

ecWizard-E100

Because of my commercial HVAC/Controls background the ecWizard-P100 and the ecDeskSensorSystem were my favorite inventions.

But after answering questions presented by [Sir Richard Branson and the Rocky Mountains Institute](#) and a coalition of the world's most influential NGOs, policymakers and innovators. I realized that the ecWizard E-100 will have the biggest impact in energy savings worldwide!

Affordability, energy savings and equipment protection, the ecWizard-E100 will eventually be purchased by millions of people throughout the world.

ecWizard operates air conditioners substantially more efficiently, and helps prevent the loss of [HFCs or hydrofluorocarbons](#) refrigerants, an extremely powerful greenhouse gas in the atmosphere.

There are millions of HVAC units running inefficiently in the world today.

ecWizard-E100 is an affordable solution to identify **inefficient** operating AC units.

Similar, to the wireless programmable thermostats in the market today, but half the price and 10 times smarter. Analytical software utilizes sensors associated with the ecWizard enabling the consumers to identify energy consuming inefficiencies. (\$Cost/Time to operate.)

Data = Intelligence

If the owners of the AC units knew the **amount of energy** they were wasting and how detrimental it is to their AC equipment they would fix the unit immediately. Good maintenance will prolong the life of the equipment and saves energy. Prevents costly emergency repairs and protects the expensive compressor from failure.

Analytical software can make assumptions of the AC units cost but it cannot diagnose if it's running efficiently without sensing vital data:

- Supply air and return air temperatures. (TD) temperature differential.
- Amperage, and converted to dollars per time.
- AC unit runtime.
- Local cloud-based outside air temperatures.

How can we solve the inefficient operation of HVAC units?

Inexpensive sensors attached to a wireless module (ecWizard) located in HVAC units. Three sensors are the minimum required to give us the following.

Amperage sensor: (amperage = dollars)

The actual cost to operate HVAC unit. Amperage X Voltage = Watts
Watts divided by your electrical bill gives you **dollars**. The cost per minute of your AC unit's operation provides a basic heartbeat of health. If your cost goes up it's a direct correlation to losing operational efficiency. **Amperage** brings savings analysis into the modern era.

Supply air and Return air temperature sensors:

These two temperatures provide what the HVAC industry uses to determine the productivity of the AC unit. An example: an average of 18°F difference between the supply and return temperatures is typical.

Detecting refrigerant leaks

Quite often AC system develops a slight leak allowing refrigerant to slowly escape from the system. Analytical software analyzes the temperature differences and compressor amperage. The AC unit runs longer to reach set point wasting a considerable amount of energy and releasing slight amounts of refrigerants into the atmosphere. If not detected early, low refrigerant conditions can also cause AC coil to completely ice up blocking airflow and possible compressor damage. (This is detected by reduced supply fan amperage.) ecWizard sends a message to the owner identifying the actual operational increase in \$cost/min. And potential equipment damage!

Is your filter dirty?

If your filter is clogged, how much money are you losing in energy waste? Analytical software analyzes the differential temperatures and identifies a drop-in amperage, and the AC unit is running longer to condition the space. A new filter reduces the runtime, normalizes the differential temperatures and amperage, providing energy efficiency.

Clogged filter. This can also lead to your cooling coil icing up and destroying your expensive compressor.

“According to the Department of **Energy**, replacing a dirty **filter** with a **clean** one can reduce **energy** consumption by as **much** as 15%. Combine that with the knowledge that you're HVAC is responsible for approximately half your **energy** bill, and you're looking at **savings** of 7.5% every month.”

A lot of assumptions with the above statement!

After changing the filter, ecWizard-E100 can put an **actual** dollar amount of savings customized to your AC unit. That is a game changer. The ecWizard can notify you of your reduction in energy costs by analyzing your AC units reduce runtimes to reach its set point.

Leaky ductwork?

Fan amperage increases with leaky ductwork. (The differential temperatures and compressor amperage are somewhat normal. (This can also cause your fan motor to run at higher temperatures.) ecWizard senses the fan amperage increase and analyzes the runtime then notifies the consumer of possible problems. The owner can also see actual costs per minute increase.

The ecWizard becomes smarter every day.

You may also have a window open. (The differential temperatures and amperage are normal.) Everything is functioning normally but your room temperature is not dropping in a timely manner. Notification is issued with increases in operating costs and a list of things to check. (Start with checking for open windows.)

Is there blockage in your ductwork?

If your ductwork has blockage. This is the same indications as the clogged filter. After checking the filter, your ductwork needs to be inspected. The high cost of operation motivates the owner to make repairs reducing operating costs, save energy and protect your compressor.

Dirty outside condenser

Cleanliness is a vital part of energy efficiency with HVAC systems. Air conditioning is about heat transfer and the heat transfer surfaces must be clean to be efficient.

One of the problems is your outside condensing unit is dirty. Your compressor runs at a higher amperage than normal and your differential temperatures show a reduction in productivity. ecWizard's analytical software provides the diagnostic evaluation and lets the owner know that the cost per hour to operate the unit has increased and they should check the cleanliness of the outdoor condensing unit. After completing the cleaning, operational costs will drop, and your expensive compressor will not be overheating.

Smart Cities and Neighborhoods.

My vision in the future, we can see the wattage values of similar AC units in neighborhoods being compared with cloud-based software. (Of course, the identity of this information would not be necessary.) Neighborhoods quite often have the same manufacturers and/or size of HVAC equipment. This data can be used in numerous ways to support cities and neighborhoods with energy efficiency. (Very helpful for utility companies.)

Summary

There are several other energy-saving opportunities with wireless programmable thermostats. What I presented are just a few the unique opportunities with the ecWizard E-100. Residential and light commercial. Works with ecDeskSensorSystem.