ecWizard-E100

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

$3 Million Global Cooling Prize

But after answering questions presented by **[Sir Richard Branson, India 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!**

There are billions of HVAC units running inefficiently in the world today. Costing $ Billions each year in wasted energy!

What if there was a affordable solution that would automatically notify the owner (text or email) that there HVAC was running longer, costing more and eventually could lead to thousands of dollars in costly repairs.

What if this affordable solution could actually diagnose the problem notify the owner the amount of energy dollars they could save if it was repaired.

Knowing the exact cost of your HVAC system per minute per hour etc. is a major game changer. Obviously, if your costs to operate increase you have a problem!

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

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

Example: text to owner. Your system is operating inefficiently costing you $x amount above normal. Low refrigerant charge is the most likely problem. This can also lead to compressor failure and possibly $1500-$2000 repair.

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 5-10 times smarter. Analytical software utilizes sensors associated with the ecWizard enabling the consumers to identify energy consuming inefficiencies. ($Cost/Time to operate.) Web based software that can be configured and adjusted via cell phone/computer or adjusted by your existing wall-mounted thermostat.

Yes, the technology to do the same thing is achievable using a standard wireless thermostat and then adding an additional wireless module into the HVAC equipment. Which would provide the same results. Affluent people or people that have already purchased expensive wireless thermostats could purchase an additional wireless module for their HVAC unit it of course an additional cost!

The ecWizard E-100 and software could be modified to accommodate the above. (More$$)

We simply take the signal from the existing thermostat (why replace something that's working) and install the wireless module in HVAC unit. This reduces the cost by 50% which is so important in the cost sensitive market.

Most of the people reading this article are affluent techies. Having a new wireless thermostat on your wall is appealing. But you are a minority of the HVAC owners of the world.

Having the wireless module located in the HVAC equipment provides an economical opportunity to receive the following data.

Data = Intelligence

If the owners of the AC units knew the **amount of energy costs** they were wasting and how detrimental it is to their HVAC equipment, they would fixed 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 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 you room temperature is not dropping in a timely manner. Notification is issued with increases operating costs and a list of things to check. (Start with checking for open windows.)

Is there blockage in your ductwork?

If you're 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 all 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.)

In Nevada the utility company will actually purchase and install a wireless thermostat for the residential occupant. This gives them the opportunity to duty cycle the AC equipment on extremely hot days. By doing this it saves millions of dollars in costs to build additional energy producing plants.

Utility companies could benefit by purchasing a wireless thermostat module (ecWizard E-100) at half the price and existing AC equipment running efficiently would require less operating time on extremely hot days.

Benefits for HVAC unit manufacturers new and replacement.

There is a large replacement market for HVAC units. Each unit sold in the future will have wireless module (ecWizard E-100) that can receive input from existing thermostat. This will allow the consumer to schedule and operate equipment via cell phone or existing thermostat. It assures the HVAC manufacturer that the owner is operating the equipment efficiently and with proper maintenance. Less costly warranty issues for the manufacture.

Let's say you have an HVAC old unit now that you know your exact cost of operation the analytical software can easily provide you with the cost savings if you were to upgrade to it energy efficient HVAC unit. (Amperage = Intelligence)

Summary

There is a real fear that in the future AI will eliminate jobs. This invention the ecWizard E 100 will improve comfort, save energy and create jobs in the service repair industry and hopefully in manufacturing of new in energy efficient HVAC equipment.

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.

Thank you for reading this information and if you have any questions please do not hesitate to contact me.

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