

ET Summit 2023



Presented by



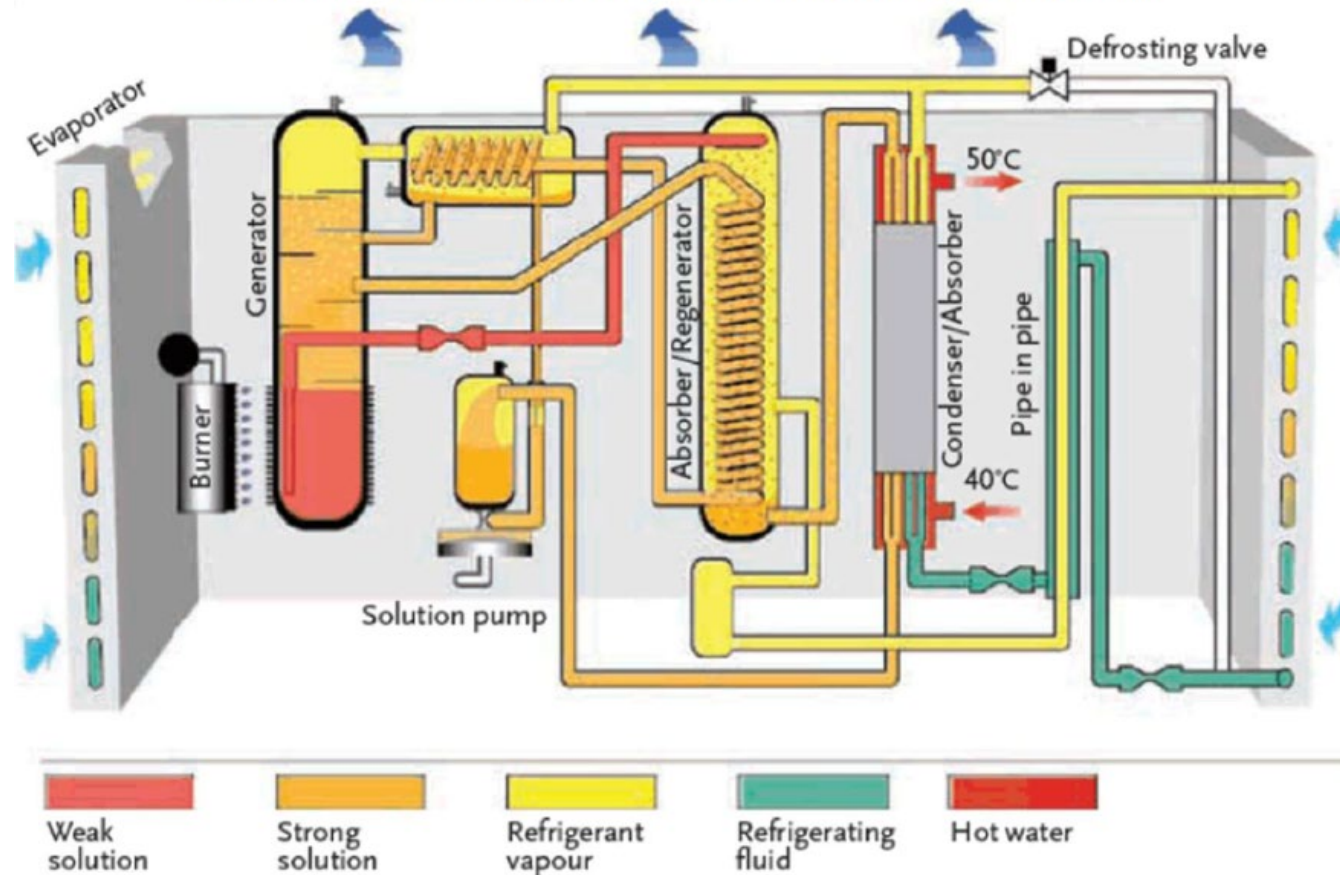
Gas Absorption Heat Pumps



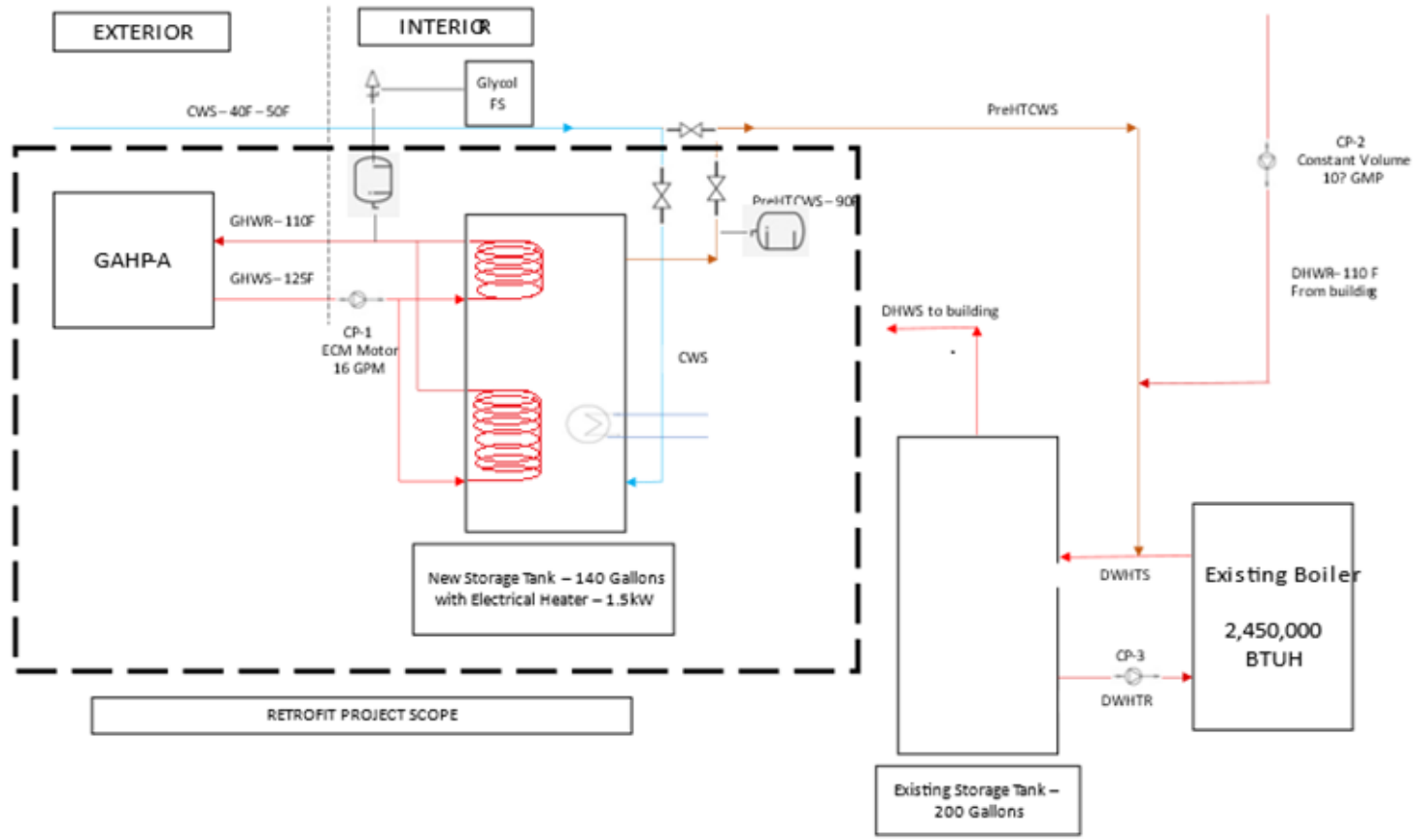
Cristalle Mauleon, P.E.
Engineering Manager
Lincus Inc.

Gas Absorption Water Heating

FIGURE 2 - GAS ABSORPTION HEAT PUMP CYCLE OVERVIEW



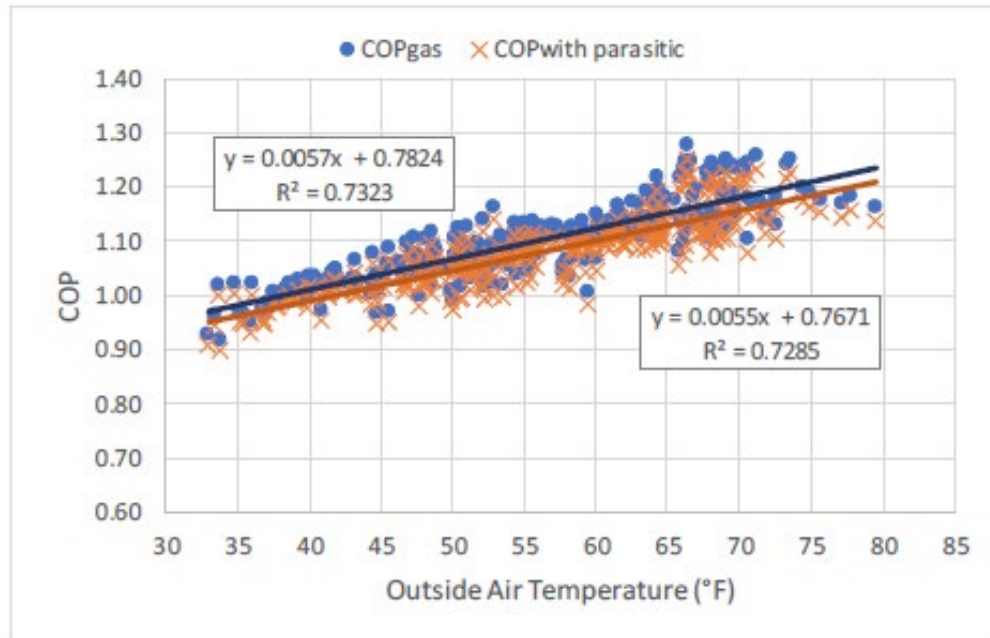
GAHP Design



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

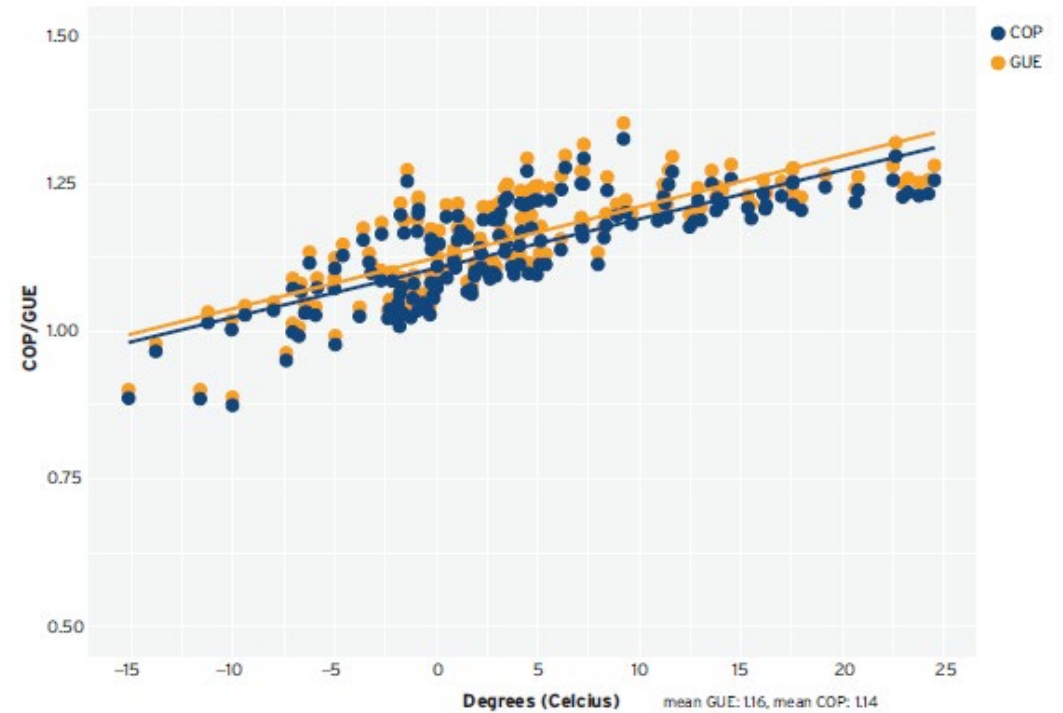
COP

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

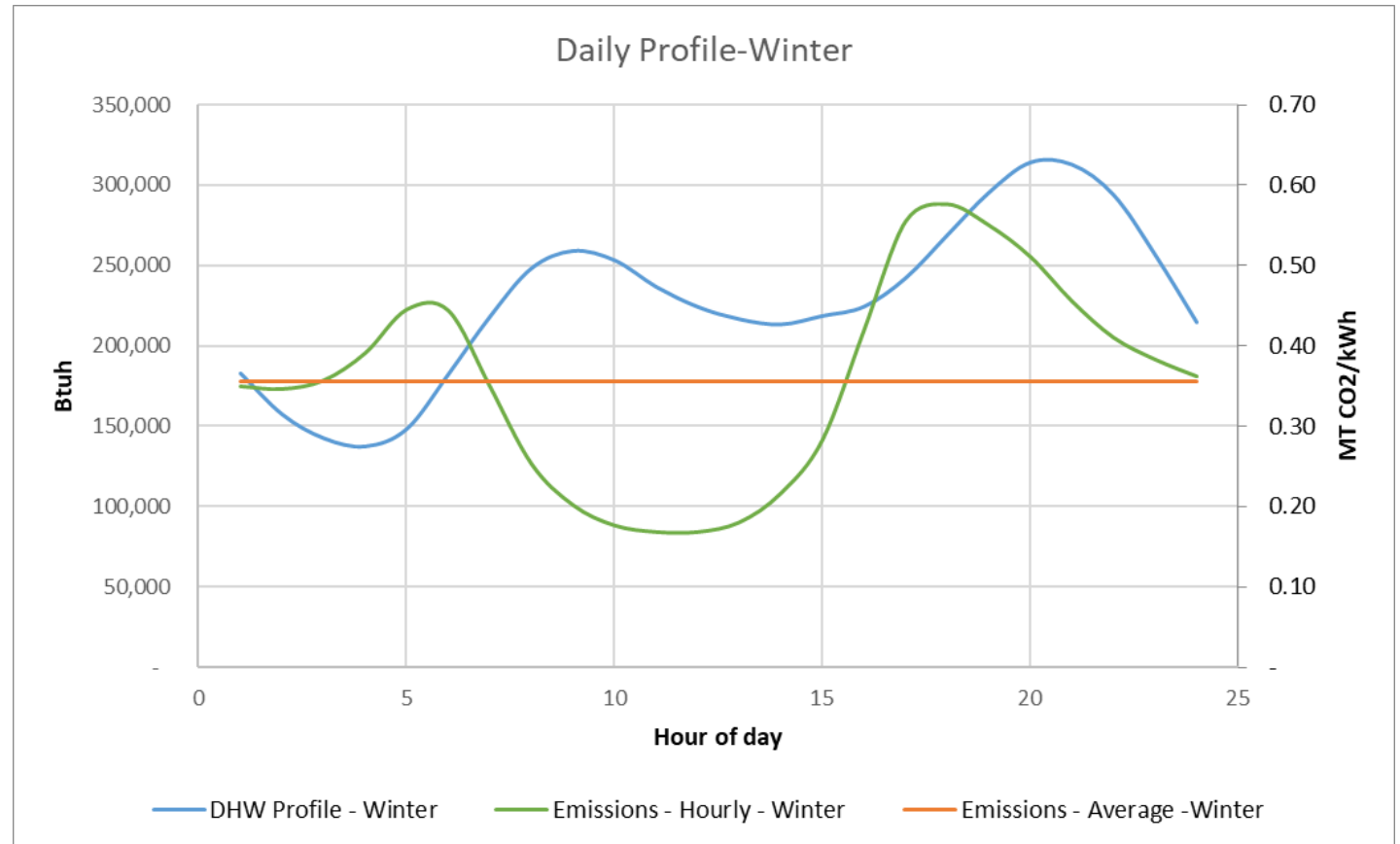
- Capacity of existing system vs. actual DHW loads
 - Robur GAHP-A should be 40-60% of peak load
 - How to determine/estimate peak load??
- Outside installation
 - 6ft x 9ft
- Max supply water temperature (135F)
- Maximum return water temperature (122F)
- Control strategies
 - With existing boiler
 - With new boiler
 - With no boiler
- New Equipment
 - Robur 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
Administered by ICF on behalf of the three Gas Utilities, under contract with
SoCalGas

For more information, contact **Brian Maloney** at **Brian.Maloney@icf.com**.

The project report can be found at **[<link>](#)**.

