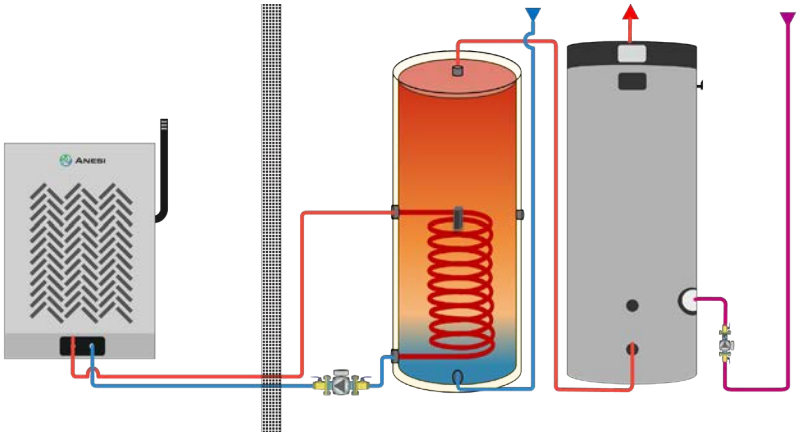
COMMERCIAL

Anesi Water Heating Solutions

reduce your operational expenses for water heating

RETHINK

Your Water Heating Options



Maintaining an adequate hot water supply in your business can be a significant operating expense and nearly always an equally significant capital expense when considering new installation or replacement. For commercial water heating with gas, an opportunity to lower operational costs by reducing natural or LP gas use and protect the environment makes the Anesi Commercial Water Heating Solution the best option on the market.

The Anesi model HP80 gas absorption heat pump (GAHP) combines the reliability and effectiveness of a gas appliance with the efficiency of air-to-water heat pump technology. This combination yields an efficient and affordable gas water heater capable of a Coefficient of Performance (CoP) 1.40. The Anesi gas heat pump's high efficiency and natural refrigerant allows business owners to demonstrate environmental responsibility with a product that conserves gas and reduces CO2 emissions, with zero ozone depletion potential (ODP), zero global warming potential (GWP), and no per- and polyfluoroalkyl substances (PFAS).

- 20-35% lower heating cost
- Reduces the impending financial impact of the higher cost of RNG and hydrogen
- Decreases the scale of massive electric grid expansion & storage for society
- Clear and logical installation

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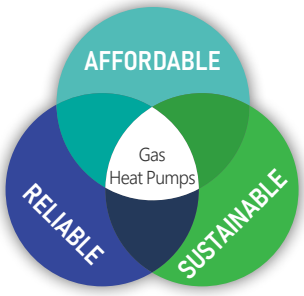
- Superior cold climate performance
- Preserve end-user comfort
- No additional load on electric grid
- Adapts to existing electrical circuits



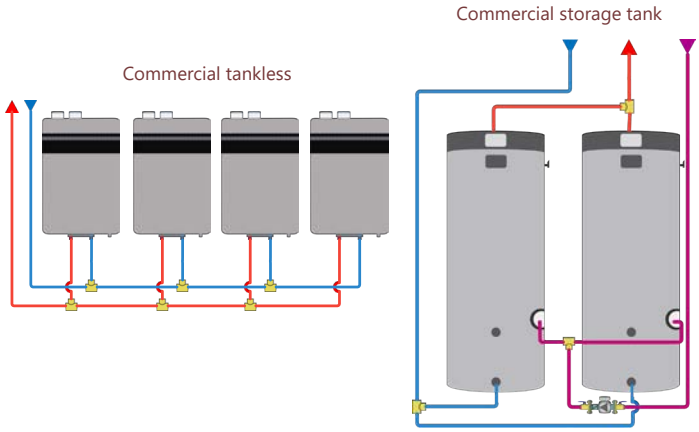
- 30-50% lower CO2 emissions
- The natural refrigerant is environmentally safe: zero GWP, zero ODP, zero PFAS
- Multiplies the positive environmental impact of the future fuels RNG and Hydrogen

What does the system look like?

The Anesi gas absorption heat pump water heating system combines one or more HP80 air-to-water heat pumps (outdoors), hydronically connected to one or more indoor storage tanks (IST), typically 100-119 gallon capacity. For low-load applications that use less than 750 gallons of hot water per day (gpd), one HP80 heat pump and a 119 gallon IST will likely provide 100% of the hot water load (Figures 1 and 1a) depending on the actual draw pattern. Leaving the legacy water heater in place provides for redundancy and coverage for any unusual peak draws.

For applications that use more than 750 gpd, a baseload/peak load configuration is recommended, where the legacy water heater (gas-fired storage tank or tankless) is left in place to handle peak loads (Figures 2 and 3). This arrangement also provides system redundancy when either the legacy water heater or heat pump requires maintenance. If present, the re-circ loop can be plumbed to the legacy system (as shown in Figures 2 and 3), or to the IST. If to the IST, it is important that the re-circ flow enter near the center of the IST to maintain proper temperature stratification inside the IST.
In scenarios where the legacy gas water heating solution is well into its depreciable lifetime, the Anesi commercial water heating system can extend the life of the legacy system through much lower use of that legacy system when configured in a base load/peak load design. The high-efficiency Anesi system will cover most of the hot water demand at the lowest cost possible, and the reduced use of the legacy hot water system to meet peak demand will extend the life of the legacy equipment.

Typical gas water heating installations
1,000-5,000 gpd



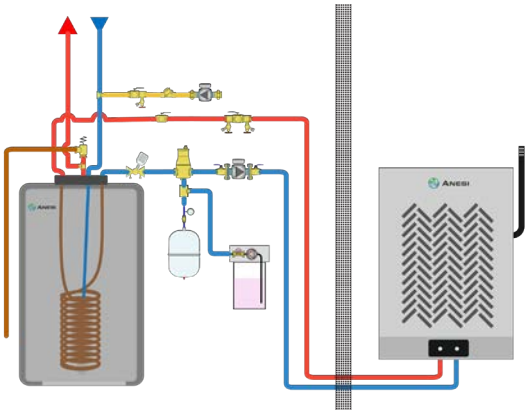


Figure 1
GAHP with steady demand served by an IST

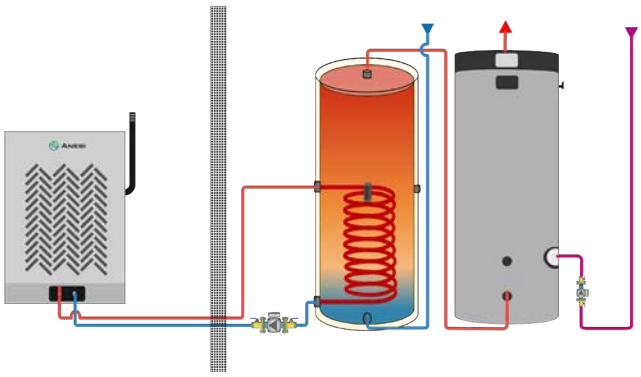


Figure 2
GAHP with high peak demand served by high efficiency water heater

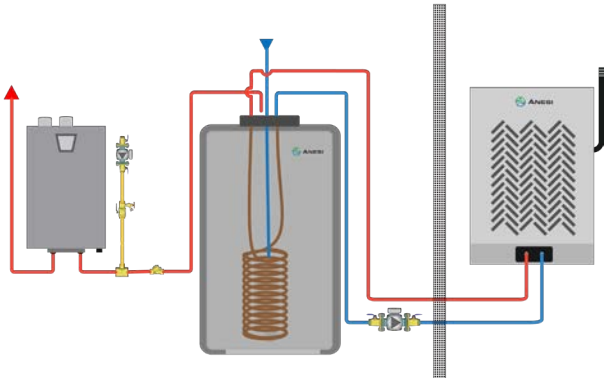


Figure 1a
GAHP with peak demand served by a single tankless

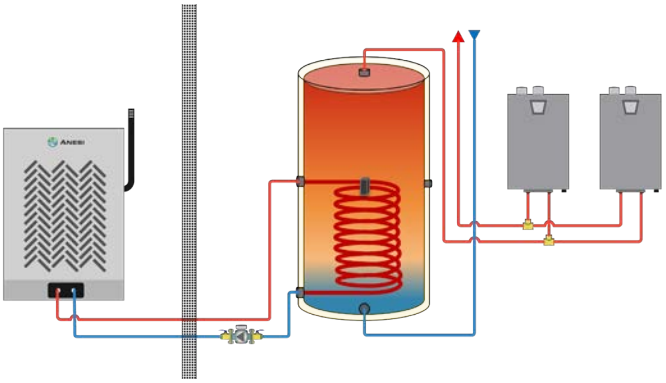


Figure 3
GAHP with high peak demand served by tankless units

Will it work for larger applications?

For larger applications that use more than 5,000 gpd, multiple heat pumps can be hydronically manifolded to provide additional capacity (Figure 4). Multiple ISTs or a single larger tank can be used. Multiple ISTs should be plumbed in parallel with regard to the incoming cold and hot outlets for maximum efficiency and hot water delivery capacity. Figure 4 shows the re-circ return entering one of the ISTs, at the tank vertical mid-point. Optionally, the re-circ return could be connected to the line between the ISTs and the peaker units. Figure 4 also shows a plate heat exchanger (PHX) between the heat pumps and the ISTs as an alternative to using ISTs with internal heat exchangers.

The number of HP80s installed is a function of the average hot water usage per day (gpd). While there is no set rule, Table 1 shows a sizing recommendation

Hot Water (gpd)	HP80 Qty.	IST capacity (gal)
<5,000	1	100-120
4,000-10,000	2	119-240
8,000-15,000	3	240-360
12,000-20,000	4	360-480
16,000-25,000	5	500

Table 1: Sizing Recommendation

What applications best fit the Anesi system?

Restaurant	Assisted Living
Hotel	Multi-Family Housing
Laundromat	Country Club
Car Wash	Kitchen
Fitness Center	Dormitory
Detention Center	Brewery

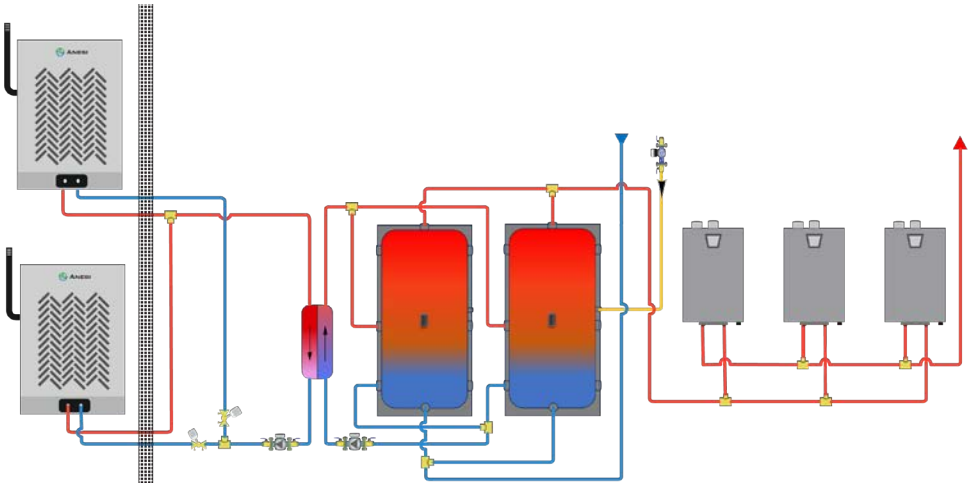


Figure 4
GAHP with high load: peak demand served by tankless units

FEATURES & BENEFITS

Fuel Flexibility	Operates on natural gas, propane, or RNG, with no component change
Power	Operates on a 120V/15A circuit, no expensive electric panel upgrades are needed
Safety	All combustion, venting, and refrigerant are located outdoors. The natural refrigerant is environmentally safe, and hydronic connections use a nontoxic, food-grade water and glycol fluid
Intelligent Control Logic	The 4:1 modulated system heats quickly at 100% when needed but reduces speed and conserves gas by modulating to as low as 25% when demand isn't high. Remote monitoring for contractors enables time saving troubleshooting

What are the system economics?

The Anesi HP80 gas absorption heat pump combines the reliability and effectiveness of gas combustion heating with the high efficiency of air-to-water heat pump technology. Heat pump technology enables the HP80 to capture heat from outdoor ambient air and combine this with the gas combustion heat for a Coefficient of Performance (COP) of 1.4. This high efficiency results in a 20% to 35% reduction in gas used to heat water and a corresponding decrease in carbon emissions. For applications where the GAHP is in a base load/peak load situation, the more water heated by the GAHP versus the legacy condensing gas tank or tankless water heater, the greater the savings and decarbonization. Additionally, reducing demand on the legacy system may result in less wear and tear, lower maintenance, and an extended product lifetime.

The amount of energy saved by an HP80 depends on several factors, including the total amount of hot water used per day and the actual draw pattern, local climate, and the efficiency of the current water heating equipment.

For a "typical" commercial water heating system, the approximate annual energy savings using a single HP80 connected to a suitable 119-gallon IST or storage tank is shown in Figure 5, assuming the current water heating equipment operates at an average efficiency of 85% (actual experiences will vary based on specific installation characteristics and location). Energy saved (one therm = 100,000 BTU) is a vital function of the total volume of hot water used daily (higher amounts of hot water usage save higher amounts of energy). Annual energy savings can vary from about 500 therms at 500 gpd to 2,500 therms at 5,000 gpd. To determine the annual savings in dollars, multiply the therms saved by the gas cost (in $/therm).

Even though the total energy saved increases with higher hot water usage, the percent of hot water load provided by the HP80 decreases with higher hot water usage, ranging from 100% at 750 gpd or less to about 50% at 5,000 gpd. When the daily hot water use is above 5,000 gpd, using two HP80 heat pumps should be considered.

Similarly, Figure 6 shows the approximate annual CO2 emissions reduction. While actual results will vary based on the specific installation characteristics and location, CO2 emission reductions can be significant, up to 16 metric tons when using 5,000 gpd of hot water.

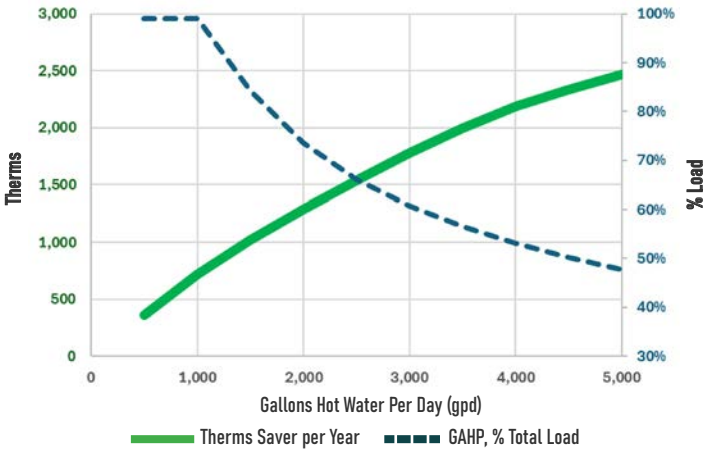


Figure 5
Typical Annual Energy Savings, One HP80

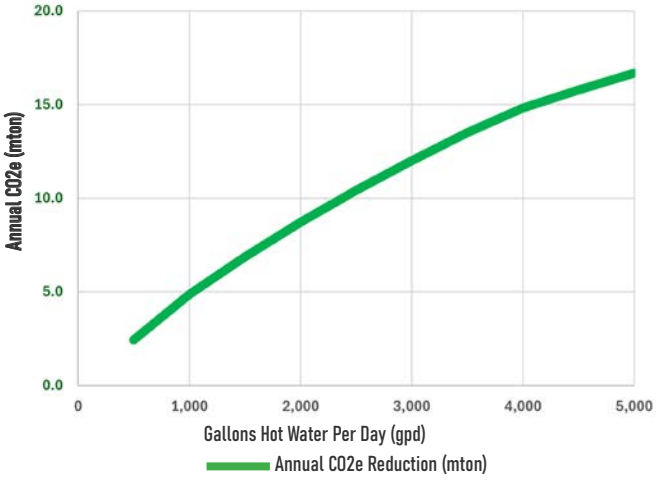


Figure 6
Typical Annual CO2 Reduction, One HP80

What's next?

The Anesi product line was launched with efficiency in mind. Our research and development team are interested in your project requirements and how you envision the Anesi brand in your business.

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To learn more about gas absorption heat pumps within commercial water heating systems, visit anesicomfort.com

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Stone Mountain Technologies, Inc. is the designer and manufacturer of the Anesi innovative heat pump technology for residential and commercial applications. By focusing on high efficiency, reliable performance, and reduced emissions, Anesi products, fueled by natural gas, propane gas, renewable natural gas, and hydrogen blends, are solutions to provide better comfort and a better planet. Stone Mountain Technologies, Inc. has design and manufacturing operations in Piney Flats, TN, and distributors across North America.

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