

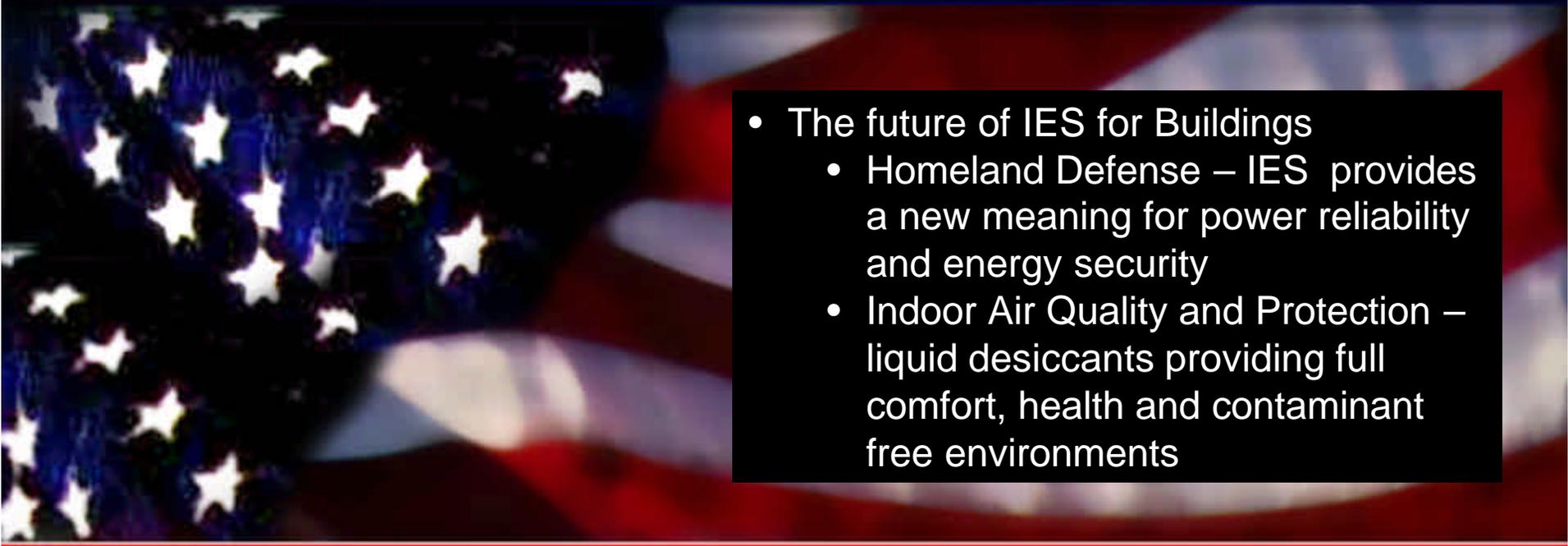
# Office of Distributed Energy Resources



***Ronald Fiskum***  
***Program Manager***  
***Office of Power Technology***

**Thermally Activated Technologies**  
**Absorption Heat Pumps/Chillers**  
**Advanced Desiccants**  
**Fuel Cells for Buildings**  
**Integrated Energy Systems (BCHP)**  
**Oil Heat/Combustion**

# Integrated Energy Systems

- 
- The future of IES for Buildings
    - Homeland Defense – IES provides a new meaning for power reliability and energy security
    - Indoor Air Quality and Protection – liquid desiccants providing full comfort, health and contaminant free environments

Integrated Energy  
Systems

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DOE completed a Roadmap for Integrated Energy Systems (BCHP) in FY-2000. Over 200 individuals from very diverse technologies assisted in the formulation of the Road Map that spanned 18 months and four workshops.



Industry Led Direction  
Integrated Energy Systems



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U.S. Department Energy

Awarded \$18.5 Million

For Packaged Cooling, Heating and Power  
Systems for Building

June 18, 2001



## Integrated Energy Systems



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Burns and McDonnell in Kansas City:

- Solar Turbines, Inc
- Broad USA
- Integrated Energy System (BCHP)
- Taurus 5,200 kW turbine
- Broad 3,000 absorption chiller
- Additional Gas fired 17,000 RT



Integrated Energy Systems



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Capstone Turbine Corp, Woodland Hills, CA:

- Integrated Energy System (BCHP)
- Absorption Chiller
- Capstone 60 kW micro-turbine



Integrated Energy Systems



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Honeywell Laboratory, Minneapolis, MN

- Integrated Energy System (BCHP)
- Absorption Chiller 500 to 2,000 RT
- IES system for Fort Bragg, NC.
- Turbine 2 to 5 MW



Integrated Energy Systems



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NiSource Energy Technologies: Merrillville, IN

- Hilton Hotel Chain
- Integrated Energy System (BCHP)
- Three Micro-turbines
- Absorption Chiller
- Desiccant Unit



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Gas Technology Institute, Des Plaines, Ill

– Waukesha

– Trane

- Integrated Energy System (BCHP)
- Waukesha engine 290 kW to 770 kW matched to several absorption chiller
- Variable sizes to match a variety of buildings



Integrated Energy Systems



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Ingersoll Rand - Portsmouth, New Hampshire

- Integrated Energy System (BCHP)
- Micro-turbine , 70 kW
- NH<sub>3</sub>/H<sub>2</sub>O absorption refrigeration system
  - inlet air cooling, refrigerator-freezer



Integrated Energy Systems



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United Tech Research Center: East Hartford, CT

- DTE Energy Technologies
- Carrier
- IES (BCHP) integrated system
- DTE 400 kW Micro-turbine
- Carrier Absorption
- Desiccant
- Ammonia/Water refrigeration system



## Integrated Energy Systems



# DER Program includes University Centers and Laboratory Network

## University of Maryland CHP Test Center

- Integrate CHP into building, HVAC system
- test advanced controls, diagnostics, operating strategies



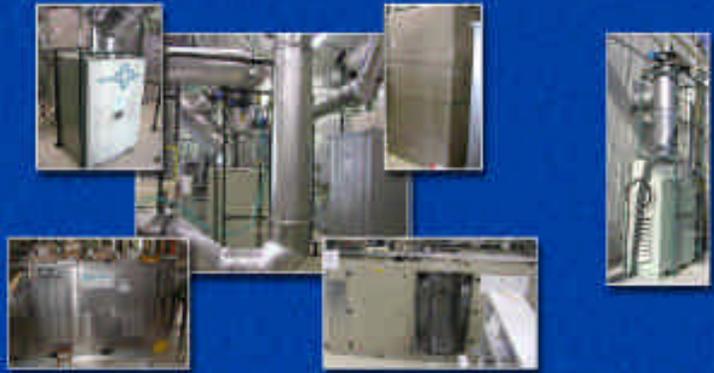
## University of Illinois-Chicago: Midwest Regional CHP Applications Center

- facilitate CHP projects, technical assistance
- region-specific information, application knowledge



## CHP Integration Laboratory at ORNL (part of DER Laboratory Network)

- evaluate electric/thermal parameters, design tools and analysis, integrate components to optimize DG/CHP system



In



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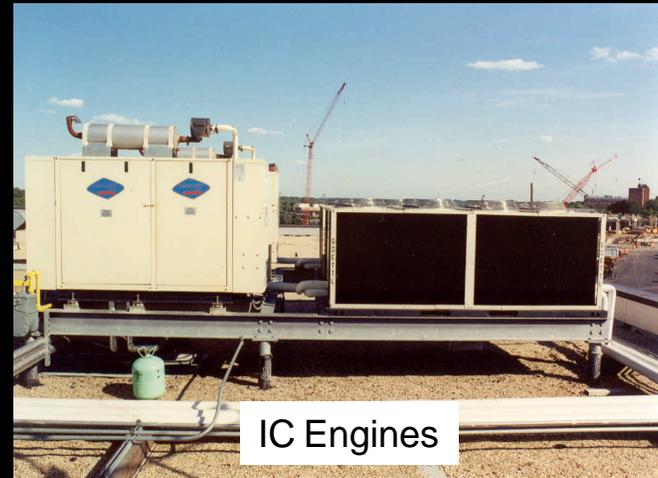
University of Maryland  
The National Test Center  
**Integrated Energy Systems**



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Cooling Tower, Chiller, Microturbine



IC Engines



Solid Desiccant



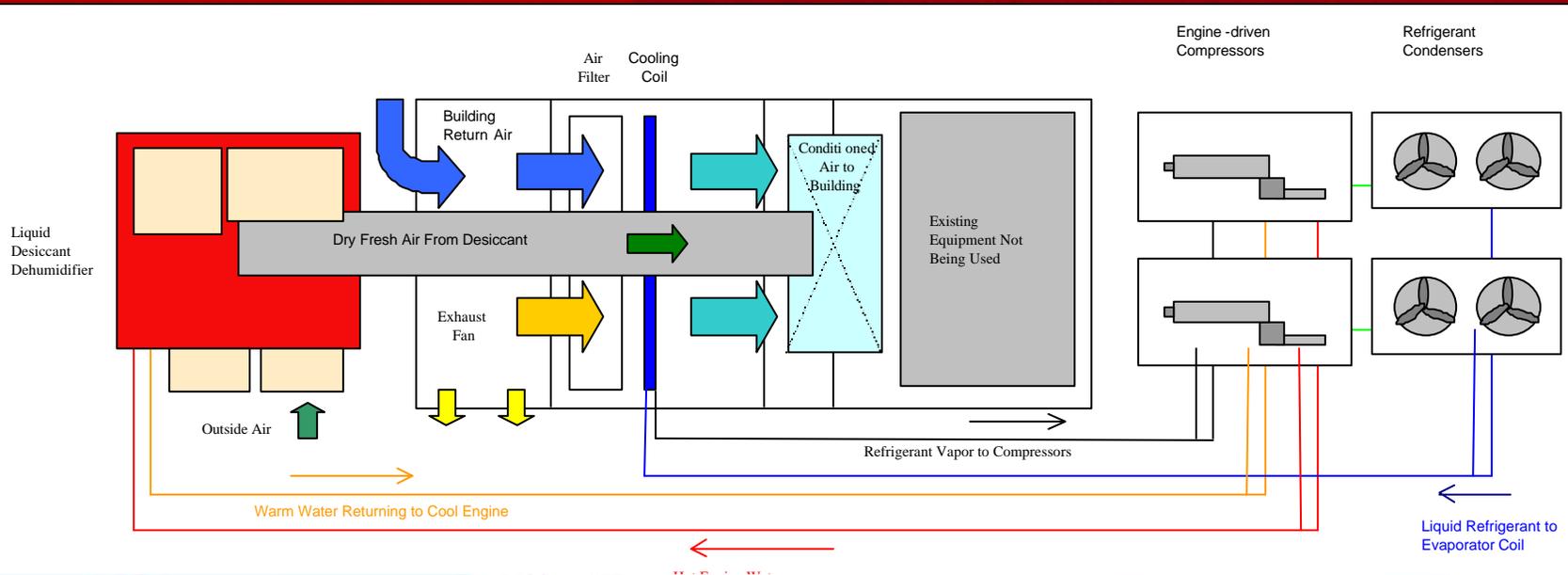
Liquid Desiccant



University of Maryland  
Integration Test Center  
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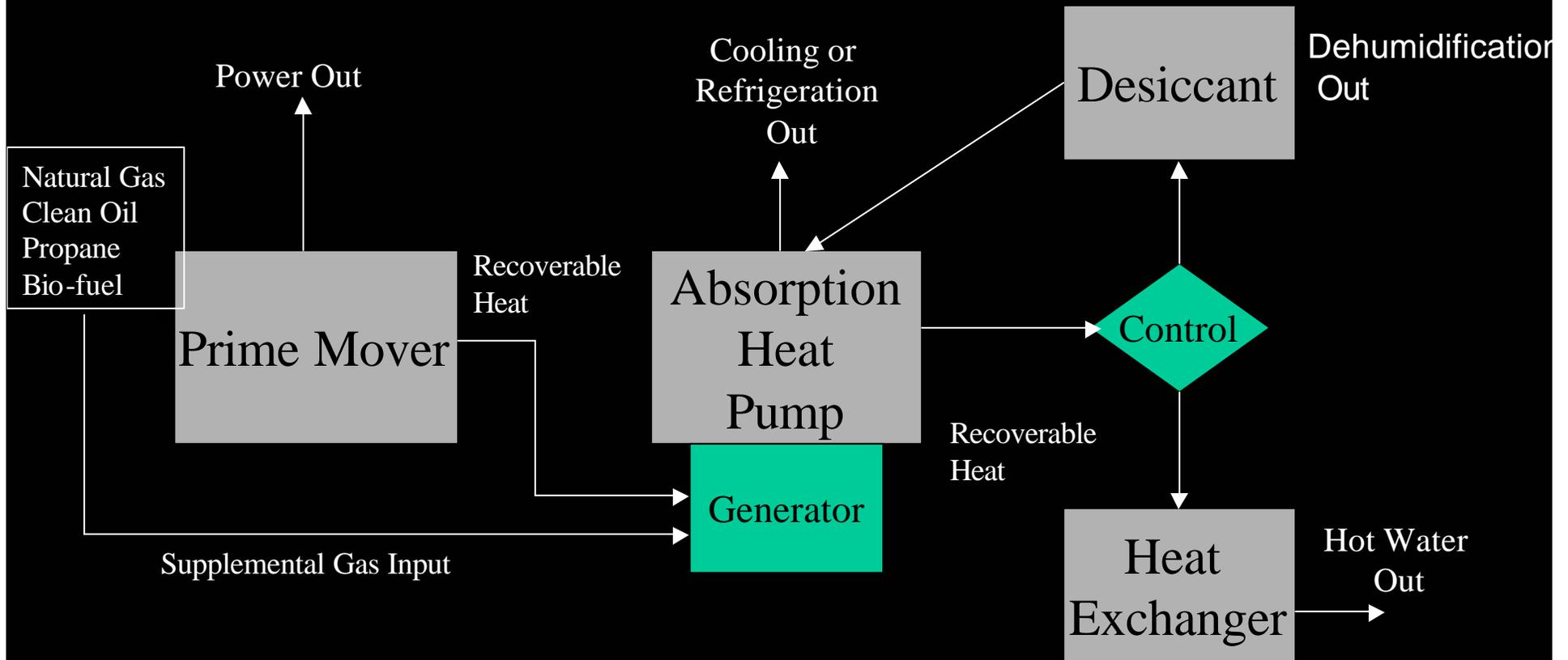
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# Integrated Energy System



Prime Mover: Micro-turbine, I.C. Engine, Fuel Cell, Etc  
**Integrated Energy Systems**



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**Thank You  
Ronald Fiskum**



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