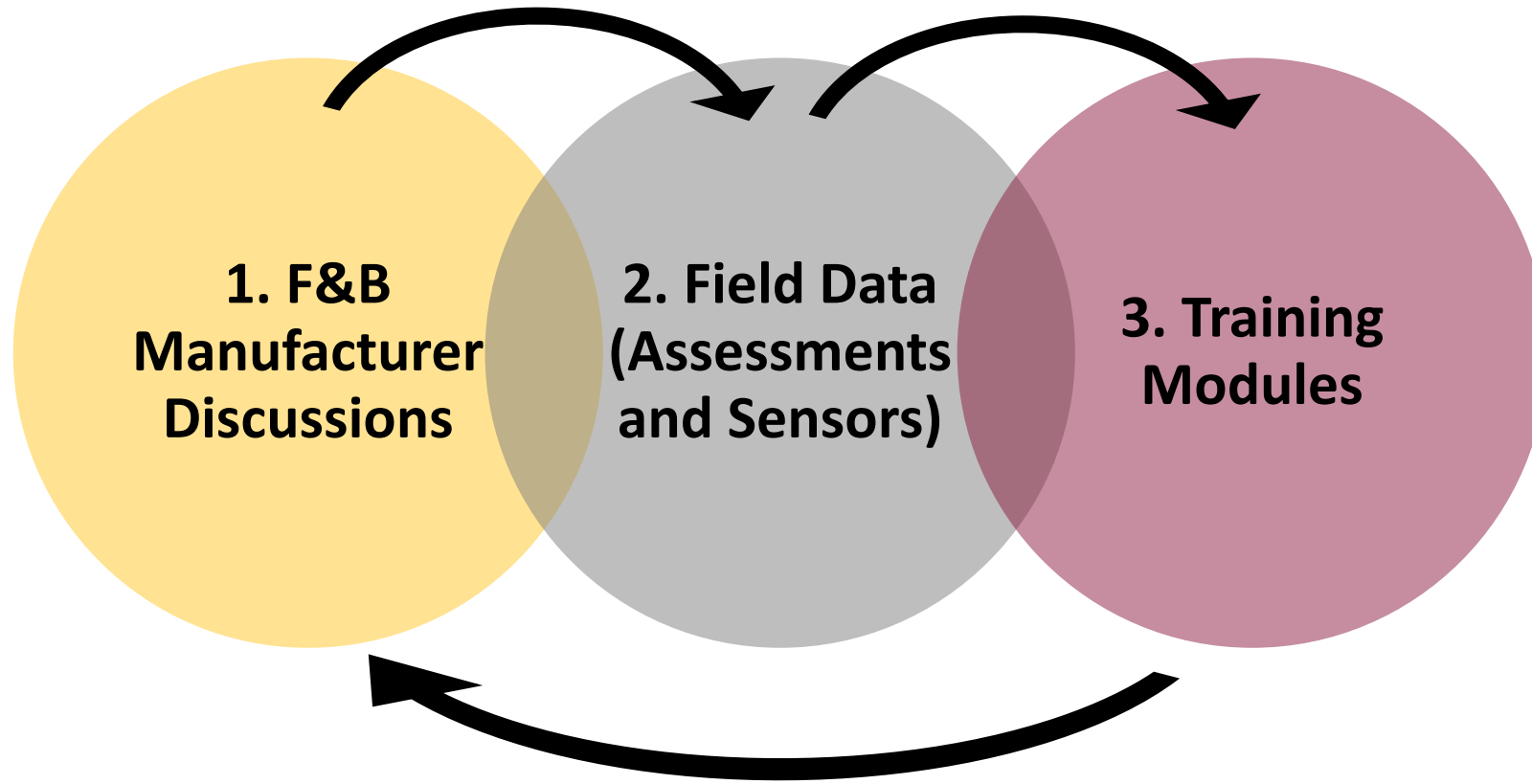
- Water bills



Water quantity

- Discharge volume
- Leak detection

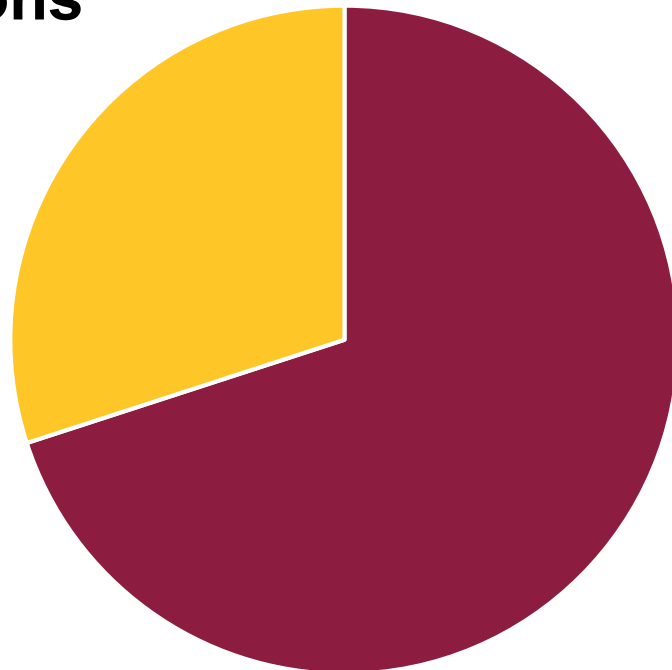
ASU Food and beverage project plan



1. F&B Manufacturer Discussions

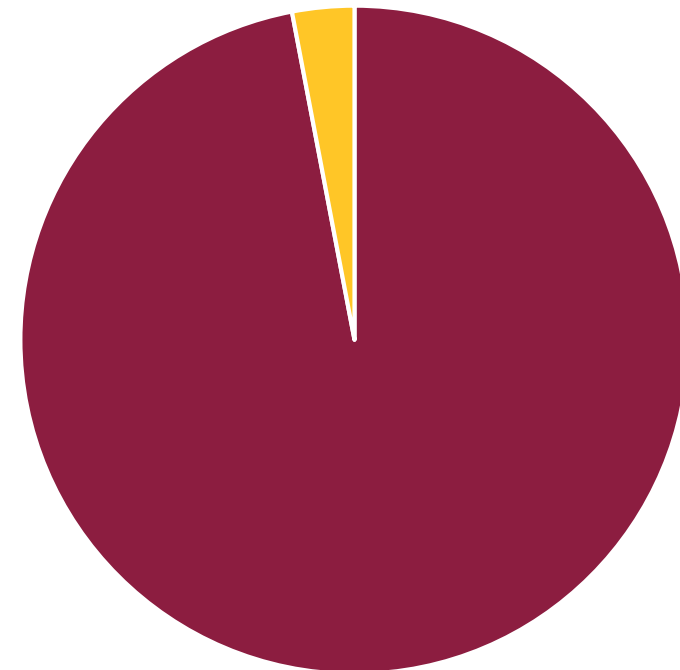
Survey results: Industrial water users

Water is critical to business operations



■ Yes ■ No

Interested in a “water community”



■ Yes ■ No

2. Assessments and Sensors



- Water Quality Concerns at a Dairy
- Water Quality Concerns at a Bakery
- Water Quantity Concerns at (another) Bakery

Industrial Assessment Center@ASU

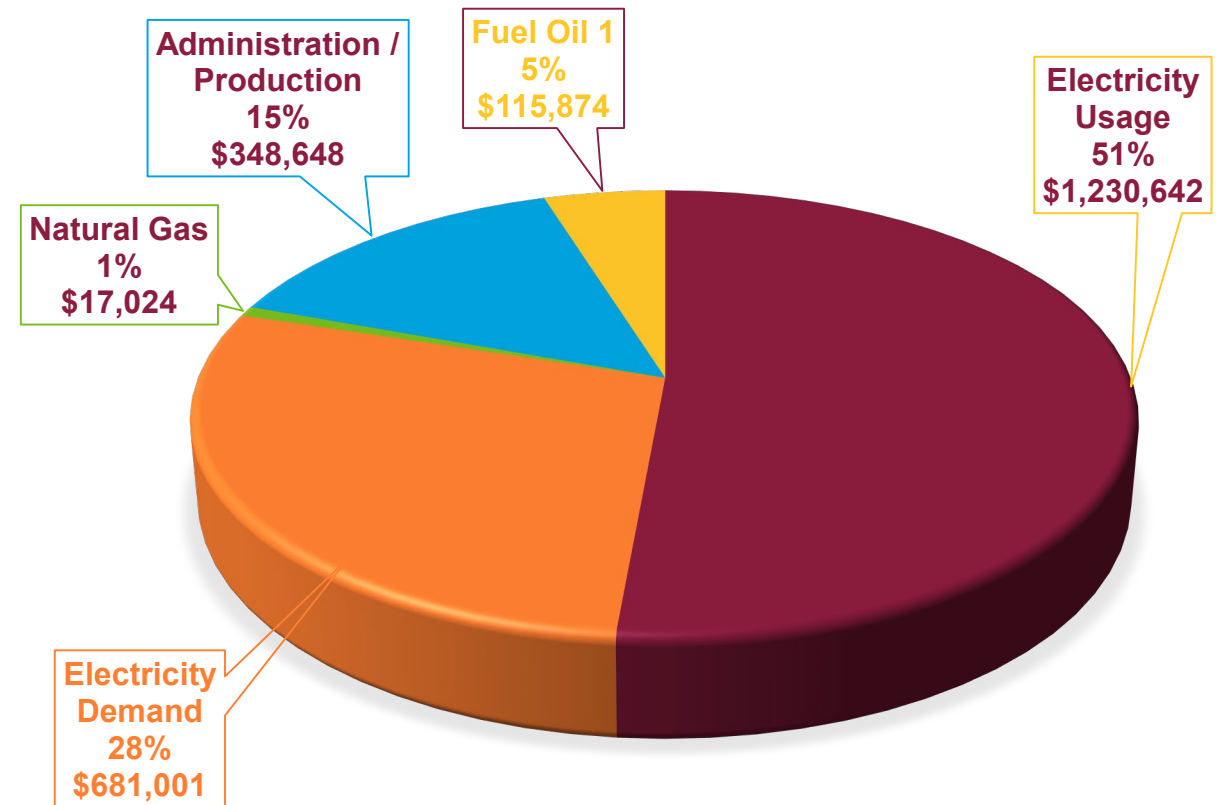
- No-cost energy assessments to small- and medium-sized manufacturers
- Improvements in energy efficiency, waste reduction, and productivity



IAC@ASU Statistics Since 2017

- **55 Assessments Completed**
- **5.1 Recs per Assessment**
- **34.9% Recs Implemented**
- **\$2.4 Million Saved in Implemented Recs**
- **\$30K Saved per Implemented Rec**

\$ Savings For Implemented Recommendations



IAC@ASU

Assessment Criteria

- **Must be US Manufacturer**
- **Standard Industrial Code (SIC)**
Between 2000-3999
- **Annual Energy Cost (per site)**
\$100,000 - \$2,500,000
- **Gross Annual Sales (per site)**
Less than \$100 million
- **Number of Employees (per site)**
Less than 500



Sensor kits

J8

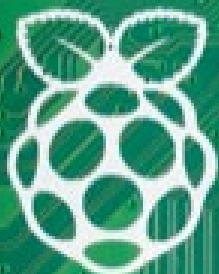
GPIO

Raspberry Pi 4 Model B
© Raspberry Pi 2018

PoE

J14

Truxcom®
TRJG0926HENT
China M 1904
cFosPlus



DISPLAY

RUN GLOBAL EN



J2

FCC ID: 2ABCB-RP14B
IC: 20953-RP14B



Made in the UK

HDMI

CAMERA

J3



POWER IN

DM10



DMT1



DMT1

J6

J13



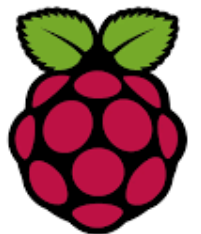
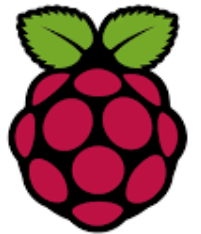
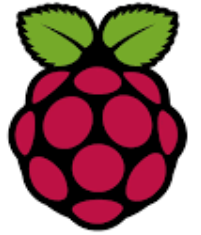
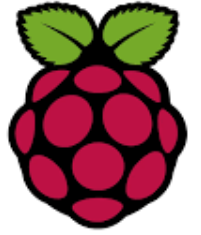
J7

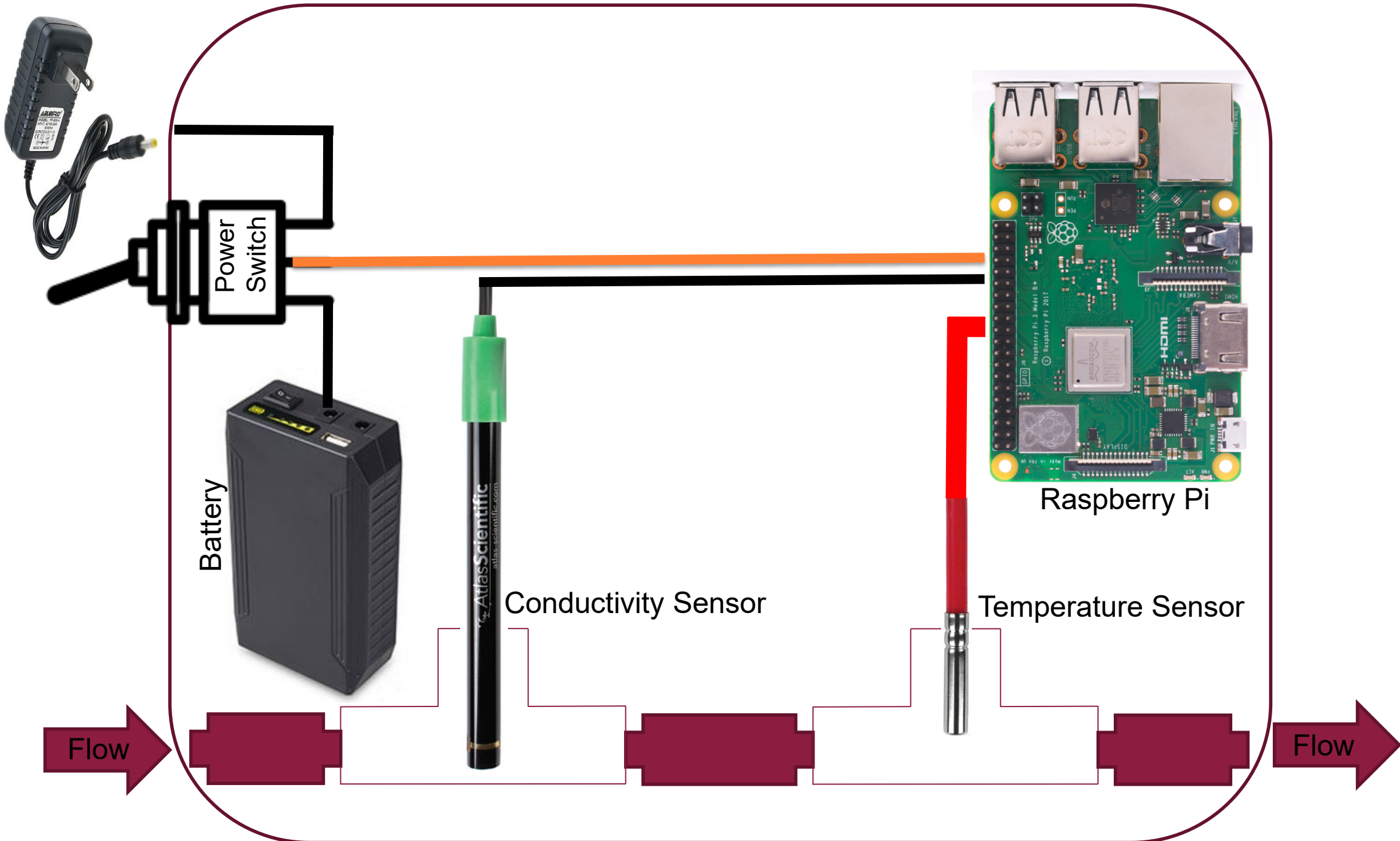


US309

“The Raspberry Pi is a low cost, **credit-card sized computer** that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. It’s capable of doing everything you’d expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games.”

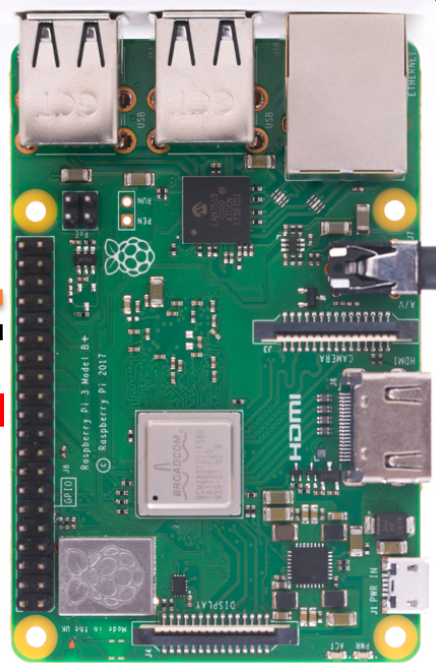
<https://www.raspberrypi.org/>





Power Switch

Battery



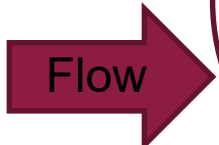
Raspberry Pi



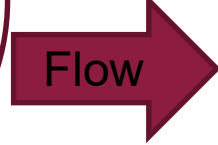
Conductivity Sensor



Temperature Sensor



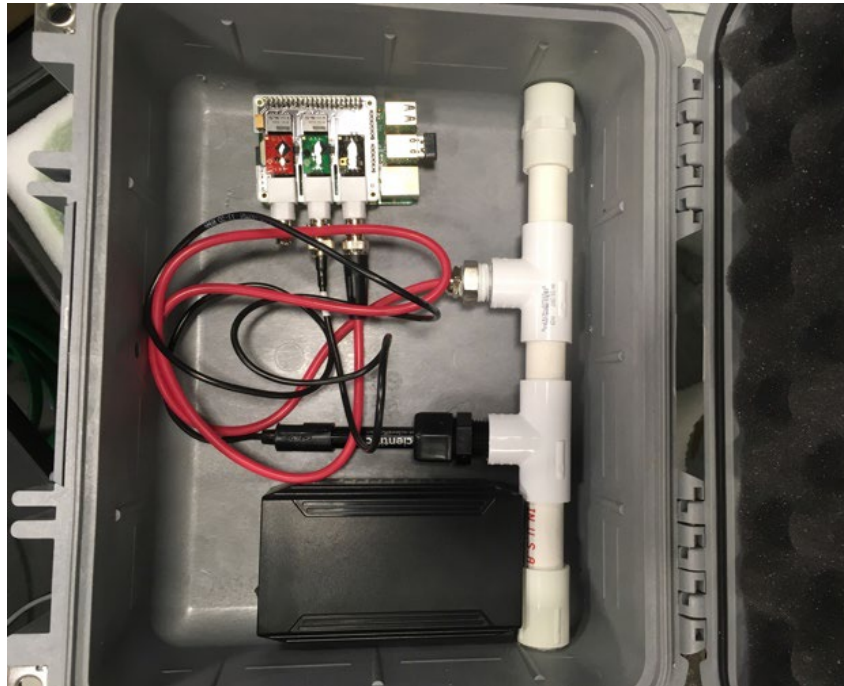
Flow



Flow

What's inside

Each sensor kit node contains a water quality sensor, Raspberry Pi controller, and power supply. Touchscreens allow for quick adjustments when sensor kit is deployed in a facility. These kits can be plugged in which allows for long term monitoring without battery recharge needs. Solar power for battery recharge is an option but has not been implemented yet.





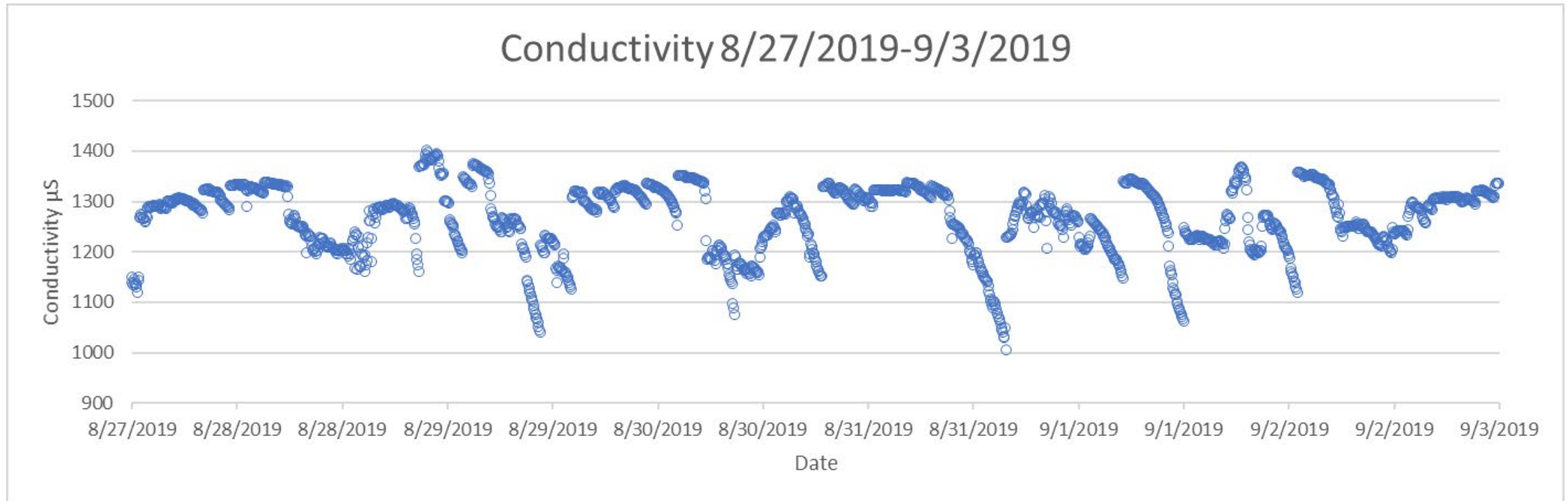
What can be monitored in a mobile kit?

- Conductivity
 - Issue with poor water quality when domestic water is used for production. High conductivity fouls equipment
 - Provide options to determine if blending should be considered or use alternate water source
- pH
 - Discharge permits may require specific pH setpoint
- If it can be powered, it should be considered, become creative

Conductivity for dairy

- Concern for dairy was drastic spikes in conductivity throughout the day and seasonally as well
 - Production line required very low conductivity water to maintain proper functioning
 - During high conductivity events, fine misters would clog quickly, and replacement would be necessary which is an added cost as well as creating down time

What did dairy learn from mobile kits?



- Conductivity probes exist
- Conductivity probes are not expensive
- Conductivity probe(s) in correct location would allow decision makers to determine when to blend or if alternate water source should be used

What can't be monitored as a sensor, but is important

- Copper
 - Bakery had both erosion and corrosion issue with their domestic hot water supplying the building
 - Used chlorine dioxide as mitigation effort
 - Had not sampled water since treatment started
 - Traditional grab samples analyzed on ASU campus provided same day results to bakery

Results

Location	First Draw Copper Concentration (mg/L)	Second Draw Copper Concentration (mg/L)	pH first draw	pH second draw	Conductivity (µS) first draw	Conductivity (µS) second draw
Cake pan wash north	0.21	0.23	7.8	7.9	2090	1789
Cold water sanitation north	0.22	0	7.7	7.7	1708	1736
Hot water sanitation south	0.24	0.22	7.8	7.9	1744	1719
Cold water sanitation south	0.32	0.17	7.8	7.8	1761	1719
City water (influent)	0	0	8	8	1514	1500

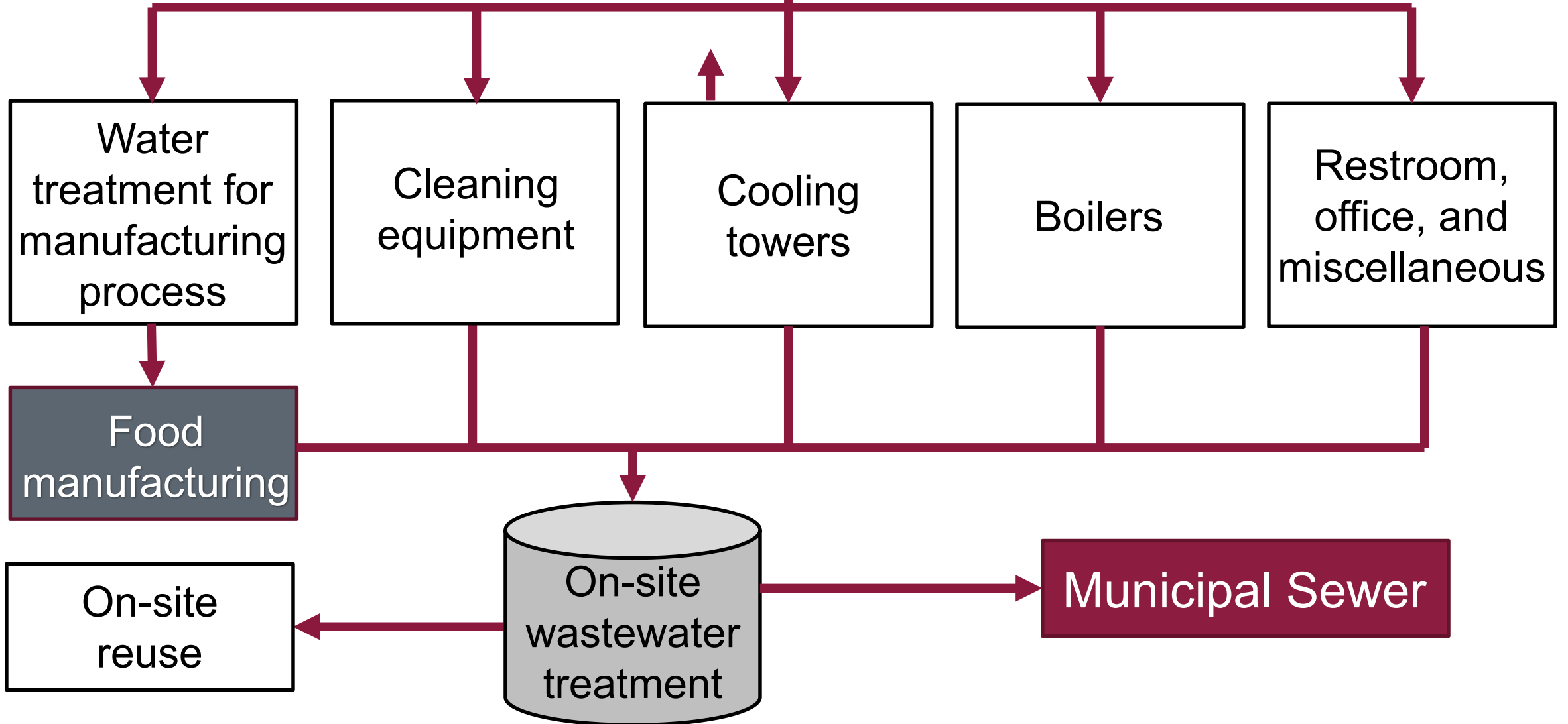
What did bakery learn?

- Cu was within EPA limits
- City distribution was not introducing
- Unique findings
 - Conductivity inside the facility was higher at locations tested than city influent
 - Allows bakery to determine if next steps are necessary
- It is possible to measure city influent water and compare against what is inside the building in real-time
 - This is an item that would allow for the mobile sensor kit to be deployed again

Know your flows

Municipal Water

It is possible to use flowmeters in a sensor kit



Benefits of mobile kits

Raspberry Pi –
Linux based
microcomputer
(but there are others on
the market as well)

Designed with
communication in
mind – not there yet,
still work in progress

Can be used as
stand-alone units

Very quick, real-time
monitoring of water
quality without the
need for a lab

Results can be
uploaded and
analyzed

Can weather the
elements

Can switch out for
other sensors

Install is super quick

If a sensor exists,
could go mobile

Lessons Learned

- Similar sectors will have different problems
- All facilities are unique for P2 opportunities
- Facilities have many competing priorities
- Knowing any problems/issues up front helps with site visits
- Site visits are critical for sensor install
 - Initial visit to understand problems and locations
 - Subsequent visit for install of sensor(s)



3. Training Modules

“Hello! I’m Laurel, a conservation talent scout. Are you wondering what that means? I’m someone on the hunt for great examples of food and beverage manufacturing conservation related to water and energy. I’m working on a project to showcase conservation in the food and beverage industry.”

Save water and energy with us!

Seeking **food and beverage manufacturers**
in Maricopa County, Arizona and
surrounding areas to participate in free
water and energy conservation program

Contact us:
Mackenzie.Boyer@asu.edu



THE GREEN ECONOMY STARTS HERE



What do we do:

1. Provide technical assistance to businesses with an easy-to-use sustainability framework
2. Promote businesses that make changes that save money by conserving resources
3. Provide a green marketplace for consumers to vote with their dollars



2019 BY THE NUMBERS

The Green Business Network doesn't just help businesses operate sustainably. State funding has allowed our Network to reach a record number of resource savings.



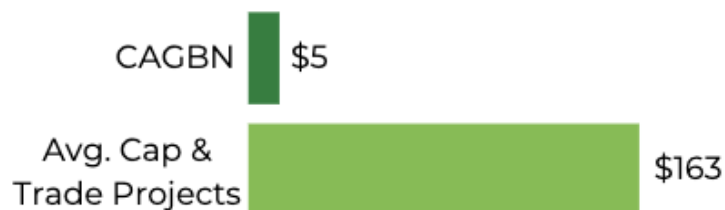
Industries Served

- 30 Sectors
- Newest Sectors
 - Agriculture
 - Biotech
 - Food Manufacturers

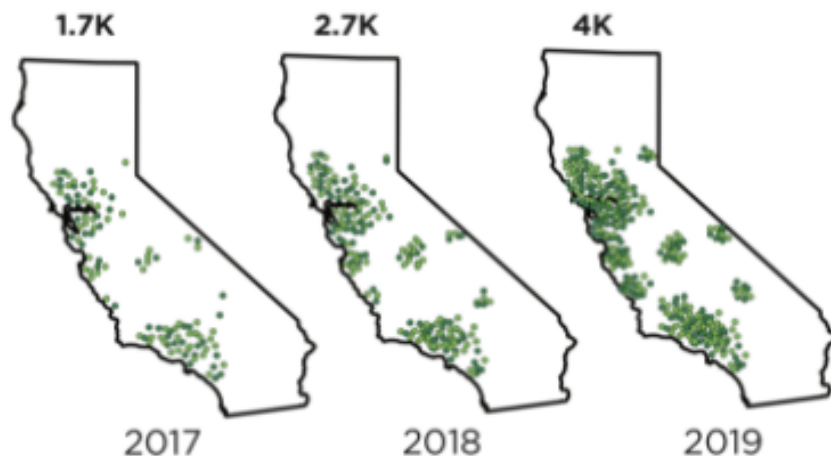
GHG Emissions Reductions (metric tons)



\$/GHG Reductions MTCO_{2e}



Total Recognized Businesses



Water Conserved



CAGBN: Connected Nationwide



Visit Portal

COMMUNITY CLIMATE COLLABORATIVE



FIND A GREEN BUSINESS TAKE THE GREEN BUSINESS ASSESSMENT

GBENN Green Business Environmental National System
NATIONAL GREEN BUSINESS TRACKER | REPORTS | START A PROGRAM | DIRECTORY | PARTICIPATING STATES | RESOURCES | CONTACT

12,744 BUSINESSES IN 8 STATES HAVE BEEN GREEN CERTIFIED
[FIND A GREEN BUSINESS](#)

DOWNLOAD THE APP Find A Green Business Directory
Available on the App Store and Google Play

WHO WE ARE
Developed by the California Green Business Network in 2009, GreenBizTracker is a web-based software program that allows programs around the nation to track their Green Businesses and collect metrics. It provides an easy to use framework for a business to become green and a way to add energy, water, waste and resource savings. It is supported by the member California Green Business Network, the Enviro Agency National Environmental Information N Washington State Department of Ecology. Most businesses that have used this framework to us We are certified Green Businesses.

[CONTACT US](#) [MORE ABOUT GBENN](#)

START A PROGRAM IN YOUR REGION
Are you thinking about starting a Green Business Program in your region or State? You should...
[EXPLORE HERE](#)

greenUP!



LOOK WHAT WE'VE ACHIEVED

Select which you would like to view

[AVERAGE ANNUAL BUSINESS SAVINGS](#) OR [ANNUAL SAVINGS FOR ALL BUSINESSES](#)

39% metric to

[FIND A GREEN BUSINESS](#) [GET RECOGNIZED](#)

226 Total Businesses Certified in Colorado



Make a difference.
Green businesses across WA.

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Get Green Get Involved About IGBA Resources Green Business

You are here: Home

Welcome to the Illinois Green Business Association

Online Certification System Launching Soon!



IGBA is honored partner with the California Green Business Network and five other states to launch a national online green business certification database and mobile application to help Illinois businesses easily achieve green accreditation and collect critical environmental impact data.

We're currently seeking businesses that are interested in participating in the pilot launch of the new certification system. Contact us if you're interested in learning more!

Learn more about the IGBA's Green Business Certification Program here!





Efficiency and Resiliency through Best Practices

Workshops for Food Manufacturers

**Presented by
CAGBN, CARB and US EPA**

**January 2018
Los Angeles, Fresno and Stockton**

Main Goals of our Food Manufacturing Outreach Project

1. Understand Industry Imperatives/Mandates (food safety and accountability)
1. Identify and Involve Best and Most Trusted Industry Resources
1. Glean Most Successful and Impactful Environmental Management Practices from Industry Leaders
1. Conduct 3 Workshops
1. Certify five food manufacturers. Work with ten.



The Core Work Team:
Jessica and Wendy (US EPA Region 9)
Judy (CARB)
Elias and Emily (Ecology Action)
Pam and Jo (CAGBN)
Tetra Tech



Industry Experts Steering Committee

Food Processors

Utilities

Government

Education Institutions

- Helped frame the agenda, content and speakers for the workshops
- Reviewed the performance standards
- Helped spread the word



Workshops

2 became 3: Stockton, Fresno and Los Angeles

Great program partnerships were made in Fresno. Best business connections were made in Stockton and Los Angeles. Los Angeles was the highest attended, thanks to LA Industry.

Presentations from stars in the sector. Breakout sessions to discuss particulars. Presented the GBP as an incentive. We had great live polls that miraculously worked.



Jessica Counts-Arnold, Environmental Pr from US EPA Region 9 and Jo Fleming fro breakout session.



Workshop attendees shared informatio best practices.



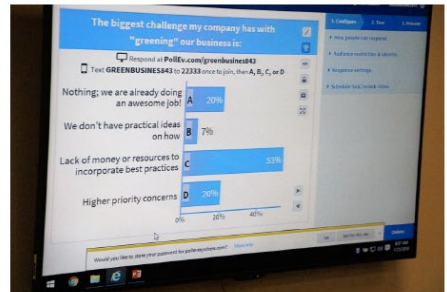
Room set up and information tables at the Stockton work-shop, hosted by the Stockton Chamber of Commerce.



Large turnout of vendors offered business assistance, support, and incentives to food manufacturers.



Jo Fleming, CAGBN, provided opening remarks and led the interactive, real time polls.



Results of the real time poll filled the screen!

FRESNO

STOCKTON



Inspirational Success

▶ Musco Family Olive Co.

Importance of corporate transparency and 3rd party certifications

▶ The Morning Star Company

Working with clients to perfect water & energy saving procedures

▶ Premier Mushrooms, Inc.

Continuous improvement in use of alternative energy - sustainability as “journey”

Musco's Environmental Achievements by the numbers

- 8 billion olive pits transformed into carbon-neutral energy, annually
- 80% reduction in salt and mineral use since 1985
- 90% of water recycled onsite
- 100% of wastewater kept onsite in a closed loop system
- 98.5% of waste diverted from landfill into reuse or institutional recycling

What did we learn?

Businesses were and probably still are very preoccupied with food safety and quality.

Large industry association did not want to play with us but several smaller ones did.

Large food manufacturers are a very different beast from the small ones. Smaller one still willing to make meaningful changes.








The work can be technically challenging with each business having unique processes, opportunities and challenges.

There is a lot of variability from one facility to the next so it is a constant learning process.

More important to know the questions to ask.



Certification Areas of Focus

-  ENERGY
-  POLLUTION PREVENTION
-  SOLID WASTE
-  TRANSPORTATION
-  WASTEWATER
-  WATER
-  COMMUNITY



New Community Measures



- ▶ Promote the use of locally-grown produce from health department approved commercial producers.
- ▶ Have a written Food Safety Management System (FSMS) to demonstrate safety and quality in the food chain.
- ▶ Choose food packaging with less environmental impact
(green material, lighter weight, reusable, recyclable, compostable).



What did we learn from the workshops?

Stakeholders identified the following as the greatest uses of energy:

Cold storage	Compressors
Refrigeration during transportation	Heating and cooling water
Pumps to move water	Chillers and cooling processes
Sanitation using heat	

Stakeholders identified the following as the greatest obstacles specific to energy conservation:

Taking a system off-line during upgrades	Heat is the preferred method for killing bacteria
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Stakeholders recognized the following as the opportunities for energy conservation

Cleaning in place	Pre-cleaning
Using microwave or ozone to sterilize	Utility providers will conduct free audits and help provide ideas for energy reduction



Finding common themes and P2 opportunities in food manufacturers can be difficult.

But we prevailed in some.



New ENERGY Measures



- ▶ Use Condensate Return for steam - heat can be used again in another process.
- ▶ Use compressor sequencing to reduce equipment cycling on and off and save energy.
- ▶ Use compressed air recovery from a high-pressure process in another lower P process.
- ▶ Operate compressed air system efficiently: (1) Control the compressed air system (compressor and drier) and use compressor sequencing to operate only when needed. (2) Complete regularly scheduled maintenance and test the compressed air system for leaks every 3-5 years.
- ▶ Insulate heating and cooling ducts, especially if pipes pass through an area which is not heated or cooled.
- ▶ Place ovens in well-ventilated areas away from processes that require cooler environments.
- ▶ New equipment purchases are made for optimal performance and results by including adjustable speed drives and right sized pumps.



Per CLEAResult (Industry Consultant):

Top 5 Food Processing Opportunities

- Lighting
- Condensate Return
- Process Optimization
- Variable Frequency Drives
- Waste Heat Recovery



Case Study: VFDs on Water Pumps



Significant energy savings for Olive Processor

CLEAResult recommended improvements to the plant's pumping system and secured incentives from PG&E

Recommended Measure

- Install 6 VFDs on 20HP pumps to control demand flow and alleviate cycling the pumps

Results

Saved 126,084 kWhs in annual energy consumption

Incentive Payment Received from Utility = \$14,226

Expected Payback = 0.56 Years

Case Study: Refrigeration Controls



Significant energy savings for Baked Goods Manufacturer

CLEARresult recommended improvements to the plant's refrigeration system and secured incentives from PG&E

Recommended Measure

- Install floating head pressure controls on the refrigeration system to reduce the work required by the compressor

Results

Saved 50,967 kWhs in annual energy consumption

**Incentive Payment Received from Utility
= \$7,645**

Expected Payback = 3.96 Years

Case Study: Heat Recovery



Significant energy savings for Snack Food Manufacturer

CLEAResult recommended improvements to the plant's oven and secured incentives from PG&E

Recommended Measure

- Upgrade new oven with a heat recovery system.
- Heat recovery system uses three heat exchangers to preheat oven intake air

Results

Saved 99,955 therms in annual energy consumption

**Incentive Payment from Utility =
\$82,894**

Expected Payback = 1 Year

Case Study: Process Optimization



Significant energy savings for Tomato Processor

CLEAResult recommended improvements to the plant's boiler system and secured incentives from PG&E

Recommended Measure

- Install a Reverse Osmosis (RO) system to improve the total dissolved solids (TDS) in the boiler and reduce boiler blowdown requirements

Results

Saved 167,744 therms in annual energy consumption

**Incentive Payment Received from Utility
= \$160,082**

Expected Payback = 1.37 Years

Case Study: Process Optimization



Significant energy savings for Butter & Cheese Producer

CLEARresult recommended improvements to the plant's CIP system and secured incentives from PG&E

Recommended Measure

- Install a preheating system that utilizes waste heat from the cogeneration system for the Clean-In-Place (CIP) system

Results

Saved 117,904 therms in annual energy consumption

**Incentive Payment Received from Utility
= \$111,977**

Expected Payback = 1.35 Years

What did we learn from the workshops?

Stakeholders identified the following as the greatest uses of chemicals:

Controlling rodents, birds, or other pests	Boilers
Sanitizing, especially with bleach	Cooling towers
Processing	Wastewater treatment

Stakeholders identified the following as the greatest obstacles specific to reduction in chemical use:

Food safety	Worker safety
Food quality effects	Chlorine is inexpensive and effective
Systems with no or low chemical usage do not work as well for companies with highly seasonal operations.	

POLLUTION PREVENTION

Stakeholders recognized the following as opportunities for chemical use reduction:

Substitution: potassium for sodium salts but can increase usage	Alternative cleaning: dry steam cleaning, heat cleaning, cleaning in place, pre-cleaning, dry ice cleaning
Alternatives to regulating the pH in the wastewater and alternatives to the sanitizers	Systems like Biofiltro which treat wastewater without chemicals



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We are Committed to Ensure a Prosperous Future one Ingredient at a Time.

Our **DROUGHT RESPONSIBILITY PROJECT** jams are made with environmentally conscious practices.

[CLICK HERE TO LEARN HOW YOU CAN HELP](#)

LOOK FOR THE BLUE LABEL or WATER DROPLET



New P2 Measures



POLLUTION PREVENTION

- ▶ Eliminate Bisphenol A (a TRI-listed chemical) from inside can coatings.
- ▶ While remaining in compliance with food safety requirements, and where possible in your facility, use safer disinfecting and sanitizing materials and methods such as dry heat or steam, dry ice, microwave, ozone or peroxides in place of chlorine-based and quaternary compounds.
- ▶ For chemicals used as disinfectants, sanitizers, cleaners and for equipment maintenance, ensure proper formulation, concentration or level to reduce unnecessary usage. Give examples of process changes.
- ▶ Supply electric power for diesel-fueled supply trucks to reduce engine emissions from idling during deliveries.
- ▶ Use anaerobic digestion to treat organic waste to reduce methane (a powerful greenhouse gas) emissions from your process.
- ▶ Use some certified organic ingredients in your food or beverage production or preparation. Detail your organic ingredients or offerings in the notes.



What did we learn from the workshops?



Stakeholders identified the following as the greatest causes of waste:

Food processing byproduct: e.g. walnut shells, olive pits, mushroom stem cuttings	Wastewater including solid components like sludge
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Stakeholders recognized the following as opportunities for reduction of waste:

Bring 100% of produce in from field	Vertical greenhouse
Donations to needy	Focused packaging
Reduce what hits the ground	Avoid spoilage; aligning waste goals with quality focus, demand projections, secondary uses and product uses from byproducts, e.g., mini-carrots, ingredients for soups
Weed control via robotics	

Stakeholders identified the following as the greatest obstacle to waste reduction:

Sending unused food to animals is difficult because of tightening requirements for animal feed (FSMA), especially transportation	Composting is not possible for some due to lack of space and odors affecting neighbors
Animal feed - too much uncertainty in acceptance requirements	Compliance issues with DOT if the waste that is transferred is too wet (such as for reuse or animal feed)



Top Waste Issues and BEMPs



SOLID WASTE

- ▶ Food waste is a big producer of GHGs and there is much food insecurity!
- ▶ Organics - Look higher on waste hierarchy, not just at waste management.
- ▶ Improve process all along supply chain and inside the plant to reduce damage, contamination and waste.

Top Waste Issues and BEMPs



SOLID WASTE

- ▶ New laws and risk policies divert organics away from tried & true channels for animal feed, restrict transport options.
- ▶ Misplaced fear of donating food for human consumption.
- ▶ **Green Tip:** Did you know? Effective January 1, 2018, the California legislature passed the “Good Samaritan Food Donation Act” (AB 1219), which amended the 1988 “Russell Bill” to provide even greater protection from liability for anyone who donates excess food to a nonprofit charitable organization or food bank. A copy of the full bill can be found here:
http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB1219

New Waste Measures



- ▶ Compost, recycle or repurpose any biosolids generated during wastewater treatment.
- ▶ Use reusable wrap for pallet shipments instead of plastic wrap.
- ▶ Donate excess food to shelters, food banks, or organizations that accept food scraps for animals.
- ▶ Have a written policy and plan to reduce damage, contamination and loss of ingredients or materials entering your facility and your process.
- ▶ Pre-clean produce or other food ingredients to reduce the risk of process contamination and waste of your finished product.



JAYLEAF

What did we learn from the workshops?



Stakeholders identified the following as the greatest uses of water:

Boilers	Reverse Osmosis
Sanitation	Float/flume/soak
Cooling Towers (Balanced)	Evaporation from pond aeration
Cooling sealed cans and bottles	

Stakeholders recognized the following as opportunities for water conservation:

Recycling water, including collecting condensate, automating water flow, and single pass through water	Cleaning in place
Cleaning including higher pressure water and decreasing flow rate	Using dry vs. flume for product handling
Worker training; much of the cleaning/sanitation is done “after hours” making monitoring difficult	Wastewater treatment: off-season partnership?
Easy to clean surfaces	Widely applicable project that would qualify for “cookie-cutter” project incentives
Low temp (130-165 F) condensate that cannot be reused, but that could supply waste heat	Using plants that can withstand high salinity wastewater

Stakeholders identified the following as the greatest obstacles specific to water conservation:

Equipment sanitation cannot be compromised	Discharge water may either be acidic or too salty for reuse and treatment is expensive. Reducing water usage increases wastewater strength and may render it unfit for existing discharge options
Product washing during initial intake and post-processing	Most stakeholders had no experience with a dry system, so education about that process may be beneficial
Cost of water is low on the supply side; whereas the often high cost of treatment and discharge is not tracked	Need for a way to economically clean the water and reuse.
Competition among other facility projects for capital	



Water Conservation Measures



- ▶ Use dry (or drier) methods of cleaning produce.
- ▶ Clean equipment in place, instead of disassembling it.
- ▶ Use low volume/high pressure cleaning methods.
- ▶ Use a process water reclamation system.



Top Wastewater Issues & Measures



- ▶ Reusing process water can increase pollutants in wastewater.
- ▶ Better pretreatment methods can reduce pollutant load and allow for re-use onsite.
- ▶ Rural sites may be able to treat wastewater using bio-based methods.



Goals for Green Business Certification

- ▶ Get 10+ businesses in the pilot.
 - ▶ Need 5 to complete certification.
- ▶ CAGBN has 16 food manufacturers certified and 27 more in process.
- ▶ First five: Straus Creamery in Marin County, Awe Sum Organics in the City of Santa Cruz, Alvarado Street Bakery in Sonoma County, Kitchentown in San Mateo County; and Ikon Roastery in San Mateo County.
- ▶ Bakeries, bread, coffee roasters, jams, creameries, etc.
- ▶ Combination of large and small manufacturers.
- ▶ They are really fun to tour!

Kitchen Town Story

Commercial Kitchen and Food Business Incubator

- 20,000 sq foot facility (serviced 400+ businesses)
- On-site cafe
- Certified to Manufacturers & Restaurant checklists
- Certified 2 additional businesses (worked w 5)

Leadership

- Spearheading Zero Footprint in SMC
 - Restaurants add 1% fee for carbon farming
- Reusable To-Go Ware Pilot in SMC
 - Partnership and grant submission for *muuse* container/cup lending and drop-off program
- Hosted 2 food waste workshops for manufacturers with expert Dana Gunders from NRDC





ShopGreen

California Green Business Network



The
**Sustainable
Economy**
is here.



GREEN

CALIFORNIA
GREEN BUSINESS
NETWORK

The ONE THING we can all do RIGHT NOW

Socially conscious purchasing

Preference for Green Businesses and
more Sustainable options

We could dramatically change the
world right now, not wait for policy
or an election.

Vote with your dollar.





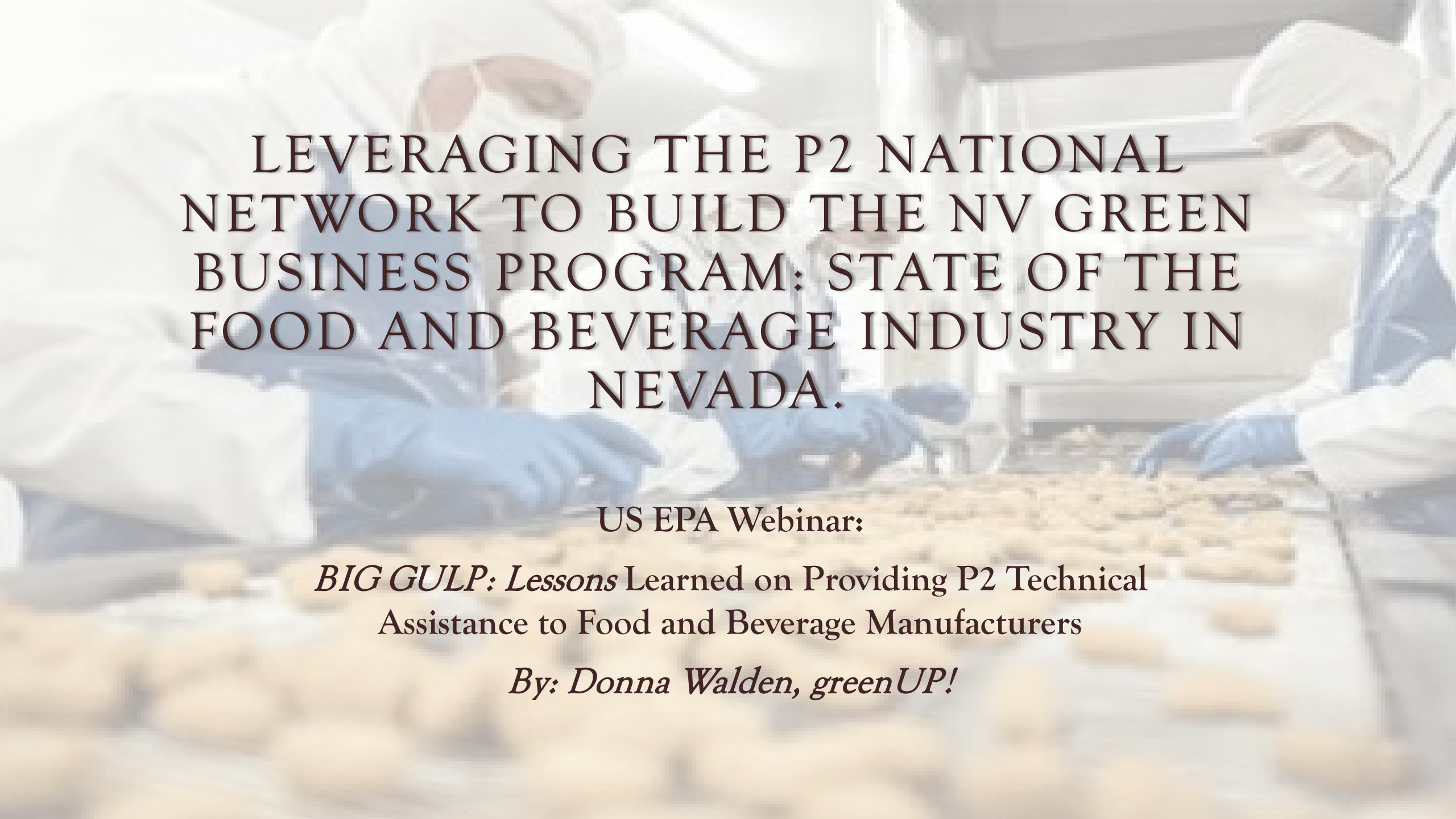
Questions?

Jo Fleming
Executive Director
info@greenbusinessca.org
(831) 706-7384

Pamela Evans
Chair of the CAGBN Board of Directors

Judy Nottoli, Chair's Office\Ombudsman
California Air Resources Board





LEVERAGING THE P2 NATIONAL
NETWORK TO BUILD THE NV GREEN
BUSINESS PROGRAM: STATE OF THE
FOOD AND BEVERAGE INDUSTRY IN
NEVADA.

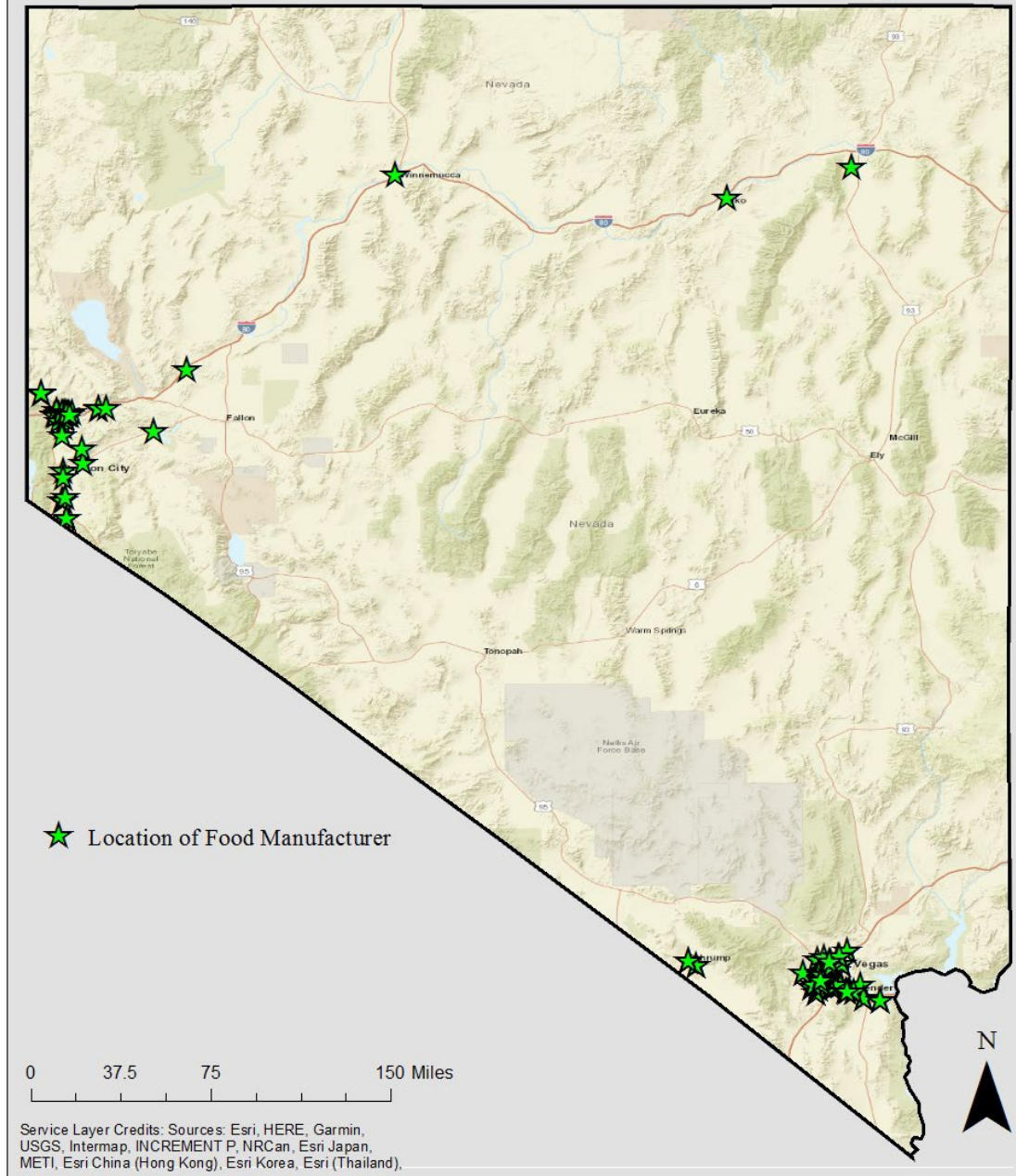
US EPA Webinar:

*BIG GULP: Lessons Learned on Providing P2 Technical
Assistance to Food and Beverage Manufacturers*

By: Donna Walden, greenUP!



Distribution of Nevada Food and Kindred Product Manufacturing

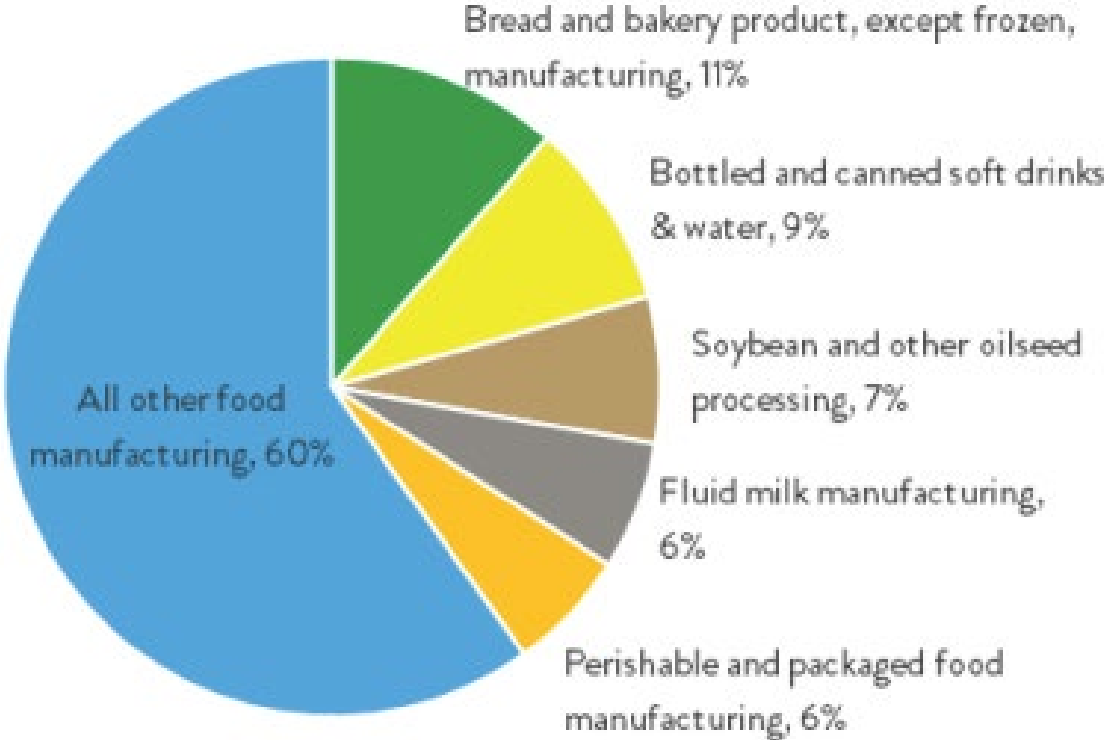


- 98 F&B manufacturers identified
- 9000 jobs and 280 F&B manufacturing companies
- Student from the UNR Community Based Research Program researched P2 challenges/solution in the following sectors:
 - Breads and cakes
 - Bottled and canned soft drinks
 - Soybean and canned oilseed processing
 - Fluid milk & cheese
 - Perishable and Packaged Food Manufacturing
 - Meat Packing Plants & Sausages; Other prepared meats
 - Dry, condensed and evaporated products
 - Candy and Other Confectionary & chocolate & Cocoa
 - Malt Beverages, Wines & Brandy, and Distilled Liquor
 - Coffee - Roasted
- greenUP! researched the Breweries sector

TOP FOOD & BEVERAGE MANUFACTURING INDUSTRIES IN NEVADA BY OUTPUT VALUE

Additional F&B Industries:

- Meat packing & sausage and other prepared meat products
- Dry, condensed and evaporated products
- Candy and other confectionary & chocolate and cocoa
- Malt beverages, wines and brandy & distilled liquors
- Coffee – Roasted



Source: Nevada Department of Agriculture and IMPLAN, 2019

Relationship Network: most common environmental challenges and the F&B industries that share them

F&B Targeted: All industry's

Common environmental and P2 challenges facing all F&B manufacturers. Top 5:

- Water pollution
- Solid waste production
- Air pollution
- High energy consumption
- High water consumption

All these concerns are addressed in GreenBizTracker

Of course, packaging is an issue for all manufacturers



FOCUS ON GENERAL F&B CONCERNS

Although it is completely dependent on the individual industry, some possible sustainable solutions to mitigate these effects are:

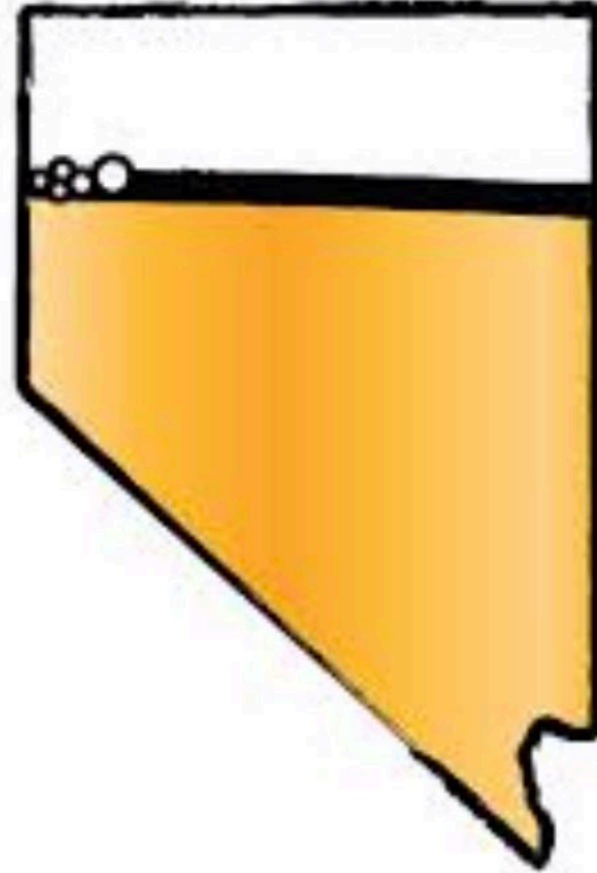
- Safer and more effective wastewater treatment and recycling
- Educating industries on the possibility of the commercial sale of their recycled byproducts
- Transitioning machine operations to renewable energy, either electric or biogas could mitigate emissions from the energy intensive processing of the products
- Optimizing batch sizes to reduce the amount of water used in some processes, if possible

TOP 5 HIGH IMPACT CHALLENGES DUE TO THE OUTPUT VOLUME OF THE INDUSTRY AND UNIVERSAL SOLUTIONS

- Habitat destruction
- Soil erosion
- Packaging waste pollution
- Nitrous oxide emissions
- Transportation impacts
- Improving grazing techniques to mitigate the effects of habitat destruction and soil erosion from the livestock industry
- Encouraging packaging materials with lower aggregate environmental impacts and using less packaging or bulk packaging when possible
- Promoting non-chemical-based fertilizers to reduce the emission of nitrous oxide

NEVADA CRAFT BREWERS - TARGETED

- Nevada economy received a \$434 million boost from Craft Beer Industry in 2018*
- Prior to COVID, there were 58 Nevada brewers listed under the National Brewers Association**
- About 50% are located in Northern Nevada and 50% in Southern Nevada
- Reno-Sparks has a high concentration of craft brewers



**NEVADA
CRAFT BREWERS
ASSOCIATION**

COMMON P2 CHALLENGES FACING BREWERIES

- High water usage
- Wastewater treatment
- Beer loss during processing
- Utilizing waste CO₂
- Large Amount of waste from spent hops and grains
- Packaging and recycling of bottles

POSSIBLE P2 SOLUTIONS FOR BREWERIES

- Spent grains and yeast both have commercial value as feeding supplements for the animal feed industry
- Retrofitting bottling line to reuse water
- Use of lighter packaging materials, lighter glass bottles, PET (plastic) bottles or aluminum cans improves transportation efficiency
- Recycling waste including using spent grains for baked goods
- Using a microbial fuel cell (MFC) that can generate energy as it treats wastewater and turning waste into compost and fish food
- Energy Efficiency measures
- Using alternative energy to replace fossil fuel use

STRATEGY

- After the P2 convening in Denver, I asked the network for example Brewery trainings
- Wanted ½ day training: NV businesses can't get away any longer than that
- Derek Boer, Pollution Prevention Specialist for the Colorado Department of Public Health and Environment in Denver had a suitable model
- Lined up John Stier, Brewers Association Sustainability Mentor
- Pitched idea to the Nevada Craft Brewers Association; planned to combine ½ day training with their annual meeting
- Discussed Fall, then Spring and then COVID happened
- Need to move the training to a virtual model



August 15, 2017
1:00pm-5:00pm



Great Divide
Barrel Bar
Bottling Hall
3403 Brighton Blvd.
Denver, CO 80219

Free Registration at:
[www.colorado.gov/
cdphe/
sustainablebrewing](http://www.colorado.gov/cdphe/sustainablebrewing)



Sustainable Brewery Summit Agenda

reduce pollution · minimize costs · increase efficiency

Intro and the Sustainable Brewery Project

1:00pm– 1:15pm

Derek Boer and Kaitlin Urso — CO Dept of Public Health and Environment
Introduction and report out of the Sustainable Brewery Project. What we've done, and how we can help you.

Sustainable Brewing Practices and Benchmarking

1:15pm– 2:00pm

John Stier—Brewers Association Sustainability Mentor (remote).
Best practices for conserving energy and water, and reducing waste. The importance of data tracking and benchmarking.

Brewers Present Successful Sustainability Projects

2:10pm– 4:00pm (15 mins each)

Breckenridge Brewing- Responding to Data Tracking
Avery Brewing- Water Savings Opportunities
Great Divide Brewing- Retrofitting your Bottling Line to Reuse Water
Odell Brewing- Providing Weak Wort to Wastewater Treatment Plant
Left Hand Brewing- Data Dashboard and Predictive Analytics
New Belgium Brewing- Beer Loss Reduction
Upslope Brewing- Utilizing Waste CO₂

Networking Break

4:00pm– 4:30pm

Grab a beer and meet with staff from other breweries that are interested in sustainability.

Tour Great Divide

4:30pm– 5:00pm

Great Divide leads a sustainability tour of their new facility.

Networking in the Taproom

5:00pm

The Taproom is open!

COURSE CORRECTION - NV BREWERS

- Virtual Training
- Virtual Brewery Tour?
- Plan for Winter 2021
- Virtual follow-up stakeholder meetings
- Technical assistance will be held virtually
- Benchmarking is on hold since some Breweries are currently operating at less than optimal capacity



SUCCESS STORY

*Great Basin Brewing Company
Sustainability Initiatives*

The largest by product of the brewery process is the spent grain. When you brew over 2.5 million pints of beer a year you create a lot of grain.



WE BLEND THE GRAIN WITH LOCAL HONEY
AND A FEW OTHER THINGS TO CREATE
ARTISAN BREADS AND PIZZAS



And we feed cows.
A lot of cows.

Our relationship with two local farmers allows us to avoid putting any spent grain in landfills. It saves us the cost of disposal, saves them the cost of the feed and creates a product that is unmatched for its quality.





Great Basin Brewing was farm to table long before it was a trend.

We use the beef in our two brewpubs for specials like our 50/50 burger and our Baker Ranch Locavore Lasagna.



OF BREWERY BEEF
BAKER RANCH

HOME CONTACT RANCH CYCLE OF LIFE BEEF PRODUCT BREWERY FEED LINKS

Ranch Raised Natural Beef Brewery Grain Feed

Brewery Beef is finished Black Angus/Hereford cross beef. Our cattle weigh around twelve hundred pounds when complete. Animals are fed alfalfa, grass and plenty of brewery grain from *Great Basin Brewery* in Reno/Sparks

From Our Ranch to Your Home.

Quality Beef Product Ranch raised natural beef with robust taste. Not like anything you could buy in the grocery store.

**NO HORMONES
NO STEROIDS
NO ANTIBIOTICS.**

We also offer alfalfa/grass hay by bale or by ton. Call or email for current pricing.

Brewery Beef - Doyle, California - 775-771-9617 - info@brewerybeef.com

Nevada and the circular economy





A REFILLABLE SOLUTION



1

**Building
an integrated system
to collect, wash and
resell
refillable bottles**

**That is
sustainable and
economically viable**



SUCCESSFUL PROOF-OF-CONCEPT PILOTS



Ten Voluntary Glass Bottle Drop off Hubs & Collection in Truckee, CA



Incentive based Craft bottled drop off Partnership with Nevada Craft Brewer



Redemption Center Glass Sorting & Collection with California Waste Hauler



Wine Bottle Renew Northern California refillable wine bottle washing business

NEVADA INCENTIVE BASED PILOT



BEERS 4 BOTTLES

RECEIVE A FREE PINT OF BEER FOR EVERY 24 BOTTLE CASE OF EMPTY 12OZ BROWN LONG NECK CRAFT BEER BOTTLES BROUGHT TO BEERS 4 BOTTLES EVENTS

SAVE YOUR EMPTY 12 OZ BROWN LONG NECK CRAFT BEER BOTTLES TO BE CLEANED & REFILLED INSTEAD OF LANDFILLED

EVENTS

JANUARY 25TH Fundraiser for Keep Truckee Meadows Beautiful		FEBRUARY 23RD Fundraiser for Respectful Revolution
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GREAT BASIN BREWERY, TAPS & TANKS
1155 S ROCK BLVD # 490, RENO
5-9PM

FOOD! MUSIC! RAFFLE!
WIN A CASE OF ICKY IPA

“Leave no Trace” is not just a catchy name for their new beer. It is something that drives the decision-making process from the top down. GB is proud of their place in the circular economy and will continue to support new initiatives and programs to, in the words of their Brew master Tom Young:

“Help make this world a better place one pint at a time.”



HOW MUCH STUFF?

TOTAL VOLUME = 59,113 cubic yards



That's as much as a football field full of a 28 ft high 7 Layer Bean Dip!

Reno-Tahoe businesses and communities send TONS of perfectly compostable stuff to landfills. Instead, Full Circle can recycle this organic waste (green waste, food waste, biomass) into soils, compost, and mulch benefitting our community and the environmental health of our entire region.



Bye-Bye to Emissions Too!

Get your eyes on the greenhouse gasses we avoided by recycling and composting rather than landfilling.

Based on the EPA's WARM (Waste Reduction) Model:
33,000 cars worth of CO2 emissions were off the road

Many Benefits For The Soil

SUMMARY & TIPS

- Foundational work completed on F&B Manufactures
 - Researched Industry Sectors
 - Identified manufactures
- Launch technical assistance in 2020-2022
 - Breweries
 - All F&B sectors via virtual trainings
 - Track environmental outcomes via GreenBizTracker & P2 Grant Business Facility-Level Reporting template
- Bring in experts from other states to help facilitate P2 programs