



# ORNL Desiccant Program Focus

## How it fits the Plan

### Pat Hoffman's Wednesday Staff Meeting

Jim Sand

October 27, 2004

Washington, DC

# ORNL Advanced Desiccant “Systems” Program

- **Goal:** Facilitate market introduction of cost-effective, energy efficient desiccant-based dehumidification technologies into mainstream HVAC comfort conditioning systems
- **Strategic Approach - Program Plan**
  - ⇒ Market, System Configuration Assessments
  - ⇒ Enabling Technologies Development
    - IAQ benefits
    - Sensors/controls technology
    - Product rating and certification
  - ⇒ Novel/hybrid system prototype development
  - ⇒ Integration with CHP Systems

# Two Relevant Program Planning Documents for New/Novel Product Development R&D

THERMALLY ACTIVATED TECHNOLOGIES

## TECHNOLOGY ROADMAP

*Developing new ways to use thermal energy to meet the  
energy needs of homes, offices, factories, and communities*

May 2003



Office of Energy Efficiency and Renewable Energy  
U.S. Department of Energy

### Energy Consumption Characteristics of Commercial Building HVAC Systems Volume III: Energy Savings Potential

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UT-BATTELLE

# Systems Integration and Novel End-Use Applications

from DOE Thermally Activated Technology Roadmap

**Paths Forward** - “Develop packaged CHP Rooftop systems. A packaged rooftop system will reduce the engineering associated with installing CHP systems”

**Strategic Goals** - “By 2008, complete development and testing of a portfolio of TATs that will be reduced in footprint, volume and/or weight by a factor of 2”



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# Heating, Cooling, and Refrigeration Products

from DOE Thermally Activated Technology Roadmap

“TAT focus on those primary building energy needs with technologies that have broadest utilization potential: heating, cooling, refrigeration, dehumidification.....”

Cooling Energy Consumption  
Total 1.4 quads (primary)

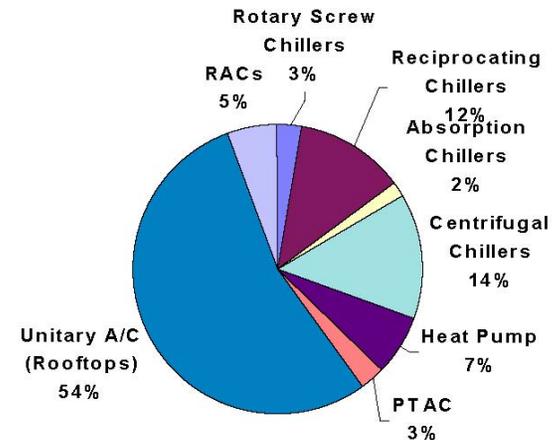
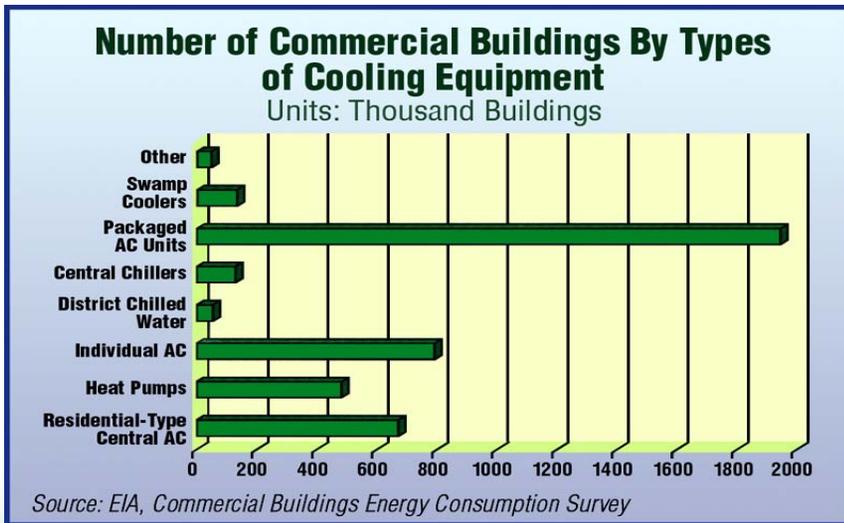


Figure 2-2: Commercial Building Cooling Energy Consumption in 1995 (from ADL, 2001)



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# TIAX Energy Consumption Characteristics of Commercial Building HVAC Systems Volume III: Energy Saving Potential

July 2002

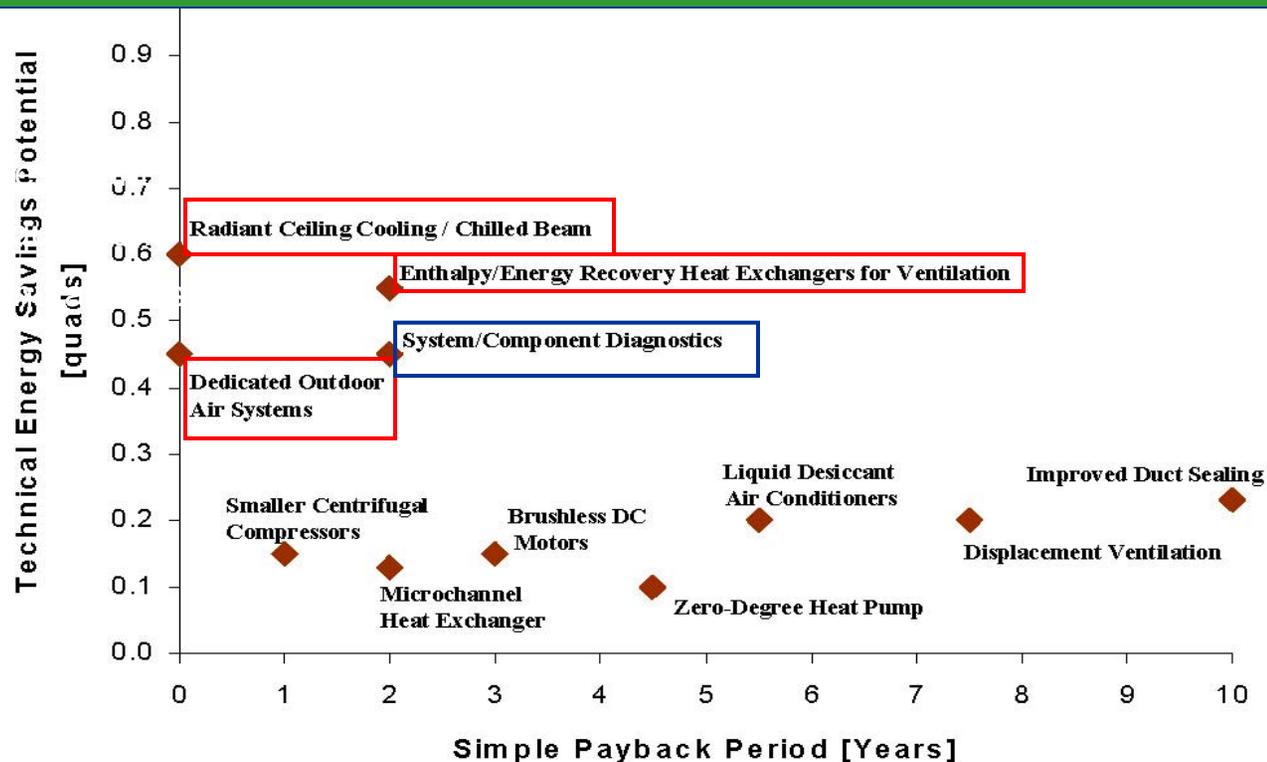


Figure 1-3: Estimated Technical Energy Savings Potential and Simple Payback Periods for the 15 Options

# ORNL's Desiccant Program Focus

## Conclusions

- **ORNL's Product development and Benchmark testing R&D fit TAT Roadmap and TIAX Report recommendations for best building/energy-saving technologies**
- **Similar assessment for "Enabling Technologies" and "Standards/Metrics Development" activities of ORNL's TAT-Desiccant/DE program**

## Other

# ORNL, In-House, Laboratory Accomplishments

- Complete Characterizations/Benchmarking of Existing, commercial desiccant systems
  - ⇒ Fueled and Waste heat regeneration
  - ⇒ Lab vs. field performance comparisons made possible
- New SEMCO IADR and DryKor TAC desiccant system lab installations
- Laboratory Data Basis for Method of Test (MOT)/Rating/Certification procedures for TAT and the integration of these technologies with DG
  - ⇒ Starting point for ASHRAE - ARI - ANSI ratings/certification efforts
  - ⇒ Demand Control Ventilation (DCV) Federal Technology Alert publication
- Analysis of energy benefits to IES from waste heat utilization
  - ⇒ Boundaries of observed CHP benefits established
- Complete utilization of lab data for TAT/TAT+DG+IES Simulation and CHP Screening Models