AIRCON ENERGY

Preliminary Assessment

Prepared for:

Mendocino County

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1.0 Executive Summary

A Preliminary Assessment of Mendocino County's infrastructure has been performed by Aircon Energy. The purpose of this energy study was to identify Energy Efficiency Measures (EEM) the county can adopt to reduce energy consumption, replace aging infrastructure, and improve building comfort. Engineering calculations have been made to quantify the energy savings and environmental impact for each measure. These measures include HVAC equipment replacements, HVAC controls, lighting retrofits, and lighting controls.

The annual savings calculated for this project are:

First Year Annual Energy Savings	$423,334
kWh Savings	2,960,670
Natural Gas Savings, Gallons	6,001

The environmental benefits of this project are:

Total Annual Environmental Benefit *	
Annual greenhouse gas emissions reduction (tons):	2,164.9
Equivalent Number Passenger Vehicles per year:	368
Equivalent reduction in gallons of gas consumed per year:	222,981
Equivalent reduction of barrels of oil consumed per year:	4,546.2
Equivalent ton of carbon sequestered annually by:	454.6

* Courtesy of EPA

The Energy Efficiency Measures are summarized along with all associated costs and benefits in the Energy Efficiency Measures Table (EEM Table), included as an attachment.

2.0 Facility Description

2.1 Background

On November 15-16, 2016 Aircon Energy performed a Feasibility walkthrough on the designated properties of Mendocino County. Based on the findings of the walkthrough and with input from County and maintenance personnel, energy efficiency measures were selected in order to best benefit the county.

2.2 Analyzed Facilities

Energy assessment walkthroughs were performed at various facilities, specified by the county and or identified through utility data as locations of interest. Aircon Energy's team observed these locations for potential retrofit/replacement opportunities that would result in maximized energy savings while producing the greatest upgrade to the facilities and infrastructure. A walkthrough was performed at the following facilities:

Ukiah

- Main Administration Center
- Juvenile Hall
- Main Jail
- Department of Transportation

Willits

- Justice Center
- Health & Human Services Agency
- Willits Integrated Services Center
- Child Care Center
- Sheriff's Office

Fort Bragg

- Justice Center
- Avila Center

3.0 Common Measure Summaries

Interior Lighting – Fluorescent 32W T-8 lamps replaced the old style 40W T-12 lamps in offices and have been utilized for many years. Fluorescent lighting as a whole has become more and more obsolete due to the increased capabilities of LED lighting which now offer the same level of lighting at a fraction of the energy use. 12W LED bulb replacement is the selected technology for this retrofit. Incandescent and CFL's will be replaced by LED screw-ins which will further reduce energy consumption.

Exterior Lighting – The exterior lighting fixtures are mostly fitted with metal halide or high-pressure sodium lamps. These types of lamps are quickly becoming obsolete as LED technology advances. The LED replacement lighting will illuminate the locations much better than the existing lighting fixtures. While the coverage is roughly the same, the emitted light is a brilliant white which does a much better job of clearly defining objects and spaces. The existing lighting fixtures produce a yellowish light which can make it hard to distinguish colors and objects.

Packaged Rooftop Unit Replacement – Over the lifetime of a unit, the Seasonal Energy Efficiency Ratio (SEER) worsens while newer units come out with improved SEER ratings. Units will have electric direct drive EC (electronically commutated) motors and dry bulb temperature economizers with barometric relief fitted on all units that are 3 tons or more. The proposed units will be high efficiency units with a SEER of up to 15.6, and will be Trane, Carrier, or equivalent.

Split System Replacement – The first type of split systems consist of an air handler/fan coil unit in a room or the attic space above and a condensing unit outside on the roof or ground. High efficiency electronically commutated motors (ECM) are now the most efficient way to move air around as well. The R22 coolant in use in the cooling systems is being phased out for the more environmentally friendly R410a. R22 will no longer be imported or manufactured in the country as of January 1, 2020. As this deadline approaches the allowable amount is being tapered down every year, which means the price of R22 will rapidly increase until it is completely phased out.

The next type of split system consists of a condenser unit outside the building and an evaporator coil inside. The condenser/coil combos in place had SEER ratings of around 10, when new. Unit efficiencies drop at a rate of roughly 0.5% per year due to factors such as part wear and undesirable material build-up on or inside the unit, even with regular maintenance. The condensers and coils will be replaced with equipment that is rated up to 16.5 SEER.

Furnace Replacement – Many of the existing furnaces are 80% Annual Fuel Utilization Efficiency (AFUE) furnaces. The existing furnaces are rapidly approaching 20 years of age. Condensing furnaces are more efficient at utilizing the heat energy produced by burning fuel. These furnaces have AFUE ratings of over 95%. The condensate captured from these furnaces will be neutralized and disposed of at an acceptable location.

Solar Panel installation – Self-generation providing clean renewable energy is not just good for the bottom line but is also good for the environment. SunPower solar panels are built in the Bay Area using material sourced locally and with designs created and patented by SunPower to offer 20 year guarantees on panel degradation. Utilizing fixed or tracker technology, these panels offer increased capability with a decreased footprint.

4.0 Narrative of Energy Efficiency Measures

This section details the energy efficiency measures and provides savings calculations for each measure. The measures in this section are strictly preliminary and are subject to change. Equipment counts and details will be verified during the Investment Grade Audit (IGA). Changes to equipment counts or unit specifications could affect the savings calculations. A factor of safety has been applied to the calculated values, reflected in the Energy Efficiency Measures table in section 1 of this report. During the IGA new measures may be added to the project based on information gathered during the detailed audit. Changes to the scope of the project will be discussed with the County in order to ensure client satisfaction. Which measures are included in the final project scope is completely at the County's discretion.

4.1 Energy Efficiency Measures

Ukiah

Measure #1: Administration Center Comprehensive Lighting Retrofit

The walkthrough showed first generation 32W T8s being employed throughout the building. Most of these fixtures were three-lamp fluorescent lighting fixtures which draw about 90W of electricity. We seek to standardize office and hallway lighting using 12W LED lamps with existing fixtures. The retrofit lighting fixtures will consume less than 40W of electricity.

Exterior lighting consisted of metal halide and high pressure sodium cobra head, canopy, and wall pack lighting fixtures. These types of lighting are rapidly becoming obsolete as LED lighting technology continues to advance. The LED lighting replacements will greatly reduce the power consumption of each fixture.

Maintaining records for each type of lamp/ballast becomes a headache for maintenance personnel and a nightmare if a replacement is needed when knowledgeable staff isn't present. By standardizing the lighting, this will no longer be an issue.

This measure is recommended due to the fact that it will result in a large reduction in energy consumption. Exterior replacements will increase visibility and personnel safety at night. Lastly, maintenance time will be decreased due to both the longer lifespan of LED lighting and the standardization of lamps.

Measure #2: Admin Package Unit Replacement

The walkthrough showed that this building has over 30 package units on the roof, of varying sizes. Some are nearing the end of their useful life and some have been replaced in recent years. This measure will replace 13 (more may be discovered during the IGA) of the existing units with Carrier or equivalent high efficiency gas/electric package units. The existing package units have SEER ratings of 8-10 when newly installed. The Carrier high efficiency units have SEER ratings of up to 15.6. The energy savings are carried a little further with gas savings. The new units will save at least a couple dozen therms of natural gas a year. This may not seem like a lot but with the price of natural gas averaging $1.46/Therm the savings add up quickly.

All equipment included in this measure will be as stated or equivalent. This measure is recommended for its ability to save energy while maintaining the same level of occupant comfort and at the same time utilizing the more environmentally friendly and cost effective R-410A refrigerant.

Measure #3: Admin Exhaust Fan Replacement

The walkthrough revealed two outdated exhaust fans that have seen better days. This measure will replace the existing exhaust fan systems with high efficiency exhaust fans with electronically commutated motors. These motors can increase the system's efficiency by around 10%. The existing exhaust fan motors are rated at 1/2 horsepower. The replacement motors will maintain the existing level of air movement while being rated at only 3/8 horsepower. This measure will reduce energy usage by increasing the exhaust system's efficiency; it is for this reason that this measure has been selected.

Measure #4: Admin Split System Replacement

The Administration building has several heat pump split systems. This measure will replace five of the existing systems. There are two ductless split systems included in this measure. These systems will be replaced by Mitsubishi Mr Slim or Fujitsu Halcyon systems that utilize hybrid flex inverter technology for increased efficiency. These systems are slim, quiet, and highly efficient with SEER ratings of up to 33.

The other three systems included in this measure are condenser and fan coil split systems. Two of the fan coils are located inside the building. The last fan coil unit is located on a wall, outside, on the south side of the building. The outdoor units will be replaced by Carrier Comfort series heat pumps which have a SEER rating of 14. The existing fan coil units will be replaced with Carrier Comfort series fan coil units with electronically commutated motors.

All equipment included in this measure will be as stated or equivalent. This measure is recommended for its ability to save energy while maintaining the same level of

occupant comfort and at the same time utilizing the more environmentally friendly and cost effective R-410A refrigerant.

Measure #5: Juvenile Hall Comprehensive Lighting Retrofit

During the walkthrough a large number of two-lamp and four-lamp 32W T8 fixtures were observed throughout the building. These fixtures consume more energy than necessary in order to illuminate their respective spaces. We seek to standardize interior lighting using 12W LED lamps with existing fixtures. Exterior lighting consisted of metal halide wall packs and barn lights. Exterior lighting will be replaced with LED lamps and NLS Hermosa LED wall packs. The new lighting will maintain the same amount of coverage while improving visibility with the bright white light emitted by these fixtures.

Maintaining records for each type of lamp/ballast becomes a headache for maintenance personnel and a nightmare if a replacement is needed when knowledgeable staff isn't present. By standardizing the lighting, this will not continue to be an issue.

This measure is recommended due to the fact that it will increase staff safety while greatly reducing the power consumption seen by the existing lighting systems.

Measure #6: Juvenile Hall Split System Replacement

Several existing split systems observed during the walkthrough are nearing the end of their useful life. The California Energy Commission (CEC) Database for Energy Efficient Resources (DEER) lists the effective lifespan of an HVAC system as 15 years. Over time the efficiency of any mechanical system decreases, even with regular maintenance, meaning that these systems are operating at far below their installed efficiencies. There are six condenser/coil split systems included in this measure.

The existing condensers and coils systems have SEER ratings of about 10 and utilize R-22 refrigerant. The replacement units will be Carrier Comfort series condensing units that will use R-410A refrigerant, the new industry standard, and have SEER ratings of up to 16.5. The indoor portions of these systems are evaporation coils, which will be replaced by Carrier horizontal design N-coils. All replacement equipment will be as stated above or equivalent. Since these coils are attached to furnaces indoors it is recommended that these furnaces be replaced as well.

This measure is recommended for the energy savings seen by its implementation. It is also recommended that this measure be selected along with the following furnace replacement measure.

Measure #7: Juvenile Hall Furnace Replacement

This measure is the replacement of 11 existing furnaces spread throughout the facility. The existing furnaces are Trane Freedom 80, XL 80, and XR 80 furnaces. These are all upright furnaces that supply the air for the split systems mentioned in the previous measure (Measure #6).

Almost all of the existing HVAC equipment at Juvenile Hall is approaching 18 years of age. These Trane furnaces have Annual Fuel Utilization Efficiencies (AFUE) of 80%. Carrier Performance Boost or equivalent condensing gas furnaces are the proposed replacements. These furnaces have AFUE ratings of over 95%, and are equip with electronically commutated motors (ECM) which can adjust fan speed based on system needs for further energy savings. All replacement equipment will be as stated above or equivalent.

This measure has been selected due to the amount of gas this measure saves. This measure combined with the last measure (Juvenile Hall Split System Replacement) will

produce an overall energy savings of over 8,900 kWh of electricity and over 2,500 therms of natural gas.

Measure #8: Juvenile Hall Package Unit Replacement

During the walkthrough three package units were examined on the rooftop of Juvenile Hall. All three units were found to be at least 18 years old, with the oldest one dating back to 1994. These units are beyond the 15 year effective lifespan discussed earlier. Mechanical part life is typically around 10-15 years, so within the 15 year lifespan of a unit it is safe to say that at least one moving part will require replacement. After 15 years, any number of parts within the unit can begin to fail. It will cost more to replace all the failed parts than it would to replace the unit all together.

The existing Trane and Carrier gas/electric package units have SEER ratings of 8-10 when newly installed. The replacement units proposed for this measure are Carrier high efficiency 3 and 3.5 ton package units, or equivalent. The new units have SEER ratings of over 15.6. This measure has been recommended for reasons previously stated and for the amount of energy savings this measure will result in.

Measure #9: Main Jail Comprehensive Lighting Retrofit

During the walkthrough of the Main Jail a large number of fluorescent fixtures were observed throughout the building. These fixtures consume more energy than necessary in order to illuminate their respective spaces. We seek to standardize interior lighting using 12W LED lamps with existing fixtures. Exterior lighting consisted of high-pressure sodium and metal halide lighting fixtures. Exterior lighting will be replaced with LED lamps and NLS Hermosa LED wall packs. The new lighting will maintain the same amount of coverage while improving visibility with the

brilliant white light emitted by these fixtures.

Maintaining records for each type of lamp/ballast becomes a headache for maintenance personnel and a nightmare if a replacement is needed when knowledgeable staff isn't present. By standardizing the lighting, this will not continue to be an issue.

This measure is recommended due to the fact that it will increase staff safety while greatly reducing the power consumption seen by the existing lighting systems.

Measure #10: Main Jail Package Unit Replacement

The existing package units at the Main Jail are all fairly large units, 7.5 tons and 18 tons. The existing units are about 15 years old, and not very efficient. The replacement units will be Carrier high efficiency gas/electric package units, or equivalent.

This measure has been recommended due to the fact that it will reduce electricity usage by more than 32,800 kWh. At the same time this measure will also reduce natural gas consumption by over 500 therms a year.

Measure #11: Main Jail Water Heater Replacement

Many of the observed water heaters around the various county properties have been fairly new units. Three units, at the Main Jail, were found to be in need of replacement. The existing water heaters are 80% AFUE rated. Seeing that they are at least 15 years old their efficiencies have been reduced by about 7%. There are now condensing furnaces that have efficiencies above 95% AFUE and over 99% thermal efficiency.

This measure proposes that the existing 19 gallon unit be replaced by an on-demand mid-efficiency tankless gas water heater. A mid-efficiency unit amongst a variety of high efficiency equipment might seem like a mistake, but this unit is more than capable of replacing the existing unit and is more cost effective than a high efficiency unit and helps in keeping the cost of this measure down. The other two units (100

gallons) are to be replaced by ultrahigh efficiency modulating condensing water heaters. The replacement water heaters will be State or equivalent.

This measure has been selected for its ability to reduce natural gas usage; this measure also has a good payback.

Measure #12: DOT Comprehensive Lighting Retrofit

During the walkthrough of the Mendocino County Department of Transportation it was found that most of the lighting is provided by two-lamp 32W T8 fluorescent lighting fixtures. We seek to standardize interior lighting using 12W LED lamps with existing fixtures. Exterior lighting consisted of high-pressure sodium and metal halide lighting fixtures. Exterior lighting will be replaced by LED lamps and fixtures along with NLS Hermosa LED wall packs. The new lighting will maintain the same amount of coverage while improving visibility.

Maintaining records for each type of lamp/ballast becomes a headache for maintenance personnel and a nightmare if a replacement is needed when knowledgeable staff isn't present. By standardizing the lighting, this will not continue to be an issue.

This measure is recommended due to the fact that it will greatly reduce the current power consumption due to the existing lighting fixtures.

Measure #13: DOT Split System Replacement

This measure is the replacement of 8 split systems around the DOT. One of the split systems consists of an outdoor condenser and an indoor ducted fan coil unit. The other seven split systems consist of outdoor condensers and indoor evaporation coils that are attached to furnaces. The current systems have been in place for 12-18 years based on the information gathered during the walkthrough. All of the existing systems have

efficiencies around 8-10 SEER.

The proposed replacement systems are Carrier high efficiency systems or equivalent. As stated above, seven of the replacement systems will be condenser/evaporative coil system replacements and one system will be a condenser and fan coil system replacement, like the one shown above (Carrier FX4D Comfort series fan coil unit).

This measure has been selected for its ability to reduce energy consumption at the location. It is recommended that this measure be implemented along with the following measure.

Measure #14: DOT Furnace Replacement

This measure is the replacement of 6 existing 80% AFUE furnaces with high efficiency 95%+ condensing furnaces. The existing furnaces are Trane Freedom 80 furnaces and are likely the same age as the split systems that are attached to them, if not older. The replacement furnaces are going to have electronically commutated fan motors that not only make the furnace more efficient but will also increase the efficiency of the cooling system.

This measure has been selected for the energy savings it will result in. It is recommended that this measure be jointly implemented with the previous measure. Together, these two measures will reduce energy consumption by roughly 6,900 kWh and 500 therms annually.

Measure #15: DOT Ductless Split System Replacement

During the walkthrough several outdated ductless split systems were observed. Approaching 15 years of use, these systems should be replaced very soon, if not now. These systems also utilize R-22 refrigerant which, as stated before, will no longer be available after January 1, 2020. Four of the existing systems are Panasonic ¾ ton ductless split systems. The last looks to be a 1.5 ton system.

This measure will replace the these systems with Mitsubishi Mr Slim or Fujitsu Halcyon ductless split systems that have efficiency ratings of up to 33 SEER; this is a great improvement from the Panasonic system's 10.8 SEER rating when it was brand new.

All replacement equipment is to be as stated above or equivalent. This measure has been selected for the amount of energy it will save, while helping the environment with the utilization of the more environmentally friendly R-410A refrigerant.

Measure #16: DOT Unit Heater Replacement

The Department of Transportation has an exterior garage that is heated by three Dayton unit heaters. While unit heaters are capable of producing a lot of heat to move around a space they are a very inefficient way to heat a space that has large doors and high ceilings. As the heat from the Dayton units is blown into the space this hot air rises to the top of the space, heating the area around the ceiling. It takes longer for the occupants to feel the effects of the unit heaters and wastes excess natural gas. The moment one of the four roll-up doors is opened the hot air in the garage will evacuate outside the building.

Infrared heating systems are a much more efficient way of heating such a space. These systems are designed to direct heat straight down towards the occupants and objects within the space. These systems do not warm the air in the space, like the name suggests, they emit infrared light (electromagnetic waves) that heat through absorption, upon contact. This means that the occupants, concrete slab, and other objects are directly heated. This form of heating is ideal for spaces that have large doors and high ceiling because there is ideally no heat lost to the space above the heaters and or to the outside.

This measure has been recommended for the fact that it is a much more efficient way to heat such a space and it will ultimately result in great energy savings and increases comfort considerably. With respect to the EEM table no factor of safety was used for this measure. In the calculations, it was assumed that replacing the unit heaters with an IR system the savings would be around 35%, when in actuality the savings would be closer to 50%. Replacing the best unit heater with a basic IR system would result in a savings of just over 40%. Replacing a typical unit heater with a basic IR system would result in a savings of just over 51%. To appease any curiosity, replacing unit heaters with the best IR system would result in a savings of over 55% to almost 64%.

Willits

Measure #17: Justice Center Comprehensive Lighting Retrofit

During the walkthrough of the Willits Justice Center it was observed that a large number of two-lamp 32W T8 fluorescent lighting fixtures were used to illuminate most spaces. LED lamp replacements will consume less energy while supplying the same amount of coverage. We seek to standardize interior lighting using 12W LED lamps with existing fixtures. Several bulky outdated exit signs were noticed around the facility. These exit signs will be replaced by 3W LED exit signs that are sleeker, more energy efficient, and have a longer lifespan.

Exterior lighting consisted of mostly high-pressure sodium and metal halide Par 38s and wall packs. Exterior lighting will be replaced by LED lamps and fixtures along with NLS Hermosa LED wall packs. The new lighting will maintain the same amount of coverage while improving visibility and clarity.

Maintaining records for each type of lamp/ballast becomes a headache for maintenance personnel and a nightmare if a replacement is needed when knowledgeable staff isn't present. By standardizing the lighting, this will not continue to be an issue.

This measure is recommended for the amount of energy it will save the county. This measure will also improve personnel safety around the facility.

Measure #18: Justice Center Ductless Split System Replacement

This measure is the replacement of a single 1.5 ton ductless split system. The existing Panasonic system has an efficiency of 10.3 SEER when originally installed. The proposed replacement Mitsubishi Mr Slim or Fujitsu Halcyon systems have efficiencies up to 33 SEER. The replacement unit will be as described above or equivalent. This measure has been selected for the savings it will provide the facility.

Measure #19: Justice Center Package Unit Replacement

The walkthrough revealed five package units that are nearing the end of their effective life. The 15 year lifespan is not a firm time limit on how long a unit will last; a unit can be left in place, running, for a lot longer than 15 years. The reason for this life limit is due to the fact that beyond this point the unit is going to begin to cost more to run and maintain than it would to simply replace the unit. The existing units are all older Carrier units with efficiencies around 8-10 SEER when originally installed.

This measure will replace the existing units with all new Carrier high efficiency package units, or equivalent. The replacement units will have efficiency ratings of up to 15.6 SEER, based on unit size. This measure will greatly reduce the amount of power consumed by the package units. The new units will utilize R-410A as the working refrigerant in the system, eliminating the use of R-22, an environmentally friendly and cost effective change.

This measure has been recommended for the previously stated reasons.

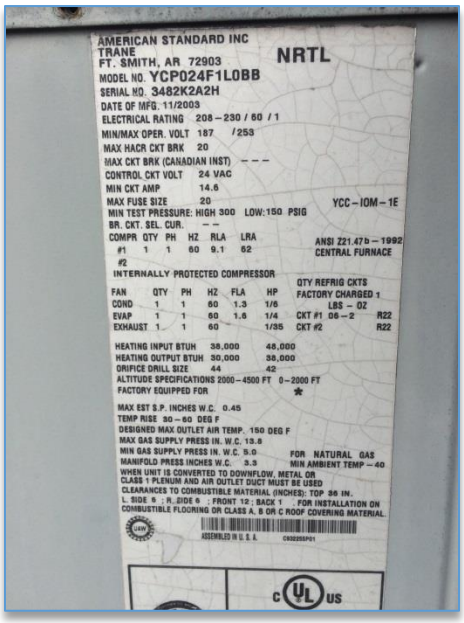
Measure #20: HHSA Comprehensive Lighting Retrofit

A walkthrough of the Health & Human Services Agency Social Services building was conducted to survey the different types of lighting at the facility. Most of the lighting inside the facility comes from three-lamp 32W T8 fluorescent fixtures. These fixtures consume around 89W of energy. 12W LED lamps will reduce power usage to about 39W per fixture. A couple dozen high-pressure sodium lighting fixtures were also spotted during the walkthrough. It is for this reason that this measure has been selected.

Measure #21: HHSA Ductless Split System Replacement

This measure is the replacement of a single 2 ton Samsung ductless split system. The existing system has an efficiency rating of 10 SEER when installed , and is approaching the end of its useful life. This unit will be replaced by a Fujitsu Halcyon ductless split system, or equivalent. The proposed unit will have an efficiency of up to 33 SEER. This measure has been selected due to the fact that it will save energy and help eliminate the use of R-22 refrigerant.

Measure #22A: HHSA Package Unit Replacement



This measure is the replacement of 11 rooftop package units. The existing units are all Trane units and have rated efficiencies of 13 SEER, or less depending on the unit. These units are nearing the end of their effective life which means that their efficiencies have reduced by about 7%. The existing units all use R-22 as their working refrigerant. Aside from these usual factors that are considered in determining if a unit should be replaced or not the walkthrough revealed something rarely seen.

While searching for further information on the

existing equipment it was found that two of the units at both the HHSA and WISC buildings (total of four units) were recalled back in 2005. The units were recalled due to a gas leak issue caused by a compromised gas valve. A crack could develop near the inlet pipe connection causing a build-up of gas in the burner compartment, which would combust upon spark. The 18,200 recalled units were Trane and American Standards package units with model and serial numbers beginning with the following:

Model Number	Serial Number
YCP or YCX	3383 thru 4475
YCY or YCZ	4282 thru 4475

The four units that are still currently installed in Mendocino County are:

	Model Number	Serial Number
HHSA		
	YCP024F1L0BB	3482K2A2H
	YCP024F1L0BB	3521LCS2H
WISC		
	YCP024F1L0BB	3514NT82H
	YCP024F1L0BB	3482X7B2H

An article, from the United State Consumer Product Safety Commission, has been included in the appendix of this report, and the hyperlink below has been provided to assist in quick access to the article.

https://www.cpsc.gov/Recalls/2005/cpsc-american-standard-companies-announce-recall-of-gas-electric-heatingcooling-units

This measure has been recommended due to the fact that it will reduce the facility's power consumption, eliminate the use of R-22 refrigerant, and avoid blowing the roof off the building (the last point is reason enough).

Measure #22B: HHSA Package Unit Replacement

This measure is the replacement of the two recalled Trane package units. If measure 22A is not selected, it is Aircon Energy's recommendation that this measure be selected. In order to avoid catastrophic failure of these units, they should be removed. This would guarantee that county employees and Willits residents will not be unpleasantly surprised by a potential time bomb sitting on the roof of a building located in the heart of town.

Measure #23: WISC Comprehensive Lighting Replacement

The walkthrough of the Willits Integrated Services Center showed that most of the lighting inside the facility comes from three-lamp 32W T8 fluorescent fixtures. These fixtures consume around 89W of energy. 12W LED lamps will reduce power usage to about 39W per fixture. A couple dozen high-pressure sodium lighting fixtures were also spotted during the walkthrough. These retrofits combined with the others pointed out during the walkthrough will result in a 60% reduction of power consumption, in lighting, for the facility. It is for this reason that this measure has been selected.

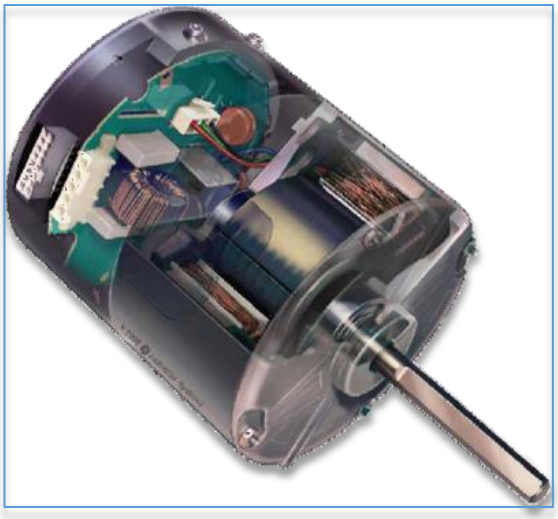
Measure #24A: WISC Package Unit Replacement

This measure is the replacement of 10 existing package units on the roof of the WISC building. Two of the existing units were recalled back in 2005. This measure will replace the existing equipment with Carrier high efficiency package units, or equivalent. This measure has been selected for all the same reasons as Measure #22.

Measure #24B: WISC Package Unit Replacement

This measure is the replacement of only the two recalled package units installed on the roof of the WISC building. If measure 24A is not selected it is Aircon Energy's recommendation that this measure be selected for the reasons discussed in 22B above.

Measure #25: WISC Exhaust Fan Replacement



The walkthrough revealed an outdated exhaust fan that has seen better days. This measure will replace the existing exhaust fan motor with a high efficiency electronically commutated motor. These motors can increase the system's efficiency by over 10%. The existing exhaust fan motor is rated at ½ horsepower. The replacement motor will maintain the existing level of air movement while being rated at only 3/8 horsepower. This measure is recommended due to the energy savings seen by its implementation.

Measure #26: Child Care Center Comprehensive Lighting Replacement

The walkthrough of the Willits Child Care Center revealed that most of the lighting inside the facility comes from two-lamp 32W T8 fluorescent fixtures. 12W LED lamps will reduce power usage and help standardize lighting around the facility. There were a few Par 38 lights outside the building that will be replace with LEDs, as well. The LED lighting will maintain the same level of existing lighting coverage while reducing the energy usage. LED lighting also has a longer lifespan than the existing lighting fixtures which will lead to savings in maintenance costs. It is for these reasons that this measure has been selected.

Measure #27: Sheriff's Office Comprehensive Lighting Replacement

It was discovered that two-lamp 32W T8 fluorescent fixtures are the most common form of interior lighting in the Sheriff's Office. 12W LED lamps will effectively reduce the power consumption of the interior lighting. Exterior lighting consisted of high-pressure sodium and metal halide cobra heads, wall packs and pole lighting. These lamps and fixtures will all be replaced by LED lamps and fixtures. The LED lighting will maintain the same level of coverage and illumination while reducing the energy usage. LED lights

have a longer lifespan than the existing lighting which will lead to savings in maintenance costs. It is for these reasons that this measure has been selected.

Fort Bragg

Measure #28: FB Justice Center Comprehensive Lighting Replacement

The walkthrough of the Fort Bragg Justice Center revealed that most of the lighting inside the facility comes from two-lamp 32W T8 fluorescent fixtures. There were also many one-lamp fluorescent fixtures and CFLs found around the facility. 12W LED lamps will reduce the power usage of the fluorescent fixtures and LED screw-ins will replace the CFLs. Exterior lighting consisted of metal halide and high-pressure sodium lighting systems. LED replacements will improve lighting quality and reduce power consumption. LED lighting has a longer lifespan than the existing lighting which will lead to savings in maintenance costs. It is for these reasons that this measure has been selected.

Measure #29: Avila Center Comprehensive Lighting Replacement

The walkthrough of the Fort Bragg Avila Center revealed an abundance of two-lamp 32W T8 fluorescent fixtures in the facility's interior. It is recommended that 12W LED lamps be used to replace the existing fluorescents because it will significantly reduce power usage. Exterior lighting consisted of metal halide and high-pressure sodium pole lighting, wall packs, and cobra heads. LED replacements will improve lighting quality and reduce power consumption. LED lighting has a longer lifespan than the existing lighting which will lead to savings in maintenance costs. It is for these reasons that this measure has been selected.

Measure #30: Avila Center Package Unit Replacement

This measure is the replacement of a single side-ducted package heat pump. The existing Trane unit has an efficiency of 10 SEER. This unit will be replaced by a Carrier Performance series 2-stage packaged heat pump,

or equivalent. The proposed replacement has an efficiency rating of over 15 SEER. This measure has been selected for its ability to save energy.

Measure #31: Avila Center Bard Unit Replacement

This measure is the replacement of two outdated Bard wall mounted package units at the Avila Center. The existing units are 18 years old. As stated before, efficiencies reduce considerably over time; the efficiencies of the existing units have reduced by about 9%. New units offer greater efficiencies, reducing power consumption. The replacement units will be Eubank 11 EER, or equivalent. This measure has been selected for its ability to reduce energy usage at the Avila Center.

County-Wide

Measure #32: Solar Energy Generation Project 1

The solar array proposed in this measure has been designed following the criteria of the RES-BCT (Renewable Energy Self Generation Bill Credit Transfer) program. This program is only available to cities, counties, school districts and local public agencies. It is limited to the top 50 utility accounts which, when combined, require no more than 5MW of electricity. This is no longer the direction of focus for this measure.

It was brought to our attention that beginning June 1st of this year the utility supplier for all the Pacific Gas & Electric (PG&E) serviced facilities is going to switch over to Sonoma Clean Power (SCP). The goal of SCP is to provide more locally sourced renewable energy to customers at a reduced cost. We spoke with

Danielle Baker a Customer Care Specialist for SCP about their rates, rebates, and solar options. Sonoma Clean Power essentially produces or purchases renewable energy that can be supplied at an average of 1% less than PG&E. SCP uses PG&E's infrastructure to transmit this energy and therefore have rate schedules that mimic those of PG&E. Energy efficiency rebates will continue to be issued by PG&E.

SCP does not participate in the RES-BCT program, but they do offer a Net Energy Metering (NEM) program called NetGreen. The NetGreen program credits renewable energy production at a rate equal to the cost at the time of production + 1¢ per kWh generated. Every May, if production exceeds use for a year one of two things happen, if the credit amount exceeds $100 SCP will automatically send the customer a check, up to $5,000; if the credit amount is less than $100 the credit will be rolled over to the next year. Any credits that exceed the $5,000 cap will be forfeited.

While the switch to the new utility provider and the unavailability of the RES-BCT program affect this measure, it has not been changed. One large array crediting many locations at once is no longer a fiscal option but we still believe that with SCP's NetGreen program the energy savings of this measure should remain about the same.

The Fort Bragg area has weather patterns that are not ideal solar energy generation, so they may not be able to participate in the NetGreen program. The facilities that are further inland may have the ability to pick up the loss by taking advantage of the annual credit offered by SCP. The solar arrays will not be sized over 100% but they can be increased to a size that will maximize return without exceeding the $5,000 limit. This measure will ultimately be split into many smaller solar arrays but the end result should be approximately the same; this measure's savings may even improve.

We do not currently know enough about SCP to be certain but should the County choose to move forward with the Investment Grade Audit (IGA), we will work together with our solar partner and SCP to maximize the size and savings involved in this measure.

Measure #33: Solar Energy Generation Project 2

This measure is the installation of a solar array at the Administration Center. We spoke with Mel Grandi, Electrical Utility Director for the City of Ukiah, about solar credit options offered by Ukiah Electric Company. While they don't participate in the RES-BCT program they do offer a Net Metering option. Net Metering is based on the electricity usage of a single location. The array must be installed at the location of use which limits the size of the array to the amount of available space.

Based on utility data for the Administration Center the solar array for this project has been sized at 296 kW. The proposed system would generate enough energy to cover 80% of the facility's electricity usage. The estimate for this project is based on rooftop installation. It is possible to look into carport installations or even some of both rooftop and carport. There is an increase in cost for carport installation due to the labor and materials that go into building the carport structures.

Measure #34: Solar Energy Generation Project 3

This measure like the last one is an onsite solar energy generation project. The 397 kW field has been sized to cover 80% of the electricity usage at the Main Jail. Again, the pricing for this system has been estimated based on rooftop installation, other options are possible.

Mel Grandi informed us that Ukiah Electric is currently crediting any production exceeding 100% of usage for the facility paid at the rate in use during time of generation. They are going to reduce this amount within the next few months and credit a lower amount which is common practice among utility providers. This is the reason for a design limit of 80% which ensures that the system will never produce more than 100% of usage. Systems that are oversized do not pay off as well due to the reduction in credit for anything over annual usage. Mr. Grandi also expressed an interest in looking into the possibility of an oversized system that could benefit both the County of Mendocino and the City of Ukiah.

Appendices

A) Trane & American Standards Recall Article

The following attachment is the article taken from the United States Consumer Product Safety Commission's website regarding the Trane & American Standards package unit recall. A hyperlink to the article has again been provided below.

https://www.cpsc.gov/Recalls/2005/cpsc-american-standard-companies-announce-recall-of-gas-electric-heatingcooling-units