

**EPC-14-063 Advanced Wastewater Treatment Using Forward Osmosis to Produce High Quality Water**

**EPC 14-065 Demonstration of Forward Osmosis to Produce Juice Concentrate, Purify and Reuse Wastewater and Reduce Energy Use**

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# PORIFERA OVERVIEW

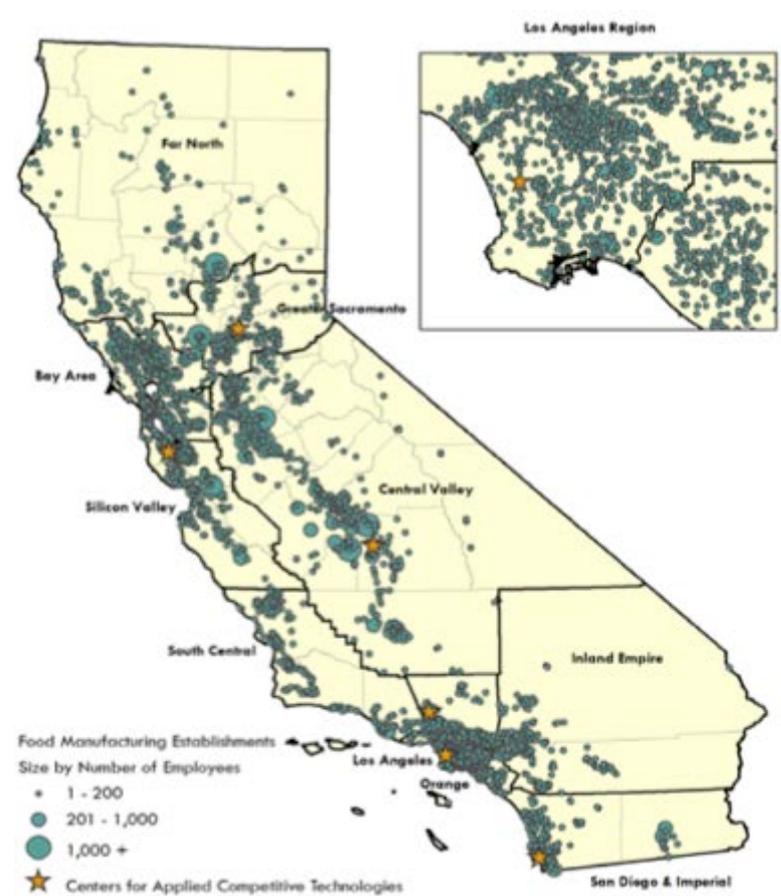
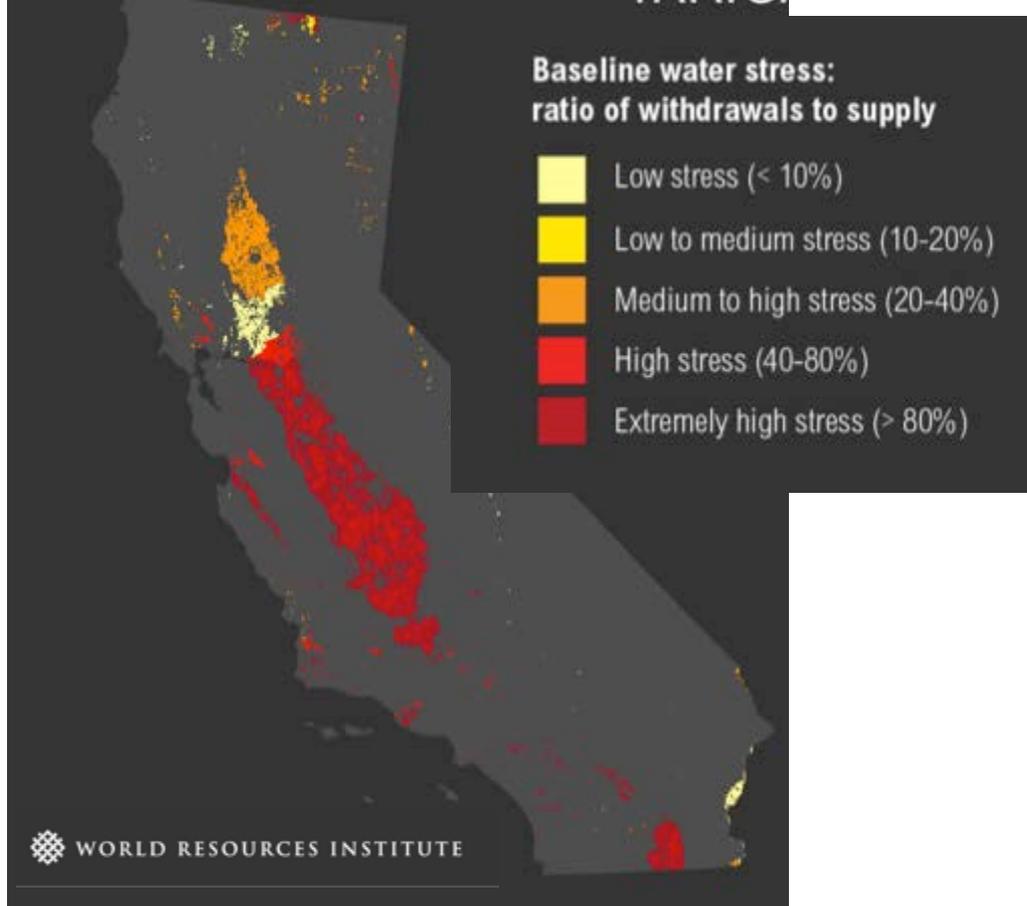
- Founded in 2009 in Hayward, CA
- Porifera Forward Osmosis (PFO) technology developed for US military (mobile desalination)
- Provide new technology for water reuse & product concentration



# WHY DID THE STATE FUND THIS TECHNOLOGY?

- State goal to reuse 2.5 million acre feet by 2030
- Porifera technology allows low energy reuse of **any water** multiple times before ocean discharge





## Example - Food & Beverage Processing Wastewater only:

- Reuse >100,000 more acre-feet of water per year
- Reduce current energy use by millions of MWh/yr during processing
- Restore soil by reversing salt loading to irrigated land

# PROJECT EPC-14-063 DESCRIPTION

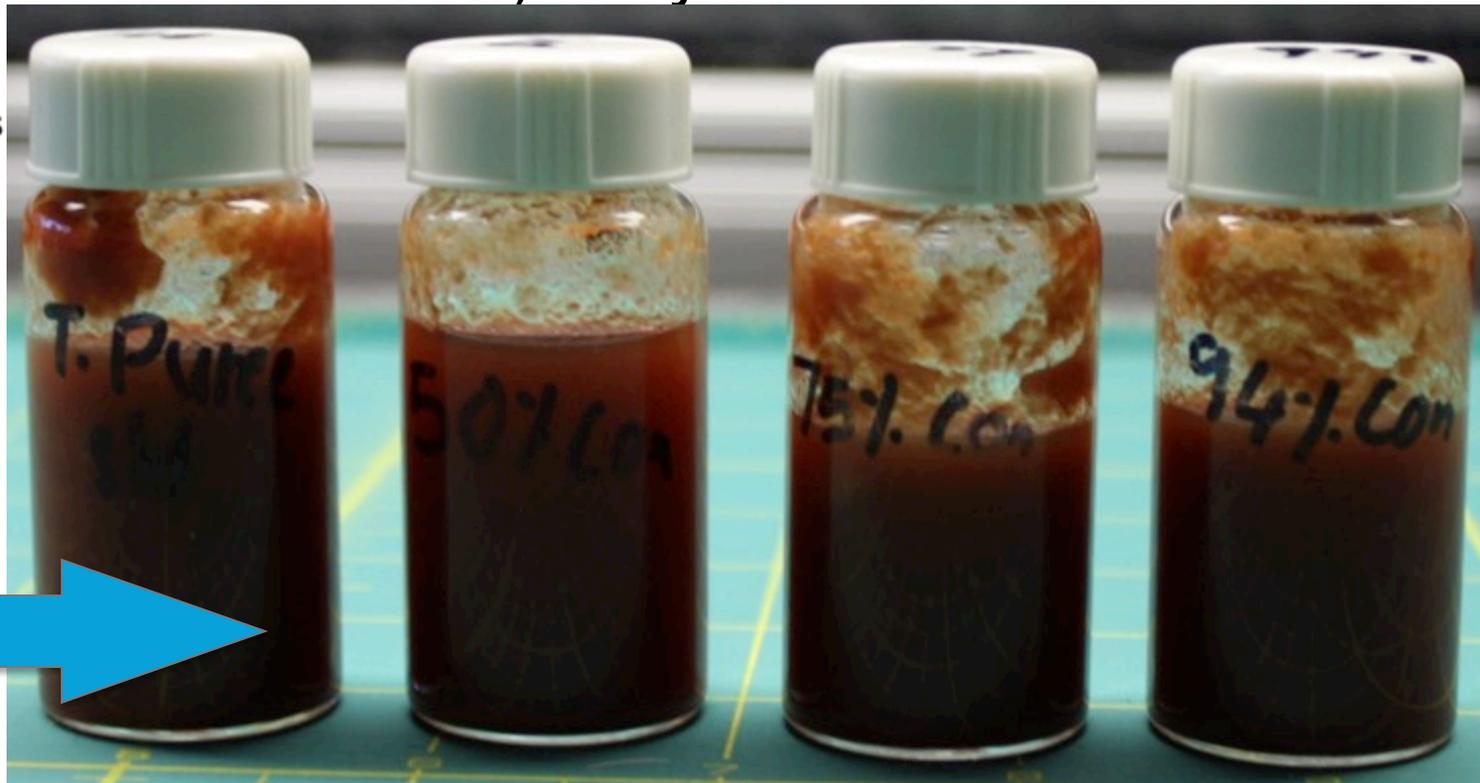
## 3 PILOT SYSTEM DEMONSTRATIONS



# PROJECT EPC 14-065 DESCRIPTION

## 3 PILOT SYSTEM DEMONSTRATIONS

Demonstration of Forward Osmosis to Produce Juice Concentrate, Purify and Reuse Wastewater



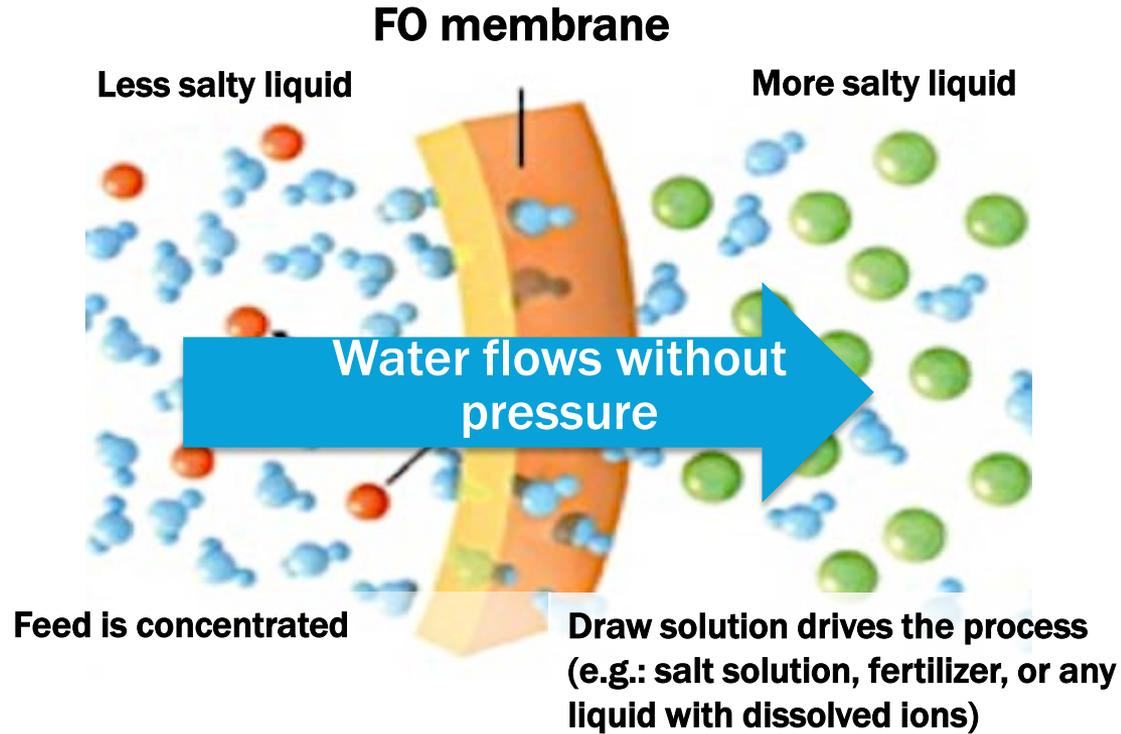
Ale Industries



Anheuser-Busch



# PORIFERA'S SOLUTION - OSMOSIS



FO

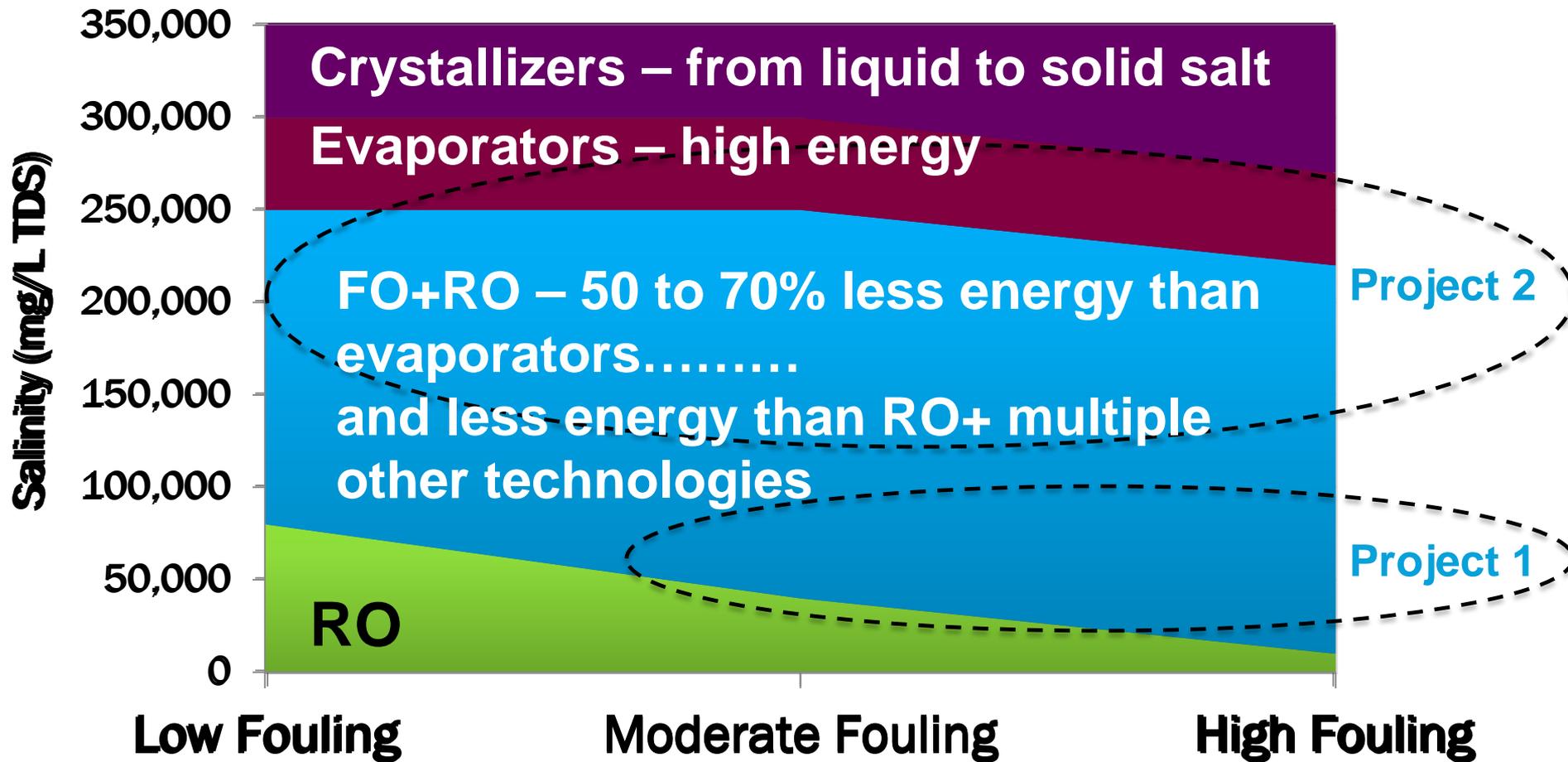
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New Solutions  
to reuse more  
water & save  
energy

# HOW DOES FO SAVE ENERGY?



# Results to Date



## WINE WASTE

- Initial testing successfully dewatered customer's feed and cleaning restored filter performance



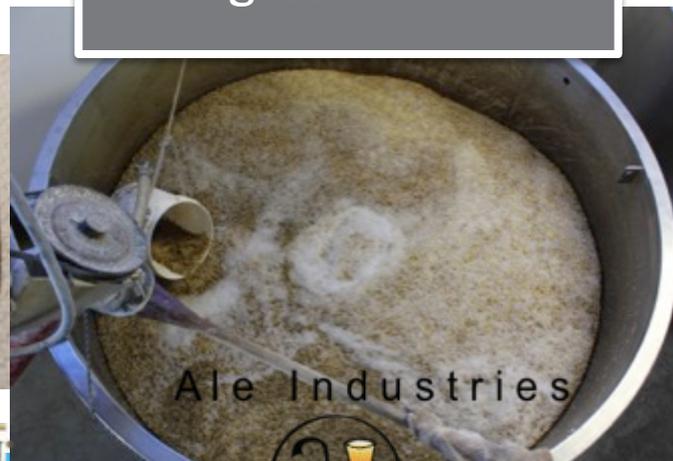
## BREW WASTE

- FO is ideal for brewery waste as long as high temperature water reused before waste goes rancid



## TOMATO JUICE

- Partner says FO Concentrate tastes too much like tomatoes!  
Next test is to dewater previously cooked tomatoes



Ale Industries



# RECOMMENDATIONS FOR FUTURE FO TECHNOLOGY APPLICATIONS AND RESEARCH

- **Direct Potable Reuse**  
demonstrate real-time membrane integrity monitoring and fail-safe pathogen and emerging contaminant removal for direct reuse
- **Low Energy Reuse for Power Plant Cooling**  
demonstrate waste water reuse using low-grade heat at power plants
- **Environmentally Friendly Seawater Desalination**  
demonstrate osmosis based intake and low energy desalination without environmental issues or brine discharge
- **Oil and Gas Fracking Treatment**  
demonstrate waste water reuse for drilling and irrigation and low energy near zero liquid discharge (ZLD)
- **Low Energy Green Building Water Reuse**  
demonstrate fertilizer driven solutions for large-architecture and green building urban reuse

# QUESTIONS?