

# ET Summit 2023



Presented by



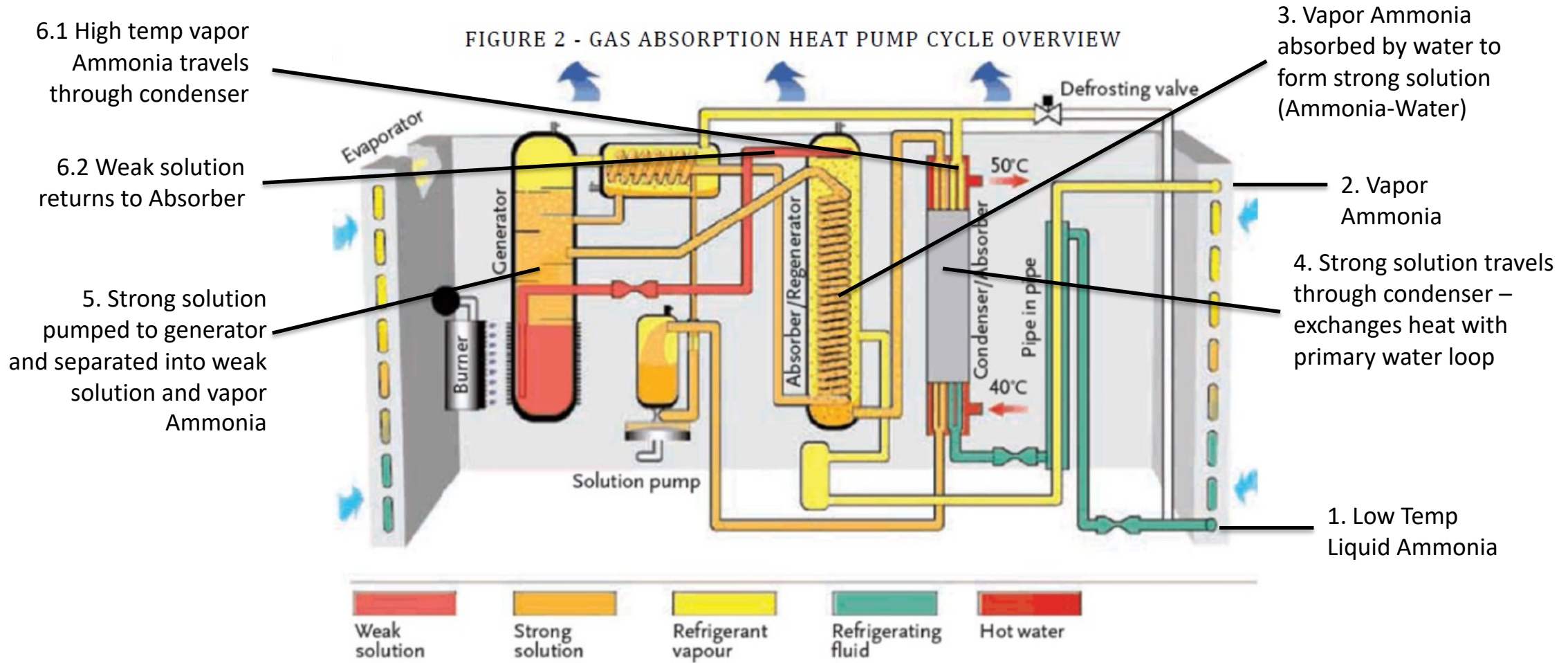
# Gas Absorption Heat Pumps



Cristalle Mauleon, P.E.  
Engineering Manager  
Lincus Inc.

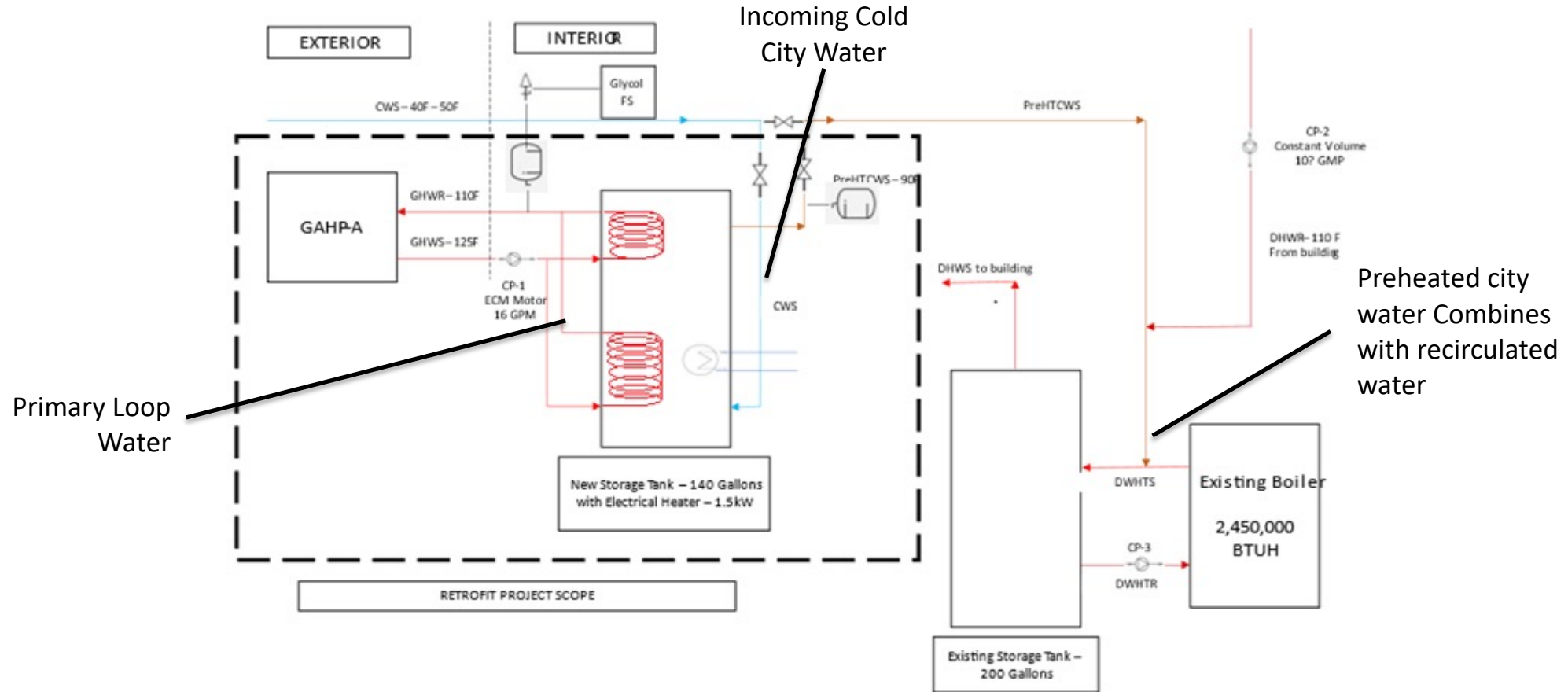
# Gas Absorption Water Heating

FIGURE 2 - GAS ABSORPTION HEAT PUMP CYCLE OVERVIEW



Source: Robur Corporation

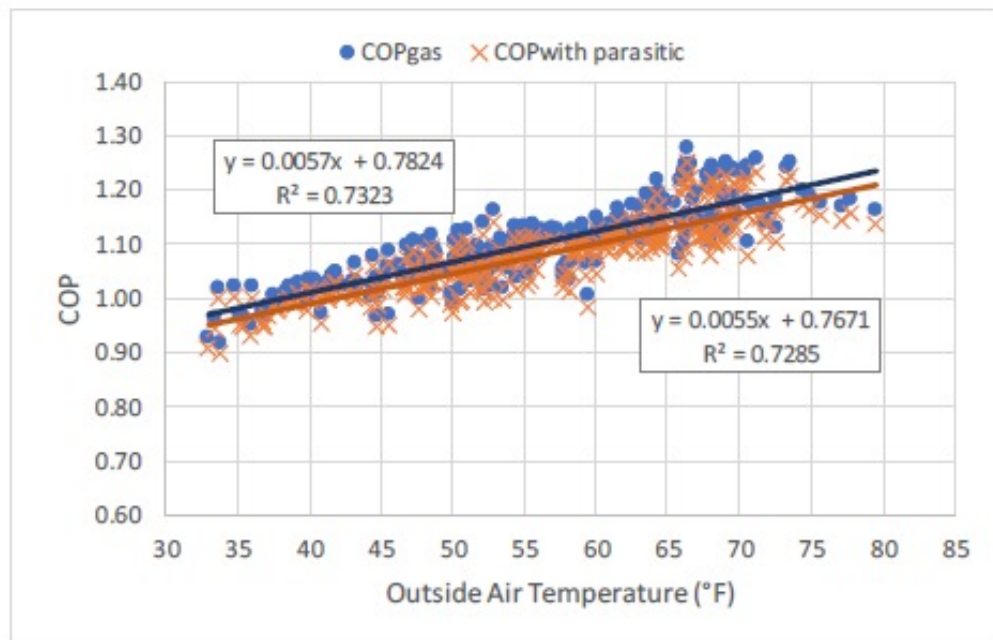
# GAHP Design



Source: GET: Gas-Fired Heat Pump Water Heating & Combi System Pilot Phase 1

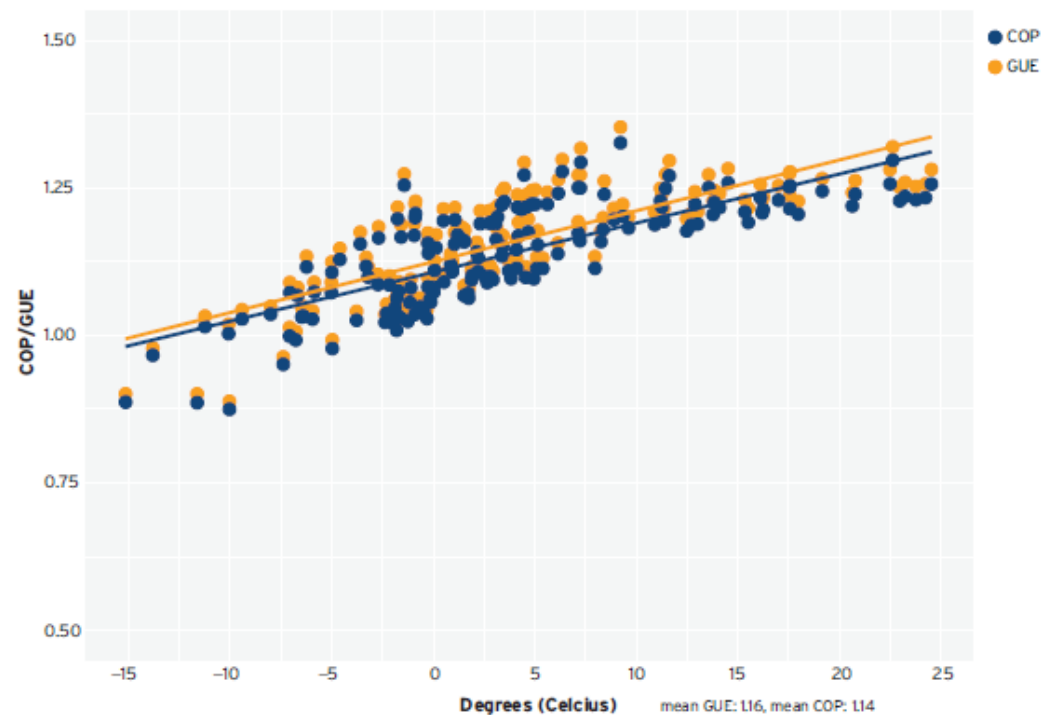
# COP

## Robur GAHP-A COP:NEEA Study



Source: NEEA: "Robur Heat Pump Field Trial"

## Robur GAHP-A COP:TAF Study



Source: TAF: "Gas Absorption Heat Pumps"

# GAHP High-Level Energy Savings

## Energy Savings

- DEER Water Heating Calculator
  - Water Heating Load
  - Make-Up Water Temperatures
  - Water Set Point Temp
  - Tank Heat Loss
- DEER Building Models
  - Space Heating Loads
- COP Values:  $COP=f(OAT)$
- OAT from CZ2022

## Energy Savings Results

Scenario	Baseline [therm]	Measure [therm]	Savings [therm]	Savings %	TRC (no incentives)
Water Heating Only Assembly CZ08	6,611.2	4,571.2	2,040.0	31%	1.20
Combination Water & Space Heating Nursing Home CZ08	28,979.1	21,576.8	7,402.3	26%	0.72
Combination Water & Space Heating Small Office CZ08	1,269.2	874.6	394.6	31%	0.25



# GAHP Design Considerations

- Capacity of existing system vs. actual DHW loads
  - GAHP-A should be 40-60% of peak load
  - How to determine/estimate peak load??
- Outside installation
  - 6ft x 9ft
- Max supply water temperature (135F)
- Maximum return water temperature (122F)
- Control strategies
  - With existing boiler
  - With new boiler
  - With no boiler
- New Equipment
  - GAHP-A
  - Heat Exchanger
  - 50-80 gallon buffer tank

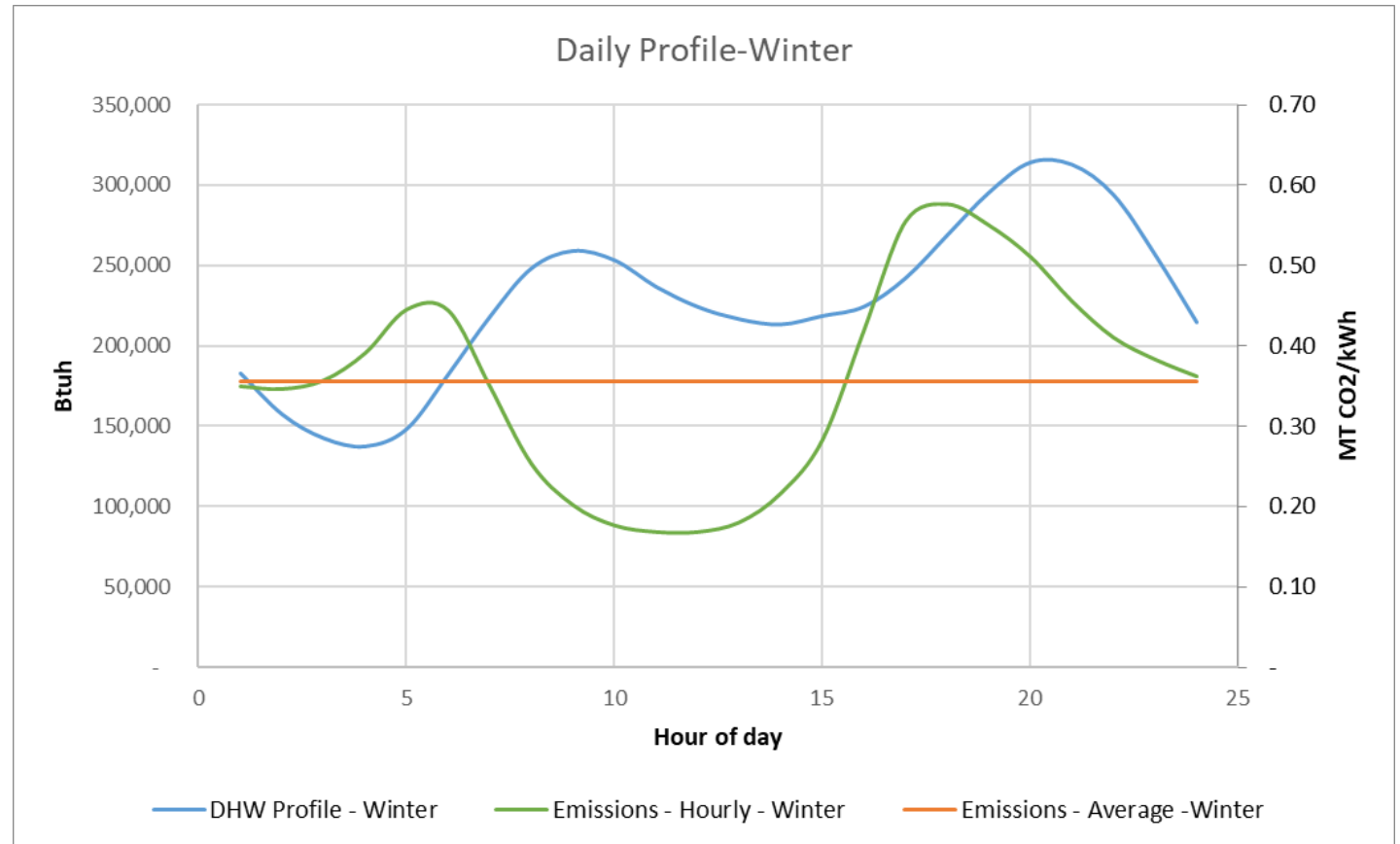
## GAHP Field and Lab Studies

- Gas Emerging Technologies (GET)
- 3-5 field studies
- Lab Testing
  - Robur: GAHP-A
  - Stone Mountain Technologies: ANESI
- Field Site #1 in Baseline M&V stage
- Recruiting Sites #2 - #5
- Lab Study Launch TBD



## GAHP Field Studies

- Gather in-field performance data
- Gather costs
- Compile design & installation challenges
- Compare source CO2 between GAHP & EHPWH



This project was funded by Statewide Gas Emerging Technologies Program  
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SoCalGas

For more information, contact Brian Maloney at [Brian.Maloney@icf.com](mailto:Brian.Maloney@icf.com).



## **Cristalle Mauleon**

Engineering Manager

Lincus Inc.

[cmauleon@lincus.com](mailto:cmauleon@lincus.com)