GREEN TECH THE SERIES COLUMN FOR JUNE 29, 2016
HEADLINE: CONDITIONED AIR: PROS AND CONS

As our climate changes, extremes in temperature are becoming more common and will remain for longer periods of time. Ask the folks in Arizona recently, where temperatures hovered around the 40.C mark for close to 10 days. One report showed a Phoenix resident baking cookies on the dash of her car! Climate change issues are with us, there is no denying that today.

Air conditioning, or A/C as it's usually referred to, is the process of altering the properties of air, primarily humidity and indoor temperature, thereby making the indoor environment more comfortable. A gentleman in New York invented air conditioning as we know it today. Willis Carrier worked on the process for some time and, in 1902, launched this industry. Carrier is now by far the largest manufacturer of commercial and residential air conditioning equipment, along with other HVAC equipment. At one point in the 20's, they called Carrier A/C "manufactured air." Carrier was one of the first companies to recognize the problems with Freon and, in 1994, began a phase-out of this refrigerant. They have a huge plant in Syracuse, New York and the stadium at Syracuse University is aptly named the "Carrier Dome."

How does an air conditioner work? The most widely known, until the mini-split systems came into the market, was the stand alone exterior cabinet where the refrigerant flows through a copper line. This refrigerant, now a liquid called P410 or Puron, flows past a coil with a fan that blows air across these hot coils, releasing the heat from inside the home to the exterior. You can feel this if you put your hand above the top of most cabinet style units. This refrigerant passes through an expansion valve that decreases the pressure causing it to change back to a gas that cools down. This cool gas travels through another coil, called the "A Coil," usually located inside the ducting above your furnace. Another fan, generally located in the furnace, moves the inside air over this cool coil. This refrigerant now moves to the compressor where it has become a hot liquid. This process is constant, circulating the refrigerant flow from a gas to a liquid and back to a gas. Mini-split systems are simply a compact rendition of the same concept.

On a blistering hot day, entering an air conditioned environment almost seems like a breath of fresh air, given that most of our urban areas during a heat wave have very poor air quality. So what are the negatives? Most are related to a lack of maintenance and replacement of the filters in the system, but there are other health concerns. Studies have shown that people who work in an over air

conditioned office may experience fatigue. In some cases, irritation to the nose results and, in extreme instances, breathing problems can become an issue. This may reduce your ability to fight off colds, flu and other respiratory illnesses. Extremely long hours in an A/C environment can cause a loss of moisture in the skin for some people. Some people with chronic illnesses see increases in their symptoms, which can make pain management difficult. Intolerance to the extremes of constantly going from heat to A/C can be a factor, too. This intolerance is often more pronounced in children and the elderly.

One study I have really zeroed in on is vehicles; they are the worst for circulating germs. A test done in Louisiana found eight types of mold inside 22 of 25 cars that they randomly tested. For long term occupancy of a vehicle, opening a window on a regular basis to exchange the air in the vehicle is recommended. If your car has a cabin filter, it should be checked and changed regularly. In every instance, improper maintenance in, not only your vehicle, but your home, is one of the largest factors. Simply put, filters must be cleaned or changed in your A/C system on a regular basis.

While there are health negatives, air conditioning can be life-saving and beneficial. It is well documented that extreme heat has a negative impact on your intellect and physical activity; conditioned air has value here. Comfort levels, job performance and lower temperatures can control sweating, which, for some people, reduces the risk of dehydration. If your system is clean, external allergens are considerably reduced, along with some insects. When it is too hot, it becomes hard to sleep and getting a good night's sleep during a heat wave is one way to reduce fatigue.

So where is the balance here? It's clear we now need air conditioning in some instances for health benefits. Air conditioned homes and commercial occupancies should have some method to regularly ventilate the building. One obvious way to do this is to open the windows. I often tell clients with HRVs (that are turned off in the summer) to operate it temporarily during a period where the outdoor temperatures are moderated and your A/C is, therefore, not operating. Have your system serviced. A good A/C tech can often spot problem areas before they become serious. Many homes we see have the conditioned temperature set at 20C or below. This is extreme, it's well documented that 21-25.C, and closer to the 25.C is suitable. Keeping your humidity around 60% is also recommended. This may mean adding a dehumidifier in your basement.

According to a US study, an average of 400 people die every year from heat related conditions. We need to find a balance in our indoor environment; climate extremes now dictate that.

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