



# Energy Labs™ Custom Air Handling Units

Engineered to exceed  
customer demands



# Energy Labs™ Custom Air Handling Units

## A Leader in Custom HVAC Solutions

### Customer Focused Solutions

The Energy Labs™ custom air handling units are the result of decades of experience in design and manufacturing:

- Skilled Engineers aid customers in the complex design process
- Vertically integrated manufacturing capability provides unparalleled flexibility

Regardless of the application, Energy Labs has a long-lasting, energy-efficient solution to fulfill a project's air handling needs.

### Design Flexibility

Energy Labs' consistent focus has been to meet and exceed the expectations of customers.

- Utilizing advanced engineering tools to design innovative, efficient, and high-quality products,
- Manufacture solutions to a high-quality standard.

Energy Labs offers a wide variety of custom components that can be configured to meet any air handling system requirement.

Component options can be found at the below link: <https://www.vertiv.com/en-us/solutions/commercial-industrial-cooling-solutions/internal-components-and-options/>

### Industries Served

With many years of experience, Energy Labs has provided quality systems and been an integral part to some of the most prestigious and diverse commercial and industrial projects. During this time, Energy labs has served a very diverse client base including:

- Hospitals and Healthcare
- Education
- Telecommunications
- Research laboratories
- Manufacturing
- Clean Rooms
- Commercial Facilities
- Pharmaceutical Labs
- Convention Centers
- Theaters
- Office Buildings
- Government & Military facilities
- Food Processing
- Correctional Facilities
- Hotels



Energy Labs™ custom air handling units are ETL listed.

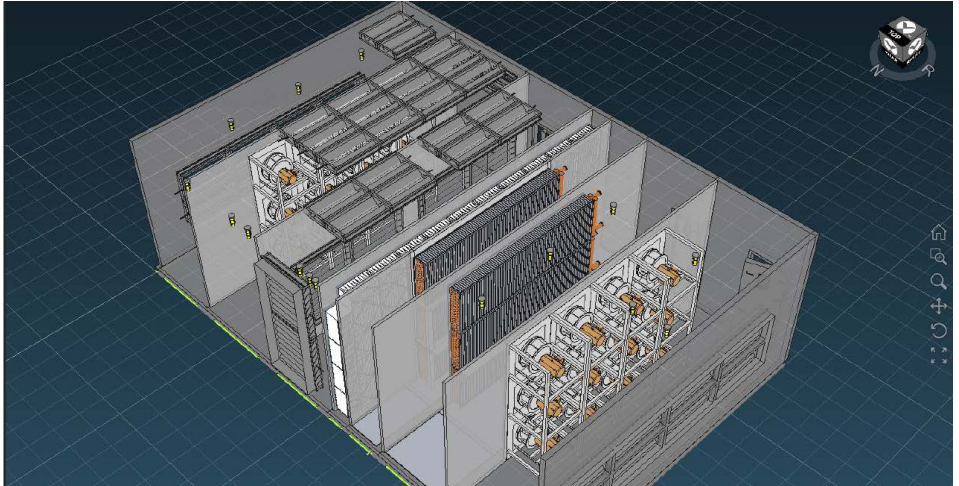


## Energy Labs Design, Analysis and Test

### Vertiv™ Thermal Designer

The Vertiv™ Thermal Designer configuration software is available to all Energy Labs Sales Representatives. Providing the ability to generate detailed system designs and budget pricing for most unit configurations, remotely or from the office. The software allows interactive, real-time evaluation between the Systems Application Engineer and the Sales Representative, providing optimum selections while saving valuable time.

Critical design and pricing information provided by the software allows real-time analysis:



- 3D System Design Environment
  - Ongoing visual equipment design evaluation to verify selected features
  - Built-in guidelines accelerate selection of coils, fans & other components
  - These guidelines work in the background to help avoid design errors
- Unit Physical Details
  - Ready review to satisfy critical space and access limitations
  - Weight limitations and possible use of alternate, weight saving materials
  - AutoCAD drawings for incorporation into design documents
- Technical Details
  - Review key electrical data
  - Review alternate fan selections to best match design goals
  - Review alternate coil selections to best match overall performance goals
- Pricing Details
  - Review budget pricing
  - Review alternate component options to evaluate cost/benefit relationship

### Engineering Analysis

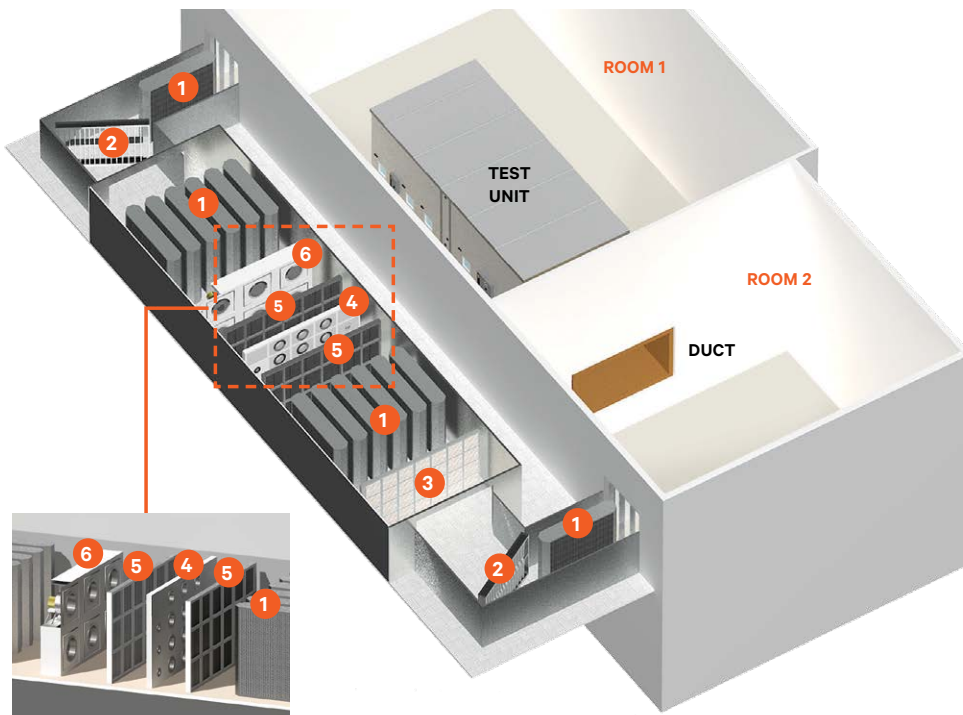
Energy Labs provides a variety of engineering services to support customer's design efforts. Examples of services include, but are not limited to:

- Unit Design/Layout
  - CAD and parametric modeling
- Structural Analysis
  - Professional Fundamental Element Analysis (FEA) software
  - Structural design in accordance with ASCE 7-10
  - Testing in accordance with ICC-ES AC156
- Air Flow and Thermal Analysis
  - High performance Computational Fluid Dynamics (CFD) modeling software
  - Air flow testing to ANSI/AMCA Standard 210
- Sound Measurement
  - Testing to ANSI/AMCA Standard 300



# Energy Labs™ Custom Air Handling Units

## Energy Labs™ Factory Test Lab



Flow Station - Close Up

**Energy Labs**, a Vertiv Company, is one of a select few manufacturers with its own state of the art testing facility. This facility, built in 2011, offers simultaneous measurement of airflow, static pressure, power consumption, and inlet and outlet sound power levels, in compliance with AMCA 210 and 300 standards.

### Components of Flow Station

- 1 Sound Traps
- 2 Air Bender
- 3 Filters
- 4 Nozzle Wall
- 5 Settling Walls
- 6 Makeup Fans

## Factory Airflow, Sound and Power Measurement

Energy Labs is capable of precise flow measurement at the specified project static pressure, enabling accurate sound test measurements for air handling units. Energy Labs' testing facility is capable of:

- Testing air handling units, up to 75,000 CFM, with calibrated and certified flow stations
  - Variable speed make-up fans allow balancing to any pressure from 0 to 10"
  - High Accuracy barometric, temperature and pressure instrumentation in accordance with AMCA 210 and 300 requirements
  - Power Analyzers for accurate power and harmonic data measurements
  - One of the largest dual reverberant chambers (82,750 / 45,850 ft<sup>3</sup>) in the business that allows simultaneous measurements of supply and return sound levels of large air handling units.

### AMCA 210 Airflow Testing

Even certified fans don't always meet performance ratings once installed in an AHU. Space limitations and unique flow path geometries do not replicate the ideal flow patterns that exist in a fan certification test, resulting in altered performance. To ensure that the system will perform exactly as specified, the manufacturer must have accurate and accredited factory testing capability during design, development, and validation of performance after manufacturing is completed.

### Leakage and Deflection Testing

All Energy Labs™ air handling systems can be factory tested to verify air leakage performance by using one of three calibrated leak testing stations. These stations measure leakage to SMACNA performance levels.

Minimizing Leakage is important:

- Air leakage decreases unit efficiency and increases operational costs.
- Can cause condensation formation at the leak site increasing unit casing corrosion and water puddling

## Quality Construction

Energy Labs™ engineers and manufactures air handling units for long life durability, energy efficient operation and maximized uptime. Each unit features high quality critical components, with make, buy or customer supplied options available to suit the project requirements.

This supply and design flexibility allows Energy labs to maintain the highest level of quality and design flexibility, while providing the benefits of true single-source responsibility to customers.

### Base Frame

Unit base frame designed for optimal strength and rigidity to reduce unit deflection during handling, installation and operation. The design includes cross-members at critical junctions to support internal components such as fans and coils or meet site seismic requirements.

- **Design**

- Welded
- Bolted

- **Material**

- Carbon Steel
- Stainless Steel
- Aluminium

- **Finish**

- Painted
- Not Painted



### Unit Floor Construction

Fully welded, leak proof floors are selectable options, with polyurethane spray foam insulation and constructed to provide a safe and robust working area inside the unit. Condensation pans and floor drains are optional to remove standing water from air path.

Available material options include:

- **Floor Material**

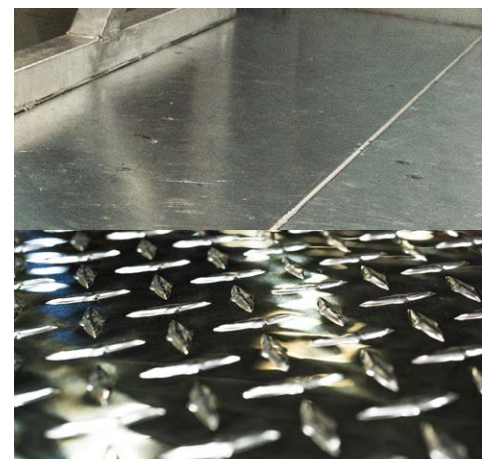
- Painted Steel
- Stainless Steel
- Bright Galv. Steel
- Aluminum

- **Anti-Slip Surface**

- Tread Plate
- Paint

- **Underliner**

- Galv. Steel
- Stainless Steel
- Aluminum



*Bright Galv. Or stainless tread plate*

# Energy Labs™ Custom Air Handling Units

## Cabinet Construction

Energy Labs has developed an extensive cabinet construction offering, options include:

- **Insulation**
  - Foam
  - Fiberglass
  - Mineral Wool
- **Material**
  - Painted Steel
  - Stainless Steel
  - Aluminum
- **Options**
  - Thermal Break
  - Moisture Resistance

Cabinets are designed to meet a wide array of project specific requirements:

- High seismic levels or unique structural requirements
- Thermal and flow efficiency (EER)
- Indoor or outdoor installation
  - Corrosive ambient conditions
- Architectural and color requirements
- Pressure and leakage as defined by SMACNA



## Roof Construction

Roof designs for both Outdoor and Indoor applications.

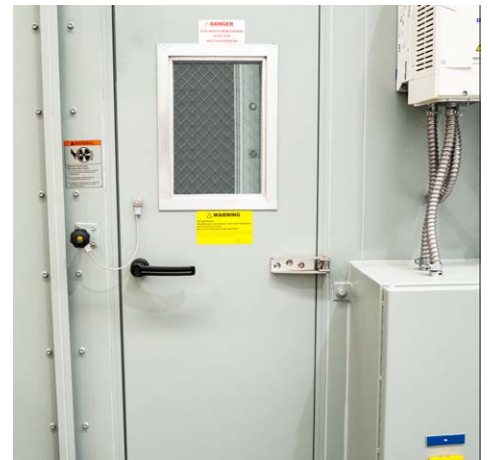
- **Outdoor Installation:**
  - All roof panels feature a bolted standing seam construction to ensure a leak-tight assembly
  - Drive cleats cover all roof panel seams
  - Roofs are sloped to ensure proper water drainage
- **Indoor Installation:**
  - All roof panels are manufactured and assembled to promote a low-profile construction
  - Seams are bolted and caulked to promote a low leak design



## Door Construction

Access doors are double-wall construction, matching the exterior and interior construction materials and insulation thickness used in the section. Access doors include:

- **Door Mounting:**
  - Mounted in a rugged extruded aluminum frame
  - Heavy-duty hinges with corrosion resistant hardware
- **Insulation:**
  - Foam, Fiberglass, or Mineral Wool
- **Options**
  - Thermal break doors and frames
  - View Windows
  - Lockable Handles
  - Test Ports
  - Fan safety interlock

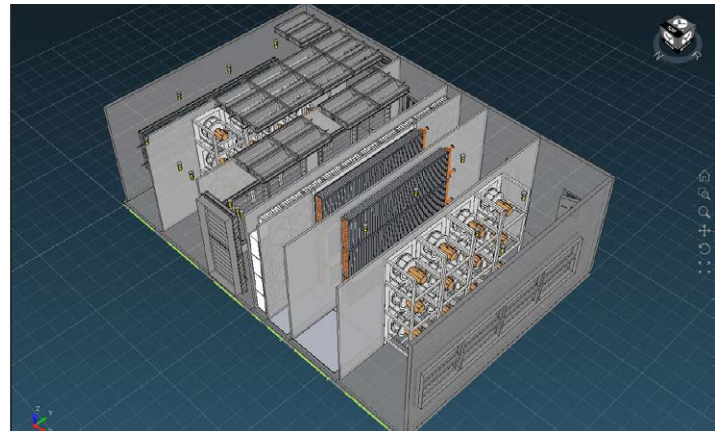


## Energy Labs™ Air Handling System Solutions

### Direct Evaporative Cooling

Make up or intake fans force air across an evaporative media, allowing evaporation to occur, resulting in a cooler temperature and increased humidity for the supply air. This enables customers to achieve the full cooling and humidification benefits of water evaporation for the cooled space. Benefits of this solution are:

- 100% of evaporative cooling effect felt by room being cooled
- Promotes good air quality by using fresh make up air
- Up to 100% outside air supply
- Quality evaporative media
- Double sloped drain pans



### Chilled Water Cooling

Offers customers a simple and versatile cooling option where water consumption or ambient conditions limit the use of evaporative technologies. Unit piping and coil design can be customized to accommodate the exact air handler design requirements as specified. Benefits of this solution are:

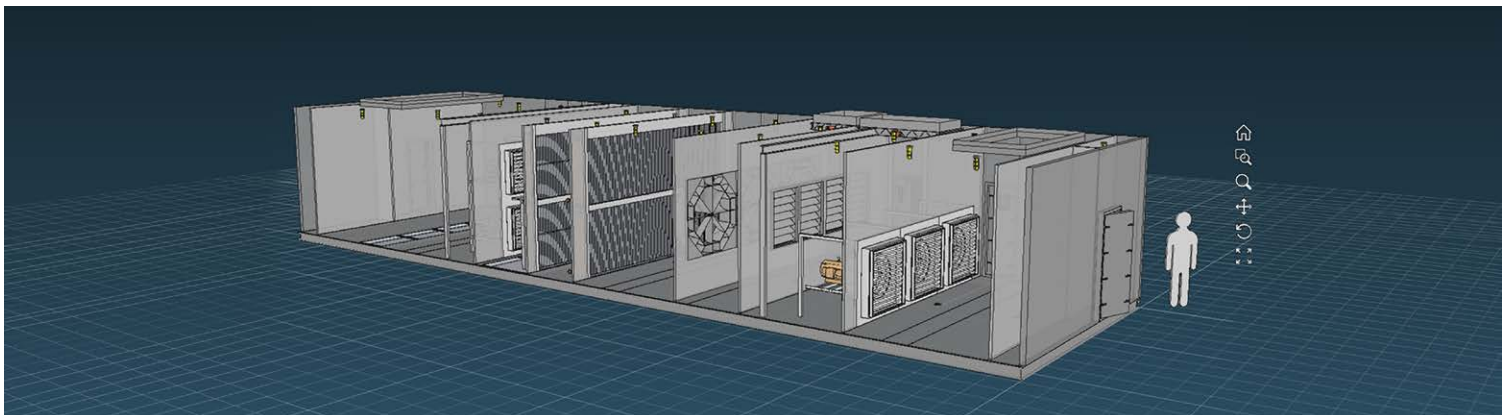
- Heat exchanger coils customized for application requirements
- Air cooling and heating applications
- Minimal water consumption during operation
- Cooling, regardless of ambient relative humidity
- Discharge air humidity control

### DX Evaporator Coils

Customizable coil design that is tailored to meet job requirements by offering:

- Flexible row and fin spacing
- Special fin material (copper or coated)
- Varied refrigerants, based on tube size

The DX coil can be shipped loose, or installed into an air handling package, which would integrate with a customer supplied condenser package in the field.



Contact your Energy Labs sales representative and request information on the industries largest line of Evaporative Cooling Products from the leader in Evaporative Cooling since 1979.

# Energy Labs™ Custom Air Handling Units

## Energy Labs™ Fan Systems

### Energy Labs™ Optiline™ HE Fan Systems

Energy Labs Optiline™ HE fans feature a fully welded aluminum airfoil blade design for efficient and quiet operation, available in a single or multiple fan configuration. Multiple fan configurations are frequently the best choice as they offer many valuable system benefits, including:

- Optimum Energy Efficiency
- System Redundancy & Reduced Service Downtime
- Improved Acoustical Performance
- Reduced Unit Footprint



#### Spring Isolators

Spring isolators with seismic restraints are mounted on all Energy Labs Optiline HE Fan Systems, capable of satisfying OSHPD and IBC requirements (others can be reviewed).

#### High Efficiency Fan Wheel

All Energy Labs Optiline HE Fans include a fully welded fan wheel, that is designed, built and paired with a motor to match the project ambient and airflow requirements.

#### Flow Trac

The Energy Labs™ Flow Trac™ system measures air flow rate. Using the fan inlet cone as a calibrated nozzle assures the airflow and sound levels are not affected by obstructions in the flow path.

### Fan Balancing

- **Primary Balance**
  - Dynamic rotor balance
  - Balancing weights welded in place
- **Final Trim Balance**
  - Balance motor and wheel assembly to BV-4; 0.15 in/sec or better (flexibly mounted)
    - Procedure in accordance with AMCA Standard 204

## Internal Components and Options

### Heaters

Wide variety of heating solutions to meet customer's requirements. Offerings include:

- Steam coils
- Hot water coils
- Indirect Fired Gas Heat
- Integral face and bypass dampers
- Other solutions can be provided with support of a Systems Applications Engineers

### Humidifiers

Steam injection manifolds can be provided to meet humidification requirements.

Each section is supplied with factory installed distribution grids and stainless-steel drain pans to ensure safe operation and quality air flow.



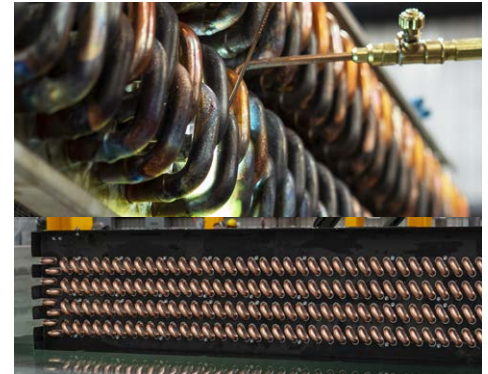
## Coils

Offer, design, and manufacture a robust line of coil solutions.

- Chilled Water, DX, Hot Water or Steam Coils

Coils built using the following materials:

- Copper tubes of various diameter and gauge, with fins made of
- Aluminum or Copper material (ElectroFin Coating Available)
- Brazed or bent return bends options available, based on tube thickness
- Stainless steel casing standard on all cooling coils
- Coils >48" tall include a unique drain pan design built into fin pack



## Energy Labs™ IAQ Options

Modern buildings require ventilation rates to comply with ASHRAE Standard 621 as well as Good Indoor Air Quality (IAQ). Poor IAQ has been directly associated with “sick-building syndrome”, which can result in high illness rates, absenteeism, reduced productivity, and employee turnover.

### IAQ Condensate Drain Pans



All units are supplied with drain pans that promote gravity induced condensate removal. All drain pan designs include:

- Double-sloped design to prevent standing water
- Pans completely cover the coil plenum section width
- Pans are insulated with spray foam
- Fully tig welded construction
- Stainless steel drain connections and piping
- Available in threaded NPT connections

### Surface/Airflow Sterilization



A flexible and effective offering for surface and airflow sterilization.

- Surface Sterilization
  - UVC irradiation provides low intensity, full-time irradiation of the coil and drain pan surfaces
  - Proven effective as a low energy demand, disinfectant for surfaces
- Airflow Sterilization
  - Solutions, such as bipolar ionization, can be reviewed and supplied
  - Work with a Systems Applications Engineer for more details and design support

### Filters



Filter options to meet project requirements, including:

- Panel filters
- HEPA filters
- Carbon filters
- Electronic filters
- Roll filters
- Bag filters

All filters and filter frames are selected and designed to allow for service access.

# Energy Labs™ Custom Air Handling Units

## Energy Labs™ Electrical Component Options

### Factory Installed Controls



The Vertiv™ iCOM™ 3 control system platform is offered as a standard. Requests to integrate other Building Automation System supplier's controls systems can be reviewed. Most, if not all, controls components are factory installed and tested, which reduces commissioning time and cost:

- Control device | Sensors | Actuators | Flow Dampers | Etc
  - Most, if not all, wiring is pre-routed in conduit/trough per Energy Labs standards
- Point-to-point wiring diagrams provided with unit drawings
- All penetrations are made and sealed in the factory

### Fan Speed Controls



Fan speed control offers the most efficient method of varying air volumetric flow. The ability to control fan motor speed allows customers to optimize the design while maximizing energy savings through dynamic cooling loads. Options include:

- Variable Frequency Drives for Non-EC fan arrangements
  - Single drive per fan motor
  - Single drive per fan array (multiple fans)
- EC fan arrangement
  - Fan/motor arrangements are supplied with an integral speed control device

### Single-Source Power Panel



To simplify the installation and improve quality of the electrical supply, single-source power panels are included as a standard. This allows field connections to be minimized to a single power connection, reducing site wiring, and testing efforts.

#### Features:

- Disconnect switches
- Fuses and relays
- Starters
- Transformers
- H-O-A Switches
- Pilot Lights

#### Ratings:

- NEMA 1 | 3R | 12

#### Listings:

- UL 508A

## Energy Labs™ Airflow and Sound Control Options

### Dampers and Louvers



High performing low leak dampers and outside air louvers are available as needed. The low leak dampers and air louvers are designed in accordance with AMCA 511 and rated for pressure drop, leakage, and water penetration.

#### Airfoil design includes

- Aluminum airfoil to minimize pressure drop
- Minimizes noise levels by reducing air movement friction across the blades

#### Low leak design features

- Neoprene blade seals
- Stainless steel side seal
- Overlapping blade edge for secure shut off, preventing damper over travel

#### Construction

- Galvanized steel frames
- Robust linkage systems

#### Options

- Factory mounted actuators
- Locking quadrants

## Sounds Traps

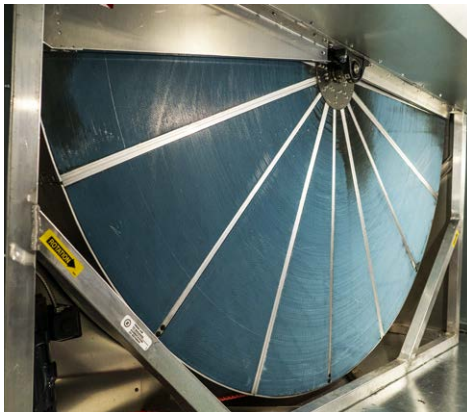


Sound traps can be designed for any application with noise restrictions. Available sound traps include:

- Low Frequency traps
- Convention sound traps
- Sound traps with Mylar film covering the fill
- Packless sound traps, for applications where fiber airstream contamination is a concern

## Energy Labs™ Energy Recovery Options

### Energy Recovery



Modern buildings require ventilation rates to comply with ASHRAE Standard 621 as well as Good Indoor Air Quality (IAQ) to keep occupants happy and healthy.

- Poor IAQ has been directly associated with “sick-building syndrome”, which can result in high illness rates, absenteeism, reduced productivity, and employee turnover.

The challenge with Energy Recovery is balancing the efficiency gains with the energy consumption. To aid with this selection, Energy Labs experienced applications engineers can help customers select one of the AHRI listed energy recovery systems to ensure customers get the performance required. Energy Labs offers the following AHRI listed energy recovery solutions

- Evaporative cooling
- Energy recovery coil loops
- Heat pipes
- Energy recovery heat exchangers
- Energy recovery wheels





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