

DOCKETED

| | |
|-------------------------|--|
| Docket Number: | 18-MISC-01 |
| Project Title: | Food Production Investment Program |
| TN #: | 224074 |
| Document Title: | Food Processing Technology Innovation Showcase Presentation |
| Description: | Energy Commission staff hosted a showcase where technology providers discussed low carbon technologies potentially applicable to the food processing industry. The Energy Commission makes no endorsements on any of the technologies presented during the showcase. |
| Filer: | Cyrus Ghandi |
| Organization: | California Energy Commission |
| Submitter Role: | Commission Staff |
| Submission Date: | 7/6/2018 11:37:44 AM |
| Docketed Date: | 7/6/2018 |



California
Energy Commission
Research & Development

Food Production Investment Program Workshop

Innovation Showcase

March 29, 2018





DISCLAIMER

The Energy Commission makes no endorsements on any of the technologies presented during the innovation showcase.

The individual showcase presentations were prepared by third party personnel, and not the California Energy Commission. The showcase presentations do not necessarily represent the views of the Energy Commission, its employees or the State of California. As the showcase presentations are the product of third party personnel, the Energy Commission, the State of California, its employees, contractors and subcontractors make no warranty, express or implied, and assume no legal liability for the information in the showcase presentations; nor does any party represent that the uses of this information will not infringe upon privately owned rights. The showcase presentations have not been approved or disapproved by the California Energy Commission nor has the California Energy Commission passed upon the accuracy or adequacy of the information in the showcase presentations.



Innovation Showcase

Energy Generation/Fuel

- Russ Teall, SEaB Energy
- Nick Doyle, Arensis

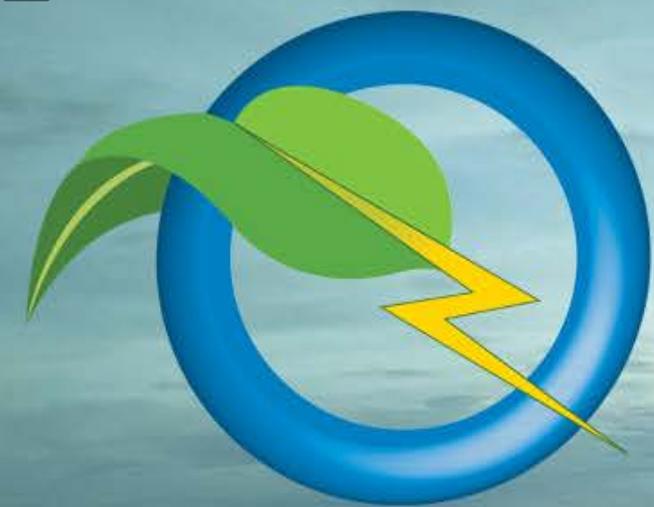
Low-Carbon Process Heating and Cooling

- Ray Cole, Axiom Engineers
- Yaroslav Chudnovsky, Gas Technology Institute
- Troy Davis, Mayekawa
- Philip Gleckman, Sunvapor
- Arun Gupta, Skyven Technologies



Energy Generation/Fuel Presenter #1 of 12:

Russ Teall, SEaB Energy



Zero Net

— Energy Farms —



Energy Self-sufficiency Using On-site Resources

- 1. Technology driven by water content of waste food**
- 2. Anaerobic Digestion for wet waste (i.e. tomato paste)**
- 3. Gasification for dry waste (i.e. almond shells and husks)**
- 4. Biodico can do a laboratory assessment**

Russ Teall, 805-689-9008, rteall@biodico.com

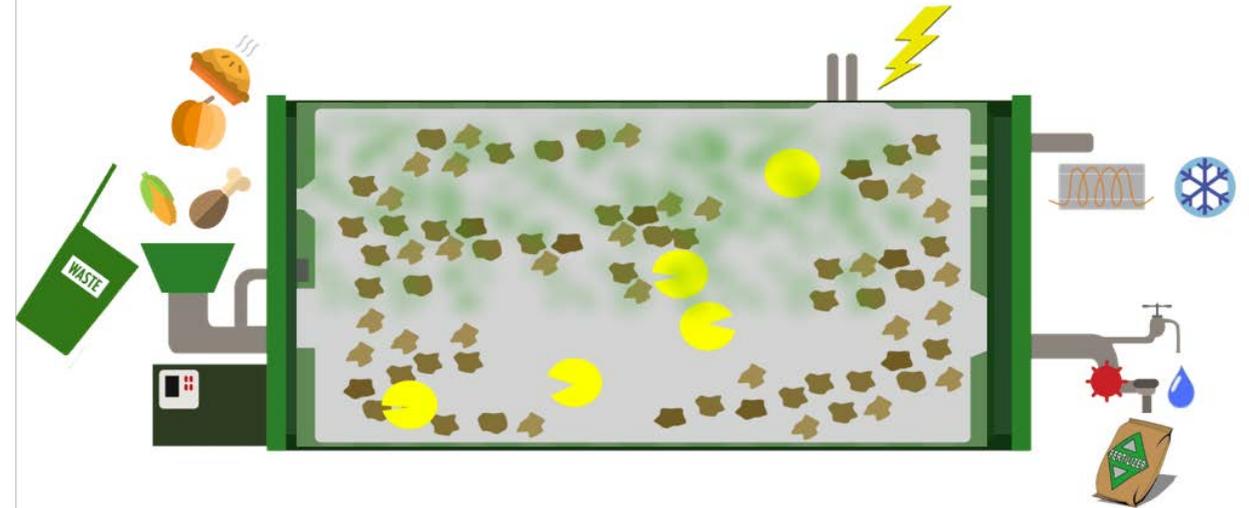


.The Problem



70 miles per trip
300,000,000 miles in US
Every DAY!

.The Solution



= + + -

.Case Study



| | |
|-------------|---|
| Food Waste | 2200lbs/day → FB48 Cost: \$80/MT |
| Electricity | Cost: \$0.16/kWh |
| Carbon | Value: \$5/MT 137MT/year carbon offset |
| ROI | 4 Years |



Energy Generation/Fuel
Presenter #2 of 12:

Nick Doyle, Arensis


arensis

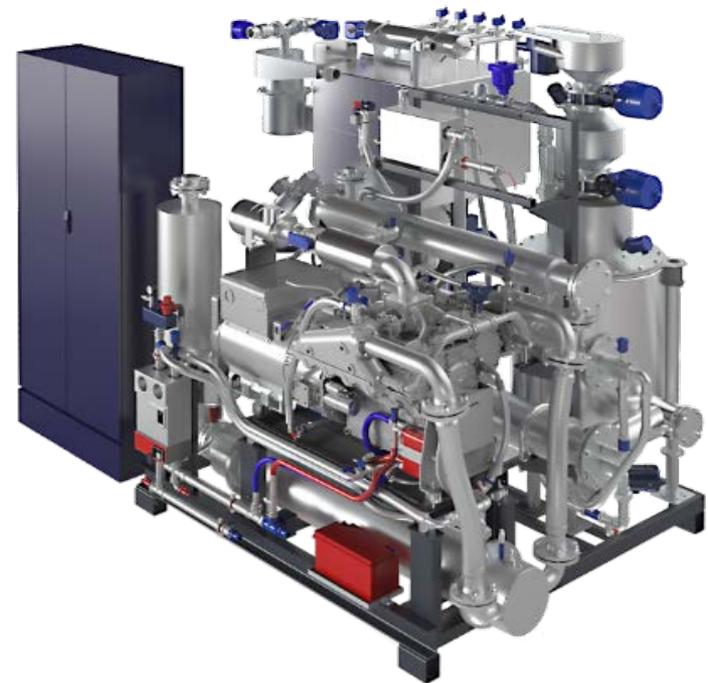


 arensis – unlimited innovation

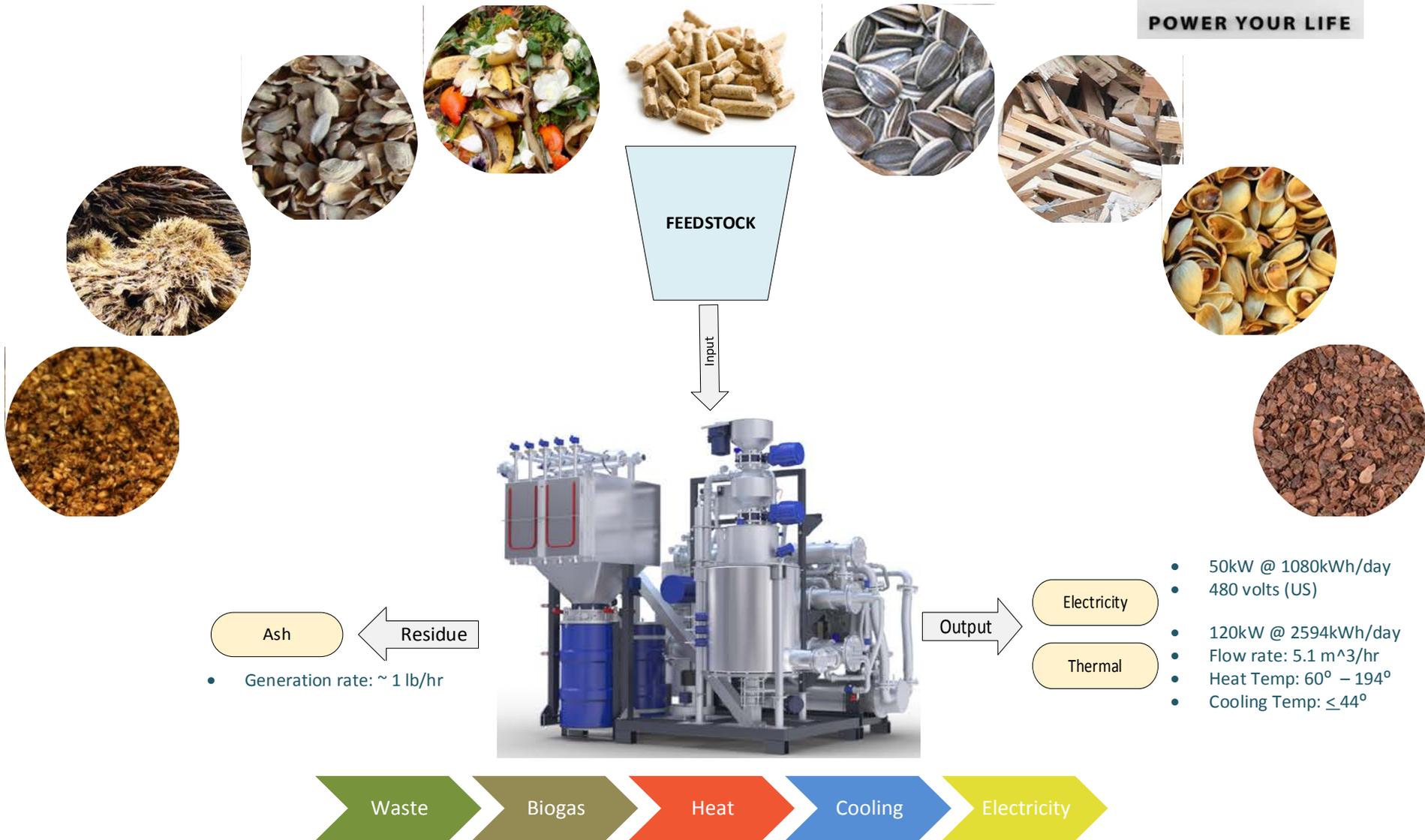
System Specifications



| | |
|-----------------------------------|------------------|
| Electrical Output (kW) | 50 |
| Electrical Generation (kWh/day) | 1080 |
| Thermal Output (kW) | 120 |
| Thermal Generation (kWh/day) | 2592 |
| Heat Delivery Range (°F) | 60 -194 |
| Cooling Delivery Range (°F) | ≥ 44 |
| Operational Uptime | 90% |
| Operational Efficiency | 86% |
| Operational Footprint (sqft.) | 435 |
| Fuel Consumption (tons per month) | 37.5 |
| Primary Fuel | Wood Chips |
| Secondary Fuel | Organic Waste |
| Fuel Feed & Storage | Automated |
| Fuel Storage Capacity (tons) | 15.5 |
| Fuel Storage Capacity (days) | 6-12 |
| arensis Service Packages: | |
| | Included |
| Operation & Monitoring | (annual renewal) |
| | Included |
| Spare Parts & Maintenance | (annual renewal) |



The Process





Thank you!

Nick Doyle
n.doyle@arensis.com
(310) 489-3826



Low-Carbon Process Heating and Cooling

Presenter #3 of 12:

Ray Cole, Axiom Engineers

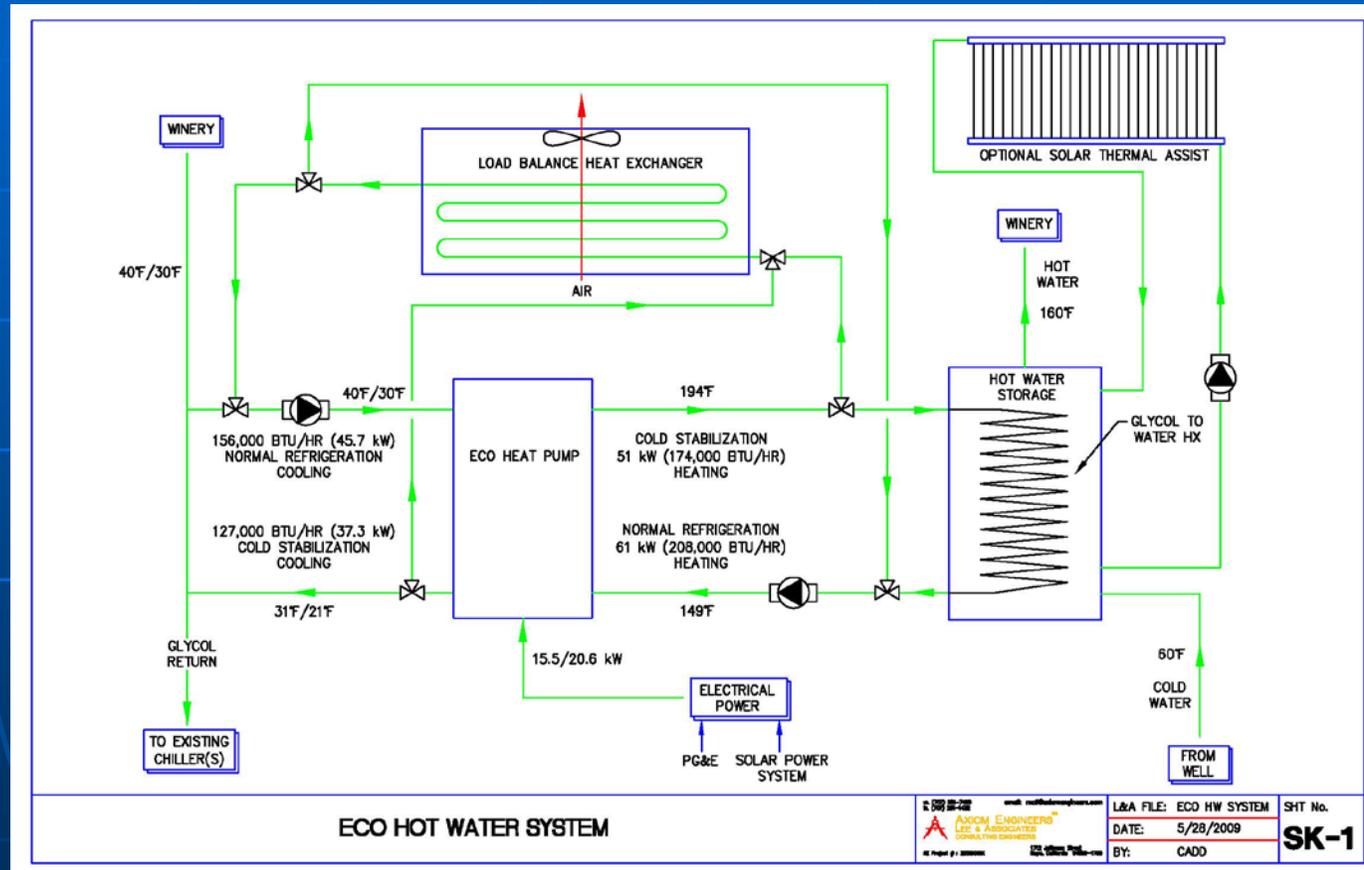
Improved Technology for Food Processing Industries to Reduce CO2 Emissions (and reduce operating costs)

- CO2 heat pumps for High Temperature Process Water
- Waste heat absorption refrigeration
- Efficient, low Nox, reliable cogeneration

ECO Hot Water System

- Transcritical refrigerant heat pumps
 - CO₂ refrigerant
 - Global warming potential of 1
 - Transfer Heat from process chilling to process hot water (190 F)
- Combine with Thermal storage
 - For off peak electrical use or balancing chilling and hot water needs

Glycol Chilling ECO Hot Water System



ECO HOT WATER SYSTEM

| | | |
|---|-------------------------|-------------|
| <p>AXIOM ENGINEERS LEE & ASSOCIATES CONSULTING ENGINEERS</p> | L&A FILE: ECO HW SYSTEM | SHT No. |
| | DATE: 5/28/2009 | SK-1 |
| | BY: CADD | |

Waste Heat Driven Ammonia Absorption Refrigeration

- Shop Built Unit of Standard Manufacture
- Shippable Modular Skid Mounted Units
- Economical cost per ton of refrigeration
- Low maintenance due to sealed design
- Efficient, waste heat makes refrigeration
- 25 Deg F to -20 F refrigeration temps.
- Ice making, cooler and freezer storage

Ammonia Absorption Unit

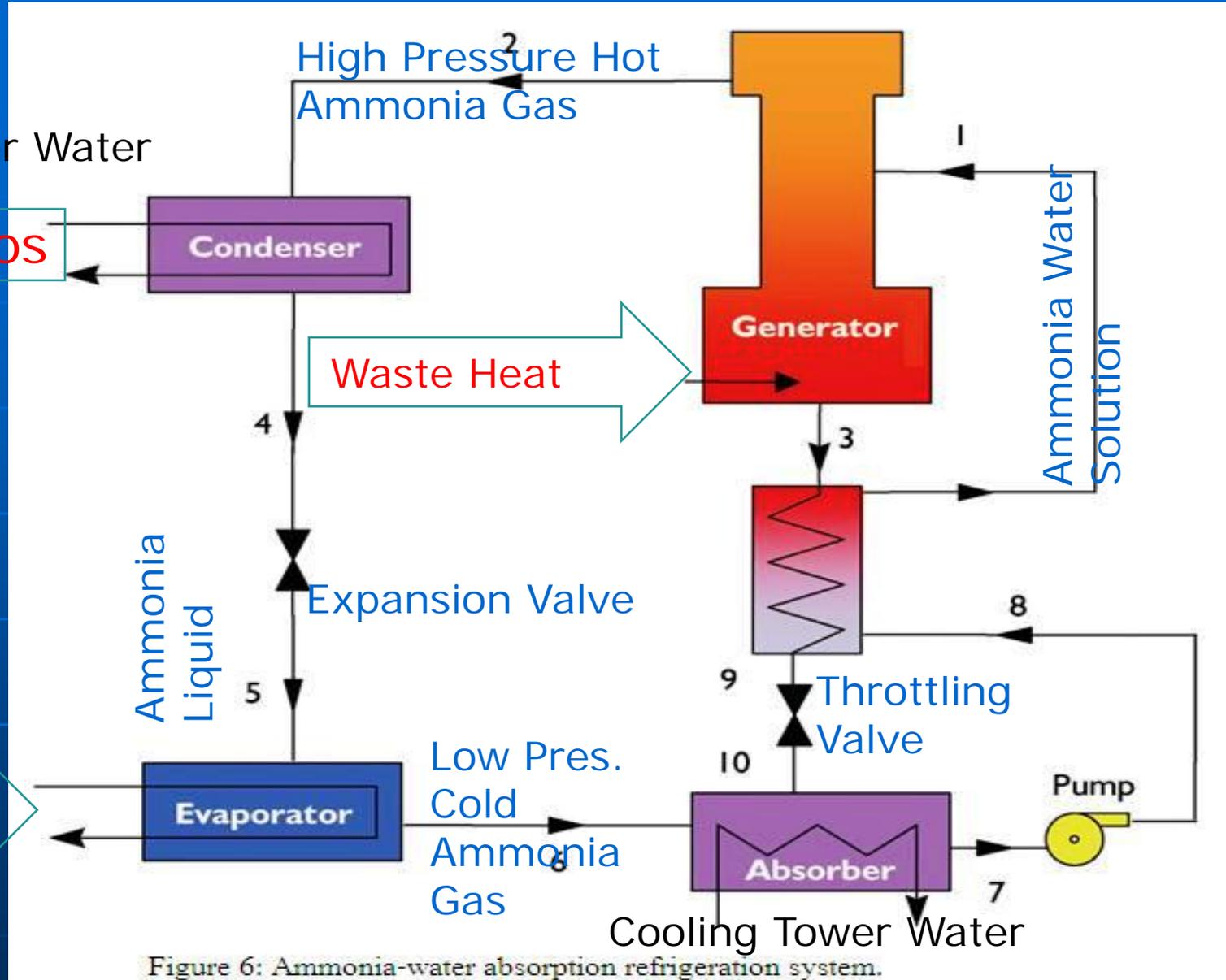


Basic Ammonia Water Absorption Refrigeration System Diagram

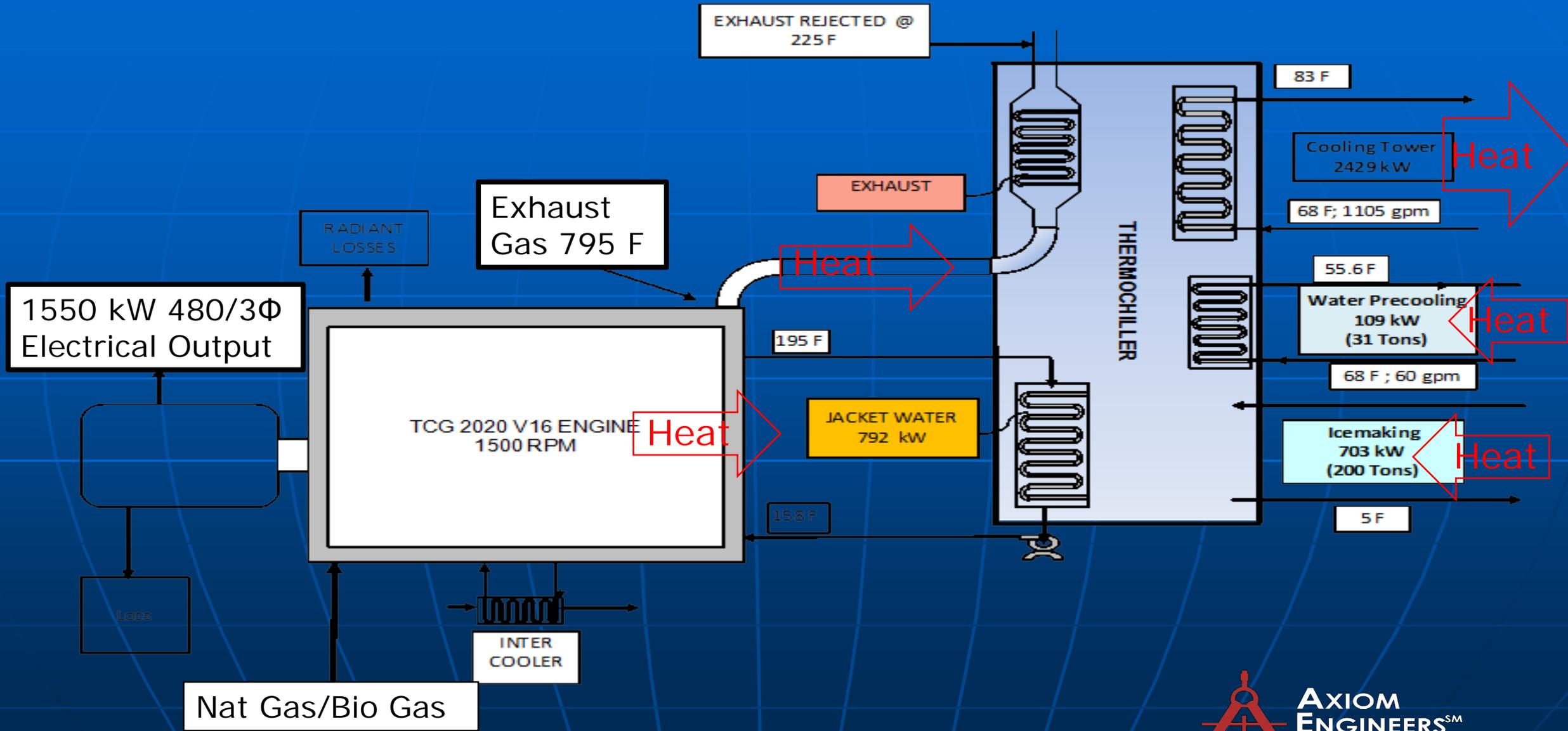
Useful Refrigeration

Cooling Tower Water
Heat to Atmos

Heat



The "Axiom Cycle" Cogen System



Contact Information

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Axiom Engineers Inc.
22 Lower Ragsdale Dr.
Monterey CA 93940

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Office: 831-649-8000 x105

Cell: 831-594-3754





Low-Carbon Process Heating and Cooling

Presenter #4 of 12:

Yaroslav Chudnovsky, Gas
Technology Institute

the Energy to Lead



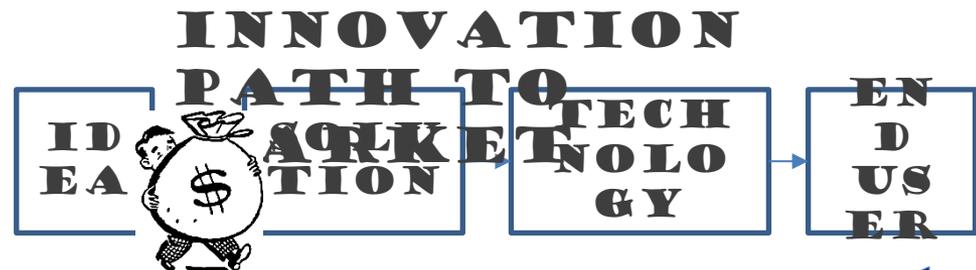
Gas Technology Institute: Advanced Cost-Effective Technologies for California Food Processors

- > by Yaroslav Chudnovsky, Ph.D., MBA, FASME
847-768-0536, Yaroslav.Chudnovsky@gastechnology.org
- > **CEC Food Production Investment Program**
March 29, 2018

Introduction



- > GTI is NFP established by the natural gas industry in 1941
- > 18-acre campus in Chicagoland
- > Applied research, development technology deployment, training
- > Over 1200 patents and over 500 products commercialized
- > Food processing employ burners, boilers, heat exchangers, controls
- > CEC FPIP goals are to accelerate the adoption of advanced energy technologies at CA food processing market by demonstrating their operational reliability and cost-effectiveness



Gas-Fired Technologies

> Energy Efficiency

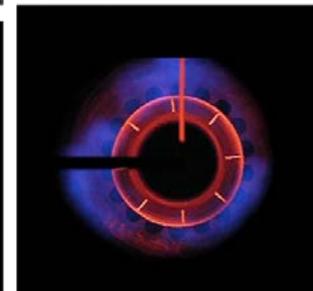
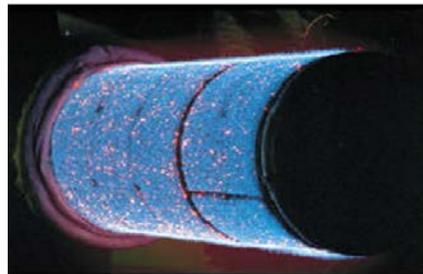
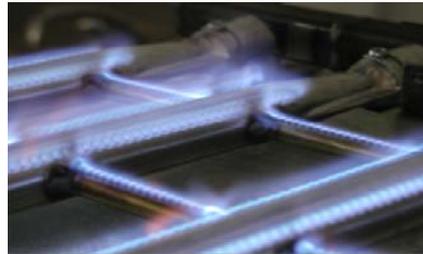
- Process improvement
- Smart heat recovery
- Energy savings

> Emission Reduction

- LN and ULN burners
- Fuel savings

> Additional Services

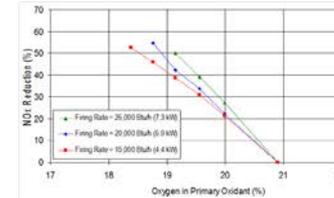
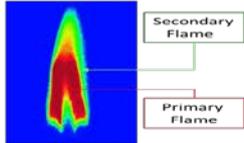
- Heating and cooling
- Cogeneration (CHP)
- Water recovery and reuse



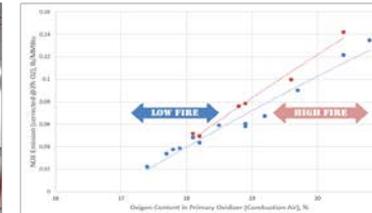
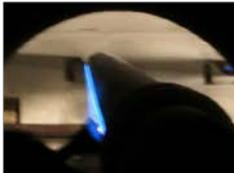
- > NO_x reduction = 64%
- > CO reduction = 88%
- > Efficiency boost > 15%
- > Doubled production
- > Low carbon footprint

Baking Oven – 50% less NOx

> Bench-Scale:



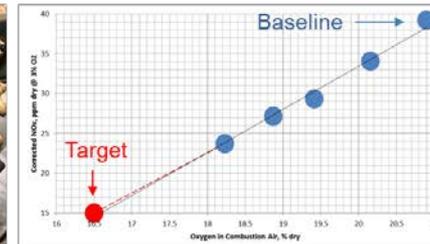
> Pilot-Scale:



> Installation:

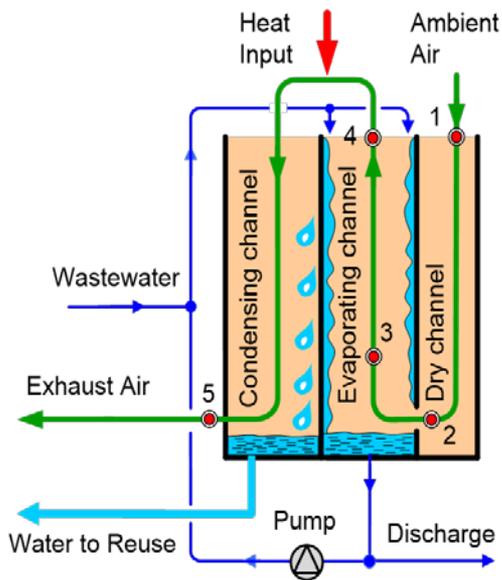


> Data Collection:



Heat and Water Recovery

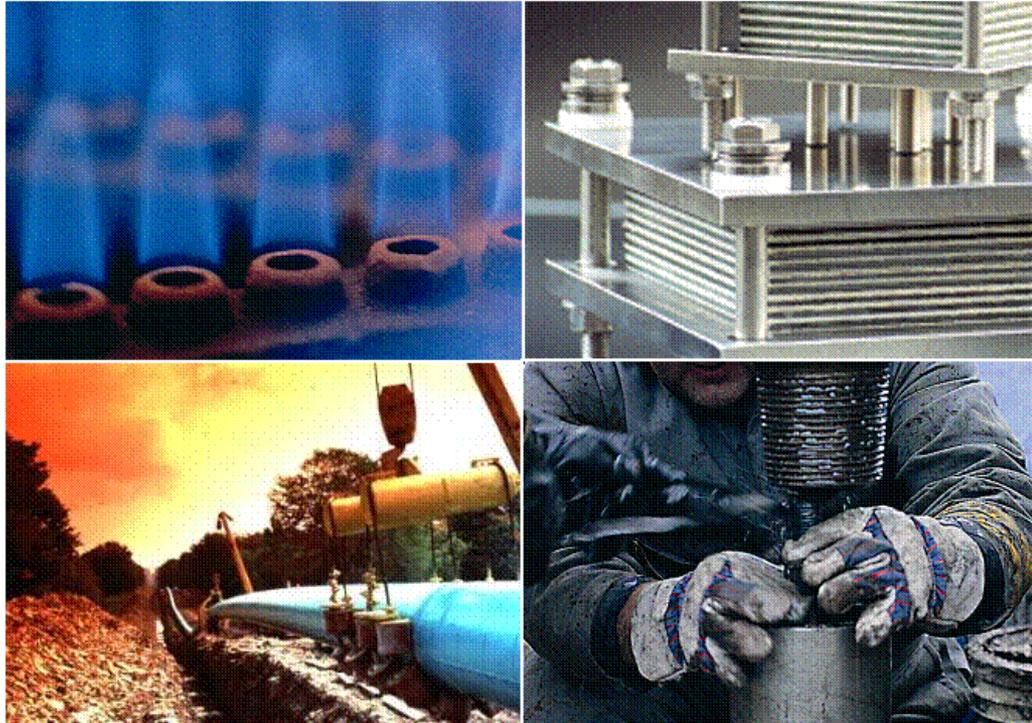
- > Food processors waste over 50% of energy input to the environment via low-grade heat and water vapor
- > Heat is sensible energy, water vapor is latent
- > Most of the solutions capture the sensible portion (15-25%)



- ✓ Successfully demonstrated under CEC PIER project
- ✓ Potential up to 100% wastewater recovery for reuse

<http://www.energy.ca.gov/2015publications/CEC-500-2015-049/CEC-500-2015-049.pdf>

Questions? Comments? Concerns?



www.gastechnology.org



Low-Carbon Process Heating and Cooling

Presenter #5 of 12:

Troy Davis, Mayekawa

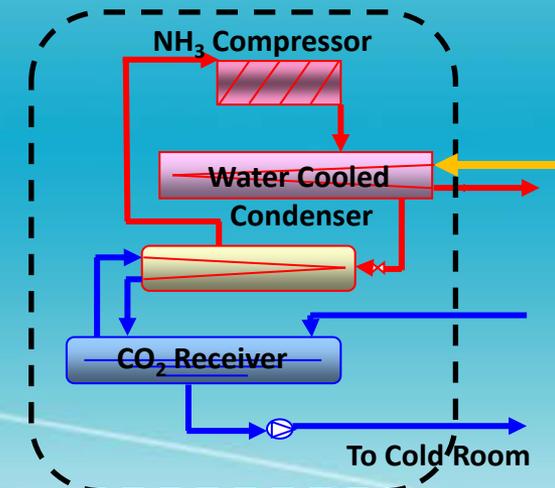
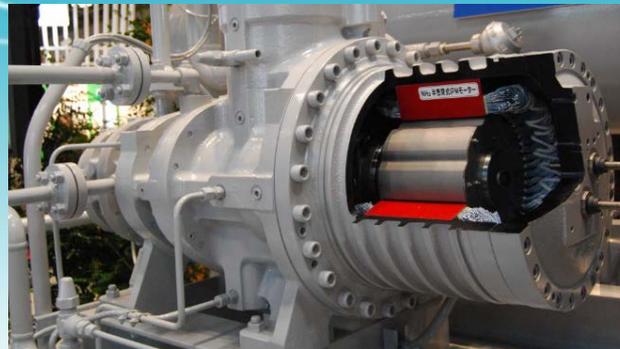
Mayekawa Product Overview
NH₃ / CO₂ Secondary Chiller Packages

NewTon

Shaping Refrigeration Systems for Tomorrow

Low Temperature Semi Hermetic Screw Package

- 0F to -45F CO₂ Supply Temperature range
- 15 TR to 85 TR Capacity range – single compressor
- Internally Compounded Twin Screw Design
- IPM Motor with Integrated VFD
- High Performance Plate and Shell Heat Exchangers
- Low NH₃ Charge with optimized flooded control



NH₃ / CO₂ PVB Package
No NH₃ inside building!

Energy Reduction of 28% compared to R-507a system!

Over 1,000 NewTon Packages Installed Worldwide!



Mayekawa Product Overview

NH₃ / Water or Glycol Chiller Packages



- Outdoor rated packages available in 40, 60 & 80 ton models at 45F water outlet temperature and 95F ambient temperature
- Micro Channel Condensers utilized to maintain low NH₃ refrigerant charge, yet maintain high package efficiencies
- NH₃ refrigerant charge less than 1 lbs./ton
- Optimized water or glycol heat exchangers
- Reliable MYCOM semi hermetic reciprocating compressors with VFD control allow for precise temperature control
- Integrated PLC controller with EC condenser fan operation capable of connection to existing BMS automation system



Air Conditioning • Process Cooling



Mayekawa Product Overview

Heat Recovery Hot Water Heat Pump Packages

Remember To Integrate **Heat Recovery** Where Possible

- Factory packaged Hot Water Heat pumps available in low charge NH₃ refrigerant or CO₂ Transcritical versions.
- CO₂ Water Source version for water heat recovery
- NH₃ Water Source and Over compression heat recovery types for highest recovery value.
- Reliable MYCOM high pressure reciprocating compressors with VFD control based on HW outlet temperature for maximum efficiency.
- Indoor and outdoor models available.
- PLC controller capable of connection to existing BMS automation system



149F to 194F
Hot Water Outlet



CO₂ Water Source Heat Pump



120F to 180F
HW Outlet



NH₃ Water Source Heat Pump

**Reduce Carbon Emissions with efficient
High Temperature Heat Pump Water Heaters!**



Thank You!



S U S T A I N Δ B I L I T Y

Troy W. Davis
Energy Group Manager
Mayekawa U.S.A.
tdavis@mayekawausa.com
650-350-2061





Low-Carbon Process Heating and Cooling

Presenter #6 of 12:

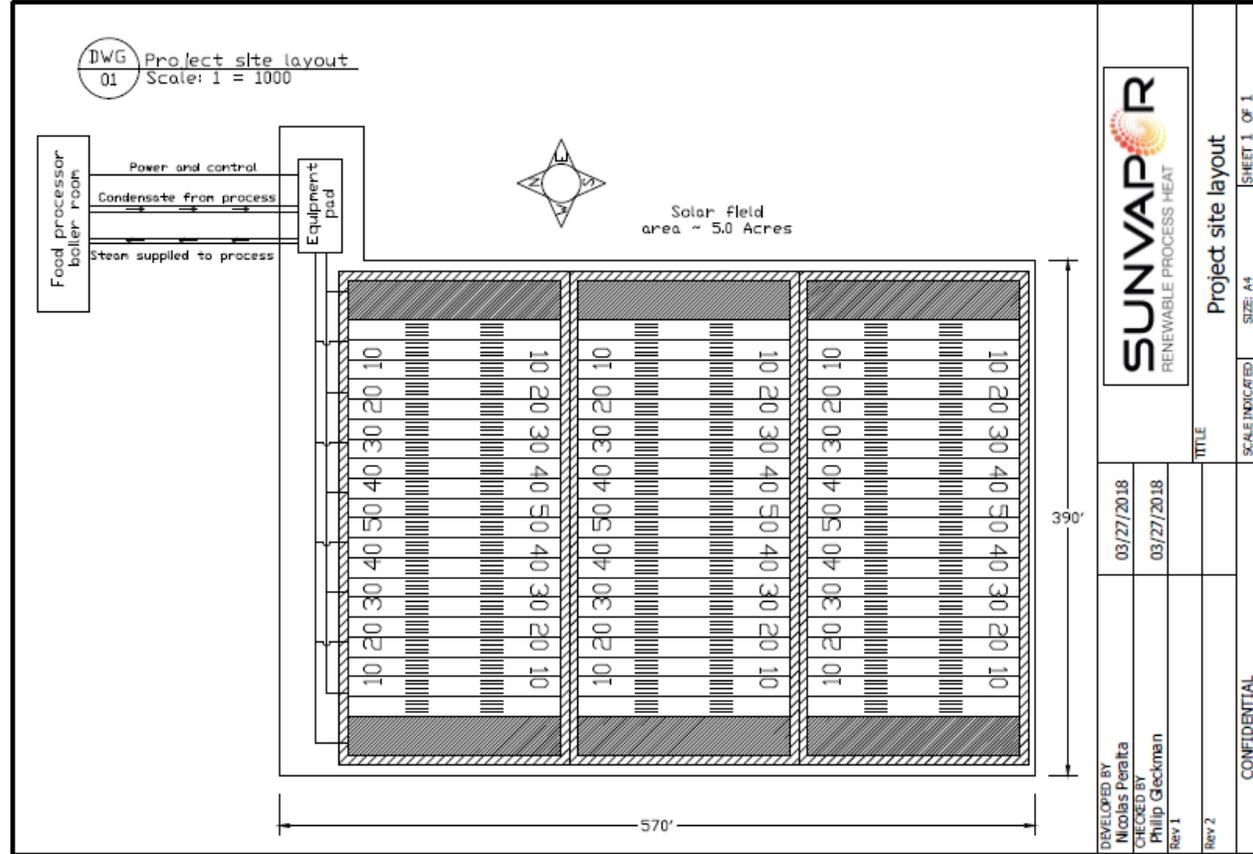
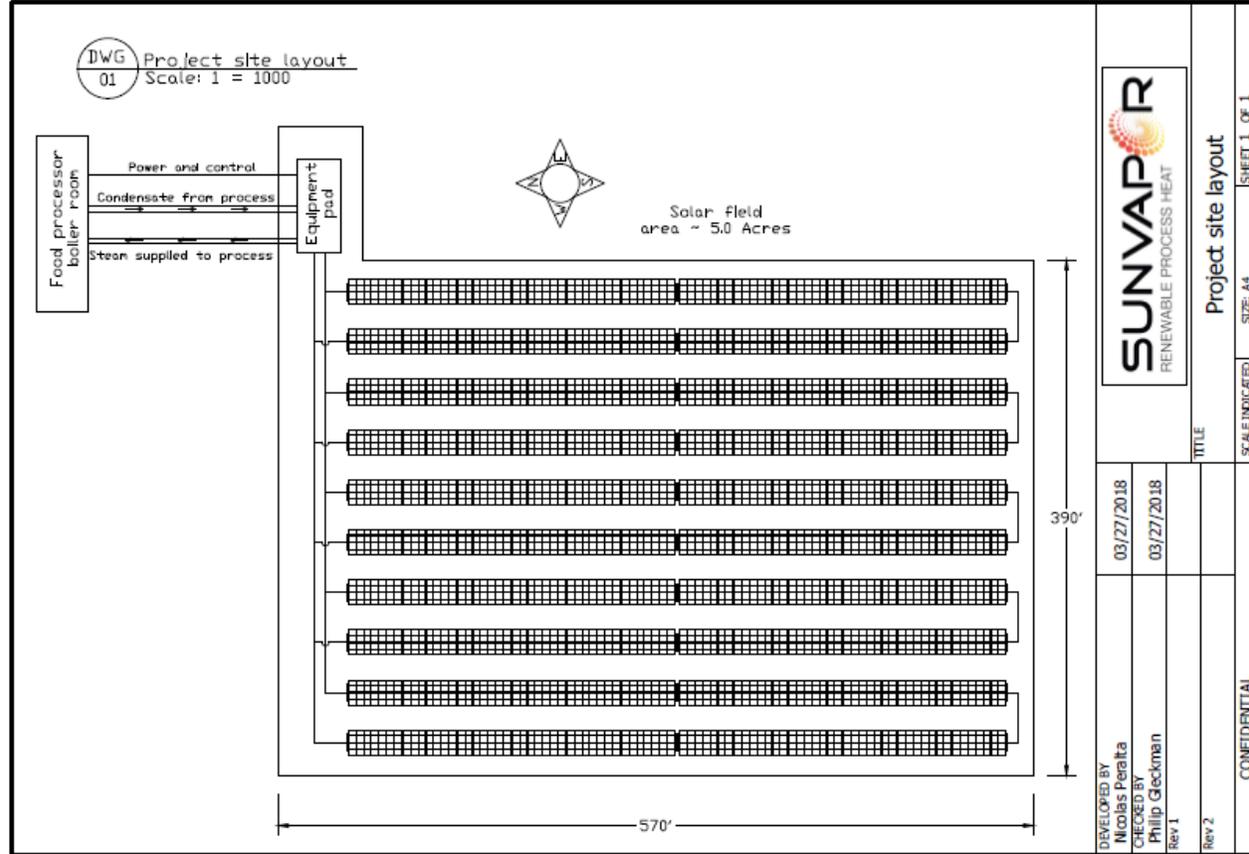
Philip Gleckman, Sunvapor

SUNVAPOR

RENEWABLE PROCESS HEAT



FPIP Solar steam project



Prototype demonstration



The Sunvapor Difference

- Patented Green Parabolic Trough Collector™
- Thermal efficiency >70% for 600°F
- 75% lower cost than state-of-the-art concentrating collectors
- Awards from U. S. Department of Energy & California Clean Energy Fund
- Utility-scale solar thermal power plant experience



Contact information

Name: Philip Gleckman

Email: philip.gleckman@sunvapor.net

Phone: (650) 625-7818

Linkedin: <https://www.linkedin.com/in/philip-gleckman-ba833a31>



Low-Carbon Process Heating and Cooling

Presenter #7 of 12:

Arun Gupta, Skyven Technologies

Zero Fuel Heat

skyventechnologies



Renewable heat

Save money from day one



Patent-pending IMA™ technology sources heat (up to 400°F) directly from the sun



ZERO CAPEX

pay only for delivered heat



ZERO PRICE RISK

discount vs fuel prices



ZERO EMISSIONS

directly offset use of fossil fuels



ZERO OP RISK

your facility is never without heat



ZERO DOWNTIME

simple integration with boiler



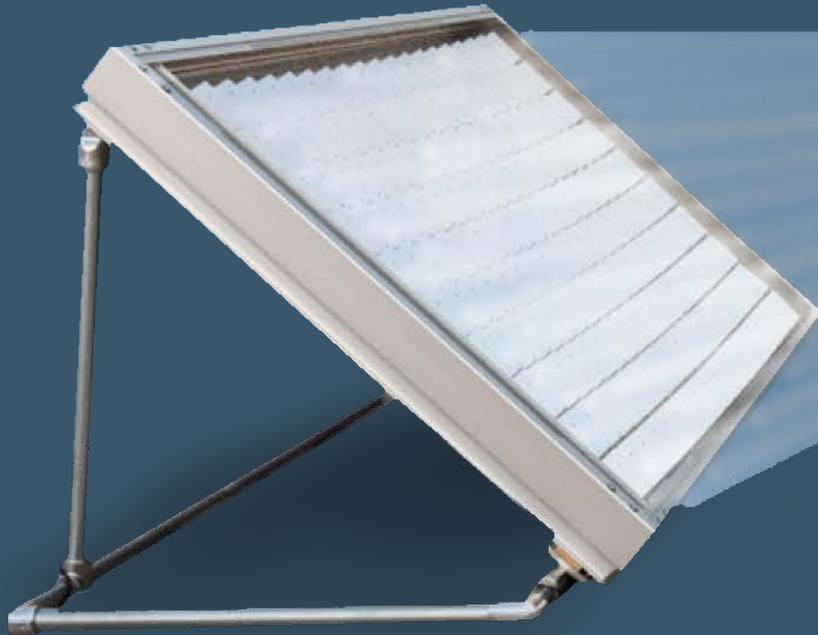


How it works

Collector panel reflects sunlight and focuses it onto a linear receiver

Collector uses an intelligent control system to collectively focus hundreds of ultra-low-cost reflectors

Receiver contains a black pipe heated with the power of thirty suns



System scalable from one collector to thousands

Standard heat transfer fluid pumped through the hot pipe to the process needing heat





skyvenimpact



1 IMA COLLECTOR

100 IMA COLLECTORS

10,000 IMA COLLECTORS

PEAK OUTPUT ON A SUNNY DAY

1.4 kW

140 kW

14 MW

ENERGY DELIVERED FROM THE SUN

ANNUAL IMPACT

6 MMBTU

ANNUAL IMPACT

600 MMBTU

ANNUAL IMPACT

60,000 MMBTU

LIFETIME IMPACT

1.2M MMBTU

GALLONS OF DIESEL OFFSET

54

5,400

540,000

10.8M

CO2 EMISSIONS AVOIDED

1,207 LB
(0.55 METRIC TONS)

120,700 LB
(55 METRIC TONS)

1.2M LB
(5,500 METRIC TONS)

24M LB
(110,000 METRIC TONS)

EQUIVALENT OF TREES PLANTED

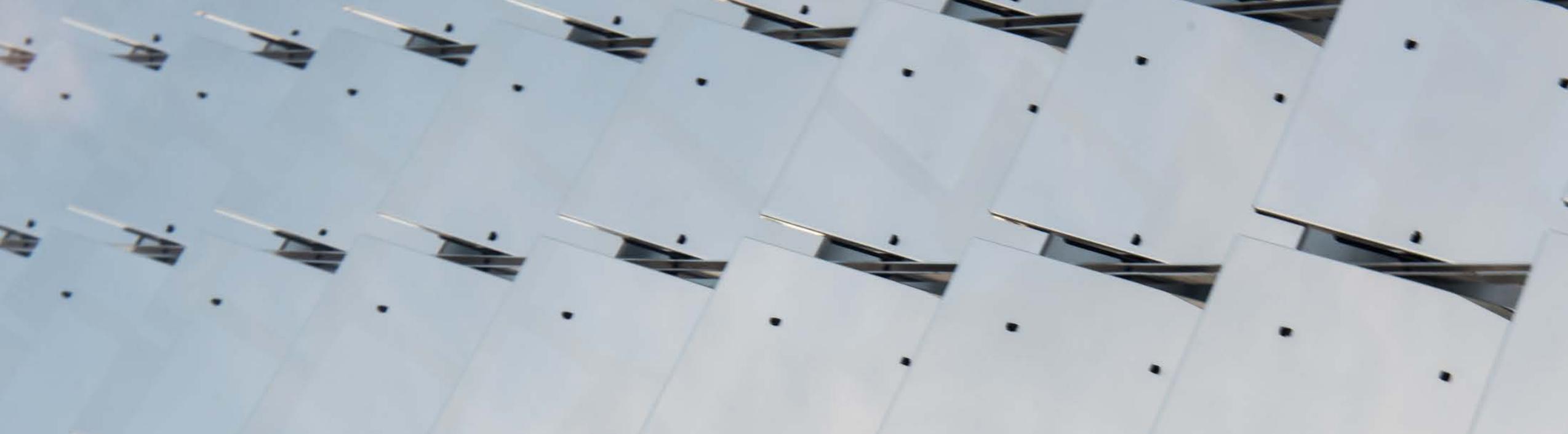
14

1,400

140,000

2.8M

These values apply to California, derate by 30-40% for the Northeast.



skyventechnologies

Thank You!

Arun Gupta, PhD | agupta@skyven.co | (734) 262-5227 | www.skyven.co





15 Minute Break



Innovation Showcase

System Control

- Elhay Farkash, Lightapp Technologies
- Tamba Balde, Sweep Energy

Water Treatment

- Jennifer Klare, Porifera
- Jon Glazer, InStill WaterTech
- Alexander Wright, ClearCove



System Control
Presenter #8 of 12:

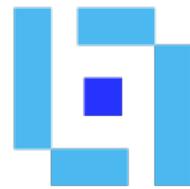
Elhay Farkash, Lightapp
Technologies

Energy Management for Food Producers

March 29th, 2018

Tulare, CA

Hosted by the California Energy Commission

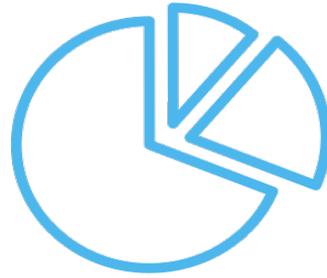


Lightapp

LIGHTAPP HIGHLIGHTS



Production & Resource **Analytics** for
Manufacturers



Data Acquisition, Real-Time Insights
and Performance Optimization



Integrated **Engagement** Platform
Delivers High Adoption, Strong
Results, and Rapid Energy Reductions

Over 100 manufacturing facilities worldwide use Lightapp and have achieved an average energy reduction of 20%.

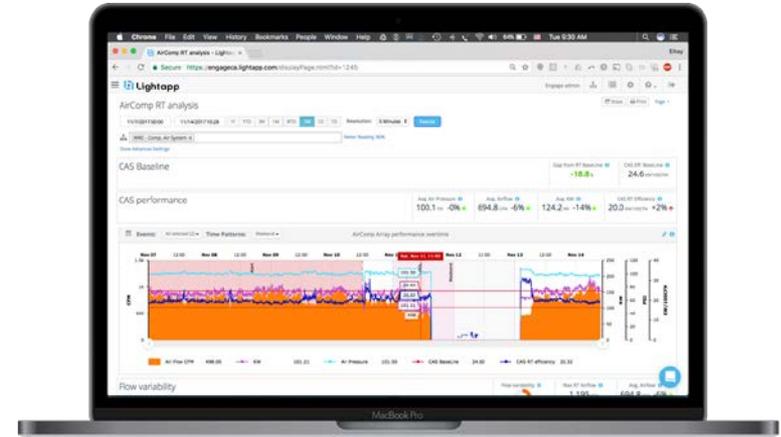
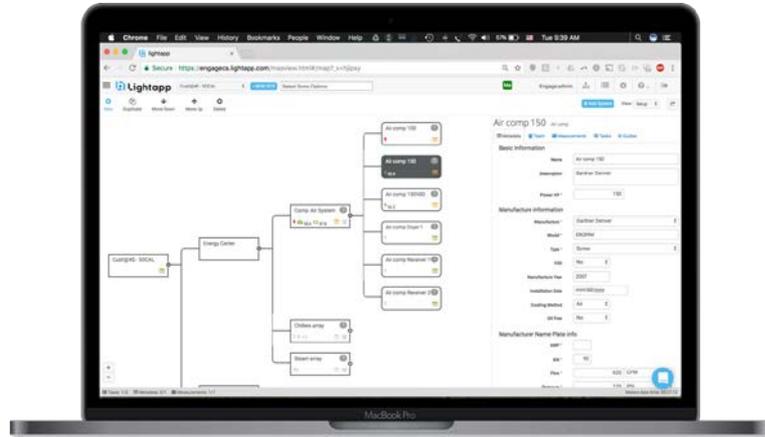
Food Processors Already Use Lightapp

Resource management

- ❖ Electricity
- ❖ Fuel
- ❖ Water
- ❖ CO2

System optimization

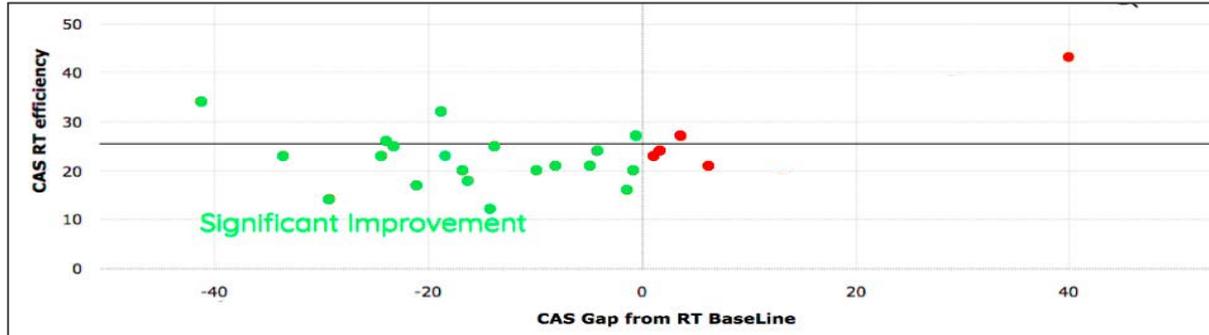
- ❖ Compressed air
- ❖ Steam (water and gas)
- ❖ Chillers
- ❖ Waste
- ❖ Production





Experience through Project Engage

The purpose of Project Engage is to deploy Lightapp in 100 manufacturing facilities throughout California to evaluate the impact of energy management software on industrial facility energy consumption.



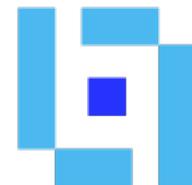
To learn more:

Contact:

Jake Ness, Business Development

Jake.ness@lightapp.com

650.382.4047



Lightapp



System Control
Presenter #9 of 12:

Tamba Balde, Sweep Energy



sweep energy

Tamba Baldé | sweepenergy.com | (408)-909-3848

Solution

Sweep Energy's platform identifies, predicts, and pinpoints issues that may occur on electrical equipment during production.

Monitor



Analyze



Report



Save



The service will save businesses thousands to hundreds of thousands of dollars by eliminating the sudden loss of production caused by equipment failure.

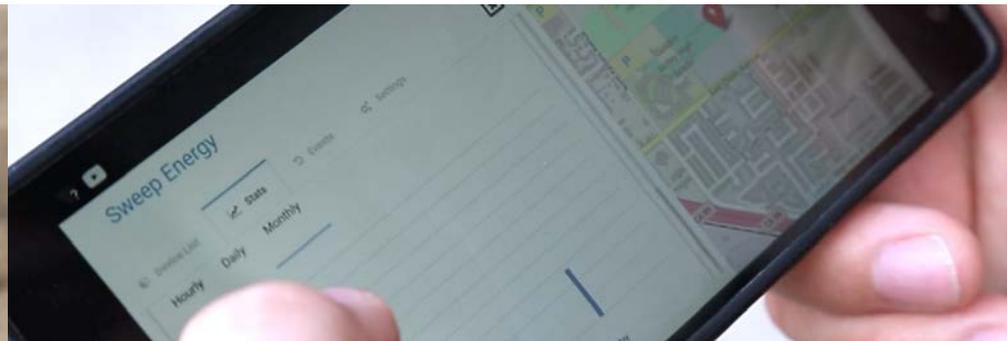
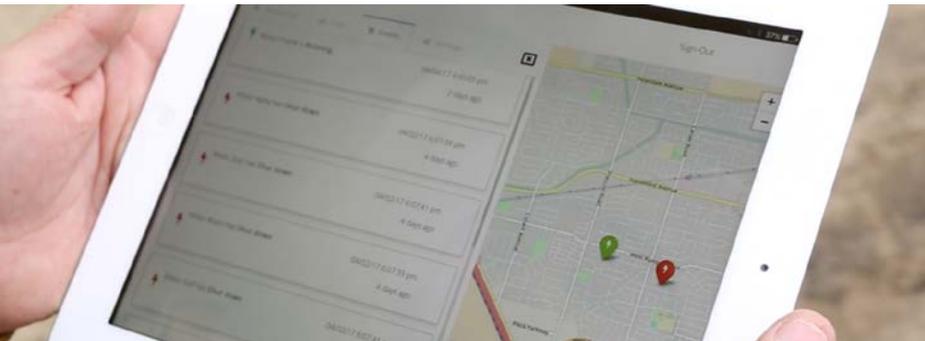


Our Offering

Sensor network



User interface



Prevent Failures - Reduce Downtime - Increase Output - Save Money - Simplify Your Job



Capabilities

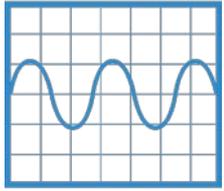
- Monitor In Real Time
- Pinpoint Problems
- Automated Alerts
- Integrated Cloud Storage
- Energy Usage Reports
- Predictive Smart diagnostics



sweep energy

Tamba Baldé | sweepenergy.com | (408)-909-3848

How Does It Work?



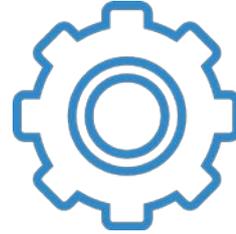
Extract Signal



Generate Statistically Relevant Insights



Generalized Prediction



Component Specific Prediction



Customer Notification



Types of Failure:

- 1) Bearing Wear
- 2) Broken Rotor Bars
- 3) Electrical Connections
- 4) Stator Winding Inter-Turn Short-Circuit





Water Treatment
Presenter #10 of 12:

Jennifer Klare, Porifera



Porifera

LESS WASTE

MORE WATER

BETTER PRODUCT

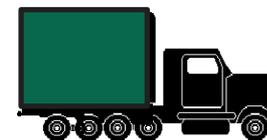
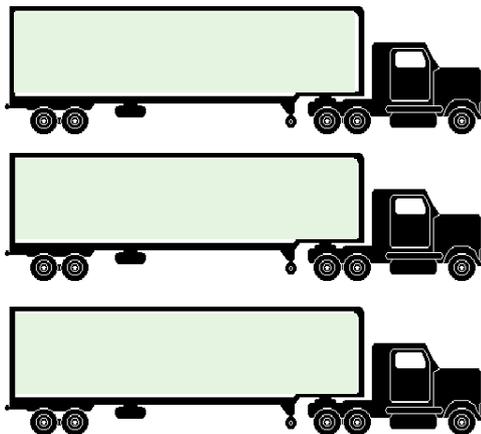
- Membrane technology for low energy product concentration, waste reduction, and water reuse
- Located in San Leandro, California
- Experienced team of 25 that delivers
- Over \$25M from NSF, DOD, DOE, NASA, and the CEC
- Customers in California and worldwide

Some of our F&B Customers...



Confidential large cap
multinational
companies

The Problem



Our Solution

Efficiently remove water
leaving the good stuff that matters



High Quality Concentrates Enable Transportation, Storage, and Energy Savings, & New Product Lines.



Celery

Pineapple

Coconut water

Watermelon

Wine

- Natural beverage products can be concentrated without heat and without pressure all while retaining volatiles
- Original taste, nutrients, flavonoids, aromas, and quality are maintained.



Milk Concentrate
No Browning!



Our Technology Minimizes Waste and Maximizes Water Reuse



PFO Elements for commercial systems

Treat highly fouling and high COD or TDS water:

- Overall waste disposal cost savings
- Transportation and energy savings



PFO+ROx Pilot System for testing your waste water on-site

LESS WASTE **MORE WATER** **BETTER PRODUCT**

Jennifer.Klare@poriferanano.com, 510-999-5142



Water Treatment
Presenter #11 of 12:

Jon Glazer, InStill WaterTech



Demineralized water for industrial facilities

- InStill produces demineralized water for use in power plants, food and beverage processors and other industrial facilities, at a cost far below existing alternatives
- We use a proprietary “natural vacuum” distillation technology which allows customers to reduce energy and chemicals consumption, reduce raw water consumption, and reduce wastewater discharges
- Customers can cut their water treatment and wastewater disposal costs by up to 75%, while operating in a more sustainable manner and using fewer scarce resources

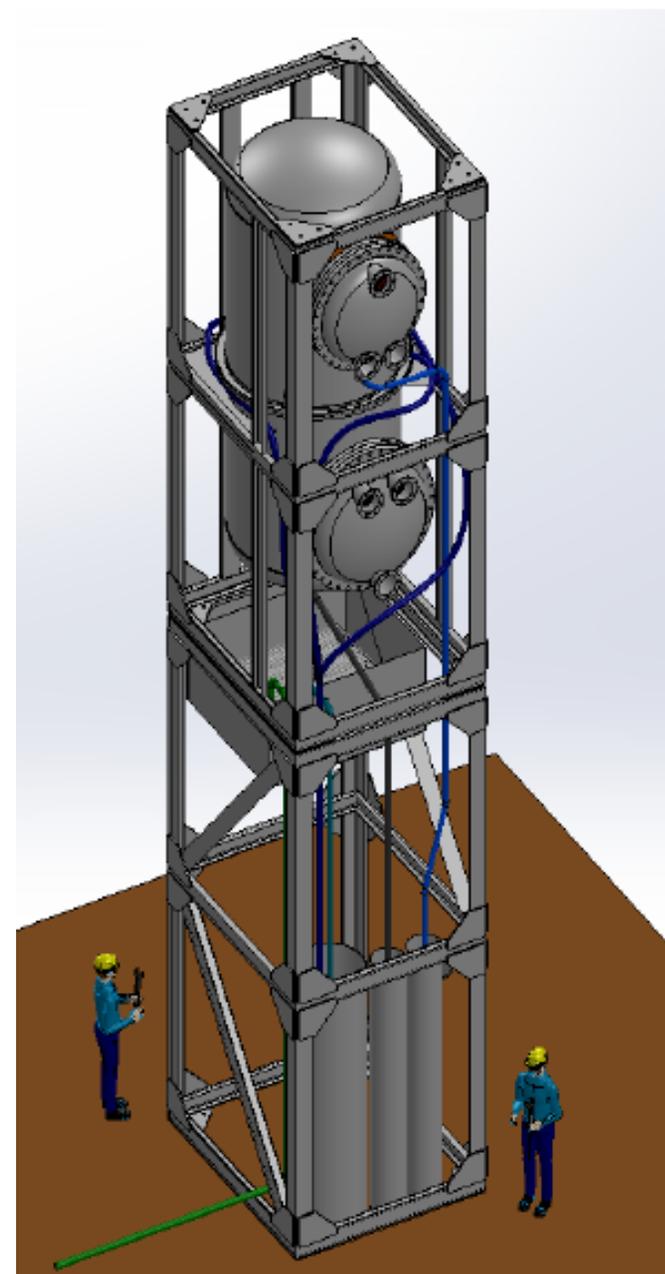
Water Purification Through Distillation

- Distillation is the most effective method of water purification
- Most distillation technologies require lots of energy to boil water at 212° F
- We use low-temperature waste heat to boil water under a naturally maintained vacuum, at temperatures as low as 113° F
- We can treat groundwater, industrial wastewater, or seawater
- We offer a plug-and-play solution which fits inside existing facilities due to its small footprint

System Requirements and Performance

- Each portable unit can process up to 50,000 gallons of incoming water per day (35 gpm)
- As an example of performance, assume a portable unit processes 12,000 to 32,000 gallons of incoming water per day (8 gpm to 22 gpm), and that 50 to 90%¹ becomes treated water available for use in the facility (4 gpm to 20 gpm)
 - Requires 2.2 to 10.4 MMBtu per hour of waste heat
 - Requires 200 to 960 gpm of cooling water
- Minimal electricity usage
- No membrane replacement costs

¹ Depending on quality of incoming water





Contact Information

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Costa Mesa, CA 92626

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949-529-5281
glen@instillwatertech.com

Jon Glazer
Chief Financial Officer
714-322-2767
jglazer@instillwatertech.com



Water Treatment
Presenter #12 of 12:

Alexander Wright, ClearCove

Patented Resource Recovery Technology. Scalable. Industry-leading Results.

ClearCove Technology for Food and Beverage Wastewater Treatment

CLEARCOVE

CLEAN ENERGY. CLEAN WATER.

March, 2018



Transforming Wastewater Treatment

The Old Way

Biological Processes



Yeast & Aeration



Air Floatation (DAF)



Lagoon / Settling Basin



- *Little innovation in 50+ years*
- Biological processes are unreliable/inconsistent
- High electricity consumption
- High CO2 emissions
- Limited capability to deliver water reuse
- High construction costs
- Large footprints required
- Long time needed to settle and treat waste
- Strong odors

Expensive, Inefficient, Pollutive

The ClearCove Way

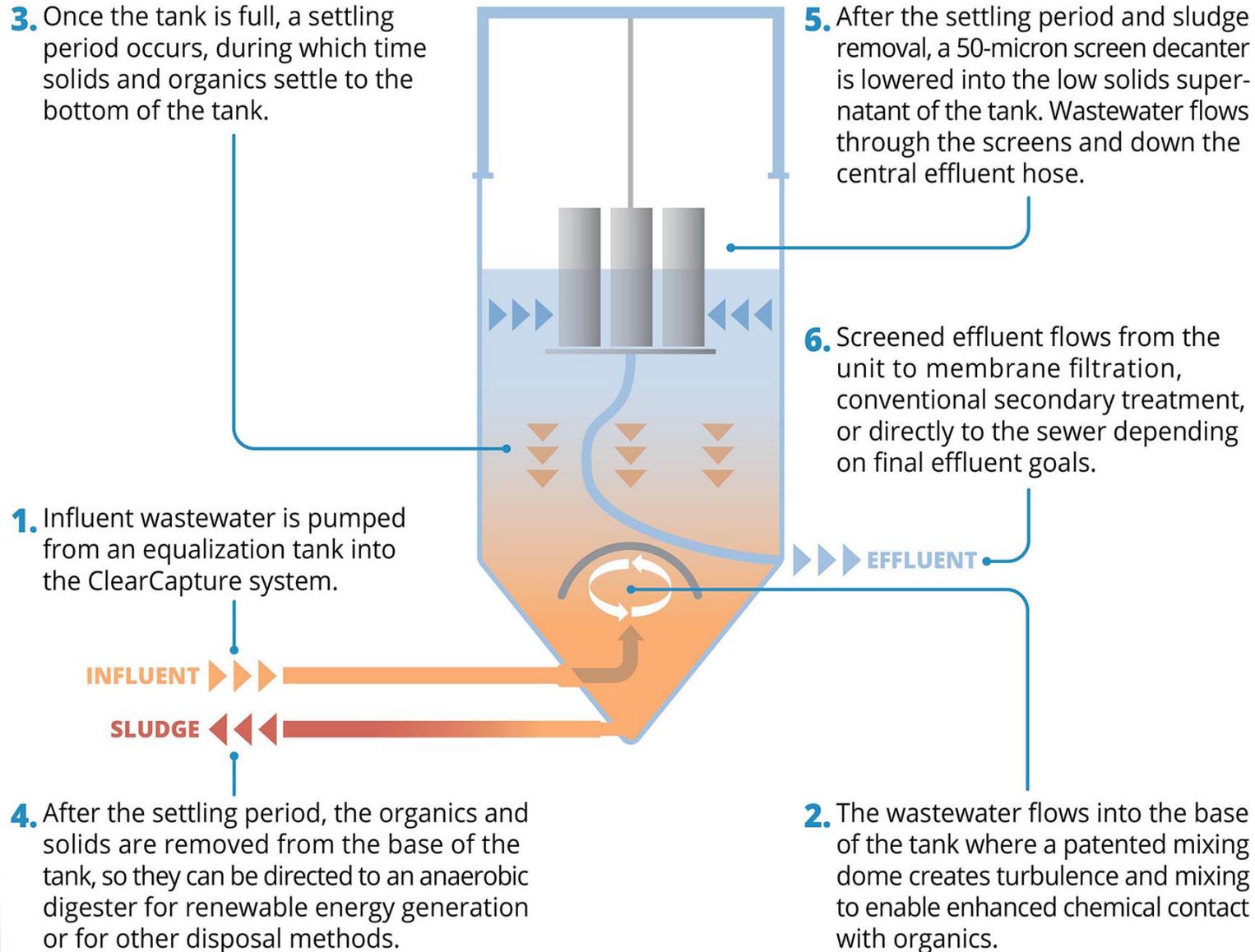
Superior Technology - 13 Patents Issued and 35 Pending



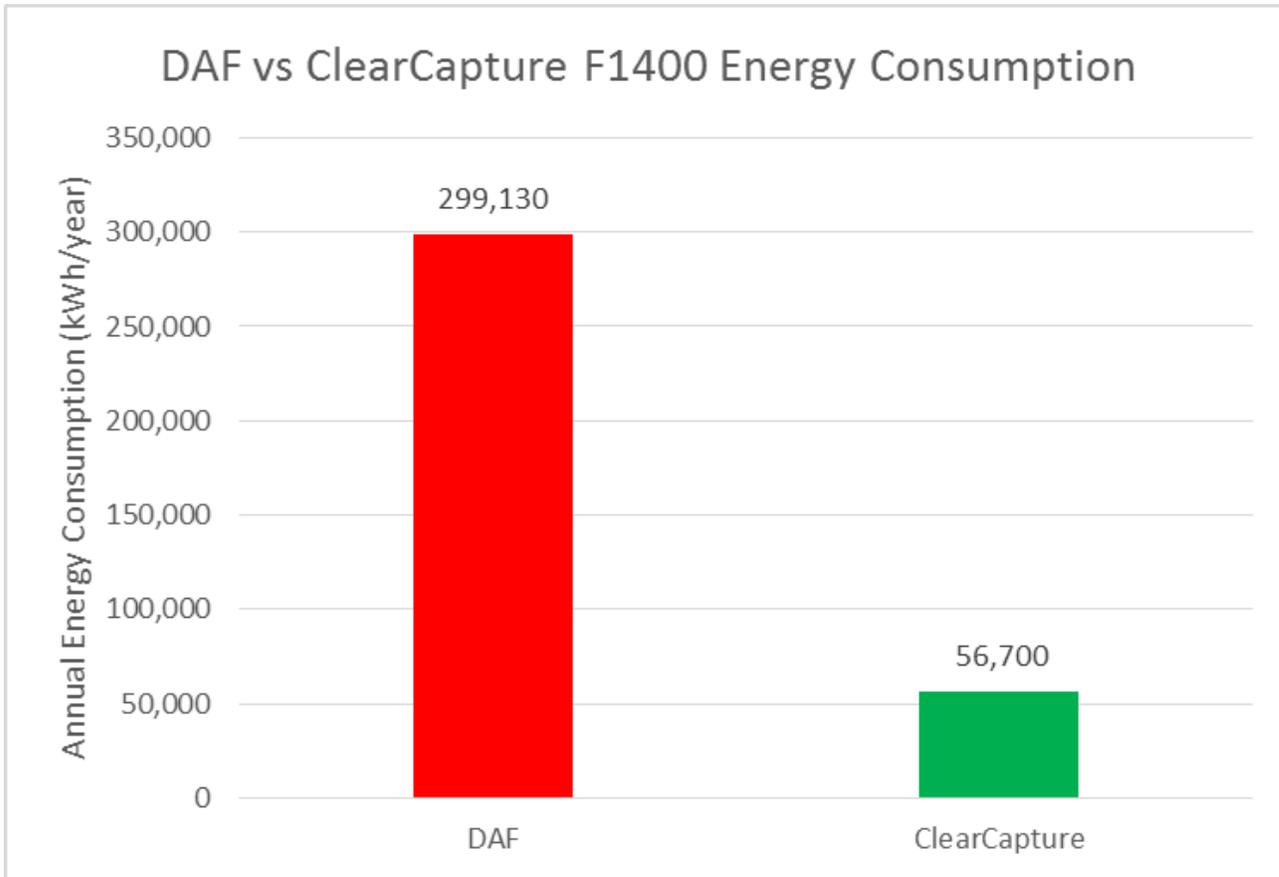
- **NO BIOLOGY**
- Chemically Enhanced Primary Treatment Technology
- Enables physical membranes for water recovery up to 90%
- Up to 50+% less energy consumption
- Up to 50+% less chemical
- Sludge has higher energy content for biogas production
- Modularly expandable
- Low odor
- Highly automated
- Smaller footprint



The ClearCapture F1400 Technology



ClearCapture F1400 vs DAF



*Diagram shows energy comparison for 60,000 GPD treated

The ClearCapture F1400 offers a number of advantages over DAF systems, including:

- Significantly less energy consumption
- Significantly less chemical consumption
- Significantly less mechanical complexity
- Significantly less operator attention
- Higher level of automation
- Enables physical membranes downstream (P1400)



Cheese Plant - 360 Sustainable Design

- **Influent Wastewater: 260,000 GPD**
- **10,950,000 lbs/year COD diverted to energy generation**
- **Energy Generation Estimate: 5,500 MWh/year**
- **WWTF Energy Consumption: 2,200 MWh/year**
- **Net-zero WWTF, excess energy will partially power cheese plant**
- **CO₂e Reduction: 2,068 tonnes/year**
- **Reuse Water (WWTF in-house process water, cow drinking water, irrigation)**
230,000 GPD or 83,950,000 GPY
- **50% less O&M cost than conventional solution (energy, operator and chemical)**





Thank You

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www.ClearCoveSystems.com



Presentations Updated After the Innovation Showcase Event



Innovation Showcase

Updated Presentations

Low-Carbon Process Heating and Cooling

- Yaroslav Chudnovsky, Gas Technology Institute

Water Treatment

- Jon Glazer, InStill WaterTech



Low-Carbon Process Heating and Cooling Presenter #4 of 12 (UPDATED Presentation):

Yaroslav Chudnovsky, Gas
Technology Institute

the Energy to Lead



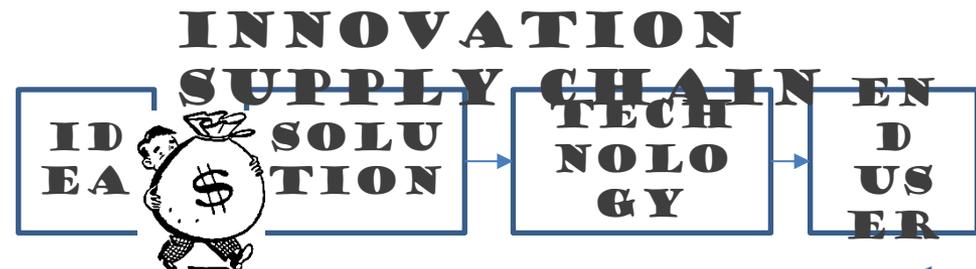
Gas Technology Institute: Advanced Cost-Effective Technologies for California Food Processors

- > by Yaroslav Chudnovsky, Ph.D., MBA, FASME
847-768-0536, Yaroslav.Chudnovsky@gastechnology.org
- > **CEC Food Production Investment Program**
March 29, 2018

Introduction



- > GTI is NFP established by the natural gas industry in 1941
- > 18-acre campus in Chicagoland
- > Applied research, development technology deployment, training
- > Over 1200 patents and over 500 products commercialized
- > Food processing employ burners, boilers, heat exchangers, controls
- > CEC FPIP goals are to accelerate the adoption of advanced energy technologies at CA food processing market by demonstrating their operational reliability and cost-effectiveness



Gas-Fired Technologies to Help

> Energy Efficiency

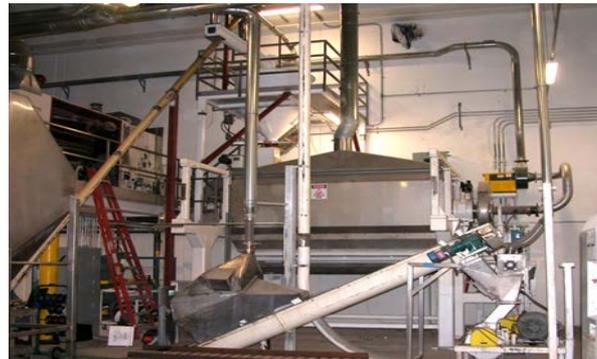
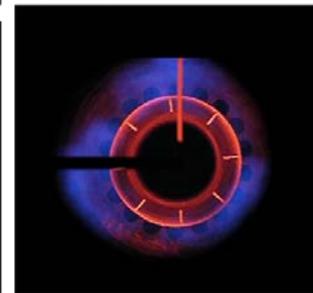
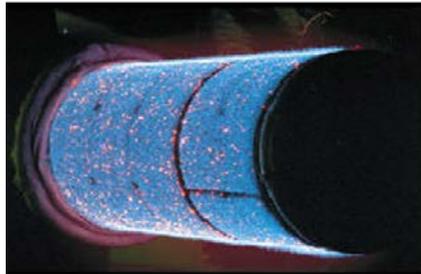
- Process improvement
- Smart heat recovery
- Energy savings

> Emission Reduction

- LN and ULN burners
- Fuel savings

> Additional Services

- Heating and cooling
- Cogeneration (CHP)
- Water recovery and reuse

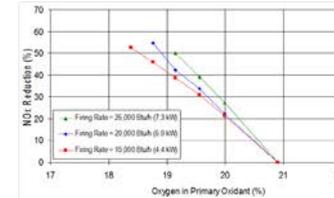
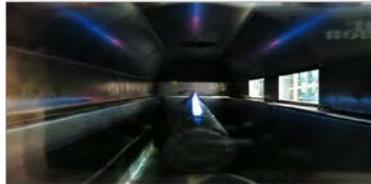
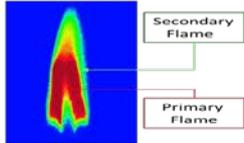


Onion Powder Dryer-Toaster

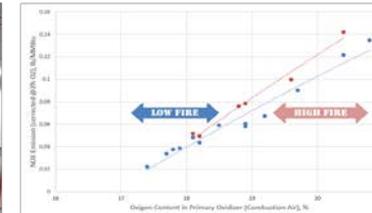
- > NO_x reduction = 64%
- > CO reduction = 88%
- > Efficiency boost > 15%
- > Doubled production
- > Low carbon footprint

Baking Oven – 50% less NOx

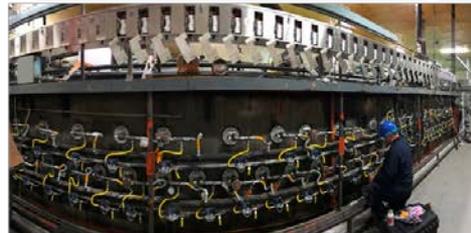
> Bench-Scale:



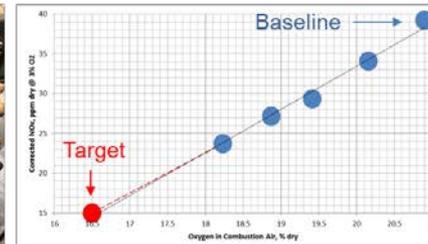
> Pilot-Scale:



> Installation:

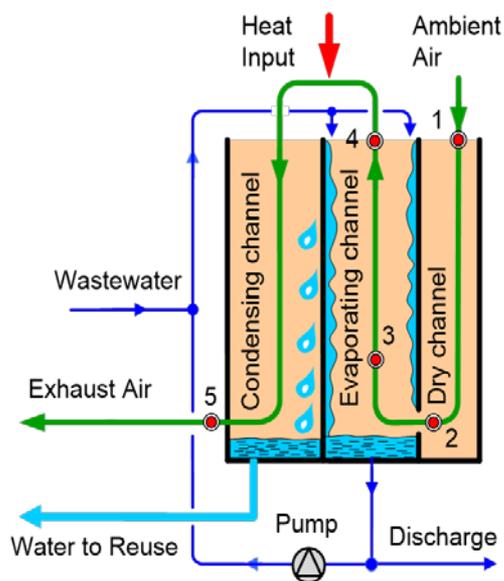


> Data Collection:



Heat and Water Recovery for Reuse

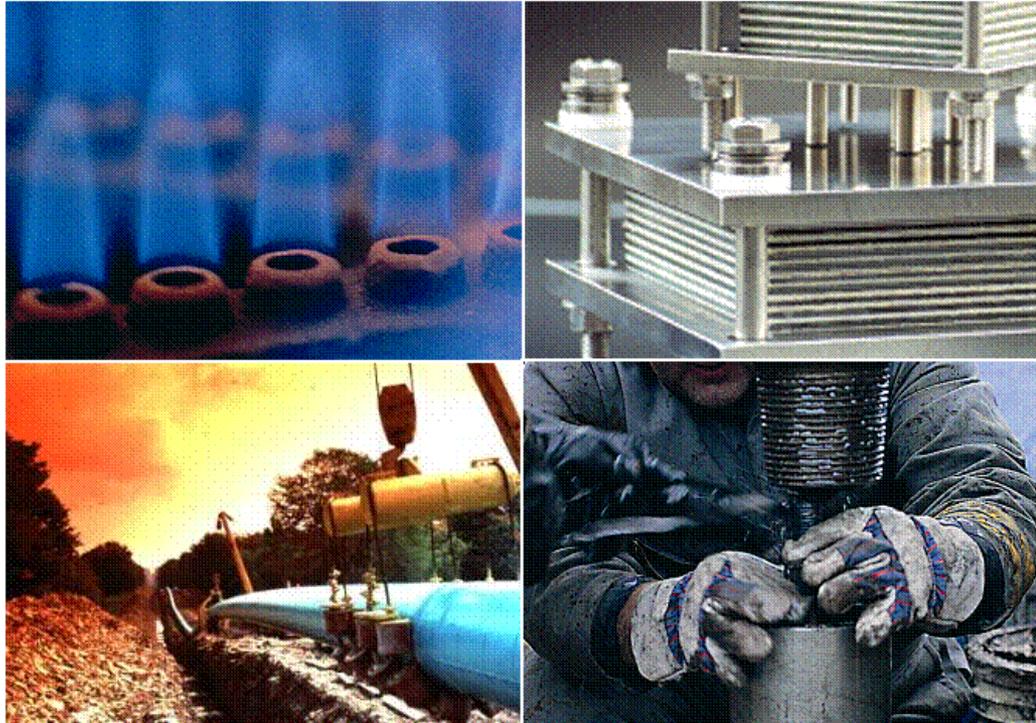
- > Food processors waste over 50% of energy input to the environment via low-grade heat and water vapor
- > Heat is sensible energy, water vapor is latent
- > Most of the solutions capture the sensible portion (15-25%)



- ✓ Successfully demonstrated under CEC PIER project
- ✓ Potential up to 100% wastewater recovery for reuse

<http://www.energy.ca.gov/2015publications/CEC-500-2015-049/CEC-500-2015-049.pdf>

Questions? Comments? Concerns?



www.gastechnology.org



Water Treatment

Presenter #11 of 12 (UPDATED Presentation):

Jon Glazer, InStill WaterTech



Demineralized water for industrial facilities

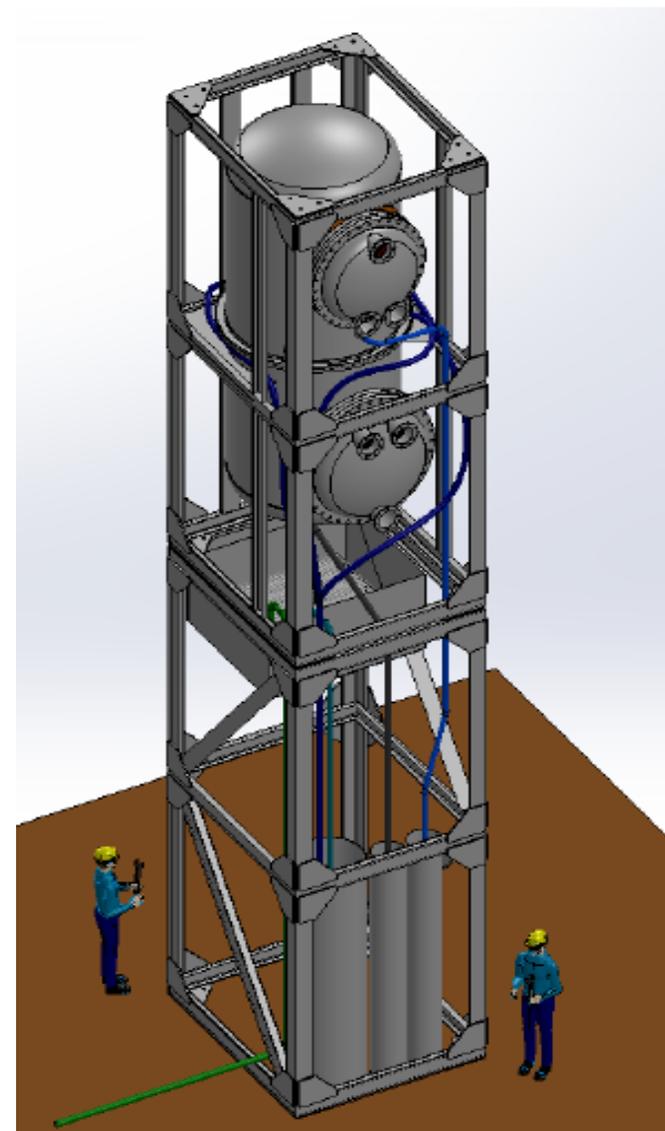
- InStill produces demineralized water for use in power plants, food and beverage processors and other industrial facilities, at a cost far below existing alternatives
- We use a proprietary “natural vacuum” distillation technology which allows customers to reduce energy and chemicals consumption, reduce raw water consumption, and reduce wastewater discharges
- Customers can cut their water treatment and wastewater disposal costs by up to 75%, while operating in a more sustainable manner and using fewer scarce resources

Water Purification Through Distillation

- Distillation is the most effective method of water purification
- Most distillation technologies require lots of energy to boil water at 212° F
- We use low-temperature waste heat to boil water under a naturally maintained vacuum, at temperatures as low as 113° F
- We can treat groundwater, industrial wastewater, or seawater
- We offer a plug-and-play solution which fits inside existing facilities due to its small footprint

System Requirements and Performance

- InStill's portable unit can process up to 50,000 gallons of incoming water per day
- Requires sufficient quantity of waste heat and cooling water
- Significant improvement in water reject rates
- Minimal electricity usage
- No moving parts
- No membrane replacement costs



Patent Pending



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