U.S. Department of Energy Study Highlights Energy Savings Potential of Sorbent Ventilation Technology™

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The latest findings from DOE's High Impact Technology Catalyst program demonstrate deployment potential for GSA and other commercial building applications.

Westwood, MA – March 9, 2022 – enVerid Systems, the leader in sustainable indoor air quality (IAQ) solutions, announced today that its sorbent air cleaning technology for HVAC load reduction has been validated by the U.S. Department of Energy's (DOE) High Impact Technology (HIT) Catalyst program. The validation comes after field testing of enVerid's HVAC Load Reduction® (HLR®) modules by DOE's National Renewable Energy Lab (NREL) in commercial buildings in the eastern and southern U.S. NREL found that HLR modules provide substantial Heating, Ventilation, and Air Conditioning (HVAC) energy savings and load reduction potential. Powered by enVerid's Sorbent Ventilation Technology™ (SVT™), HLR modules safely remove carbon dioxide, ozone, formaldehyde, and a wide range of Volatile Organic Compounds (VOCs) from indoor air so that ventilation rates can be optimized to improve energy efficiency and IAQ, which can lead to reductions in HVAC equipment costs, operating costs, and buildings' carbon emissions.

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SORBENT AIR CLEANING FOR HVAC LOAD REDUCTION

OPPORTUNITY

How much energy can be saved by bringing in less outside air?

7% DECREASE IN ENERGY USE INTENSITY (EUI)
from bringing in less outside air to meet ventilation requirements.[1]
The air in a building can be replaced between 10 to 20 times a day.[2]

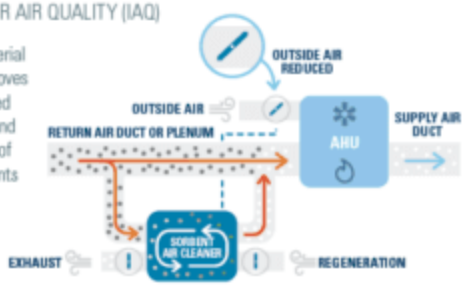
TECHNOLOGY

How does sorbent air cleaning for HVAC load reduction work?

CLEANS INDOOR AIR

SO LESS OUTSIDE AIR IS REQUIRED TO ACHIEVE GOOD INDOOR AIR QUALITY (IAQ)

Absorbent material selectively removes indoor-generated contaminants and reduces intake of outdoor pollutants



M&V

Where did Measurement and Verification occur?

NATIONAL RENEWABLE ENERGY LABORATORY (NREL) assessed sorbent air cleaning provided by enVerid at multiple commercial and educational buildings in the Eastern and Southern United States.

RESULTS

How did sorbent air cleaning for HVAC load reduction perform in M&V?

IMPROVED
IAQ AND HUMIDITY CONTROL
WITH LOWER VENTILATION RATES[3]

6%–37%
COOLING SAVINGS
DURING PEAK COOLING MONTH[4]

ADD-ON
INSTALLATION
OUTDOOR DAMPERS MUST BE OPERABLE AND CONTROLLABLE[5]

Modeled Energy Savings Across Climate Zones

Highest energy savings in climates with extreme hot or cold temperatures

Location		Annual Energy Savings per SF		Peak Demand Reduction
CLIMATE ZONE	CITY	COOLING kBtu/sf/yr	HEATING kBtu/sf/yr	JULY PEAK SAVINGS %
1A	Miami, FL	2.57	0	9%
2A	Houston, TX	1.89	0.52	10%
3A	Atlanta, GA	0.99	1.75	8%
3B	Las Vegas, NV	0.72	0.13	6%
4A	New York, NY	0.56	1.64	11%
5A	Chicago, IL	0.30	3.10	7%
AVERAGE MODELED SAVINGS		1.17	1.19	9%

Modeling assumes one air cleaning module for a medium-sized office building (53,600 ft²).
Gas is only used for heating ventilation air, space heating is controlled by electric reheat coils.

DEPLOYMENT

Where does M&V recommend deploying sorbent air cleaning for HVAC load reduction?

SITE SPECIFIC

- Best suited for hot/humid or cold climates where there is higher energy savings potential, especially when existing HVAC equipment is undersized. The energy cost to run the unit can exceed savings in mild climates.
- Best economics for projects that can benefit from reducing heating and cooling capacity requirements. Modeling estimated capacity reductions between 9% and 20%, depending on location.
- Reducing ventilation rates during periods of high outdoor air humidity or pollution may improve IAQ.
- Not recommended where outside air can't be controlled.

[1] *Assessment of the Energy Impacts of Outside Air in the Commercial Sector*, K. Benne, B. Griffith, N. Long, and P. Torcellini (NREL), D. Crawley and T. Logee (DOE), April 2009 [2] *Energy Performance Validation of a Gaseous Air Cleaning Technology for Commercial Buildings*, Michael Deru and Jason DeGraw (NREL), February 2020, p.12 [3] Ibid. p.7 [4] Ibid. p.7 [5] Ibid. p.28

Image: https://www.gsa.gov/governmentwide-initiatives/climate-action-and-sustainability/center-for-emerging-building-technologies/published-findings/hvac/sorbent-air-cleaning-for-hvac-load-reduction

DOE's HIT Catalyst program conducts evaluations of new energy efficiency technologies in coordination with the U.S. General Services Administration's (GSA) Green Proving Ground (GPG) program. NREL assessed enVerid's HLR modules in commercial and educational buildings located in hot, humid, and cold climates across the country. The findings were published in the report, Energy Performance Validation of a Gaseous Air Cleaning Technology for Commercial Buildings. GSA has posted the NREL report and an infographic with key findings from the report on the GPG Published Findings page.

> "Addressing building decarbonization and resilience are among our top priorities," said Kevin Powell, Director of GSA's Green Proving Ground program. "NREL's assessment gives us valuable guidance on where sorbent air cleaning technology will help save energy and meet the net-zero carbon targets established in the President's recent executive order."

Based on NREL's findings, DOE's Better Buildings initiative has also identified sorbent ventilation air cleaning technology as a step building owners and operators can implement to achieve smart, healthy, and low-carbon small offices, large offices, and primary schools in the Better Buildings Low Carbon Technology Strategies Toolkit.

> "NREL's validation of the energy saving capabilities of enVerid's HLR modules and its underlying Sorbent Ventilation Technology in real world applications is another critical affirmation of this technology," said Christian Weeks, CEO of enVerid Systems. "Sorbent Ventilation Technology can be employed to achieve the dual priorities of healthy indoor air quality and reducing HVAC energy intensity to lower building carbon emissions. The timing of this important development aligns well with the actions being taken under the Infrastructure Investment and Jobs Act and the Biden

> Administration's recent commitment to prioritize decarbonization across the 370 million square feet of space in 9,600 buildings GSA oversees, addressing IAQ, carbon emissions, and building resilience."

SVT and IAQP – A Compelling Combination

enVerid's SVT, the core technology in HLR modules and other SVT-enabled HVAC systems, when applied in combination with the ASHRAE 62.1 Indoor Air Quality Procedure (IAQP), enables cleaned indoor air to replace a portion of the outside air required to maintain acceptable indoor air quality in a way that is fully compliant with existing building codes. This is an important consideration as large volumes of outside air are very energy intensive to condition and outside air is increasingly compromised by pollution and wildfire smoke. Using SVT in combination with the IAQP, annual HVAC energy use can be reduced by up to 40%, substantially lowering a building's energy intensity and carbon emissions without comprising indoor air quality.

About enVerid Systems, Inc.

enVerid Systems, the leading provider of sustainable indoor air quality (IAQ) solutions, helps buildings achieve air quality goals, save money and reduce energy consumption and carbon emissions. Its flagship HVAC Load Reduction®(HLR®) modules are award-winning air cleaners that deliver up to 40% HVAC energy savings and superior indoor air quality in new and existing buildings. For new HVAC systems, HLR modules also enable immediate capital cost savings. At the core of all HLR modules is enVerid Sorbent Ventilation Technology™(SVT™), uniquely designed to capture gaseous contaminants that degrade indoor environmental quality. enVerid's HEPA air filtration products remove particulate and microorganism

contamination, including viruses, from indoor air without the significant cost of upgrading mechanical systems and increasing mechanical ventilation rates. enVerid's products are deployed in commercial, academic, and government buildings globally. Its air cleaning products are ASHRAE Standard 62.1, LEED®, and WELL compliant and eligible for utility rebates. For more information, please visit https://enverid.com.