

# COMMERCIAL PROGRAM

## GET COMFORTABLE WITH HVAC MEASURES

Measure Training Brown Bag Part 2  
December 2, 2015



# LET'S GET COMFORTABLE WITH HVAC MEASURES



AIR ALLIES

UNDERSTAND

HOW UTILITY PROGRAMS  
WORK



PROGRAM MANAGERS

UNDERSTAND

TECHNOLOGIES AND  
HOW THEY BENEFIT THEIR  
CUSTOMERS



END-USERS

UNDERSTAND

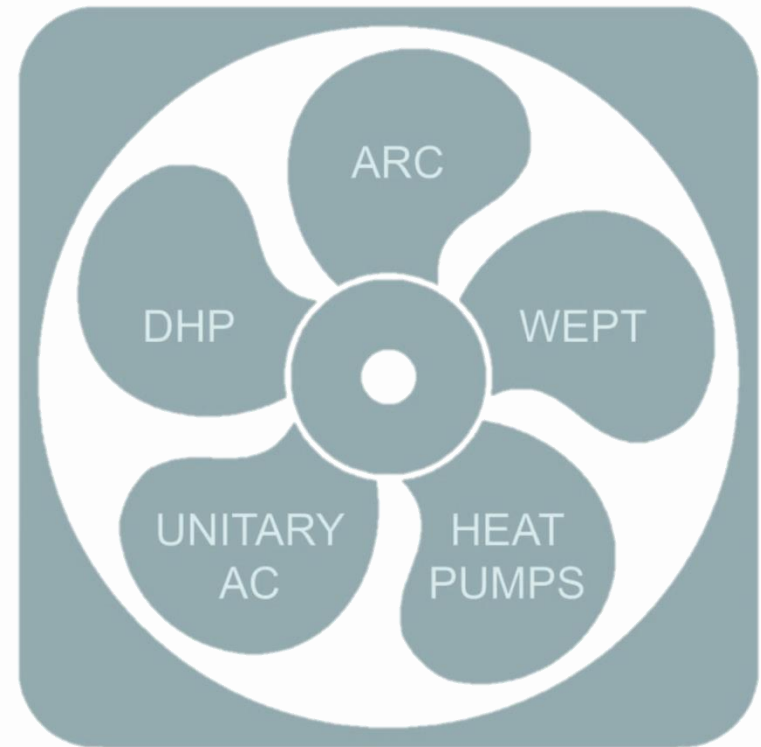
HOW TO LOWER COSTS AND  
INCREASE COMFORT

# HELP IS ON THE WAY!

FEWER PROGRAM REQUIREMENTS • SIMPLIFIED DOCUMENTATION • GREATER PROGRAM SUPPORT

NEW MARKETING MATERIALS FOR UTILITIES  
AND AIR ALLIES WILL HIGHLIGHT

- End-user benefits
- Basis for energy savings
- Estimated cost and payback
- Where to install



# MARKETING & PROGRAM SUPPORT


**Advanced Rooftop-unit Controls**



**SAVINGS FROM TOP TO BOTTOM**

**Optimize Performance**      **Save Money**      **Reduce Maintenance**

Older, inefficient commercial rooftop units can waste thousands of dollars annually. By replacing or retrofitting with Advanced Rooftop-unit Controls you can save money and make your building more comfortable. BPA is now offering up to \$225 per ton of cooling capacity in qualifying retrofits.


-  Improved Performance
-  Remote Energy Monitoring & Control
-  Reduced fan energy use
-  Save thousands in annual energy cost savings

**Contact your local utility to confirm incentives!**



B O N N E V I L L E P O W E R A D M I N I S T R A T I O N

**Web-Enabled Programmable Thermostat Qualified Products List**



the current BPA Implementation Manual.

Model
Thermostat
Commercial EMS
EMS SI
Vision Pro 8000 with Gateways for web-enabling
WiFi Vision Pro 9000
Prestige Wireless
UNITY System
P1900
Internet Managed Thermostats (IMT) 550 hard-wired wi-fi model
CATALYST BMS
EMS

Model	Doesn't qualify
Thermostat	needed for residential applications; it doesn't meet fan-on during is and fan-auto during unoccupied-periods requirements to meet qualification code.
Commercial EMS	needed for residential applications; product is intended to work with other thermostats from "most manufacturers", its qualification will be based on the manufacturer's capabilities and whether it meets the commercial requirements.
EMS SI	needed for residential applications; it doesn't meet fan-on during is and fan-auto during unoccupied-periods requirements to meet qualification code.
Vision Pro 8000 with Gateways for web-enabling	needed for residential applications; it doesn't meet fan-on during is and fan-auto during unoccupied-periods requirements to meet qualification code.
WiFi Vision Pro 9000	needed for residential applications; it doesn't meet fan-on during is and fan-auto during unoccupied-periods requirements to meet qualification code.
Prestige Wireless	needed for residential applications; it doesn't meet fan-on during is and fan-auto during unoccupied-periods requirements to meet qualification code.
UNITY System	needed for residential applications; it doesn't meet fan-on during is and fan-auto during unoccupied-periods requirements to meet qualification code.
P1900	needed for residential applications; it doesn't meet fan-on during is and fan-auto during unoccupied-periods requirements to meet qualification code.
Internet Managed Thermostats (IMT) 550 hard-wired wi-fi model	needed for residential applications; it doesn't meet fan-on during is and fan-auto during unoccupied-periods requirements to meet qualification code.
CATALYST BMS	needed for residential applications; it doesn't meet fan-on during is and fan-auto during unoccupied-periods requirements to meet qualification code.
EMS	needed for residential applications; it doesn't meet fan-on during is and fan-auto during unoccupied-periods requirements to meet qualification code.

that do not appear on the list, or other questions, please

**Ductless Heat Pump Project Information Form**  
For Commercial Locations

LOGO

Instructions: Complete this form and submit it to the serving electric utility. **Boxes with bold outlines** indicate BPA requirements.

**BUSINESS AND SITE INFORMATION**

Business Name \_\_\_\_\_ Address \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Operating hours per week \_\_\_\_\_ Operating weeks per year: \_\_\_\_\_ Holidays observed per year: \_\_\_\_\_

Considering the above, estimate the number of operating hours per year: \_\_\_\_\_  
*The business must operate between 2,000 and 5,700 hours per year to qualify.*

**BUILDING INFORMATION**  
Qualifying buildings must meet the requirements below.

The building was constructed before 2009 <i>Check the box if this statement is correct. If not, the equipment is not eligible for incentives.</i>	<input type="checkbox"/> Yes
The existing heat source is electric resistance (either zonal or forced air) <i>Check the box if this statement is correct. If not, the equipment is not eligible for incentives.</i>	<input type="checkbox"/> Yes
The estimate square footage of the conditioned area is less than 20,000 sq. ft. <i>Check the box if this statement is correct. If not, the equipment is not eligible for incentives.</i>	<input type="checkbox"/> Yes

**NEW EQUIPMENT INFORMATION**  
Complete the information for each installed DHP.

	DHP 1	DHP 2	DHP 3	DHP 4
DHP manufacturer				
DHP model number				
Heating capacity in tons				

**INSTALLER INFORMATION**

Company Name \_\_\_\_\_ Total Installed Cost (before rebate) including equipment, labor, permit and tax \_\_\_\_\_

By signing this form, I confirm that the above information is correct to the best of my knowledge.

Installer Signature \_\_\_\_\_ Date \_\_\_\_\_

Ductless Heat Pump Project Information Form 09/30/2015 1

# HOW DOES AN ADVANCED ROOFTOP CONTROL WORK?

## BEFORE ARC

- ❑ Constant speed fan
- ❑ Operates at 100% during occupied periods
- ❑ Operates more than is needed for required ventilation

## AFTER ARC

- ❑ Variable or multi-speed fan
- ❑ Only operates at speed needed
- ❑ Uses sensors to bring in correct amount of required ventilation



# ARC AND ARC LITE

## BUILDING USE TYPE EXAMPLES

- Retail
- Shopping mall
- Grocery
- Warehouse
- Auditorium
- And many more!

## END USER BENEFITS

- Reduced electricity costs
- Increased occupant comfort
- Potential to extend motor life
- Fault detection

## ESTIMATED COSTS

- The average total project cost is \$332/ton for ARC Lite, \$725/ton for ARC
- Additional software monitoring costs may apply

## INCENTIVES

- \$150-\$225/ton

## ESTIMATED PAYBACK

- 2-6 years for ARC Lite, 4-10 years for ARC

Buildings with any fuel type qualify for ARC incentives



Tip: RTUs in multi-story buildings may be great for ARCs because stairways are often in ventilation mode

# ARC AND ARC LITE

## SPECS & REQS

### EXISTING CONDITIONS

- > 5 tons of cooling capacity
- Unitary equipment (no split-systems)
- Existing system has constant speed supply fan (no variable speed fans)
- An operational economizer
- Continuous operation during occupied hours (minimum 2,000 hours/year)

### ARC

- Either supply-fan variable speed, multi-speed or cycling
- Digital, integrated economizer control.

### ARC Lite

- Either supply-fan variable speed, multi-speed or cycling

### GOOD FACTS

- Sweet spot: between 5 – 20 tons
- Most units over 20 tons have variable fan speed operation
- Any existing fuel type

## ENERGY SAVINGS

- ARC Retrofits add controls to convert constant air-volume RTUs into variable air-volume RTUs
- Research showed supply-fan controls accounted for over 80% of the ARC retrofit energy savings

## FORMS & DOCUMENTATION

- PIF
- QPL

Check with the supplier to ensure the ARC doesn't effect the RTU warranty



# DUCTLESS HEAT PUMPS

## BUILDING USE TYPE EXAMPLES

Less than 20,000 square feet of floor area in newer buildings (post-2009)

- ❑ Homes converted to businesses
- ❑ Banks
- ❑ Warehouse Offices
- ❑ Small / Closet Server rooms

## END USER BENEFITS

- ❑ Reduce electricity costs
- ❑ Increase comfort
- ❑ Better zone control
- ❑ Quiet units
- ❑ Small footprint, no duct work
- ❑ Easy operation and maintenance

## ESTIMATED COSTS

- ❑ The average cost of an installed ductless heat pump is between \$3,000-\$5,000
- ❑ Factors that influence cost include: manufacturer and model, refrigerant line-set length, difficulty of installation, and contractor rates

## INCENTIVES

- ❑ \$250/Ton

## ESTIMATED PAYBACK

- ❑ Less than 12 years for a 3 ton unit

This technology isn't recommended for applications that require significant ventilation.





# DUCTLESS HEAT PUMPS

## SPECS & REQS

The building conditioned by the DHP has the following characteristics:

- <20,000 square feet of conditioned floor area
- A construction date before 2009
- Zonal or forced air electric resistance heat

## ENERGY SAVINGS

- Control each heating/cooling zone independently, eliminating costly over-heating and cooling
- 25% greater efficiency due to lack of ductwork
- Inverter-driven variable speed compressors maintain constant indoor temperatures by running continuously at higher or lower speeds
- No on/off cycling common in electric resistance and forced air systems

## FORMS & DOCUMENTATION

- PIF



Project costs could include: condensate pumps, extra refrigeration, demo of old ductwork or outside concrete pad

# WEB-ENABLED PROGRAMMABLE THERMOSTAT (WEPT)

## BUILDING TYPE

- Any commercial building except for hotel or motel rooms

## END USER BENEFITS

- Reduced electricity bills
- Remote monitoring and control
- Increased occupant comfort

## INCENTIVE

- Replacing a programmable thermostat \$150
- Replacing a non-programmable thermostat ranges from \$500- \$800

## ESTIMATED COST

- The average product cost is between \$150- \$500, with some products approaching \$2,000
- Installation costs should be for approximately one hour of labor

## ESTIMATED PAYBACK

- Approximately one year for Type 1, two-three years for Type 2

Some WEPT products require annual data subscriptions



# WEPT

## SPECS & REQS

### WEPT REPLACES

- A thermostat that is not programmable
- A thermostat that is programmable but not web-enabled

### WEPT MUST HAVE THE FOLLOWING TO QUALIFY

- Limited duration occupied-period override, multiple set back schedules and holiday programming
- Continuous supply fan operation during occupied periods and intermittent operation during unoccupied periods (this ensures ventilation requirements are to code, while saving energy)
- Remote, web-based programming (this allows building operators more opportunities to schedule HVAC operation to match occupancy)
- Battery and memory backup (this prevents loss of scheduling features during power outages)

## APPLICATION

- Any commercial space with the exception of hotel rooms

## ENERGY SAVINGS

- WEPTs match HVAC operation with actual occupancy, minimizing energy use when not occupied

## FORMS & DOCUMENTATION

- PIF
- QPL



# HEAT PUMPS

## BUILDING USE TYPE EXAMPLES

Small- to medium-sized buildings less than 50,000 sq ft.

- Retail
- Schools
- Offices
- Mixed-use
- Many building types!

## END-USER BENEFIT

- Reduced electricity bills
- Increased occupant comfort

Heat pump savings are site-specific, so costs and payback can vary greatly from location to location

## ESTIMATED COSTS

- Upgrades and conversion costs vary
- Units from 3 to 5 Tons can range from \$2,500 to \$5,000
- Other costs may include: Start-up, thermostat, controls, refrigerant and warranty

## INCENTIVE

- \$100-\$250/Ton – depending on an upgrade or conversion

## ESTIMATED PAYBACK

- 13 – 17 years, depending on product, installation and energy costs



# HEAT PUMPS

## SPECS & REQS

- HP meets at least CEE Tier 1 efficiency level

Existing building has:

- 50,000 square feet or less conditioned building area
- Consume less than 600,000 kWh annually
- Electric heat

## TYPICALLY REPLACING

- Packaged rooftop unit
- Small interior forced air furnace

## ENERGY SAVINGS

- Uses a refrigerant system involving a compressor and a condenser to absorb heat at one place and release it at another
- Let's talk about the Coefficient of Performance, or COP!

## FORMS & DOCUMENTATION

- Heat Pump Tool (calculator)

Heat Pump incentives are for retrofits and upgrades of existing buildings only.



# COMING UP...

- ❑ Commercial Measure Training 201:
  - Commercial Shell Measures
  - Refrigeration Measures
  - Commercial Small Savers
    - Generator block heater control
    - Engine block heater control
    - Hot water storage tanks
  
- ❑ Marketing Materials online beginning this month
  
- ❑ Interested in learning about other measures? Have a suggestion? Request a topic!



**THANK YOU!**

**QUESTIONS?**

**YOUR FEEDBACK MATTERS!**

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