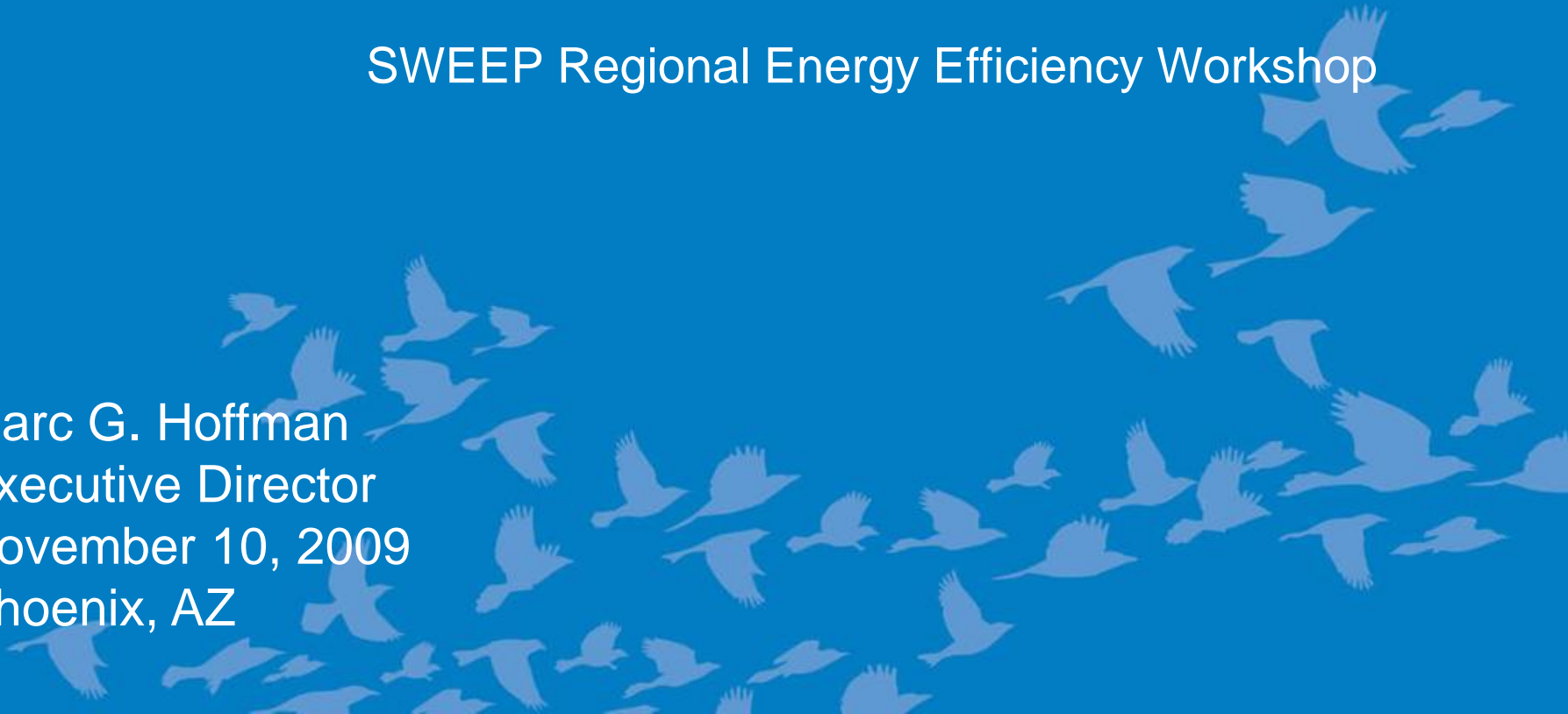




# Advancing More Efficient Technologies at the CEE Forum

SWEEP Regional Energy Efficiency Workshop

Marc G. Hoffman  
Executive Director  
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Phoenix, AZ



# CEE Today

- ▶ Brings together 100 efficiency program administrators serving all or part of 38 states and 8 provinces
- ▶ Governed by Board of Directors drawn from members
- ▶ Develop and sponsor 18 CEE initiatives
- ▶ Staff of 26
- ▶ \$3 million budget



# Today's Discussion:

- ▶ What's the latest on the new technologies efficiency programs are working on at CEE?
  - Comprehensive Lighting Programs
  - Water Heating
  - HVAC
- ▶ Opportunities for CEE Members
- ▶ What do the changes at DOE and EPA mean for us?

# Comprehensive Lighting Programs

## ◀ Situational Analysis

- Need more savings while traditional opportunities shrink with new federal standards
- Meaningful savings are available
- Require more comprehensive approaches than one for one change outs of lamps or fixtures

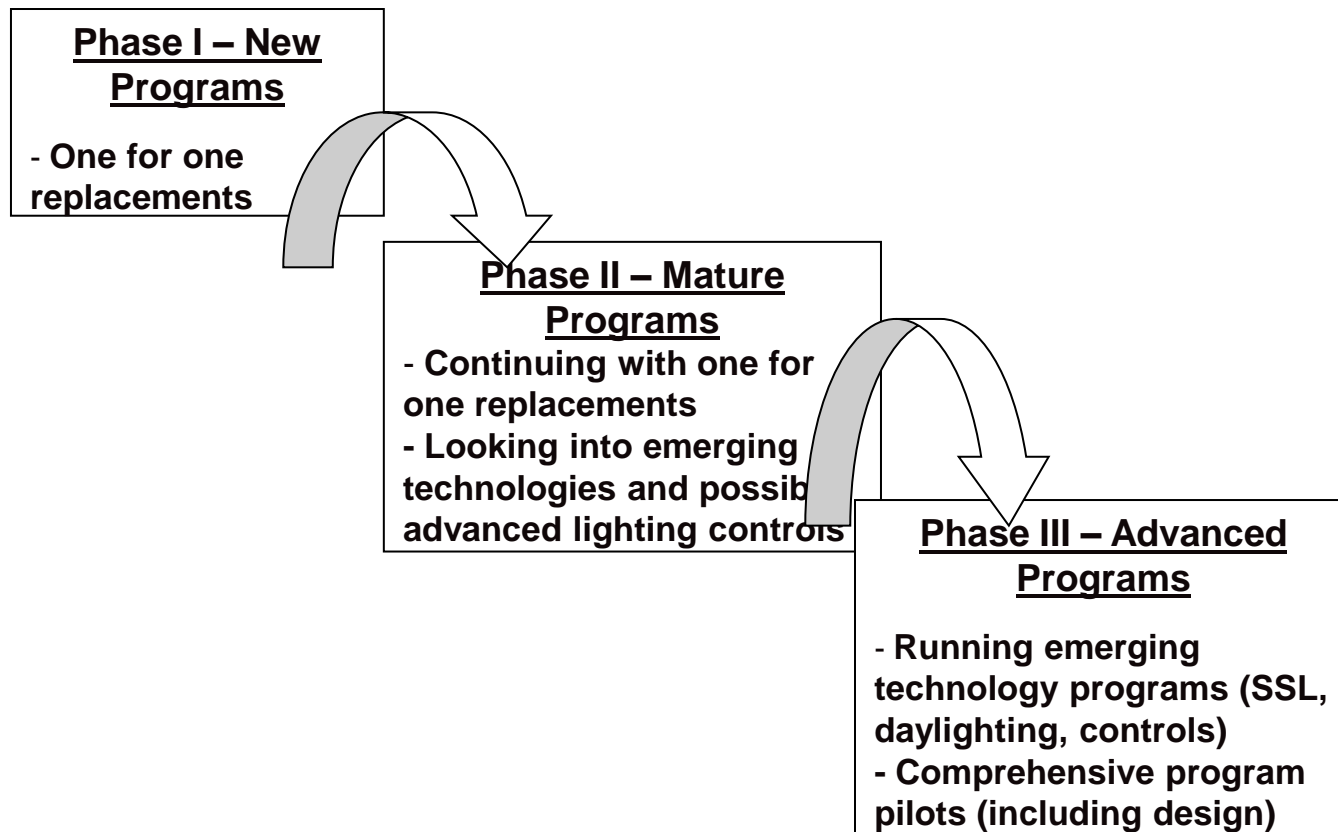
# Comprehensive Lighting Programs

- ▶ Efficiency Programs are pursuing more comprehensive approaches at CEE Commercial and Residential Lighting Committee including:
  - Solid State Lighting
  - Lighting Controls
  - Design Assistance
  - Daylighting
  - Working together on a new program model

# Evolving Lighting Program Model

- ▶ Gathering available resources
  - Ex: DOE Commercial Design Templates
- ▶ Identifying what data regulators need
- ▶ Compiling studies to document savings
- ▶ Developing a program pathway for transition
- ▶ Creating a plan for local implementation

# Example Program Pathway for Transitioning to a More Comprehensive Lighting Program Model



# Next Steps for Comprehensive Lighting

1. Engage industry working groups
2. Next combined Residential and Commercial Lighting Committee call in early December—members only
3. CEE members contact your favorite CEE lighting person: Rebecca, Kate or Eileen for more information or to join the committee

# CEE SSL Specification for SSL program scope and design

- ▶ Data, not a performance, specification
- ▶ What information efficiency programs need to assess qualifications of SSL products for their program eligibility
- ▶ Desire an open, public central clearinghouse
- ▶ Guidelines on characteristics of such a clearinghouse
- ▶ Seeking appropriate hosting- stay tuned

# Advanced Domestic Water Heating

- ▶ Electric Heat Pumps coming to market
  - GE, Rheem and AO Smith have provided models for testing
  - EnergyGuide ratings suggest 50% savings over resistance.
  - Most programs await performance data
  - EPRI has a demonstration project testing hundreds of units
  - Initial models optimized for warmer climates

# Advanced Domestic Water Heating

## ▶ ENERGY STAR Gas Water Heaters come of age

- .62 EF models becoming available
- Higher efficiency models also available but limited by installation and price
  - New condensing model for residential at .80 EF
  - Direct fired storage at .67 suitable for new construction
  - Tankless units meet .82 EF for right applications

# But ENERGY STAR Awareness Just Beginning



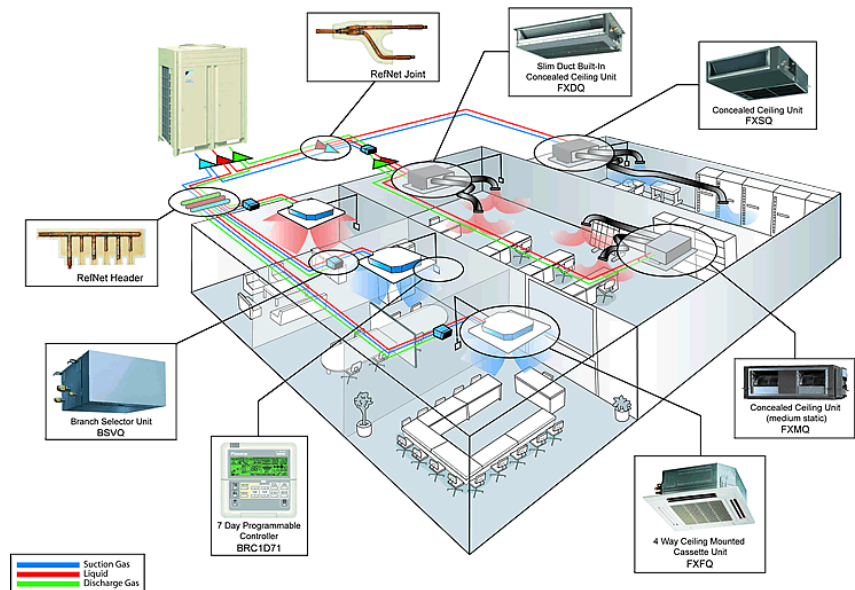
**COALITION FOR  
ENERGY STAR®  
WATER HEATERS**

# Advanced HVAC Technologies

1. Efficiency programs are pursuing revising CEE specs for future variations by climatic regions
2. Exploring implications of inverter-driven compressor systems-test procedures, program criteria
3. Coordinating with EPRI research on VRF systems so programs have actual performance data for program design

# Variable Refrigerant Flow (VRF) System

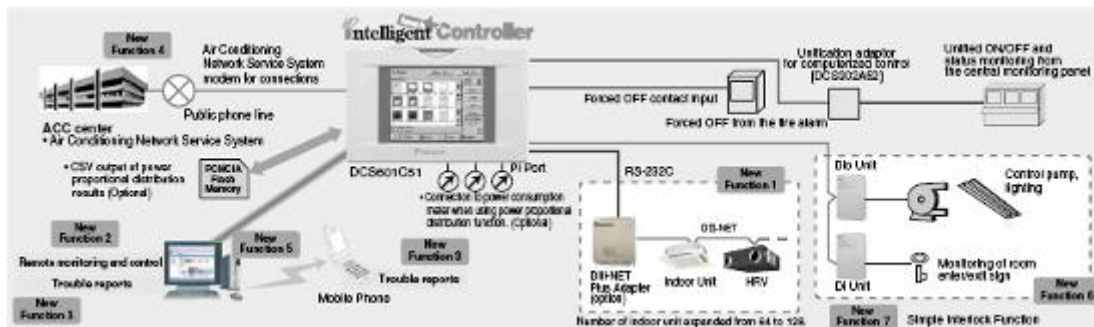
- ▶ Multi-split ductless AC systems – single condensing unit, multiple evaporators
- ▶ Flow of refrigerant is controlled to each evaporator by VFD compressors
- ▶ Simultaneous heating and cooling possible
- ▶ Energy efficiency improvements up to 40% possible, per manufacturers' claims
- ▶ Technology is commercially available in Asia



Slide: Courtesy of EPRI. Figures: Courtesy of Daikin

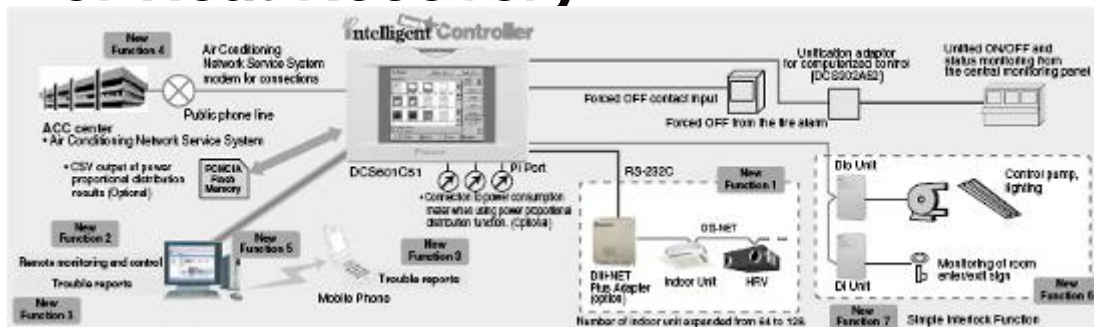
# Characteristics of VRF Systems

- ▶ **Energy efficient heat pump system**
  - VFD compressor to control the amount of refrigerant flowing in the system
  - Designed to maximize efficiency during partial load condition
- ▶ **Individual zone control**
  - Designed to keep running costs at minimum by controlling each zone individually
- ▶ **Comfort compared to traditional technology**
  - Improved room temperature control ( $\pm 1$ deg F)
  - Improved dehumidification by running compressor continuously with minimum speed
- ▶ **Refrigerant flow control is the heart of the system**

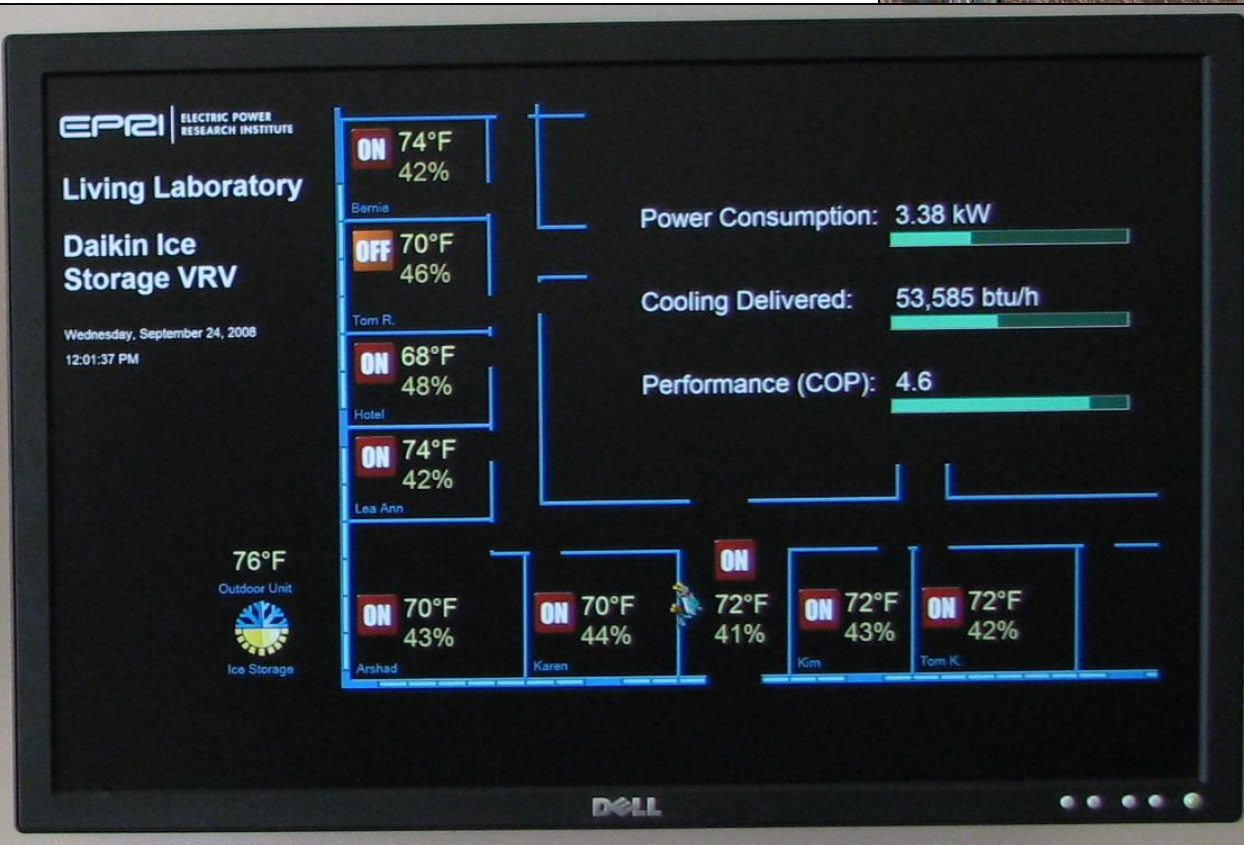


# EPRI VRF Demo Sites

- ▶ Preferred sites are side-by-side
  - Baseline split-system or RTU
  - Retrofitted installation of VRF
- ▶ Alternative—monitor an existing (recently installed) VRF
- ▶ VRF installations will be Heat Pump or Heat Recovery.



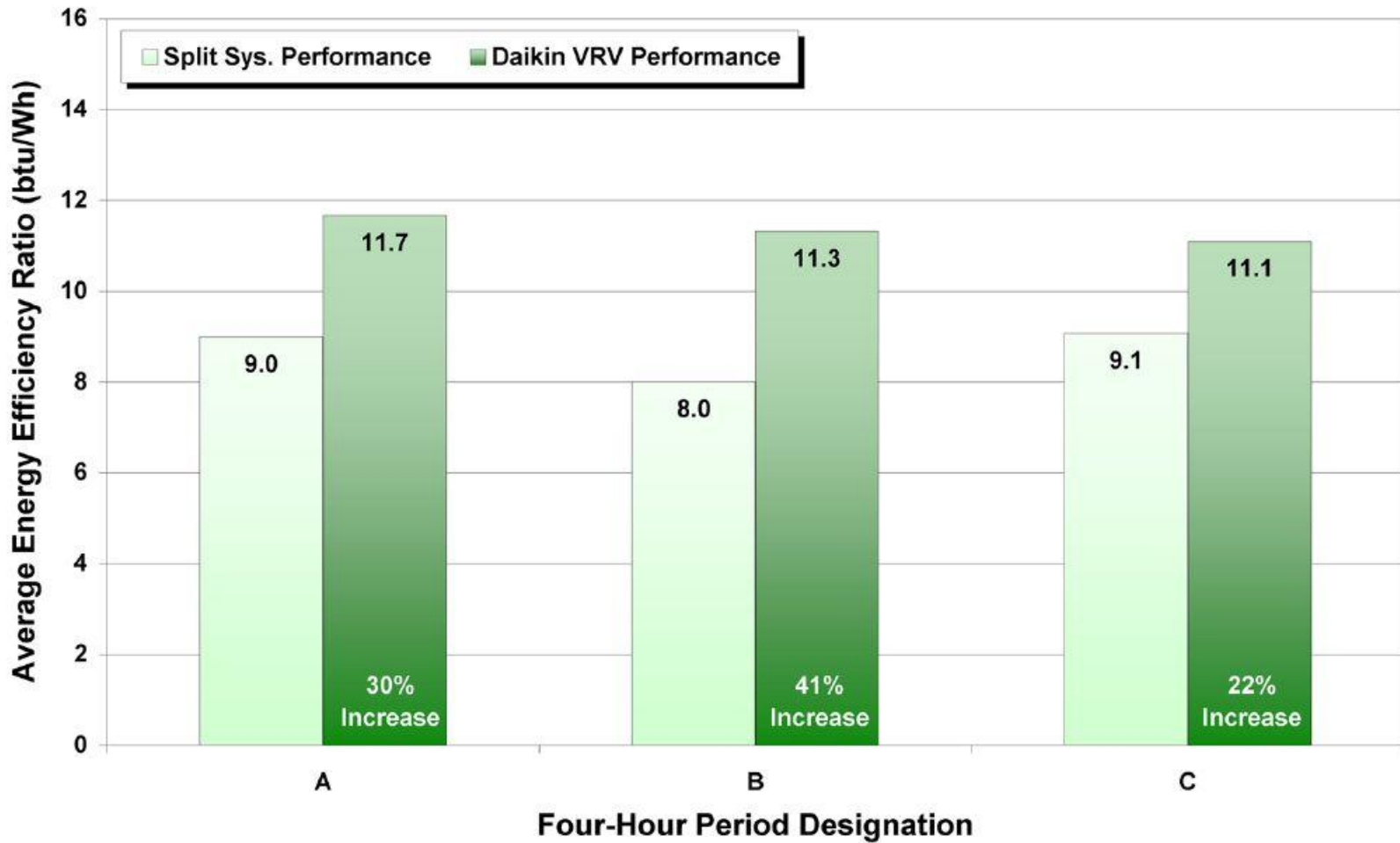
# Daikin's VRV at EPRI Knoxville



Slide: Courtesy of EPRI



# Efficiency Comparison



# Status of Program Explorations

- ▼ Ductless mini-splits
  - Members doing pilots (BPA, NEEA, NSTAR)
  - Efficiency measured with SEER and EER-qualify for ENERGY STAR and CEE specs
  - Fully commercialized and widely available
- ▼ VRF technology raises program issues
  - Performance documentation and measurement
  - Energy versus peak tradeoffs
  - Competitive to regionally optimized machines?
  - Should we develop stand alone programs for this technology?  
Stay tuned
  - Not available in residential sized units—yet
- ▼ Contact Afroz Khan or John Taylor for more info

# New, Improved CEE-AHRI HVAC Directory

## [www.ceedirectory.org](http://www.ceedirectory.org)

- ▶ Since 2004 programs have worked with AHRI to have Verification included as part of listing process
- ▶ Listing of ENERGY STAR and CEE qualifying systems
- ▶ Most widely used site for energy efficient HVAC programs
- ▶ Now has:
  - Quality Installation content
  - Enhanced security for integrity of verified ratings
  - Links to all CEE member websites for program incentives
- ▶ Work with us to make it even better- contact John Taylor

# High Efficiency Gas Packs

- ▶ Gas furnace side of Roof Top units
  - Conventional 80% AFUE
  - Barriers to condensing efficiencies up to 95%
- ▶ Partnering with GTI on feasibility research
- ▶ Funded by CEE gas members directly to GTI
- ▶ Programmatic aspects worked on at CEE Gas Committee
- ▶ Contact Kara Rodgers

# New EPA-DOE Partnership on EE

1. Clarified roles and responsibilities on ENERGY STAR program management
    - DOE taking technical lead
    - EPA taking market lead w/brand management
    - Greater stakeholder involvement
    - Product testing
    - Accelerated spec revision and new product processes
    - Commitment to new Best in Class program
  2. New Building Rating Effort
  3. Accelerated Appliance and Building Standards Efforts
- ▼ Meets the criteria of efficiency programs for greater reliance on ENERGY STAR marketing platform and better partnerships with federal efforts

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