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Using Air-to-Air Energy Recovery for
Industrial Process and Energy Optimization
to Comply with 90.1 and Score with LEED

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Advantages of Indirect Evaporative Cooling Used with Air-to-Air Energy Recovery

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Building Performance Equipment

- Standard ERV (Energy Recovery Ventilators) 200 CFM to 10,000 CFM
- Custom ERU and ERV (Energy Recovery Units and Ventilators) to 75,000 CFM.
 - Can engineer larger units on an engineered system basis.
 - TAC Americas Integrated Controls and factory pre-wired and tested.

Imagine if



- If a refrigerant could be used, that did not have to be saved or recovered.
- If a single expansion cycle could be used with a refrigerant, so that there would be no need to compress the refrigerant or reject heat.

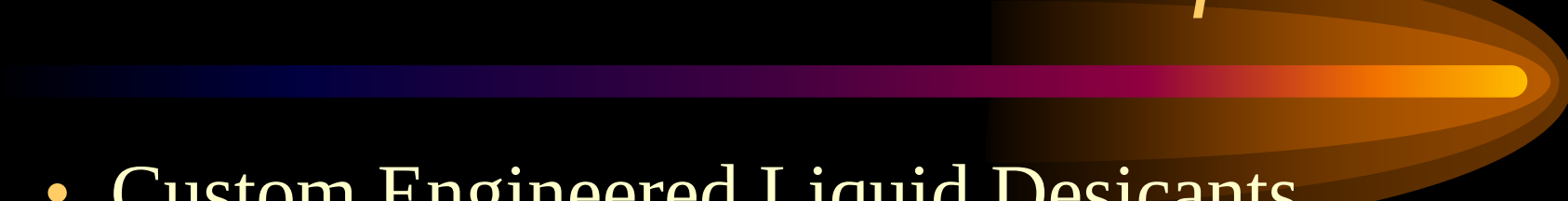
How Optional IEC works with other Heat Exchanger Modes
IEC is Indirect Evaporative Cooling

- Cooling Mode with Evaporative Cooling.
 - Can greatly increase cooling capability.
- Ventilating Mode.
- Heat Recovery Mode
- Controls with TAC Americas

*Indirect Evaporative Cooling
Using Water to Cool, Without adding Moisture*

- 2000 CFM ERU can produce 41,945 Btu/hr of sensible and latent cooling with IDEC.
41,945 Btu/hr = 3.495 Tons of Cooling.
- Sensible cooling = 38,361 Btu/hr.
- Latent cooling = 3,584 Btu/hr.

BPE Active Dehumidification



- Custom Engineered Liquid Desiccants
 - Lithium Chloride Dehumidification Systems.
 - Typically over 5000 CFM.
- Desiccant Wheels
 - Extremely compact.
 - Smaller systems down to several hundred CFM.

TAC Americas Controls



- GSA Approved Controls Contractor
- Standard or Customized Control Operations
- Can Scale to 75,000 CFM systems or larger

Building Performance Equipment



- Stainless Steel
Standard Modular
Units
- Pre-Wired and tested
- Fresh Air Intake can
be ducted or Custom
Configured

Provide all Weather Energy Recovery

- Can use any mode at any time as weather demands.
- Winter: Heat Recovery with defrost cycle.
- Spring and Fall: Ventilation Mode or Free Cooling Mode.
- Summer: Standard Cooling Recovery .
 - As an option indirect evaporative cooling.

Building Performance Equipment



- Hospital 100% outdoor air applications.
- Clean Room applications.
- Industrial Ventilation
- Increase comfort and reduced operating costs.

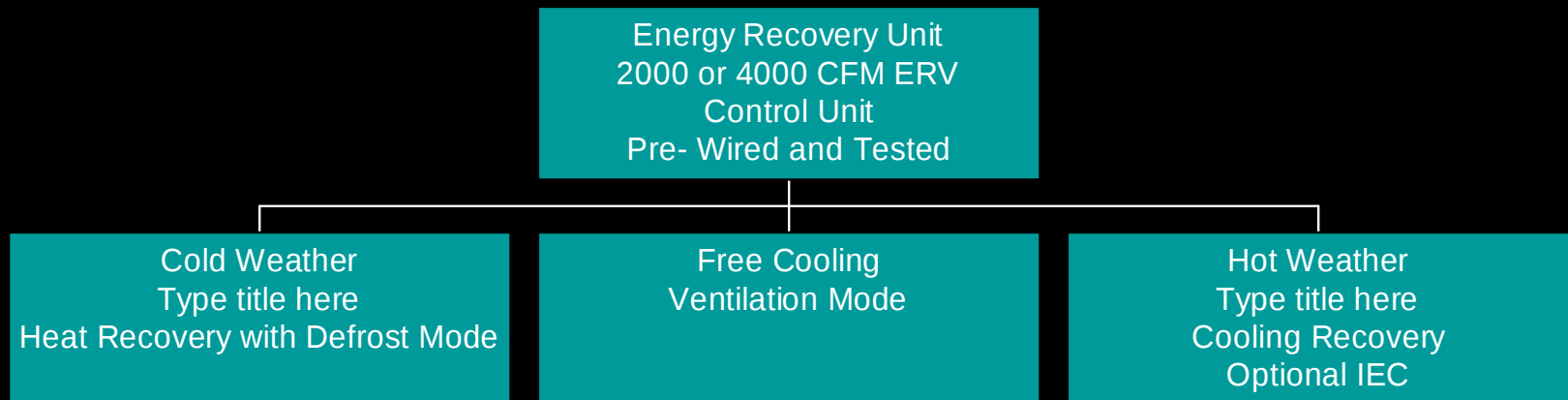
TAC Americas Controls



- Lon Compatable
- Can interface with existing BMS or Plant Mangagement Systems
- Emergency Management Mode Option
 - Wind driven make-up air control
 - Johnston Island Example

All Weather Energy Recovery

Three Modes of Heat Recovery or Ventilation



Effective Energy Recovery



- Units can provide a payback of under 3 years.
- Reduce peak demand charges.
- Reduce peak cooling and heating loads on existing equipment.

Building Performance Equipment



- Industrial energy recovery for chemical work areas for 75,000 cfm.
- Good chemical compatibility.
 - Up to %50 HCL
 - Strong bases such as Ammonia Gas
 - Salt air compatibilty

Energy Recovery Made Simple



- Typical ERV can be installed to;
 - Common Plenum Return.
 - Ducted Return.
 - Most standard rooftop units can be retrofitted.
 - Direct vent large common areas or auditoriums.
 - Conditioned make-up air for chemical fume hoods or industrial applications.

LEED Potential Impact



- Heat island temperature reduction credits.
 - Reduced outdoor roof temperature.
- Reduced demand credits.
- Overall energy savings credits.
- Improved IAQ credits.

Heat Island Credits



- ERV Unit exhaust will cool outdoor air on heat island.
- Water for plants on heat island.
- Air movement and cooling to create Heat Island Credits.

Reduced Demand or kW

- Recovering conditioned exhaust air cooling energy
- Cooling from indirect evaporative cooling;
 - Measured IEC at 0.34 kW/Ton
 - Cools outdoor areas, such as roofs, creates less cooling demand or load for a building.

Over-all Energy Savings



- Reduced run hours for conventional Heating and Cooling systems.
- Free cooling during economizer mode.
- Reduced cooling load due to IEC Mode.

Improved IAQ



- The ability to exhaust and supply outdoor air with greatly reduced cost.
- Retrofit existing buildings for IAQ and added out door air intake without increasing existing traditional mechanical heating and cooling equipment.

90.1 - 2001 Impact Meeting Energy Standards

- Improved Mechanical Equipment Efficiency.
- Freeze protect without wasting energy.
- Adding ventilation controls.

Improved Mechanical Equipment Efficiency

- Increased EER's
- Reduced Demand, as low as .34 kW/ton delivered chilled air.
- Integral economizer mode, free cooling.

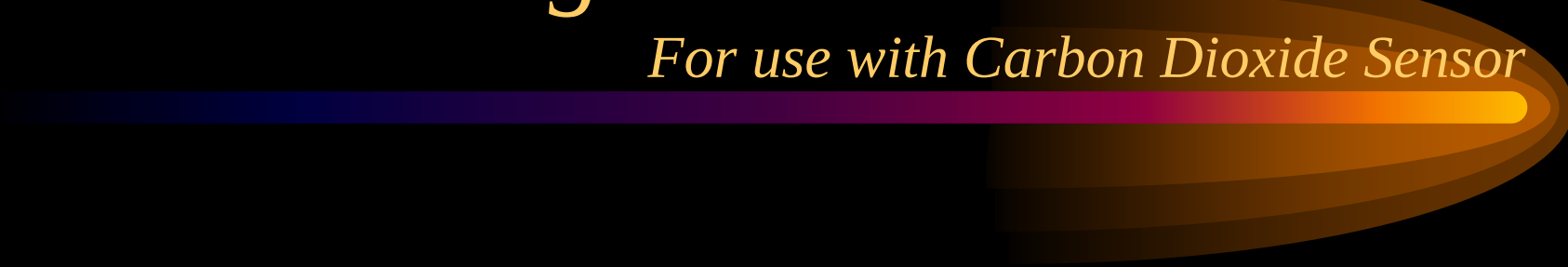
Freeze Protection

Without Wasting Energy in Very Cold Weather.

- Using fan cycling to defrost ERV core with exhaust air.
- Using moving plate to defrost ERV core with exhaust air.
- No external heat source needed.

Adding Ventilation Controls

For use with Carbon Dioxide Sensor



- Improved turn down or reduction of OA during periods of low or no occupancy.
- Power assisted ventilation for free cooling.