



SEMCO's Hybrid Active Desiccant Rooftop

Integrated Energy System in High School (SEMCO, Inc.)

Benefits of Integrated Energy Systems

Capital Cost Reduction

Pre-engineered systems can cut CHP system capital costs by 15% to 30%.

Shorter & Less Expensive Installation

IES can reduce CHP system installation time by as much as two-thirds, and provide corresponding installation cost savings.

Replicability

System designs are suitable for multiple applications in facilities around the country.

Optimize Facility Energy Use

Pre-engineered systems allow facility operators to manage power generation, cooling, and heating to optimize energy use as well as reduce electricity use during peak periods.

Simplified Systems

Peak shedding power, cooling, heating, dehumidification, and continuous ventilation provided in one package.

Versatility

Combines strengths of advanced DX cooling, desiccant dehumidification, and waste heat utilization technologies in a packaged rooftop format.

Program Contact:

Jim Sand
Oak Ridge National Laboratory
(865) 574-5819
sandjr@ornl.gov

<http://www.eere.energy.gov/de/>

Project Overview

SEMCO, Inc., of Columbia, Missouri, has teamed with C&M Engineering, Southern Engineering, and Deutz Corporation to package a 200 kilowatt reciprocating engine generator, coupled with an integrated active desiccant (IADR) system, at the new Pepperell High School, in Floyd County Georgia. This project work will encourage further widespread adoption and implementation of integrated distributed energy systems consisting of electrical generators combined with desiccant dehumidifiers regenerated by engine heat to provide power and dry air.

Benefits of an Integrated Active Desiccant Rooftop (IADR):

- Unit achieves precise performance/load sensible/latent matching with variable speed compressors and blowers, modulating regeneration control, and direct digital control (DDC) logic algorithms.
- IADR applicable as dedicated outdoor air system (DOAS) or total air conditioning system with 100% to 0% outdoor air (0% to 100% return air) handling capability.
- SEMCO hybrid system delivers independent space temperature and humidity control for any fresh air fraction ventilation rate, which constitutes ideal rooftop air conditioning performance.
- Positioning the desiccant wheel after the DX cooling coil allows dry ventilation air at cool temperatures, lower desiccant regeneration temperatures, smaller component weights and footprint, and better waste heat utilization capability.
- Cool, dry ventilation air from IADR prevents mold and mildew risk in carpets, ceiling tiles, inside furnishings, and interior space.
- Hybrid system allows integration with building exhaust air energy recovery exchangers for exceptionally efficient performance and convenient integration with waste heat recovery applications.



Objectives

- Develop an integrated CHP System to optimize performance for a variety of energy customers in the most popular air conditioning package.
- Define prototype system(s) in one of the most demanding applications.
- Demonstrate energy-saving and enhanced comfort/IAQ features.

Project Contact:

John Fischer
Director of Research and Development
SEMCO, Inc.
(770) 850-1030 • johnfischer@bellsouth.net

