



# DOE High Impact Technology Catalyst Tech Validation Site Selection

Commercial Buildings Initiative  
Building Technologies Office



# Green Proving Ground (GPG)

## DOE & GSA Partnership

- Annual RFI seeking technologies with far-reaching benefits.
  - FY21 solicitation focus was **Healthy Efficient Buildings**
- Field Validation of Pre-Commercial and Early Commercial Technologies with broad potential to commercial buildings.
  - Target two validations; in GSA owned building and private sector commercial building.
- Independent validations produce case studies of real-world performance of the technologies.
  - National Laboratories lead M&V Validation and produce Case Study of findings.

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# FY 2021 GPG & High Impact Technologies (HIT) Program

## DOE Technology Field Validation

- **What:** An annual call 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:** 3<sup>rd</sup> 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 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

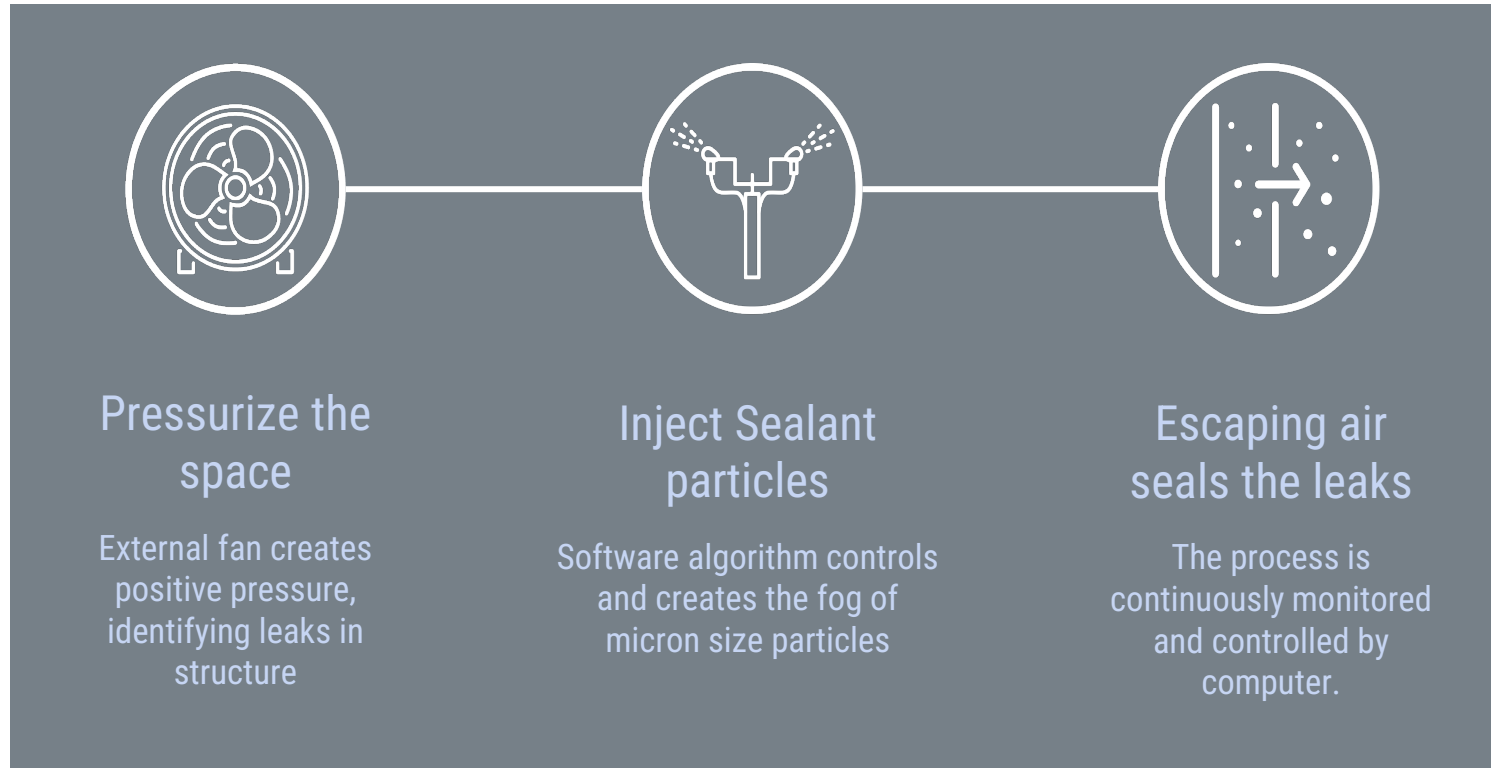
- **Required**
  - Engaged and interested building management
- **Preferred**
  - Historical data related to the technology
  - Availability of current building drawings
  - Supportive and knowledgeable O&M

# 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

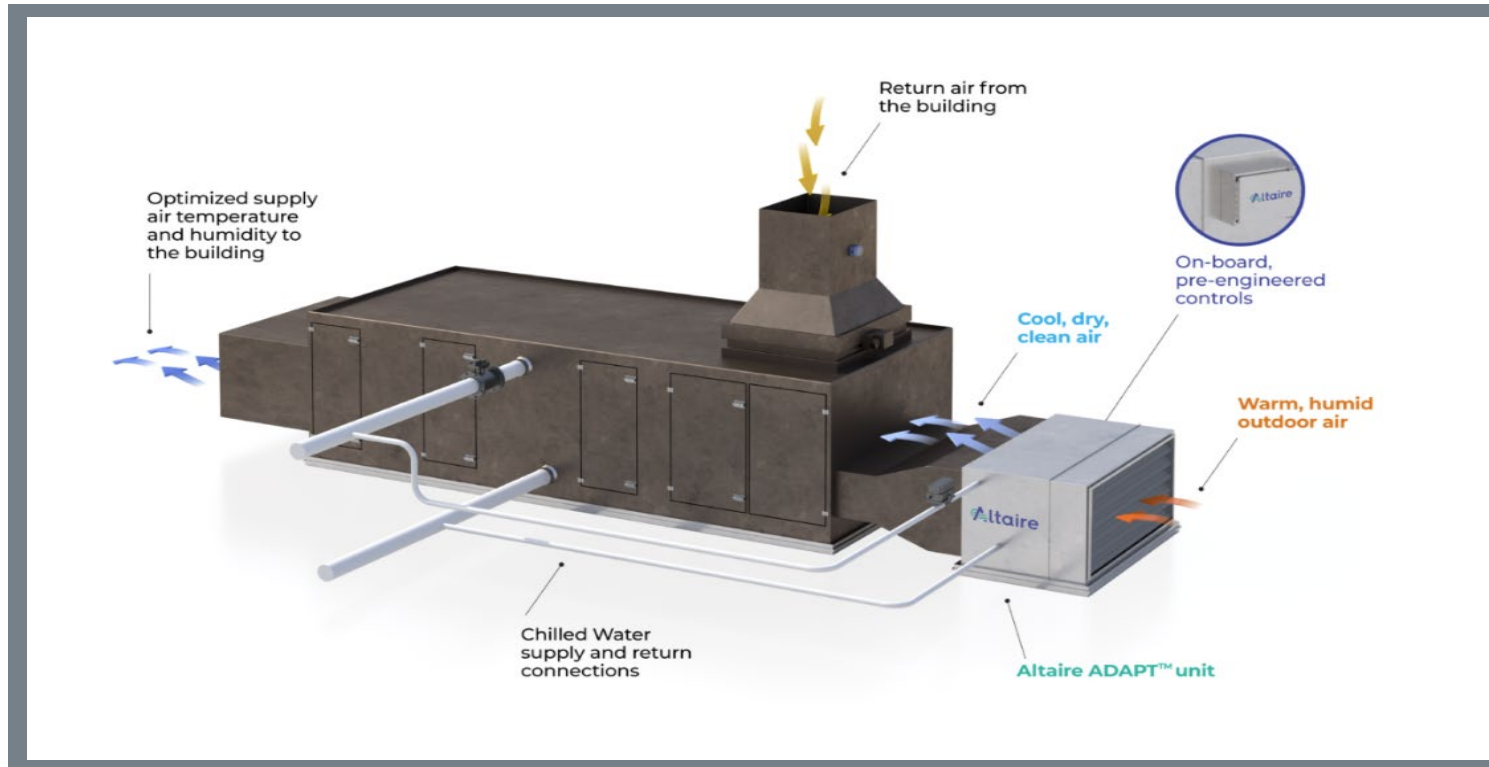


# HVAC Pretreatment Dehumidification by Altaire (Ellisville, MO) w/ Academy Energy Group (Newburgh, IN)

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

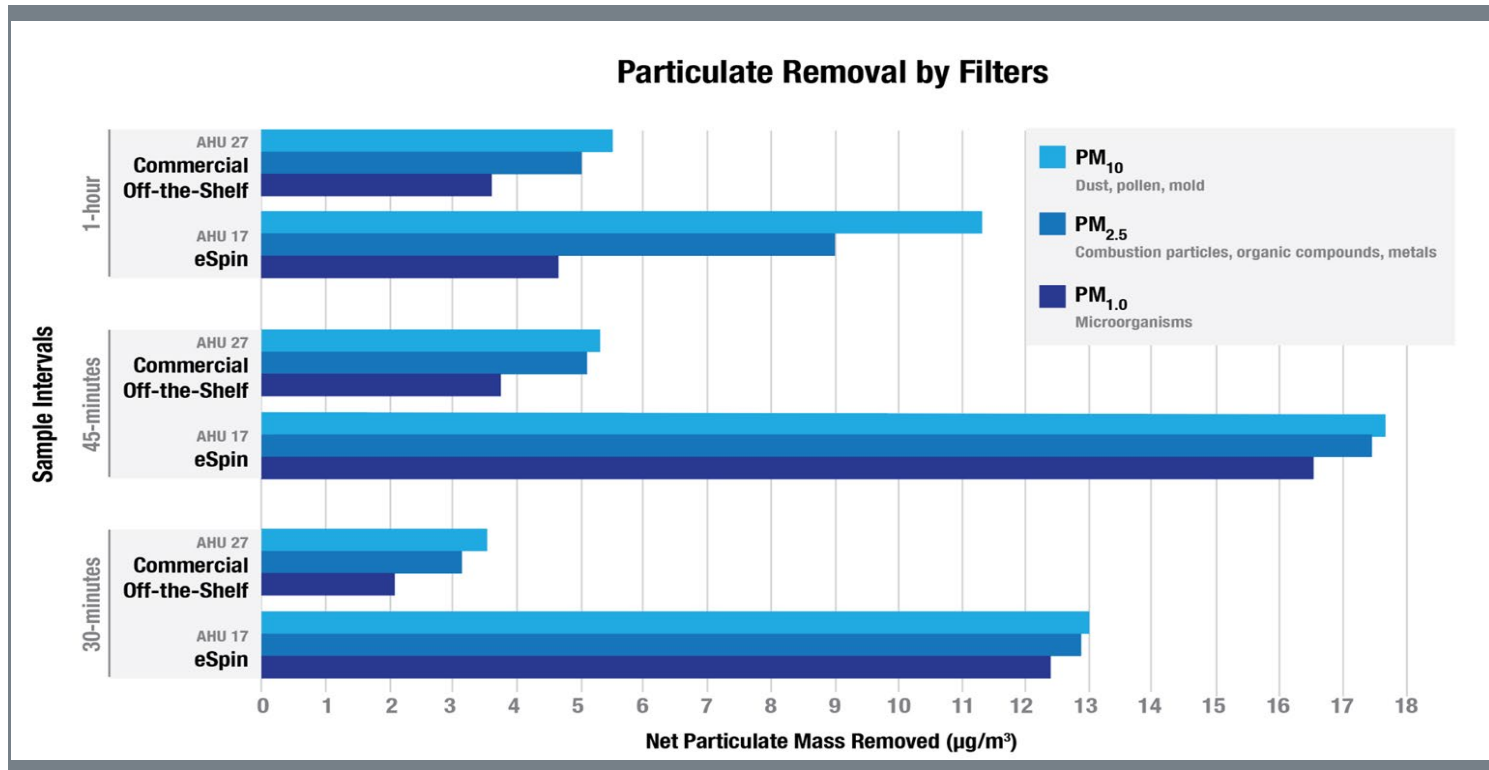


# Nanofiber Air Filter by eSpin (Chattanooga, TN)

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<sub>2.5</sub> and/or PM<sub>10</sub>) during regular operating hours. Regions with urban, agricultural or wildfire air pollutants would satisfy this.

(R) = Required

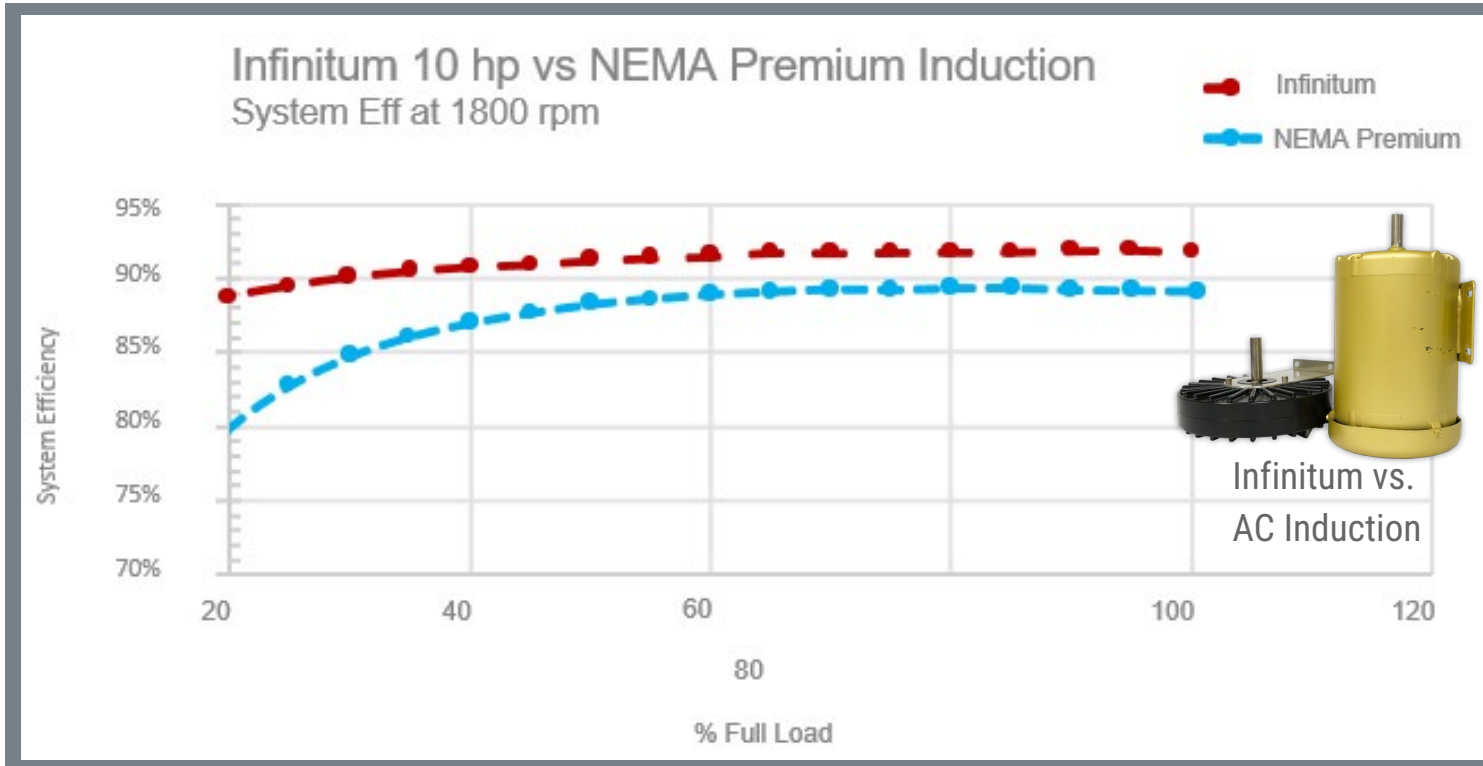
(P) = Preferred

# 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

# FY 2022 Green Proving Ground RFI

## Technologies for Net-Zero Carbon Buildings

This Year's RFI is seeking technologies that help reduce greenhouse gas emissions from commercial buildings.

- **High-Performance/Low-Carbon Building Technologies and Solutions.**

- Electrification of major loads, including large-scale heat pump systems.
- Retrofit heat recovery systems
- Innovative building envelope retrofit solutions

- **Onsite Energy Generation and Storage Systems.**

- High-efficiency and Building-integrated photovoltaics (PV)
- Solutions to better integrate PV and energy storage into building management systems
- Solar thermal and geothermal
- On-site distributed wind, and hydrogen fuel cells

- **Greenhouse Gas or Carbon Reduction Technologies.**

- On-site carbon capture for fuel-fired processes
- Technologies that use next-generation refrigerants with low or no global warming potential

## 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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Green Proving Ground Program

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