



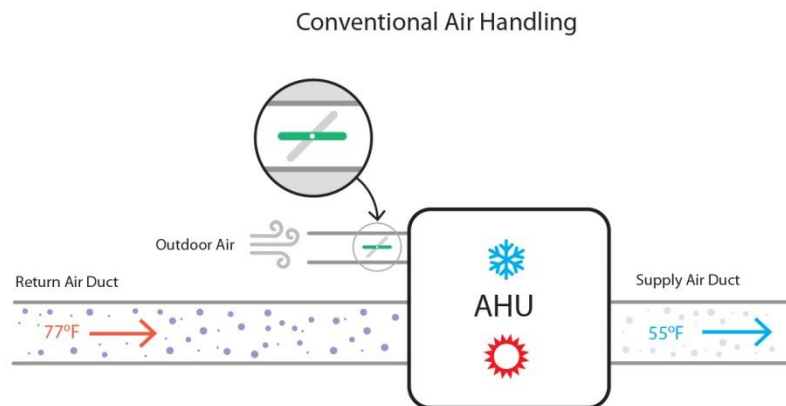
enVerid

Energy savings. Air quality.

Introducing HLR Technology:
**Energy Savings
and Indoor Air Quality**

May 2016

Maintaining Indoor Air Quality Today



- Commercial buildings use a lot of outside air
- The reason: ensuring indoor air quality (ASHRAE 62.1)
- A universal, but *inefficient* practice



Remove molecular contaminants



Reduce outside air for ventilation



Lower energy costs & maintain indoor air quality

Introducing HLR Technology

- The HLR[®] HVAC (Heating, ventilating, and air conditioning) - **Load Reduction** actively and intelligently reduces building energy loads.
- Replaces outdated, inefficient and costly ventilation methods with a practical, proven, energy-efficient approach.
- Cleans the indoor air instead of continuously replacing it.
- Works anywhere. Changes everything.



The HLR System

- Modular, scalable system of smart scrubbers
- Bolt-on retrofit to existing HVAC systems
- Easy to install; indoor or rooftop installation
- Designed to minimize amount of outside air
- Enables significant downsizing of equipment for new construction



The HLR E Series



- All season module; heating and cooling
- Maximizes energy efficiency & savings
- Light-weight, easy to install



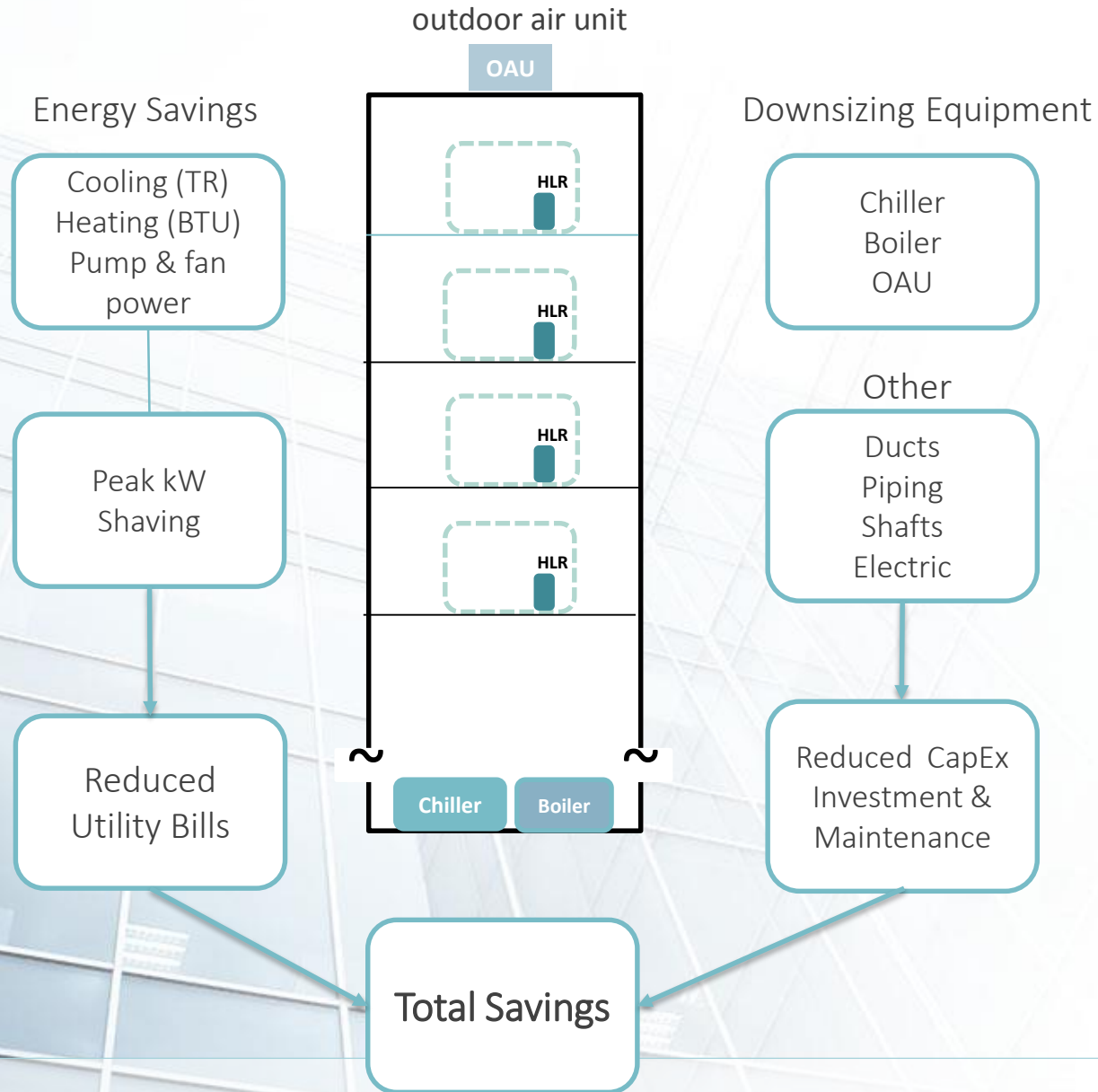
HLR-1000E

HLR Economics and ROI

- Typical annual savings ~ 20%
 - *Peak* savings routinely **exceed 40%**
 - Payback for retrofit is **1.5 – 3 years**
 - Immediate payback for **new construction**
 - Eligible for local utility rebate programs
-
- Energy savings model developed by enVerid
 - City & building specific; historical climate data



New Construction Economics




HLR Benefit: Compliance (ASHRAE) and Sustainability (LEED)

- 100% compliant with ASHRAE 62.1-2013 Guidelines
 - THE standard for indoor ventilation and IAQ
 - Under “Performance” ventilation procedure
 - Specific RFI clarified and published in Jan. 2015
- USGBC & HLR Systems
 - Pilot program launched in 2014 to encourage adoption
 - Up to 9 LEED credits for installations



Why do we need better Indoor Air Quality?

Study: Buildings With Cleaner Air Make You Smarter
 TriplePundit.com • by Bill Roth Nov 6th, 2015



A study just published by the Harvard T.H. Chan School of Public Health has linked a building's indoor air quality directly to its occupants' cognitive function. Cognitive function is defined as the cerebral activities that lead to knowledge including acquiring information, reasoning, attention, memory and language.

The revolutionary finding of this study is that lowering indoor air levels of carbon dioxide and volatile organic compounds (VOCs) improves human cognitive function. In other words: Cleaner air makes us smarter!

This amplifies the issue of CO2 as a pollutant to a new level, it brings the issue inside our homes, offices and schools. It creates a significant motivation to reduce indoor air pollution by reducing CO2 and VOC levels.

Impacts on competitive advantage, building owners, lawyers and smartphones

To this economist focused on 21st-century mega trends this study shouts out business and societal questions around "competitive advantage." It suggests that a business with superior indoor air quality will have higher performing work associates. It suggests that a business with superior indoor air quality will be more effective in messaging, and winning, customers.

The study presents a radically new real estate value proposition. It suggests that buildings with superior indoor air quality will sell for more money and win higher leasing levels.

Indoor air quality could become a major educational issue with societal ramifications. It raises questions about student performance (with issues of inequality) based on a school's indoor air quality and proximity to sources of CO2 like highways, factories and power plants.

Based on this study, the role that CO2 has in driving climate change may be only half of the environmental cost/benefit analysis tied to CO2 emissions. A recognition that indoor CO2 levels have a measurable human cognitive function impact should spark massive building code revisions.

It would also appear to be only a matter of time before poor indoor air quality soars to a top-of-mind issue among lawyers with the likely emergence of class action litigation against building owners and property managers. And it suggests a future killer app for smartphones or wearables that continuously monitors indoor air quality to protect us from working or living in a home, factory, office or hotel with poor indoor air quality.

Smart vs. green buildings

A stated motivation for constructing this study was to assess the growing number of green buildings that achieved increased energy efficiency by wrapping a building to more more conditioned air (and energy) loss. These tightly-sealed buildings were thought to represent "sick building syndrome," where occupants felt impacted by poor indoor air quality.

The study found that, in fact, poor ventilation in tightly-sealed buildings does create a human health threat. The finding holds the potential to shift building design and operations away from "green" buildings and toward "smart" building designs like those adopted into California's building codes that incorporate ventilation solutions with building sensors, smart technologies and onsite renewable generation to achieve Zero Net Energy annual results.

How indoor air quality could impact real estate values

Who wants to work, stay or live in a building that makes them dumber? How that question is answered during the 21st century could make CO2 and VOC levels a major determinant in real estate sales.

Future real estate disclosure could include measured quantification of a building's indoor air quality. The ability to finance a building or home, including the cost of financing, could be impacted by a building's potential air quality impacts on occupants. In the future home prices and sales could be impacted by how a potential homebuyer's smartphone or wearable measures the house's indoor air quality during a walking tour.

Smart buildings will cost less, mean more and makes us smarter

Smart buildings are a 21st-century mega trend. They will cost less because they will use onsite solar energy systems that are projected to deliver grid parity, or lower prices, in all states by next year. Smart buildings will achieve lower costs by deploying battery systems, which are projected to reach grid price parity in five years, to enable price arbitrage against utility rates plus enhanced service reliability. They will cost less because smart technologies will optimize energy and water consumption around human behavior and comfort. They will cost less because they create less risk, litigation and human complaint.

Smart buildings will mean more for two reasons. The first is tied to the human experience: They will enhance human productivity and satisfaction with their seamless connectivity to human activity. A recent survey found that people want their smart home or office to be easy to use and experience. Smart tech will be bundled, connected and intuitive. Smart tech will anticipate human need (like sensing two people walking into a room and automatically turning on the appropriate level of lighting and conditioned air ventilation). The smart home or building will be secure and protected against misuse through easy-to-implement human interaction like a voice command or the touch of a finger.

The second reason they will mean more is tied to their ability to protect/enhance human and environmental health. Smart buildings will have reduced environmental emissions. They will monitor air quality around human health parameters. They will be a major contributor toward the mitigation of climate change.

Smart buildings will reshape the 21st-century economy, improve our environment, enhance human health and make us smarter from just breathing cleaner air.

Scanned by CamScanner

Study published by the Harvard T.H. Chan school of public Health

Industry Recognition



U.S. DEPARTMENT OF
ENERGY



Including US Department of Energy \$2.4M award:



“Top 10 startups of 2014 “
Globes / E&Y ranking

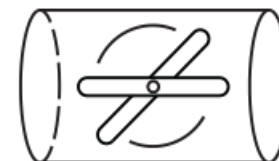
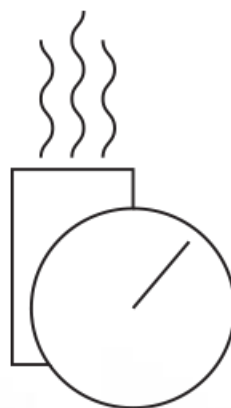
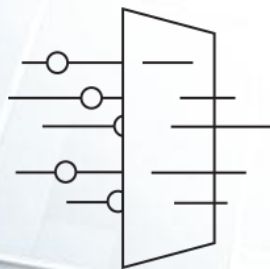
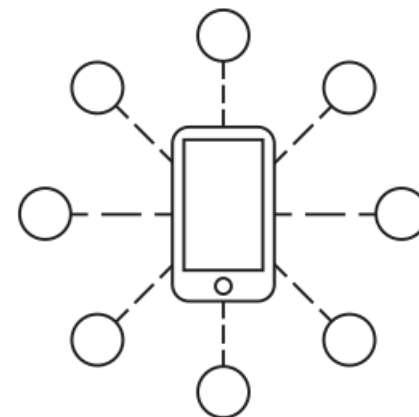
Additional Recognition: Federal Government's GSA

- GSA manages all Federal office buildings & facilities
- “Green Proving Ground” program
 - Identifies, selects and *funds* demonstration of new energy efficiency technologies for GSA
 - Clears way for wide adoption by the GSA
- enVerid recently invited to participate
 - Installation of HLRs in US Custom House in Houston, TX



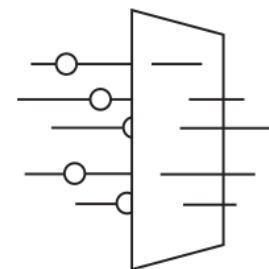
The HLR System – 4 Integrated Capabilities

- Indoor Air Treatment
- Automatic Regeneration
- Outside Air Management
- Monitoring and Reporting



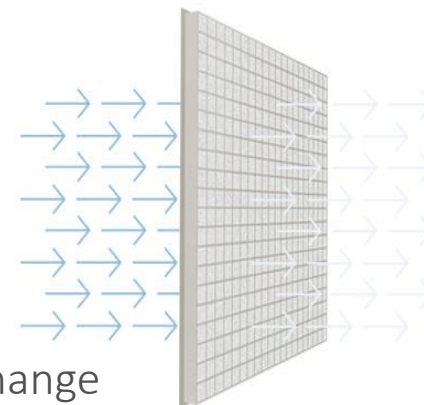
Capability 1: Indoor Air Treatment

- The Big Idea: *clean* the indoor air instead of replacing it.
- Only commercially available solution to capture CO₂, volatile organic compounds (VOCs), PM_{2.5} and formaldehyde from the indoor air.
- Intelligent feedback mechanisms monitor air quality keeping up with dynamically changing levels of building contaminants
- During adsorption phase, a small portion of indoor air flows through the sorbents, contaminants are captured, and clean air flows back into the building.



Indoor Air Treatment – Patented Sorbents

- Sorbents housed in cartridge set
 - Non-toxic; no byproducts; recyclable
- Low-cost **CO₂ removal**
 - New adsorbents developed to address global climate change
 - Re-engineered by enVerid for indoor conditions
- **Volatile organic compound (VOC) capture**
 - Micro-activated carbon fiber technology
 - Used so far only in military / industrial settings
- **Formaldehyde-selective sorbents**
 - Discovered by enVerid Systems
 - Leveraging similar chemistry to that of CO₂ sorbents

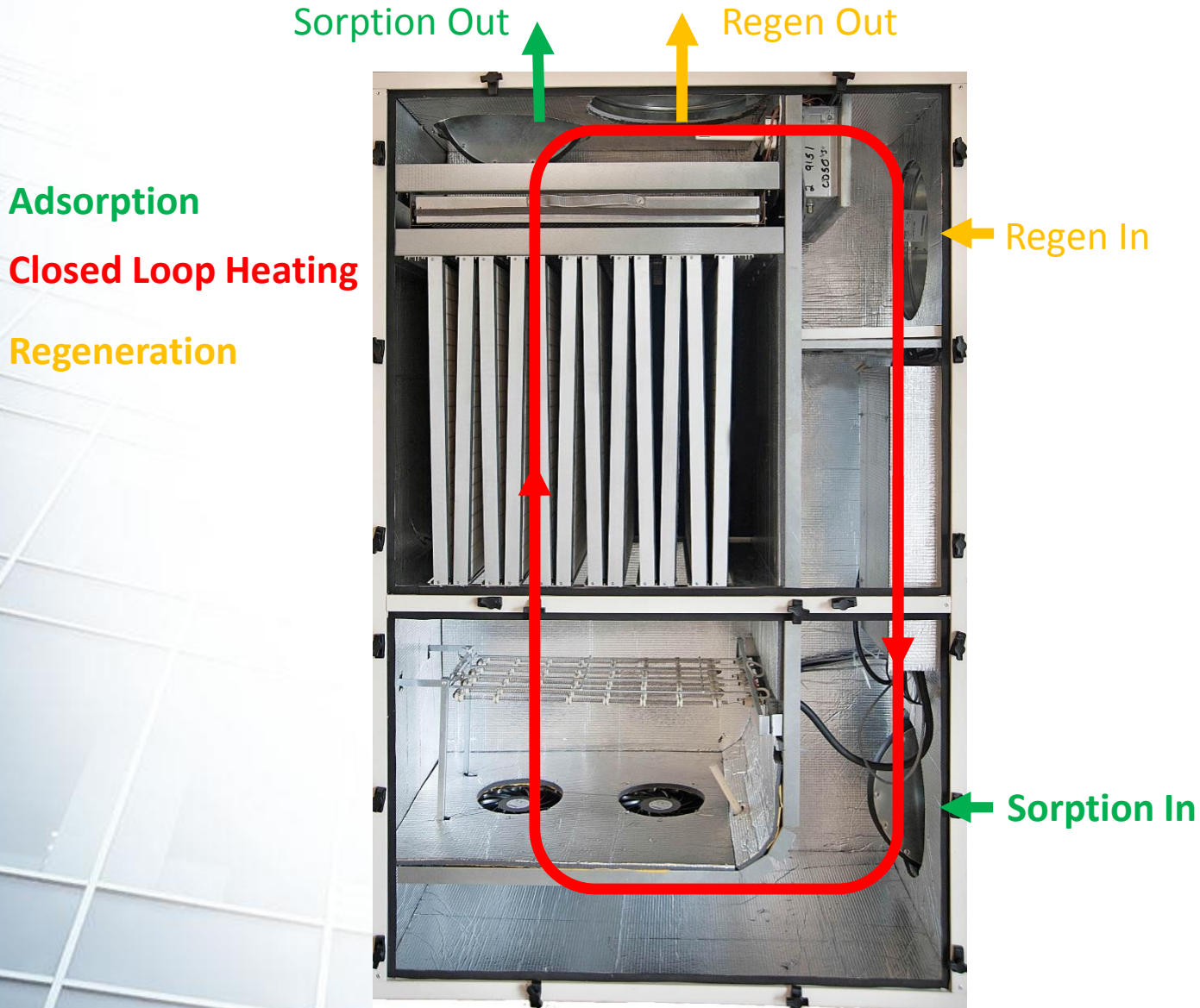


Capability 2: Automated Regeneration

- Closed Loop Regeneration technology enables operating in both warm and cold climates.
- Sorbents are automatically cleansed of captured contaminants.
- Scheduled, managed and timed for optimal performance and minimal energy use.

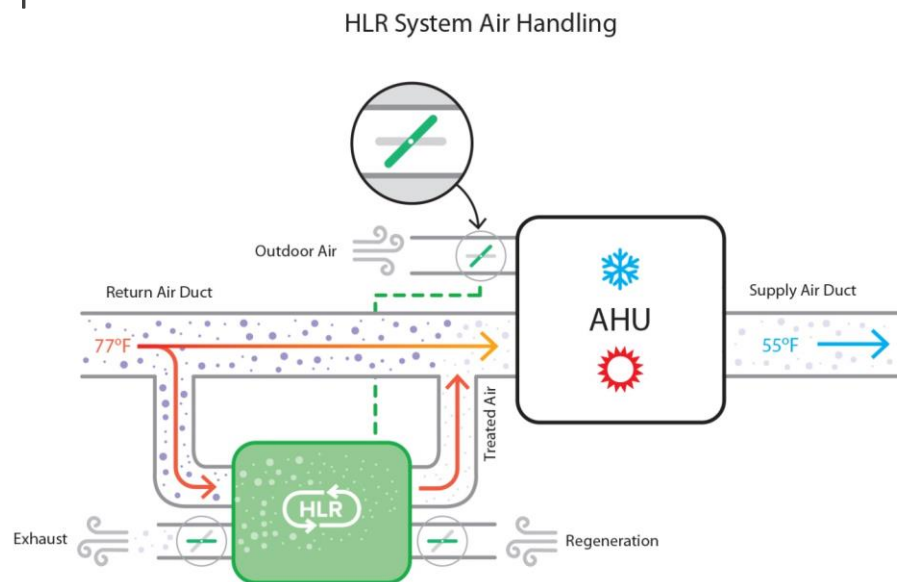
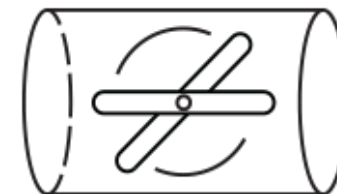


Automated Regeneration In Situ



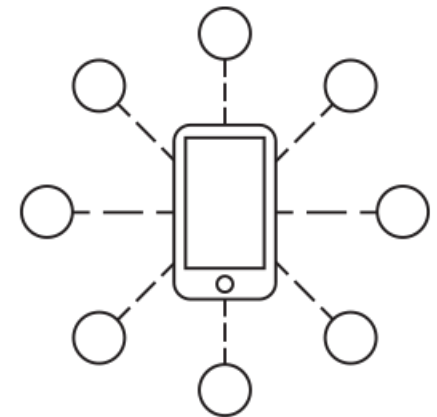
Capability 3: Outdoor Air Management

- Energy is saved by automatically reducing outside air intake.
- Typical outside air savings is 80% or more.
- Enough air is brought into the building to maintain positive pressure.



Capability 4: Monitoring and Reporting

- Embedded sensors monitor and record:
 - Indoor air quality
 - Sorbent performance (first sensor to measure VOCs in ppb)
 - Outside temperature
 - System operating conditions
- State-of-the art cloud connectivity for advanced system control and operability
- Sophisticated proprietary algorithms maximize energy savings based on building needs and conditions
- Building management and facility managers can monitor energy savings and IAQ in real-time



Summary Benefits of the HLR Solution

- Substantial Energy Savings
- Excellent IAQ
- Real-time Monitoring, Reporting & Validation
- Scalability and Flexibility
- Reliability – Simple, Elegant Mechanical Design
- Compliance and Sustainability



Projects

- Broad range of buildings:
 - New construction and sustainability goals
 - Historic buildings with energy savings goals
 - Small office buildings to large office towers

- Results
 - Initial results – site reports for energy savings and IAQ results
 - Ongoing results through cloud-based reporting capabilities
 - Comparison of Conventional Mode and HLR Savings Mode

Summary

- Substantial energy savings
- Excellent IAQ (Indoor Air Quality)
- Retrofit or new construction

Change is in the air.

Works anywhere. Changes everything.

4 INNOVATION
BUSINESS DEVELOPMENT LTD

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