### Air Conditioner Tune-up

###### Description

An air conditioning system that is operating as designed saves energy and provides adequate cooling and comfort to the conditioned space

###### Definition of Efficient Equipment

In order for this characterization to apply, the efficient equipment is assumed to be a unitary or split system air conditioner least 3 tons and preapproved by program. The measure requires that a certified technician performs the following items:

* Check refrigerant charge
* Identify and repair leaks if refrigerant charge is low
* Measure and record refrigerant pressures
* Measure and record temperature drop at indoor coil
* Clean condensate drain line
* Clean outdoor coil and straighten fins
* Clean indoor and outdoor fan blades
* Clean indoor coil with spray-on cleaner and straighten fins
* Repair damaged insulation – suction line
* Change air filter
* Measure and record blower amp draw

A copy of contractor invoices that detail the work performed to identify tune-up items, as well as additional labor and parts to improve/repair air conditioner performance must be submitted to the program

###### Definition of Baseline Equipment

In order for this characterization to apply, the baseline condition is assumed to be an AC system that that does not have a standing maintenance contract or a tune up within in the past 36 months.

###### Deemed Lifetime of Efficient Equipment

The expected measure life is assumed to be 3 years.[[1]](#footnote-1)

###### Deemed Measure Cost

The incremental capital cost for this measure is $35[[2]](#footnote-2) per ton.

###### Loadshape

Loadshape C03 - Commercial Cooling

###### Coincidence Factor

CFSSP = Summer System Peak Coincidence Factor for Commercial cooling (during system peak hour)

= 91.3% [[3]](#footnote-3)

CFPJM = PJM Summer Peak Coincidence Factor for Commercial cooling (average during peak period)

= 47.8%[[4]](#footnote-4)

**Algorithm**

###### Calculation of Savings

###### Electric Energy Savings

ΔkWH = (kBtu/hr) \* [(1/EERbefore) – (1/EERafter)] \* EFLH

Where:

kBtu/hr = capacity of the cooling equipment actually installed in kBtu per hour (1 ton of cooling capacity equals 12 kBtu/hr).

=Actual

EERbefore = Energy Efficiency Ratio[[5]](#footnote-5) of the baseline equipment prior to tune-up

=Actual

EERafter = Energy Efficiency Ratio of the baseline equipment after to tune-up

=Actual

EFLH = Equivalent Full Load Hours for cooling are provided in section 4.4 HVAC End Use

###### Summer Coincident Peak Demand Savings

ΔkWSSP = (kBtu/hr \* (1/EERbefore - 1/EERafter)) \* CFSSP

ΔkWPJM = (kBtu/hr \* (1/ EERbefore - 1/EERafter)) \* CFPJM

Where:

CFSSP = Summer System Peak Coincidence Factor for Commercial cooling (during system peak hour)

= 91.3% [[6]](#footnote-6)

CFPJM = PJM Summer Peak Coincidence Factor for Commercial cooling (average during peak period)

= 47.8%[[7]](#footnote-7)

###### Natural Gas Energy Savings

N/A

###### Water Impact Descriptions and Calculation

N/A

###### Deemed O&M Cost Adjustment Calculation

N/A

###### Measure Code: CI-HVC-ACTU-V03-160601

1. Ibid. [↑](#footnote-ref-1)
2. Ibid. [↑](#footnote-ref-2)
3. Based on analysis of Itron eShape data for Missouri, calibrated to Illinois loads, supplied by Ameren. The AC load during the utility’s peak hour is divided by the maximum AC load during the year. [↑](#footnote-ref-3)
4. Based on analysis of Itron eShape data for Missouri, calibrated to Illinois loads, supplied by Ameren. The average AC load over the PJM peak period (1-5pm, M-F, June through August) is divided by the maximum AC load during the year [↑](#footnote-ref-4)
5. In the context of this measure Energy Efficiency Ratio (EER) refers to field-measured steady-state rate of heat energy removal (e.g., cooling capacity) by the equipment in Btuh divided by the steady-state rate of energy input to the equipment in watts. This ratio is expressed in Btuh per watt (Btuh/watt). The cooling capacity may be derived using either refrigerant or air-side measurements. The measurement is performed at the outdoor and indoor environmental conditions that are present at the time the tune-up is being performed, and should be normalized using a correction function to the AHRI 210/240 Standard test conditions. The correction function should be developed based on manufacturer’s performance data. Care must be taken to ensure the unit is fully loaded and operating at or near steady-state. Generally this requires that the outside air temperature is at least 60°F, and that the unit runs with all stages of cooling enabled for 10 to 15 minutes prior to making measurements [↑](#footnote-ref-5)
6. Based on analysis of Itron eShape data for Missouri, calibrated to Illinois loads, supplied by Ameren. The AC load during the utility’s peak hour is divided by the maximum AC load during the year. [↑](#footnote-ref-6)
7. Based on analysis of Itron eShape data for Missouri, calibrated to Illinois loads, supplied by Ameren. The average AC load over the PJM peak period (1-5pm, M-F, June through August) is divided by the maximum AC load during the year [↑](#footnote-ref-7)