



DOE High Impact Technology Catalyst Tech Validation Site Selection

Commercial Buildings Initiative
Building Technologies Office



FY 2021 High Impact Technologies (HIT) Program

DOE Technology Field Validation

- **What:** A proving ground for novel deployment-ready, energy-efficient technologies in partnership with the US General Services Administration (GSA).
- **Who:** DOE seeks leading owner/operator partners to act as host sites for validating each technology.
- **How:** 3rd party performance measurement and verification (M&V) is funded by DOE and performed by National Lab experts.
 - Evaluations may last a few weeks to a full year, depending on technology
 - Procurement (purchase agreement) for the technology will be negotiated between the vendor and facility owner.
- **Why:** DOE publishes and disseminates results as a case study, providing real-world evidence of technology performance

Benefits of Participation

DOE Technology Field Validation

- Engage in low-risk pilot with installation and deployment managed by others
- Receive independent M&V and an evaluation of benefits, conducted by Lawrence Berkley National Laboratory.
- Inclusion in a well-supported, high-visibility DOE-funded demonstration program
- Gain insights regarding this technology's fit for your portfolio

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FY 2021 HIT Program Selections

GPG/DOE Technology Finalists

- **Automated Air Sealing**
Aeroseal (Miamisburg, OH)
- **HVAC Pretreatment Dehumidification**
Altaire (Ellisville, MO)
with Academy Energy Group (Newburgh, IN)
- **Nanofiber Air Filters**
eSpin (Chattanooga, TN)
- **Coreless Axial Flux Motor**
Infinitum (Round Rock, TX)
- **Snap-on Window Insulation Panels**
WexEnergy (Rochester, NY)

FY 2021 HIT Program Site Selection

General Criteria - All Sites

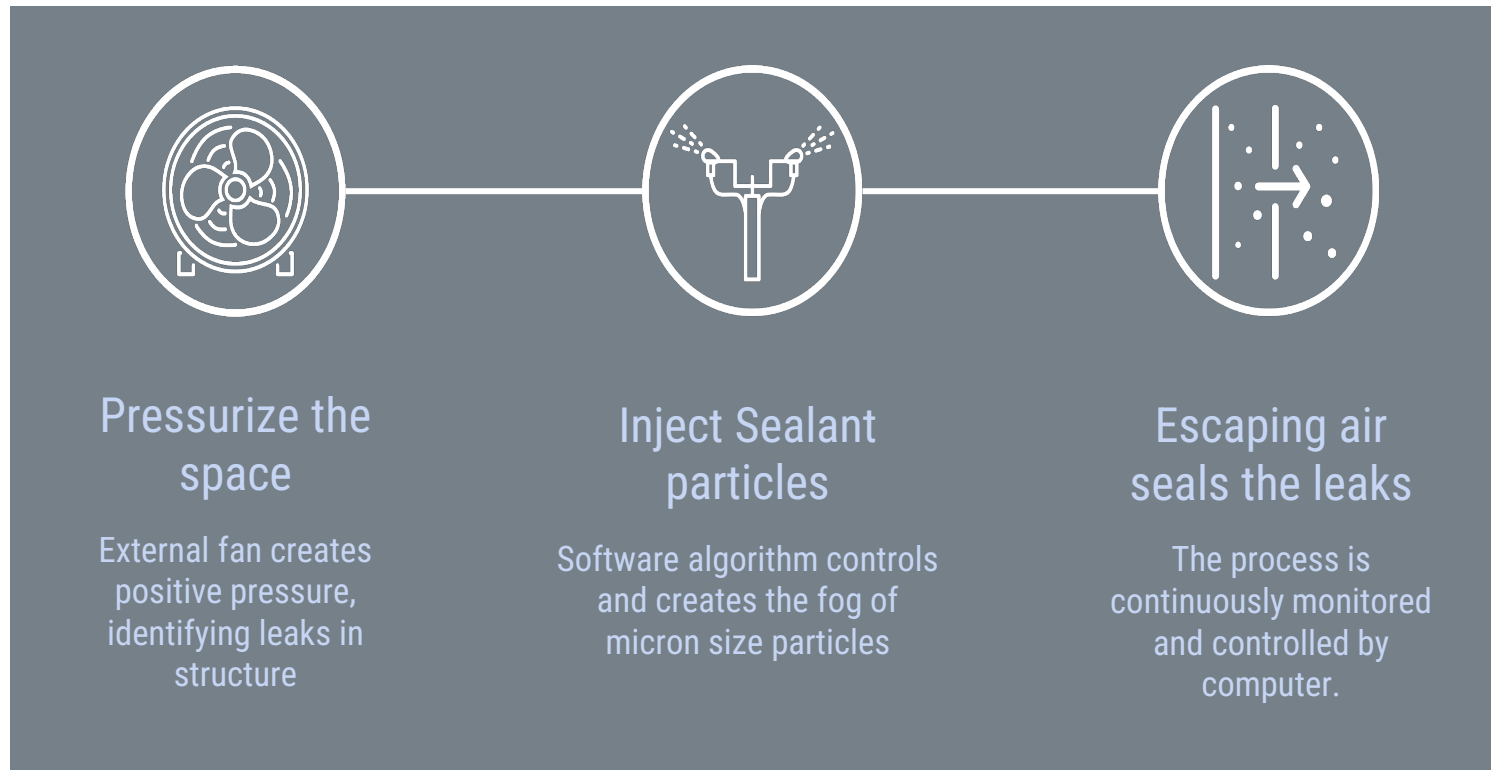
- **Required**
 - Engaged and interested building management
- **Preferred**
 - Historical data related to the technology
 - Availability of current building drawings
 - Supportive and knowledgeable O&M

Automated Air Sealing by Aeroseal (Miamisburg, OH)

Seals the building envelope by pressurizing it and then distributing an atomized non-toxic water-based sealant that is automatically drawn to leaks. System software records progress in real time, allowing users to control the desired level of envelope air-tightness.

Ideal Test-Site Building Characteristics

Cold climate and for simplicity a building with significant renovations scheduled.



Key Site Criteria

- (R) A small or mid-sized office building which is not retrofitted or built in the last 5 years.
- (R) Unoccupied spaces or extensive masking of horizontal surfaces.
- (P) Heating climate zones (Zone 5 and above)
- (P) Building with high contrast façade (façades such as CMU, concrete, or brick are preferred in comparison to Vinyl siding)

(R) = Required

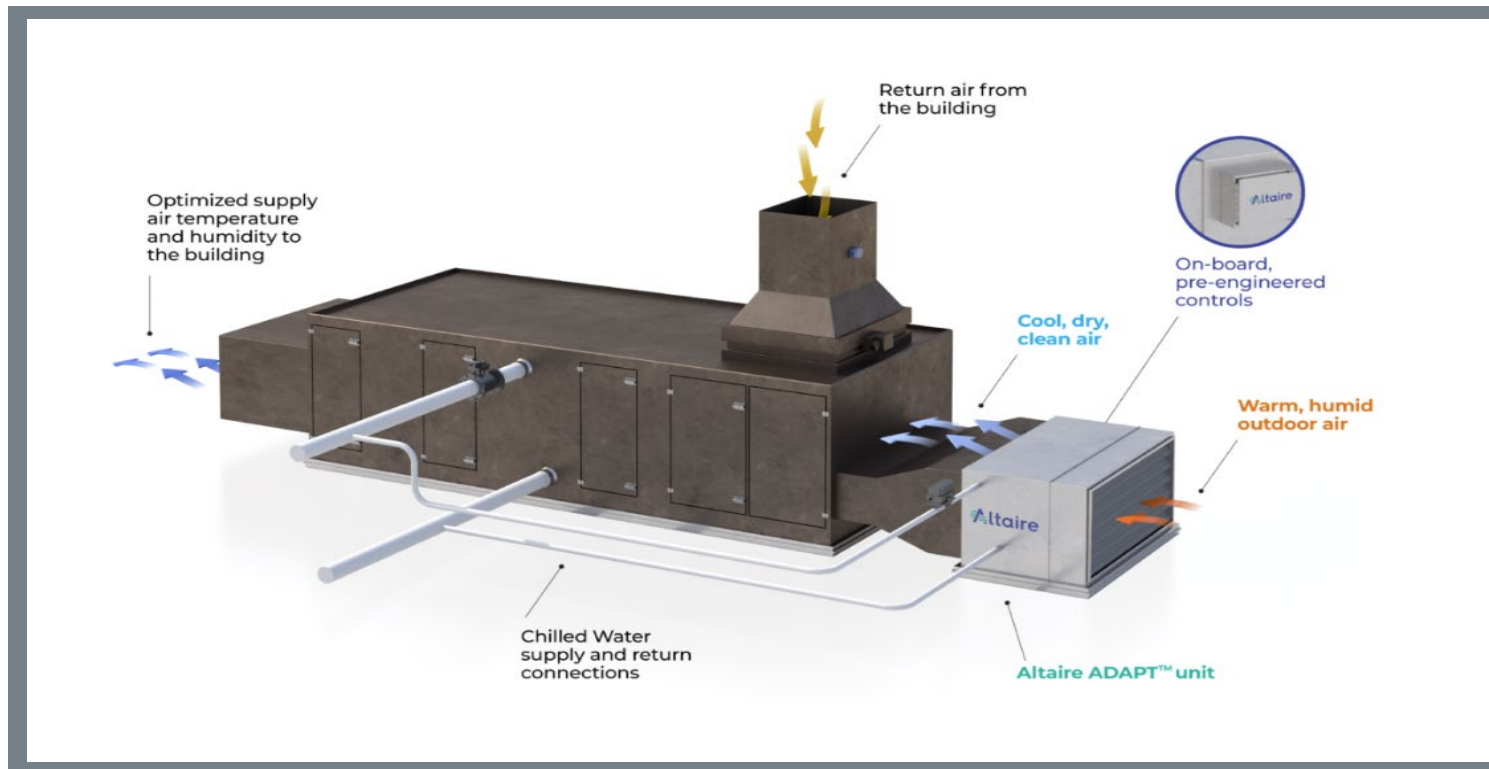
(P) = Preferred

HVAC Pretreatment Dehumidification by Altaire (Ellisville, MO) w/ Academy Energy Group (Newburgh, IN)

Controls the building's humidity level through pretreating the outside air before it enters the HVAC system. Decoupling humidity control from heating and cooling enables improved indoor air quality management while reducing energy consumption.

Ideal Test-Site Building Characteristics

High humidity climate and potentially stringent humidity criteria.



Key Site Criteria

- (R) Facility with chilled water-based cooling.
- (R) The Altaire system comes in 2500, 5000, and 10,000 CFM outdoor air nominal capacities, so the facility's AHUs must have outside air flow rates in these ranges.
- (R) A location in a hot/humid climate is desired. Deep south or island states (i.e., FL, GA, LA, MS, AL, TX, GA, SC, HI, PR).
- (P) a building with high energy use intensity and relative humidity (RH) comfort issues

(R) = Required

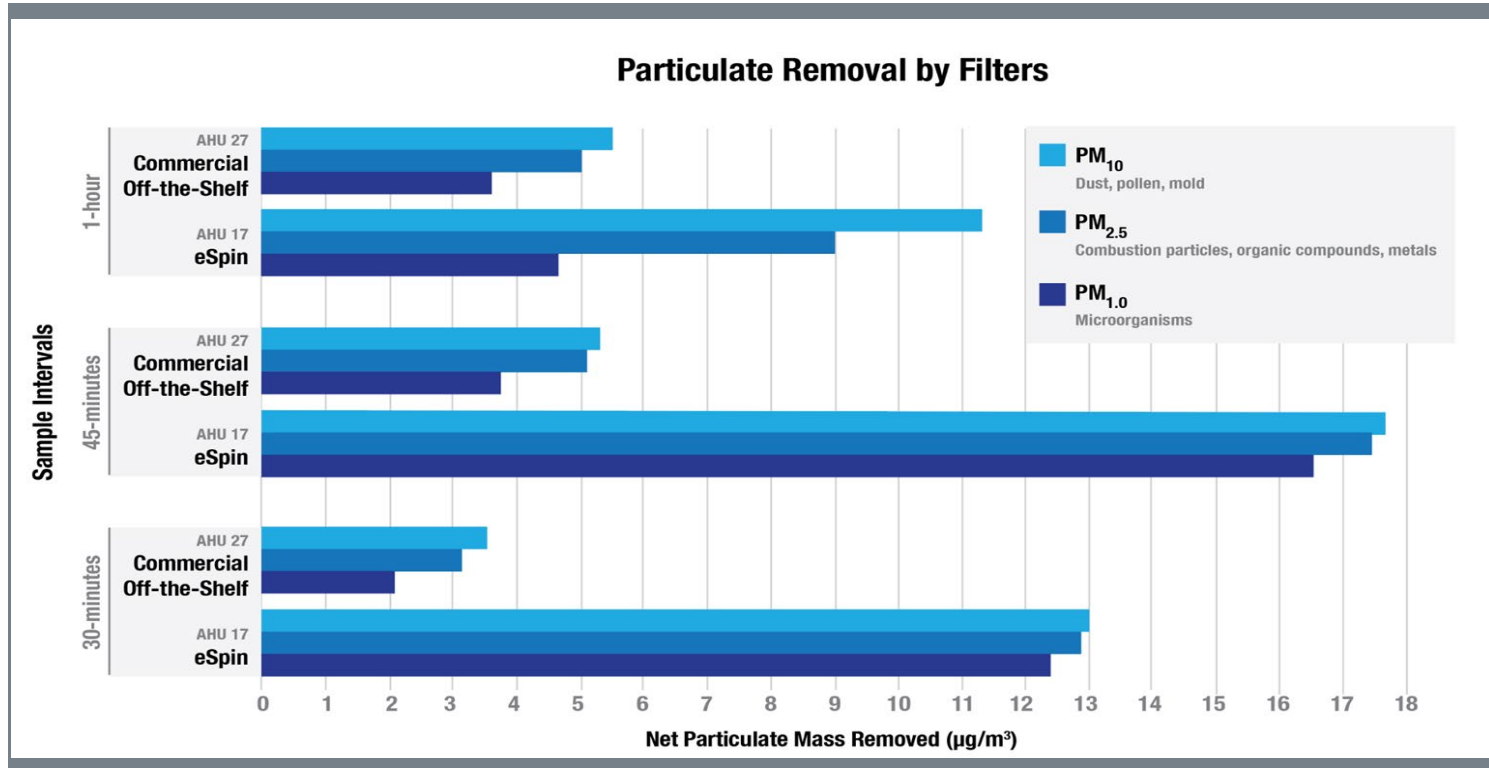
(P) = Preferred

Nanofiber Air Filter by eSpin (Chattanooga, TN)

High-capacity HVAC filters use nanofiber media to improve filtration effectiveness while simultaneously improving energy efficiency by lowering airflow restriction.

Ideal Test-Site Building Characteristics

Healthcare facility or building with high outdoor air requirements



Key Site Criteria

- (R) Centralized forced air HVAC.
- (R) Filter change criteria based on pressure drop.
- (P) Healthcare facility or building with similar high outdoor air requirements and 24/7 operation.
- (P) Region with high particulate matter (PM_{2.5} and/or PM₁₀) during regular operating hours. Regions with urban, agricultural or wildfire air pollutants would satisfy this.

(R) = Required

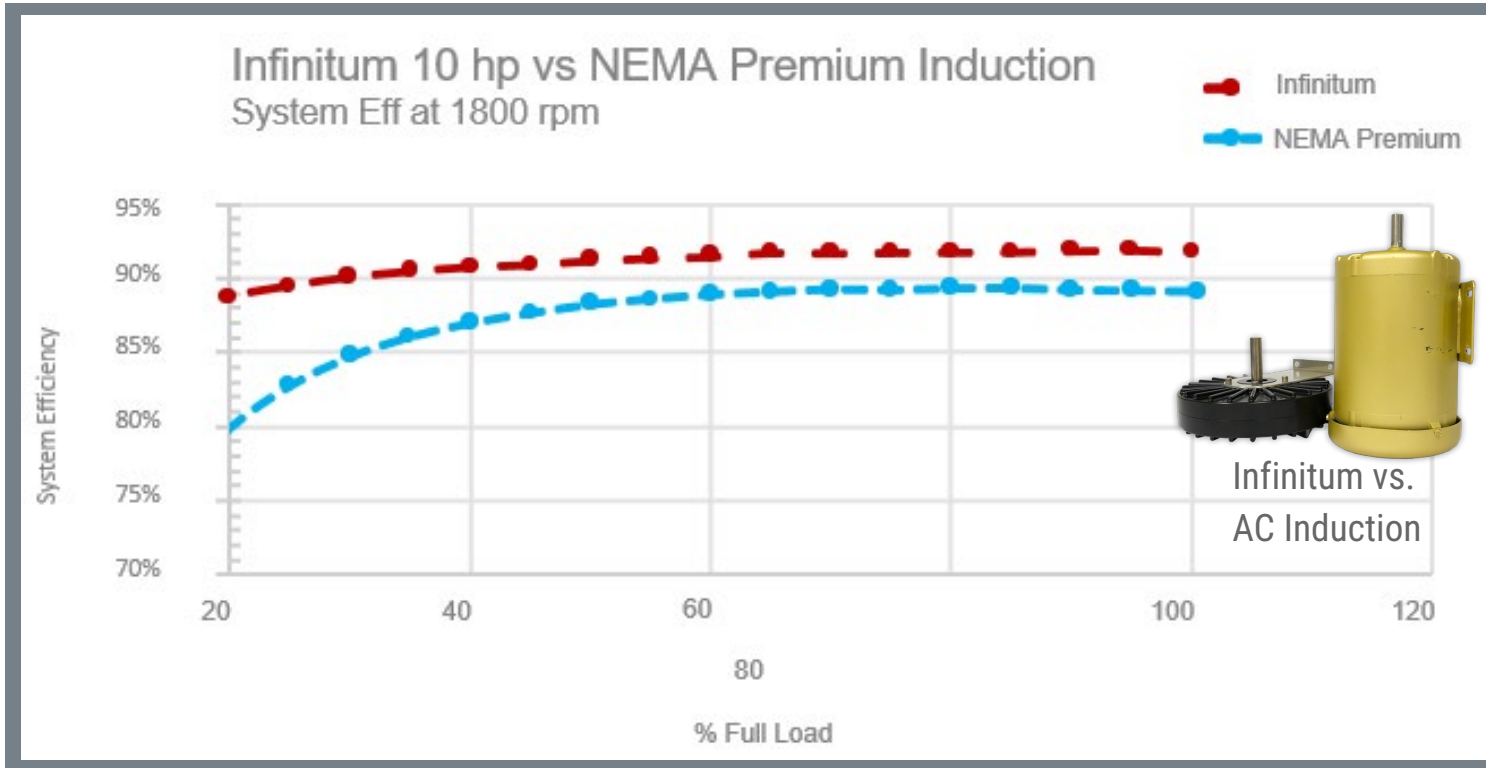
(P) = Preferred

Coreless Axial Flux Motor by Infinitem (Round Rock, TX)

Replaces copper wire and laminated iron core found in conventional motors with a printed circuit board stator making the motor smaller, lighter and more efficient. Combined with a programmable variable frequency drive (VFD) and a controller for real time monitoring and cloud-based connectivity.

Ideal Test-Site Building Characteristics

Motors that frequently run at partial load.



Key Site Criteria

- (R) 1,800-2,400 rpm, 7.5-10 hp, 460Vac 3 phase, Maximum ambient temperature 40C, Nothing above IP54 rated enclosure. Motor is not rated for outside or for direct exposure to water (rain or emersion)
- (P) A facility with a fan array or interested in a switch to a fan array from a single fan assembly

(R) =Required

(P) = Preferred

Snap-on Window Insulation Panels by WexEnergy (Rochester, NY)

Windows are commonly one of the most poorly insulated aspects of a building's envelope. This secondary glazing increased the insulation value of windows while resulting in minimal change in appearance, full transparency, and maintaining operability of the window. Simple and low-cost installation also make these an attractive alternative.

Ideal Test-Site Building Characteristics

Multi-family Housing or Commercial Buildings where maintaining operable windows is critical.



Key Site Criteria

- (R) office building (15,000 to 25,000 sq. ft or smaller)
- (R) Window to wall ratio 30-70%
- (R) Windows with glass pane(s) sized smaller than 4 ft x 6 ft
- (R) Single-pane or single-pane with exterior storms
- (R) Windows with no tint film or insulating film already applied
- (R) Cold climates, locations in IECC climate zone 5-8. GSA Regions 1,2,11,5,6,8, and selected locations of regions 9 and 10.

(R) = Required

(P) = Preferred

Demonstration Objectives

Validate Performance and Deployment Potential

Technical Examples

- Verify energy reduction, associated utility cost savings, peak demand reductions
- Verify occupant satisfaction impacts

Market Adoption

- Investigate applicability to different building types, sizes and end use systems
- Evaluate maintenance, operability benefits to operations/management staff
- Verify the cost-effectiveness

Host Site Role vs Lab Role

Site Role

- Work with Lab team and technology provider to provide information needed for site evaluation
- Procure technology and host demonstration
- Provide information for measurement & verification (M&V) scope development and during M&V process

Lab Role

- Evaluate candidate sites, recruit and select site
- Develop M&V Scope
- Conduct rigorous M&V
- Develop final report and case study

Next Steps

If you are interested in hosting the technology validation in your facilities, or would just like to learn more, please contact the DOE team:

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