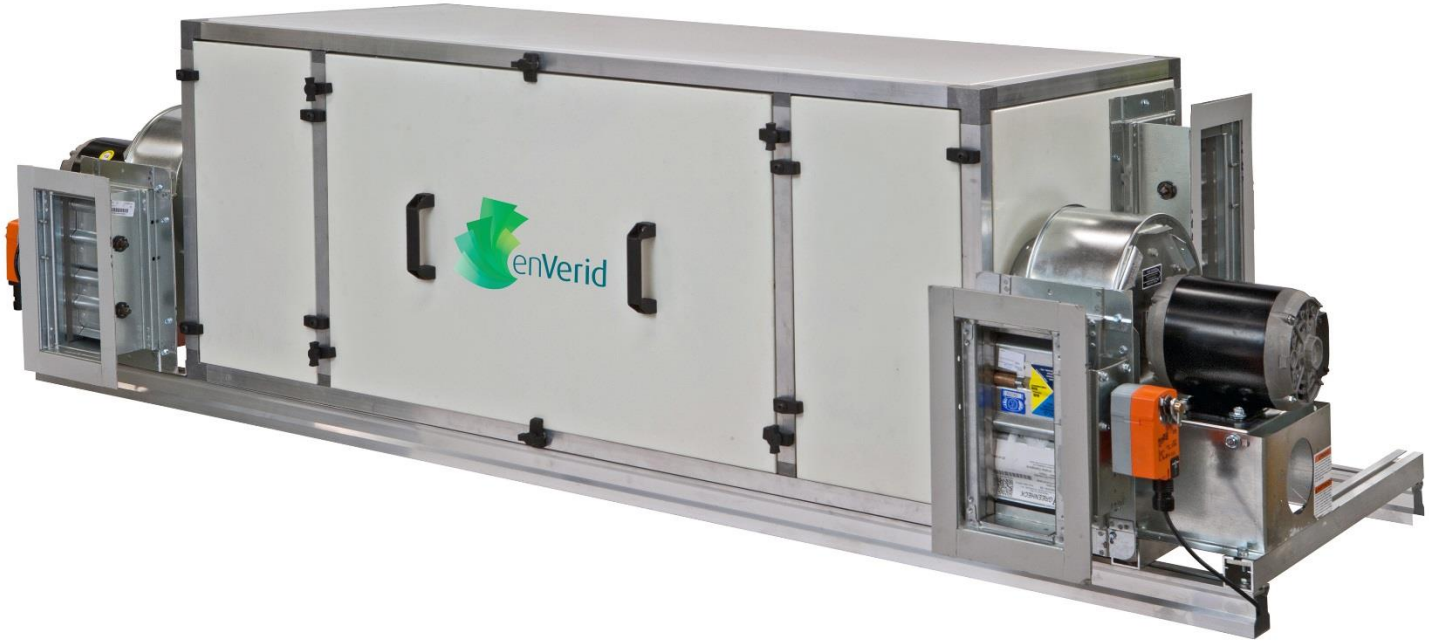
enVerid Systems Inc. - Commercial Building Technology Demonstration

2015 Building Technologies Office Peer Review



U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Project Summary

Timeline:

Start date: Oct, 1st 2014

Planned end date: Sep, 30th 2017

Key Milestones

1. At least one successful installation already in operation, Sep 30th 2015.
2. One vendor (or more) qualified to manufacture HLR modules in USA, Sep 30th 2015.

Budget:

Total DOE $ to date: $150K

Total future DOE $: $2,250K

Target Market/Audience:

Commercial real estate and public building owners/managers, HVAC engineering consultants, electric utilities

Key Partners:

Johnson Controls	
BASF	
NETL	
Cox Engineering	

Project Goal:

The objective of this project is to install and operate modular HVAC Load Reduction (HLR) retrofits in multiple and diverse buildings, monitor their performance, analyze the energy savings, overall economics, and verify Indoor Environment Quality/Indoor Air Quality IEQ/IAQ with specific tests for CO2 and other contaminants of concern (to be determined prior to demonstration initiation). The set of buildings selected for demonstration will collectively represent target markets based on market and commercialization analyses and strategies. The demonstrations will result in the creation of a body of validating case studies and data to encourage and enable widespread adoption around the country.

Purpose and Objectives (I)

Problem Statement: Air replacement is a standard practice in commercial HVAC, necessary to remove indoor generated molecular contaminants and maintain indoor air quality. A significant fraction of the total cooling or heating load of typical HVAC systems is due to air replacement. The project objective is to provide the quantitative evidence and practical experience to enable HVAC load reduction and energy savings by scrubbing indoor air as an alternative to air replacement.

Target Market and Audience: The target market is air conditioned commercial and public buildings – office, retail, schools, and other public venues, of which there is over 40 billion sqft and 400 billion kwh in cooling per year. Heating market is comparably affected and even larger, though typically utilizing gas. The primary audience is the decision makers (owners, facility managers) and influencers (distributors, contractors, regulators, utility companies, sustainability executives, energy service companies, and especially the engineering community).

Purpose and Objectives (II)

Impact of Project: The ultimate goal of the project is to overcome market hesitancy that stands in the way of widespread adoption, by creating a critical mass of success stories across different regions and building types. This will be facilitated by accruing enough case studies, success stories and demonstrations, to overcome lingering hesitation and promote widespread acceptance.

The achievement of our goals will be measured by the number of buildings that adopt our technology, both as retrofit to existing systems and ultimately as a part of new designs.

Near Term: Hundred of retrofit installations

Mid Term: Thousands of retrofits and some new building designs

Long Term: Tens of thousands of retrofits and more than 10% of new buildings

Approach

Approach: Our approach to energy savings is the HLR module, an intelligent, modular indoor air scrubber that removed CO2 and VOCs from indoor air. It is designed as a relatively easy, all-purpose retrofit. We plan to leverage DOE funding to incentivize early adopters to become "demonstration sites", install HLR modules and collect extensive performance data on energy savings and indoor air quality.

Key Issues: (a) Quantifying energy impact over extended timeline and seasonal changes, and in particular peak demand impact; (b) Verifying indoor air quality under HLR operation; and (c) Solving mechanical challenges of retrofit installations in different building types and HVAC configurations

Distinctive Characteristics: The retrofit required no changes or removal of any existing infrastructure, and is purely additive; therefore it is minimally invasive and reversible, which reduces risks and objections.

Progress and Accomplishments

Lessons Learned: Baseline state of many buildings is often not accurately known to owner nor necessarily in compliance with codes. It is more consistent and valuable to validate our performance relative to intended (compliant) state of building rather than actual state.

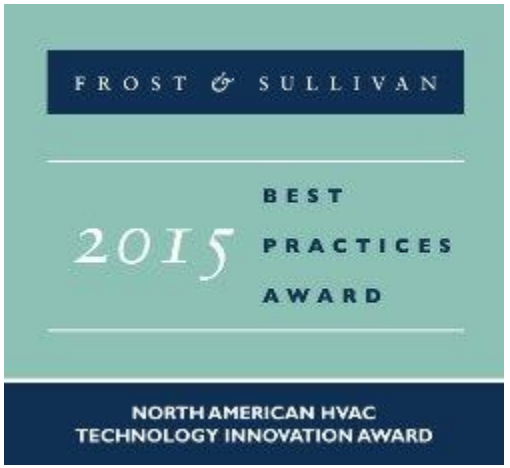
Accomplishments: Rich pipeline of candidates sites (well more than we can afford to service), two sites signed up and ready to start (subject to DOE approval)

Market Impact: No measured data yet as project has merely begun.

Awards/Recognition:

(1) Frost & Sullivan 2015 Best Practices Award ("most innovative company in HVAC")

(2) RFI published by ASHRAE (Jan. 2015) confirming in generic terms the compatibility of the proposed approach with existing ASHRAE 62.1 guidelines for ventilation and IAQ.



Project Integration and Collaboration

Project Integration: We are in discussion with engineering firms, real estate firms (JLL, CBRE, Tishman, Advance, Vornado, others), ASHRAE, and utilities (ConEd, CPS, Exelon, others)

Partners, Subcontractors, and Collaborators: Strong collaboration with Johnson Controls on market introduction and technology. Also working with LVR Energy, Cox Engineering, BASF, MagicAire, and multiple component suppliers. Collboration with DOE/NETL and several universities(USC, Akron.

Communications: AE3 Summit, Frost-Sullivan, press releases.

Next Steps and Future Plans

Next Steps and Future Plans: Our main activities and to lock down the sites, preform the installation and operate the sites while collecting extensive data, pictures, reports.
Much effort continues to be invested in lighter and ore efficienct sorbents, simpler module design with better electronics and controls. We also believe that the second wave of sites can be in colder climates where winter/heating energy savings can be measured.

REFERENCE SLIDES

Project Budget

Project Budget: We are behind our planned budget, however we intend to catch up with our operational plan and budget during 2015
Variances: Originally we planned on being at 2 sites by the end of March 2015. We currently at the final stages of enrollment with 2 potential sites at Miami FL and a 3rd site at Chattanooga TN
Cost to Date: 7% of project budget
Additional Funding: Not at this stage.

Budget History					
Oct, 1st 2014 – FY2014 (past)		FY2015 (current)		FY2016 – Sep 30th 2017 (planned)	
DOE	Cost-share	DOE	Cost-share	DOE	Cost-share
$0	$0	$1,354	$1,354	$1,046	$1,046

Project Plan and Schedule

Original plan was to install our technology in 2 sites by April 2015; however due to long recruitment process we are now planning to conclude the installation for the first 2 sites by end of **May 2015**.
We expect to achieve all the Go / No-Go goals as planned, including the Marketing plan, at least one site with successful installation, 3 sites or more that have been secured, and 3 sites or more that have been qualified. One vendor (or more) qualified to manufacture HLR modules in USA, and on-site sensors show CO2 maintained below 1100 ppm and other contaminants (VOCs) maintained below levels recommended by ASHRAE, NIOSH or USGBC.

Task Name	Duration	Start	Finish	Predecessors
Site #1 - Installation and Operation/Base lining	435 days	Wed 10/1/14	Tue 5/31/16	
Site #2 - Installation and Operation/Base lining	393 days	Mon 1/19/15	Wed 7/20/16	
Site #3 - Installation and Operation/Base lining	393 days	Wed 4/1/15	Fri 9/30/16	
Site #4 - Installation and Operation/Base lining	393 days	Wed 4/1/15	Fri 9/30/16	
Site #5 - Installation and Operation/Base lining	393 days	Mon 8/3/15	Wed 2/1/17	
Site #6 - Installation and Operation/Base lining	393 days	Mon 8/3/15	Wed 2/1/17	
Site #7 - Installation and Operation/Base lining	393 days	Tue 12/1/15	Thu 6/1/17	
Site #8 - Installation and Operation/Base lining	393 days	Tue 12/1/15	Thu 6/1/17	
Site #9 - Installation and Operation/Base lining	393 days	Wed 3/2/16	Fri 9/1/17	
Site #10 - Installation and Operation/Base lining	393 days	Tue 3/1/16	Thu 8/31/17