

What Can I Do with IAQ?

Seizing the Indoor Air Opportunity
Bill Spohn
www.TruTechTools.com

- BSME & MSME, PE
- Engineering, Marketing, Sales, Business
 - 86-88: Fisher Scientific
 - 88-98: Bacharach
 - 98-99: Superior Valve: AC Valves
 - 99-09: Testo
 - 09-present: Owner of TruTechTools
- 3 Patents
- *Technical Committees:*
 - *BPI, RESNET, GAMA, AHRI, OMA, RSES, NATE, AGA, ACCA*

BIO: Bill Spohn



Veteran Owned and Operated



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Eric at Tru Tech Tools
was very helpful over the
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“What do you do when you get the house too tight? Celebrate! And, introduce proper ventilation from a trusted source.”

- Joe Kuonen



Joe says.....

- Indoor Air
 - Where does indoor come from?
- Quality
 - What happens to the air?
 - Pollutants
 - Gases
 - Deadly or unhealthy gases
 - Objectionable odors
 - Regional factors - Radon
 - Particles
- Is comfort part of IAQ?
 - Stiffness
 - Humidity or Temperature

Definition



The Four Ps

- Combustion sources
 - oil, gas, kerosene, coal, wood, and tobacco products
- Building materials and furnishings
 - deteriorated, asbestos-containing insulation
 - wet or damp carpet
 - cabinetry or furniture made of certain pressed wood products
- Products for household cleaning and maintenance
- Products for personal care, or hobbies
- Central heating and cooling systems and humidification devices
- Outdoor sources
 - radon, pesticides, and outdoor air pollution



EPA says...many sources of IAP

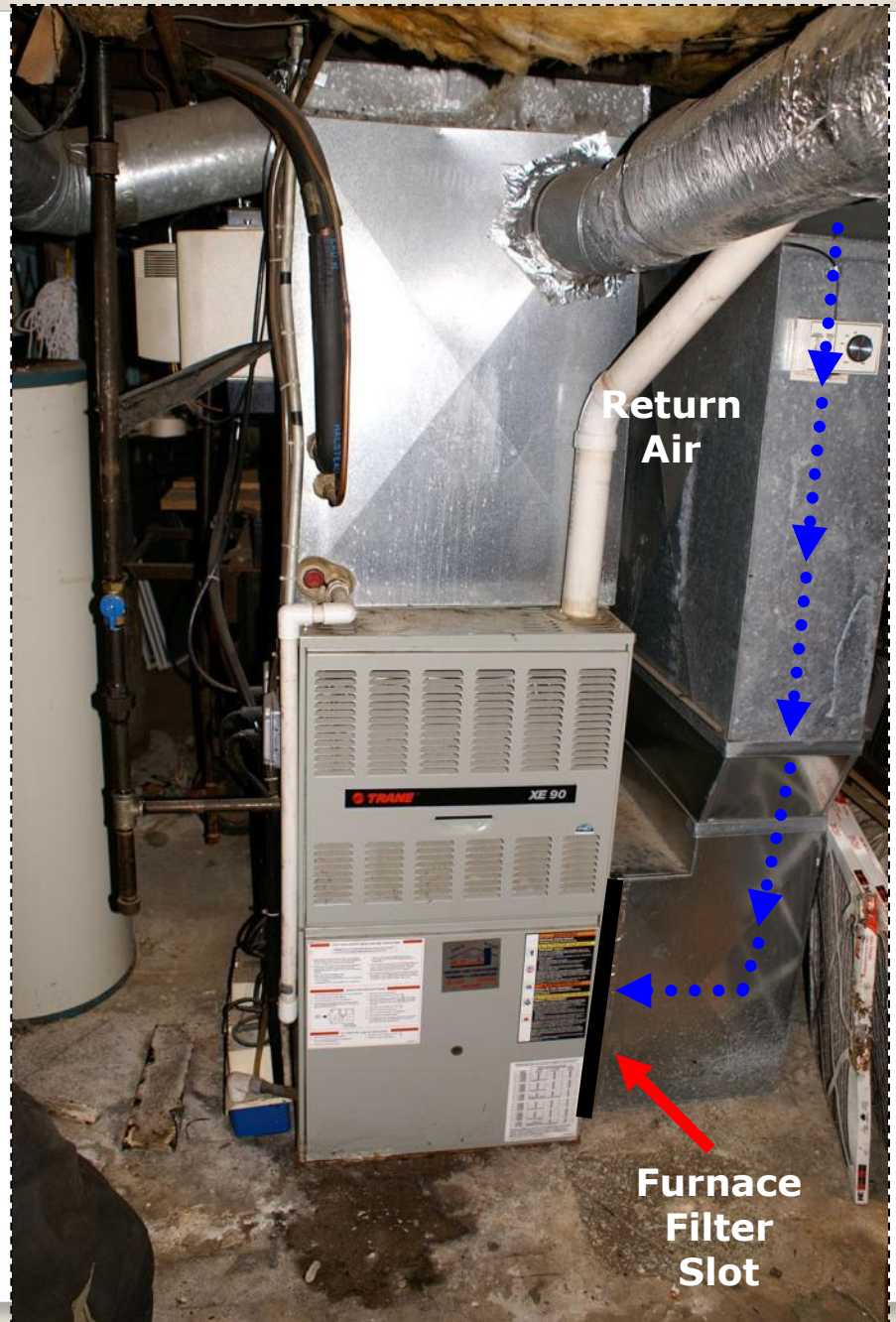
What bugs you about your house







Many
happy
returns?





- What are customers expecting from their air quality?
 - comfort, health, safety
 - What analysts can affordably* measure?
 - What technicians can affordably* install or change to fix found issues?
- *such that customers will pay for the service

The issues: as I see them

- Temperature
- Humidity
- “Fresh air”
 - usually via CO2 levels
- CO
- An industrial hygiene specialist (IH) may find interest in monitoring tens of different parameters
 - particulates, biologicals, VOCs, light, sound, etc.

3 (or 4) core parameters

- What am I likely to find here?
- What could I possibly find here?
- Where & **when** you sample makes a difference
 - different rooms can have different levels of any measured parameter
 - And things change over time
 - CO Sleuthing



Balance

- **EXPECTATIONS**

- Temp and humidity make good sense for basic human comfort and ASHRAE tables well define their bounds.
- Public is educated to acceptable ranges by the Weather Channel "feels like" temperatures which consider humidity. (actually dewpoint)

- **MEASUREMENTS**

- Measurement tools abound in features and costs (from well under \$100 to over \$1000)

- **FIXES**

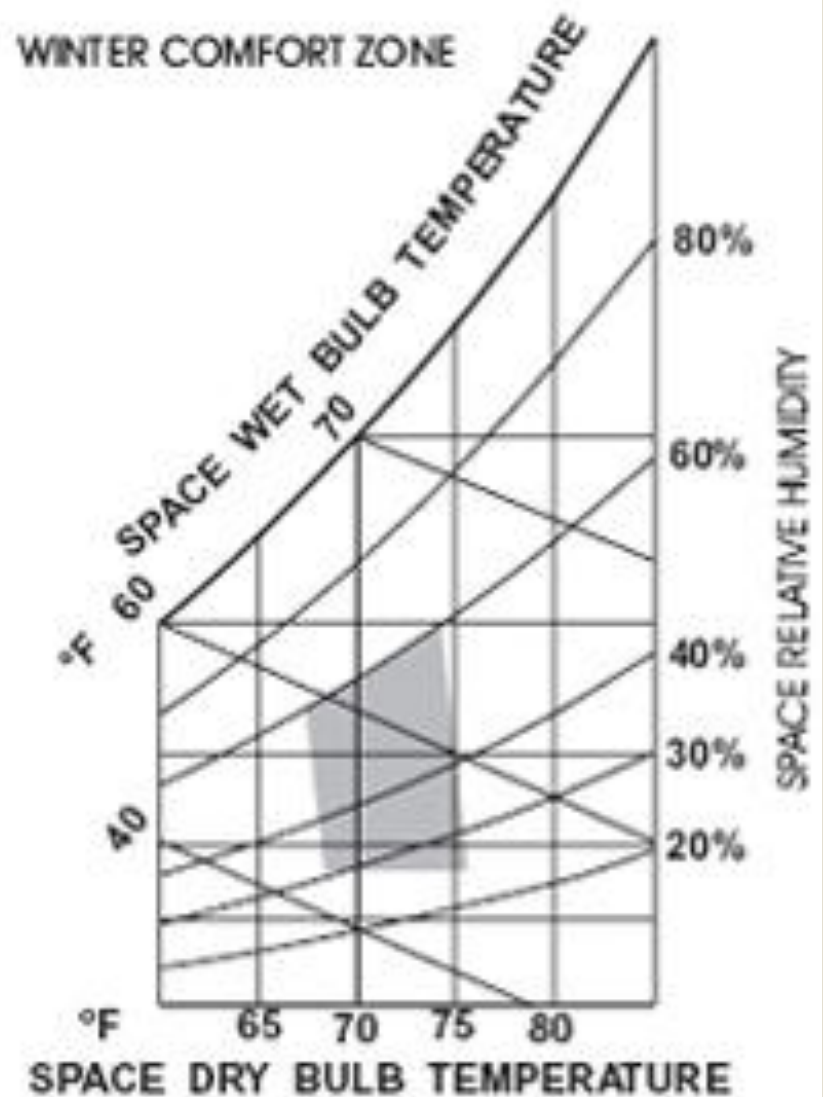
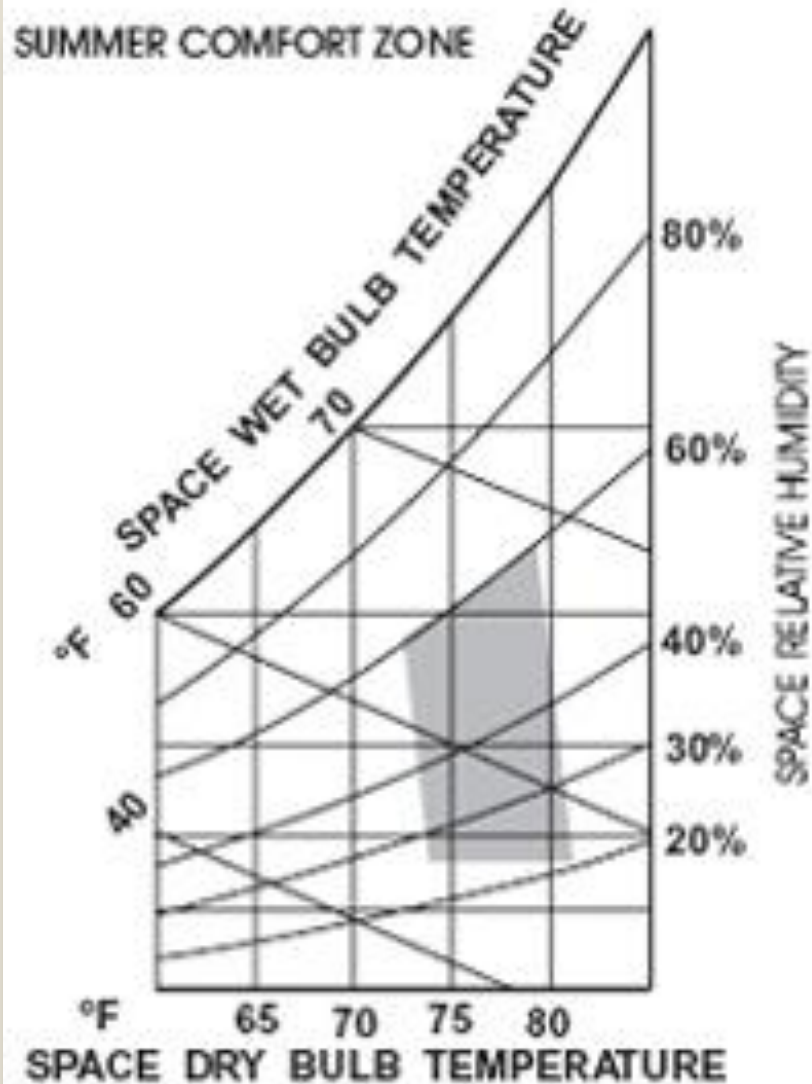
- Properly sized and delivered output from heating and cooling systems, humidification and de-humidification.

- **Mold & Biological growth**

- Warm enough, Wet enough, enough Food

Temperature and Humidity





ASHRAE Comfort Zones

- **EXPECTATIONS**

- Usually no expectation
- May "feel different" or be totally unaware.
- CO2 (ppm) surrogate indicator for fresh air
- As the indoor air concentration of CO2 rises above the outdoor air, ASHRAE actually defines stuffiness and impact on health factors.
- Locker room smell

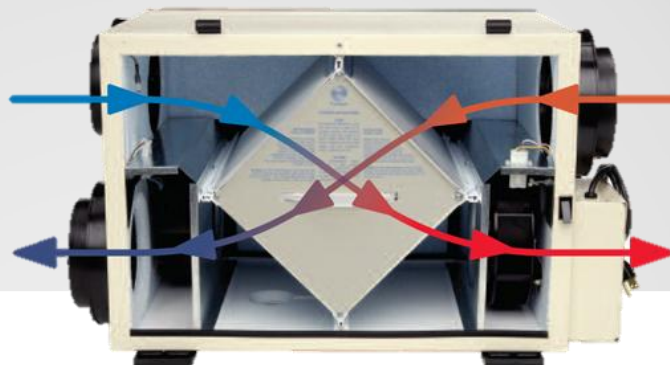
- **MEASUREMENTS**

- CO2 Measurement devices start under \$400 and can go over \$3000
- Air changes per hour (ACH) as calculated by a blower door test
- Combustion levels and IAQ levels

- **FIXES**

- Bring in (and hopefully condition) more outdoor air
- HRVs and ERVs come into play.

Fresh Air



The former ASHRAE Standard “Ventilation for Acceptable Indoor Air Quality” (ANSI/ASHRAE 62-1989) references the term 1,000 ppm CO₂ as a surrogate for where human ***bioeffluents*** (odors) may be at levels not acceptable for human comfort.

Further, this value of 1,000 is a guideline value only and not considered a regulated standard.

ASHRAE on CO₂ LEVELS

- **EXPECTATIONS**

- Public awareness CO and CO alarms
Health impact over exposure concentrations and times is well known.

- **MEASUREMENTS**

- CO alarms warn to life safety issues for well under \$100, and analyzers range from \$200 to \$500

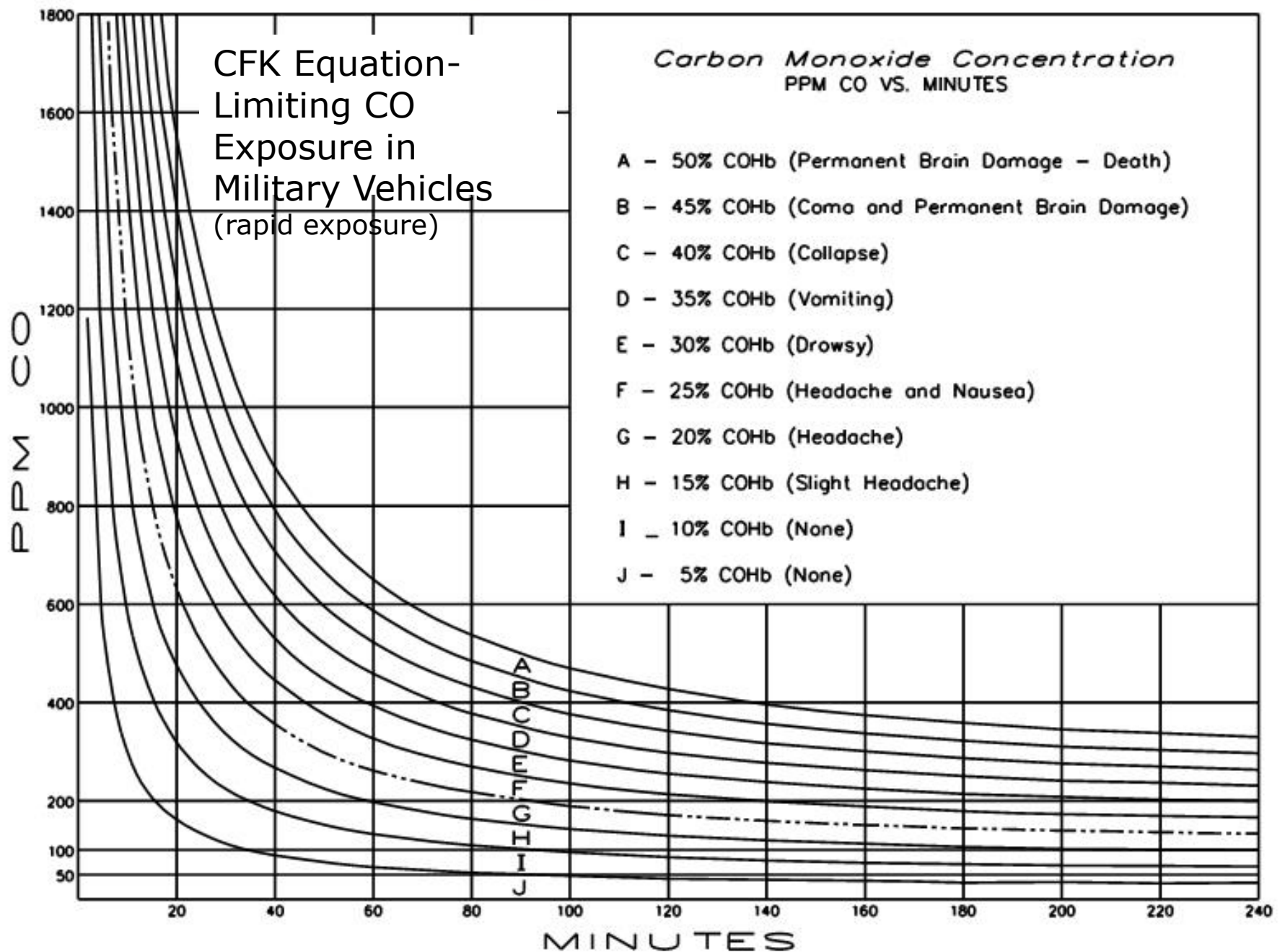
- **FIXES**

- Correction of the CO emitting appliance/source or pathway
- CO filter? Hopcalite®



CO - an extension of fresh air

Figure 38.1 revised October 15, 1997



- **MEASUREMENTS**

- Meters here cost about \$1800 and up

- **FIXES**

- Electronic and media filters up to HEPA filters

- **Austin Air - \$649**

- Cleans benzene, wood smoke, formaldehyde and other volatile organic compound (VOCs)
 - Capable of trapping 99.97% of particulates down to 0.3 microns
 - Effective for areas up to 1500 sq ft.

Particulates

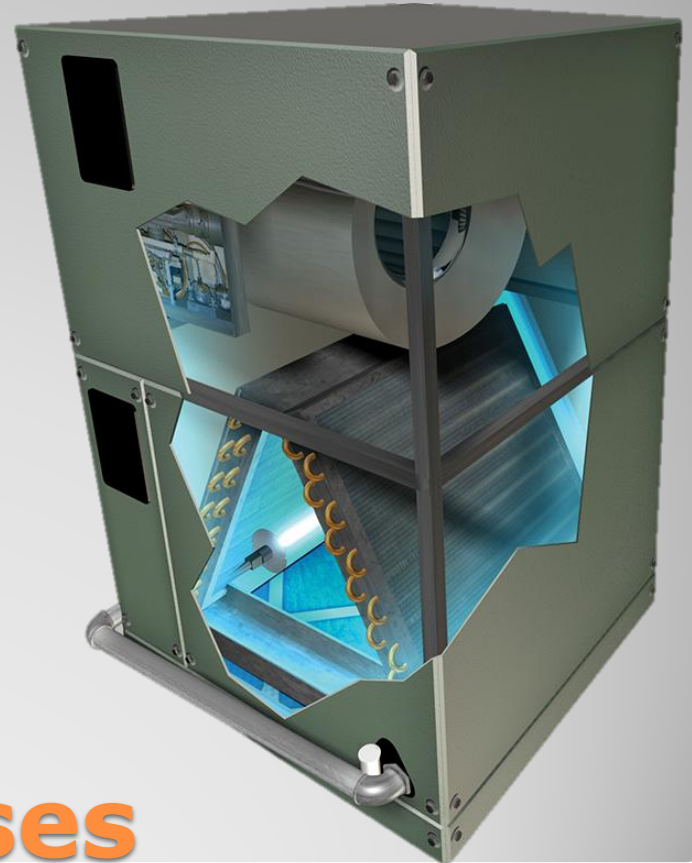


- ***MEASUREMENTS***

- Some portable & Special lab testing here

- ***FIXES***

- UV (AC) coil lights



Microbes and viruses

- ***New to me this week!***
- ***Hygenica portable unit***



Biologicals....TBD

- **MEASUREMENTS**

- sophisticated testing or
- "gut reaction" = it smells!

- **FIXES**

- Air Cleaners and Air-treaters
- (including ozone-ators)

- **Personal View**

- Don't fully appreciate
- Gives me headaches
- And the EPA sez....



Stale air and odors

- O₃ - Alters chemical composition in your body, too!
- Can damage the lungs
- Low amounts can cause chest pain, coughing, shortness of breath, and, throat irritation.
- May also worsen chronic respiratory diseases such as asthma and compromise the ability of the body to fight respiratory infections.
- People vary widely in their susceptibility to ozone.
- Healthy people, as well as those with respiratory difficulty, can experience breathing problems when exposed to ozone.
- Exercise during exposure to ozone causes a greater amount of ozone to be inhaled, and increases the risk of harmful respiratory effects.
- Recovery from the harmful effects can occur following short-term exposure to low levels of ozone, but health effects may become more damaging and recovery less certain at higher levels or from longer exposures
- SHEESH!

EPA on Ozone - Generators

- Study up on one or two aspects that you believe
- Keep in mind you need access/license to sell and install the "fix" or can work with someone who will do so.
- Install the "fix" in your own house and see if you would stand behind it.



Building an IAQ business

- Can help raise customer awareness to need for your product or service.
- A mature product offering especially in the larger building environment.
- HomeAdvice product covers Temp, rH, CO and particulates and perhaps VOCs (volatile organic compounds)
- Local Home Show experience
- The WHEN factor



AirAdvice – “all” in one

- **Bactronizing™**
- Sanitizing solution to eliminate mold, mildew, food-related illnesses and other harmful viral/bacterial infections for all types of environments.
- Proven safe and effective for human and animal environments."

Bactronix

The Holy Grail for the HP Community!

**A 67% decline in
emergency room
visits due to
energy retrofits!**

**Aetna: Savings of
over \$600 for
each asthma-
related ER visit
(\$6,600 for a
hospital stay).**

Home energy retrofits reducing healthcare costs

By David Worthington | December 7, 2012, 5:32 AM PST

Wegowise, a start-up that identifies energy efficient homes by analyzing utility data, has partnered with a national non-profit to upgrade low-income housing around Baltimore, Maryland. A recent pilot project produced an unforeseen result: emergency room visits among residents who were helped fell by 67 percent.

The Environmental Protection Agency says that buildings in the U.S. waste an average of 20 percent of the US\$400 billion plus that's spent on energy annually, but not every building owner has the same resources to eliminate waste. Homes that aren't sufficiently weatherized can be hazardous to health. [WegoWise](#) and Green & Healthy Homes Initiative (GHHI), a national non-profit, are partnering to help economically disadvantaged families fix weatherization issues that negatively impact their household budgets and lives.



Many incidents of asthma occurred with children and were attributed to insufficient home weatherization.

[WegoWise](#) provides a Web application to track and analyze utility data. Building owners would use its application to identify their most wasteful properties and greatest potential savings with upgrades. The entire process is automated by the application, which is available to anyone in the U.S. as a monthly subscription. WegoWise saved the GHHI from having to scour through spreadsheets to target homes that were in the greatest need of health and energy upgrades. 31 homes were selected for repairs.

- www.IAQ.net
- www.epa.gov/iaq
- www.AirAdvice.com

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Questions.....

