ETCC QUARTERLY MEETING: 
MAKING EMERGING TECHNOLOGY WORK IN THE AGRICULTURAL SPACE

April 26, 2016
Energy Training Center, Stockton, CA
HOSTED BY: Pacific Gas & Electric

Wifi: xxxxx     WIFI code: xxxxx
Welcome, Safety and ETCC Updates

Mangesh Basarkar
Manager, Product Management, Energy Efficiency Products | Pacific Gas & Electric
Before we get started....
housekeeping and safety
FOR OUR ONLINE MEETING PARTICIPANTS

• Quick logistics
  – Phone lines are muted, so if no sound is coming from your speakers, click here
  – Speaker check: select “raise” hand in the control panel to confirm you are able to hear
  – Please use question field to ask questions during Q&A or if any technical issues
HOUSEKEEPING FOR ALL PARTICIPANTS

- Please **turn off** or **silence** your phone, and **step outside** for any non-program conversations
- Video and audio recording today’s session
  - Will be posted on [www.etcc-ca.com](http://www.etcc-ca.com)
- Slides will be posted to [www.etcc-ca.com](http://www.etcc-ca.com)
- Don’t forget to fill out evaluations!
SAFETY MESSAGE

• In the event of an emergency:
  – Earthquake
  – Fire
  – Other evacuation

• Meeting point

• 911

• CPR
## TODAY’S AGENDA

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 AM</td>
<td>Welcome, Safety &amp; ETCC Updates</td>
</tr>
<tr>
<td>10:20 AM</td>
<td>What Does Success Look Like? Building a Partnership with the ET Program</td>
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<tr>
<td>11:30 PM</td>
<td>LUNCH (provided)</td>
</tr>
<tr>
<td>12:35 PM</td>
<td>Field to Market: What are the Needs in the Agricultural Space?</td>
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<tr>
<td>1:55 PM</td>
<td>BREAK</td>
</tr>
<tr>
<td>2:15 PM</td>
<td>Emerging Solutions: What Technologies are Available for the Agricultural Space?</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>WRAP UP</td>
</tr>
</tbody>
</table>
EMERGING TECHNOLOGIES COORDINATING COUNCIL (ETCC)

The ETCC supports ETP efforts in the advancement of energy efficiency and demand response initiatives through its leadership, impact and influence in the emerging technology domain. It pursues this objective by strategically engaging with a wide range of external ET stakeholders and effectively and efficiently managing coordination among ETCC members.

Members include:

- Southern California Edison
- Pacific Gas and Electric Company
- SMUD
- State of California Energy Commission
- Southern California Gas Company
- SDGE
- Los Angeles Department of Water & Power
Emerging Technologies Program Mission

“...to increase energy efficiency market demand and technology supply through evaluation of emerging and underutilized advanced technologies to increase customer savings...”
ET PROGRAM DESIGN

Technology Development Support

• Provide resources to transform early-stage technologies / concepts into saleable products
• Develop forward-looking product specifications
• Provide outreach to early-stage entrepreneurs, investors, and analysts (TRIO)

Technology Assessment

• Evaluate performance claims
• Generate energy savings and cost data required for regulatory approval of a new EE measures

Technology Introduction Support

• Conduct scaled field placements to foster market traction
• Build demonstration showcases to create visibility / market awareness
• Conduct third-party solicitations using competitive bidding (TRIP solicitation)
## UPCOMING ETCC EVENTS

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Check the ETCC website for updates: [http://www.etcc-ca.com/events](http://www.etcc-ca.com/events)
WHAT DOES SUCCESS LOOK LIKE?
BUILDING A PARTNERSHIP WITH THE ET PROGRAM

Dean Kunesh, Senior Solutions Marketing Manager | Pacific Gas & Electric – moderator

Tom O'Donnell, Principle Engineer | E&J Gallo Winery

Dan Sonke, Manager of Ag Sustainability Programs | Campbell Soup Company
Dean Kunesh
Senior Solutions Marketing Manager | Pacific Gas & Electric
Livingston Water Innovation and Energy (LWINE)

• Design to treat wastewater:
  – 450,000 Gallons / Day of Water
  – Lower COD
  – Lower Nitrates

• Generate 2 MW of Power

tom.odonnell@ejgallo.com
Dan Sonke
Manager of Ag Sustainability Programs | Campbell Soup Company
Campbell Soup Company

$8 Billion Portfolio
Tomato Operations & the Water-Energy Nexus
WHAT DOES SUCCESS LOOK LIKE? BUILDING A PARTNERSHIP WITH THE ET PROGRAM

Dean Kunesh, Senior Solutions Marketing Manager | Pacific Gas & Electric – moderator

Tom O'Donnell, Principle Engineer | E&J Gallo Winery

Dan Sonke, Manager of Ag Sustainability Programs | Campbell Soup Company
LUNCH

*Program will resume at 12:35 pm*

PLEASE FILL OUT EVALUATIONS!
FIELD TO MARKET: WHAT ARE THE NEEDS IN THE AGRICULTURAL SPACE?

Robert Parkhurst, Director, Agriculture Greenhouse Gas Markets | Environmental Defense Fund - moderator

Stuart Styles, Director, Irrigation Training Center | Cal Poly San Luis Obispo

Laurie Park, Principal | Water Energy Innovations, Inc.

Neil Black, President | California Bioenergy
Robert Parkhurst
Director, Agriculture Greenhouse Gas Markets | Environmental Defense Fund
Stuart Styles
Director, Irrigation Training Center | Cal Poly San Luis Obispo
Field to Market: What are the needs in the Agricultural Space

Dr. Stuart Styles
Director
Cal Poly Irrigation Training and Research Center
www.itrc.org  sstyles@calpoly.edu

Specialization: Modernization of irrigation systems (including both on-farm and irrigation projects)
Map showing where in the state the energy is being used.

California Ag Energy and Water Use

Graph of water use compared to yield.

California - Water Use Efficiency

Water Use (million AF)
Yield (million tons)
Water Use Efficiency (Tons/AF)

1960-1990 water data from David Knezev, California Farm Bureau (http://www.cfb.org/info/wateruse.htm)
Year 2000 data from the following sources: California Land and Water Use California Department of Water Resources <http://www.waterboards.ca.gov/water_issues/programs/land_water_use.html>
Laurie Park
Principal | Water Energy Innovations, Inc.
Neil Black
President | California Bioenergy
ETCC Conference

April 26, 2016
California Dairy Industry Key Statistics

- Largest dairy industry, 20% of America’s milk
- 1.8M milk cows, 1,500 dairies
- Majority of farms concentrated in the San Joaquin Valley
- Industry generates 50% of CA CH4 emissions, 25% from lagoons
- Dairy digesters provide a solution with multiple benefits to California and the farmer
Benefits of Dairy Digesters

- Capture and destroy vented methane
- Energy generation
  - Electricity. Renewable source to power ~450,000 homes. Biogas can be stored to generate electricity as needed. Engine heat can cool milk.
  - Vehicle fuel (R-CNG). 1 cow = ~ 3000 car or 500 truck miles. Plus cleaner than diesel.
- Nutrient management
  - Consistent manure water, can flow into irrigation system
  - Increase in plant soluble nitrogen: potential decrease use of chemical fertilizers and enhanced ground water
  - Will be testing for use into drip irrigation systems
CalBio Contact Information

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cell: 917-589-6009

www.calbioenergy.com
DISCUSSION / Q&A

FIELD TO MARKET: WHAT ARE THE NEEDS IN THE AGRICULTURAL SPACE?

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BREAK

Program will resume at 2:15 pm

PLEASE FILL OUT EVALUATIONS!
EMERGING SOLUTIONS: WHAT TECHNOLOGIES ARE AVAILABLE FOR THE AGRICULTURAL SPACE?

Carolyn Weiner, Manager, Industrial Ag and Water Program | Pacific Gas & Electric - moderator

Yanbao Ma, Professor of Mechanical Engineering | UC Merced

Krishna Somayajula, Engineer | CLEAResult

Doug Scott, President and Founder | VaCom
Yanbao Ma
Professor of Mechanical Engineering | UC Merced
Sustainable Water & Energy Technologies

Professor Yanbao Ma
Yma5@ucmerced.edu
(Welab.ucmerced.edu)

1. Develop cost-effective reliable and safe energy storage systems

California renewable energy goal: 33% renewable portfolio standard by 2020; 1,325 MW energy storage be completed by 2020 and implemented by 2024.
http://www.energy.ca.gov/research/energystorage/tour/roadmap/
2. Develop irrigation drainage water treatment system with zero liquid discharge

- Salt buildup problems in the San Joaquin Valley (SJV), each year
  - 2,800,000 tons of salt into the SJV through surface water supplies
  - 350,000 tons of salt carried away by the San Joaquin River
  - 2,450,000 tons of salt buildup each year (8 football fields - 100 feet high)


✓ Our solutions: Drainage water treatment

Schematic of integrated continuous-effect membrane distillation and crystallization system driven by solar thermal energy.

Diagram of a multifunctional greenhouse system.
Krishna Somayajula
Engineer | CLEAResult
Energy-Water Nexus in the Dairy Industry

Krishna Somayajula, P.E.
Engineer, CLEAResult Consulting
Typical Operating Conditions:

- Milk required to be cooled to below ~40F within 2 – 4 hrs of extraction to be considered Grade A
- Ground water used to pre-cool milk from 95F to 75/80F
- 30-50 gpm water in pre-cooling stage
- Refrigeration system cools milk from 75/80F to 40F
  - Fixed 225 psig Head Pressure (110F Condensing temp)
  - Groundwater condensers on most dairy refrigeration systems (35-50 gpm water)

Consequence of Typical Operating Conditions:

- Refrigeration System Efficiency:
  - ~2.0 kW/ton!!
  - ~70 millions gallons/yr of water (medium sized dairies) & 130 million gallons/yr (large dairies)
  - ~approximately 50% of water not required at the dairy and goes to waste!!
**Unitary Cooling System**

- Replaces ground **water pre cooling & ground water condensers** with closed loop cooling tower
- EEV installation ensures floating head pressure based on cooler tower water temperature
- **Dual benefit** of increased cooling from pre cooling stage & FHP!
- Eliminate 100% of ground water usage previously
- ~ 0.8 – 1.4 kW/ton Efficiency!
- ~ 50-60% reduction in water usage
- (3) Projects installed in 2015 that have yielded ~600,000 kWh in energy savings and ~ 150 million gallons in annual water savings!
Doug Scott
President and Founder | VaCom
Doug Scott
VaCom Technologies
La Verne, California
dscott@vacomtech.com
(909) 392-6704
Heat Rejection Choices and New Technologies

Control Optimization

Performance Analytics

Refrigerants
Phase Out: CFCs, HCFCs
Phase Down: HFCs
New Synthetic Blends?
EPA and CARB Low GWP Directions?
Natural Refrigerants?
DISCUSSION / Q&A

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SESSION WRAP-UP

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