



SOLUTIONS FOR BUSINESS

A breath of fresh air for customers and employees

What you need to know about HVAC and your business

The energy used by HVAC equipment accounts for 30-50% of all energy costs for Arizona businesses. How does your HVAC system work and how you can make the most of it? Learn more about your system below.

HVAC: Why It Matters

Heating, ventilation, and air conditioning (HVAC) systems all have one goal: creating a great indoor environmental quality (commonly referred to as IEQ) by addressing temperature, humidity and contamination. A good IEQ benefits not only employee and customer comfort, but also their health. There are many contaminants that can be found inside a building. Poor indoor air quality can lead to discomfort and additional sick days. Fortunately, HVAC systems incorporate filters to significantly reduce contaminant levels and maintain a healthy IEQ.

Quick Tips

Keep your HVAC unit operating efficiently

- Routinely inspect and replace air filters
- Remove obstructions from duct vents
- Create a daily schedule on your thermostat
- Setback thermostat after closing
- Use ceiling fans to more evenly distribute air
- Encourage employees to keep windows and doors closed
- Keep heat-producing equipment away from your thermostat
- Insulate any exposed ductwork

Which of These is Your System?

Below are a few common types of HVAC equipment:

- **Chillers** - Chillers are generally large systems. They have three piping loops: a refrigerant, a chilled water, and a condenser water (water-cooled) or refrigerant (air-cooled) loop. Typically, mechanical compression—centrifugal, screw, scroll or reciprocating—is used to achieve refrigerant phase change.
- **Packaged Rooftop Units (RTU)** - A packaged rooftop unit contains a compressor, evaporator coil, condenser, heating unit, supply fan, exhaust fan and filter. All of these components are in a single self-contained packaged unit.
- **Variable Refrigerant Flow (VRF)** - A VRF supplies varying amounts of refrigerant to numerous indoor fan coil units (cassettes), each of which is individually metered and individually controlled. VRF also allows simultaneous heating and cooling by moving heat recovered from cooling to cassettes that are heating in the same VRF circuit.

If your unit is greater than 15 years old, consider replacing it with a more efficient unit.

Operating Your HVAC

Proper operation of your HVAC equipment will save energy and provide comfort for employees and customers.

- Set thermostats to 80°F+ during off-hours in the summer and 65°F or lower during the winter. Each degree of temperature adjustment over a 24-hour period saves 2-3% on heating or cooling costs.
- Install an Energy Management System (EMS) to balance the operation between different HVAC components and even lighting. It can optimize the sequence of operations, monitor system performance and provide alerts upon fault detection.
- If you are on a time-of-use plan, use a smart thermostat or EMS to pre-cool your space and minimize HVAC run time during the peak hours of 3-8 p.m.
- Take advantage of cool outside air with an air economizer. It balances outside air temperature with indoor temperature to minimize HVAC run time.
- Run exhaust hood fans only when equipment is in use. Demand-controlled ventilation (DCV) combines sensors and variable frequency drive controls to reduce the amount of makeup air needed. DCV can reduce hood fan energy use 50 percent or more.

Start saving today.

For more ideas and to learn what rebates are available, call the Solutions for Business team at (866) 333-4735, email us at aps.solutionsforbusiness@dnvgl.com, or visit aps.com/businessrebates.

Simple Ways to Calculate the Cost of HVAC Operation

When determining the cost to operate existing equipment or researching new, use the below calculation.

$$\text{Energy cost} = \text{Power (kW)} \times \text{Operating time (Hours)} \times \text{Electricity cost (\$/kWh)}$$

Typical operating hours are known as cooling load hours (CLH) or heating load hours (HLH). The following table lists average values for Arizona.

HVAC Annual Operating Hours		
Location	CLH	HLH
Yuma	3,150	540
Phoenix	2,900	750
Flagstaff	130	2,600
Prescott	700	1,900

HVAC Efficiency

Efficiency is a measurement of how much cooling or heating output you get for a given input of electric energy. A common unit of efficiency is Energy Efficiency Ratio (EER). When purchasing HVAC equipment, look for units that exceed 12.5 EER and 15 SEER efficiency.

Example Calculation

To determine how much energy the equipment uses, the first step is to convert the EER rating to kW/ton full-load values (FLV). Simply divide 12 by the EER rating to get the kW/ton.

An owner of a 10-ton rooftop unit with an efficiency of 14 EER in Phoenix would consume roughly the following amount of energy annually, based on the below equation:

$$\begin{aligned} \text{Energy consumption} &= \text{Power (kW)} \times \text{Time (Hours)} \\ &= 10\text{-tons} \times (12/14) \text{ kW/ton} \times \mathbf{2,900 \text{ hours}} \\ &= 8.6 \text{ kW} \times 2,900 \text{ hours} = 24,940 \text{ kWh} \end{aligned}$$

To estimate your annual energy cost, multiply the energy consumption (kWh) by your electricity price (\$/kWh).