

Recent Energy Conservation Modifications

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Arizona State University has completed utilities infrastructure upgrade projects that reduce energy consumption, in the form of electricity and natural gas, as well as reducing water use at the main campus.

Energy efficiency projects included retrofit lighting systems, motors, building HVAC controls and HVAC upgrades, Central Plant and Thermal Energy Storage system digital controls, chiller and cooling tower replacements, steam pipe insulation—and newly installed boiler blow down heat recovery, campus buildings energy sub-metering, and solar photovoltaic parking covers.

Electricity consumption avoidance roughly equates to 53 million kWh per year with a 13 MW demand reduction. Projects encompassed eighty buildings that provide 6.5 million square feet of campus space. Environmental benefits resulting from the decrease in electricity use include annual emissions reductions of approximately 110,929,000 pounds of CO₂; 2,014 pounds of VOC; 221,222 pounds of NO_x; 16,748 pounds of CO; 153,700 pounds of SO₂; 12,243 pounds of PM₁₀ particulates; and 689,954 milligrams of Mercury.

Forty thousand lighting fixtures in 3 million square feet of building area were replaced. Fixtures with T12 lamps were fitted to T8 lamps with new reflectors, compact fluorescents replaced incandescent and HID lamps, and LED exit signs were installed. The project restored standard light levels to many areas providing more pleasing and consistent visual effects to enhance occupant comfort and safety while reducing the electrical demand rate by 3,100 kW or 15.5 million kWh conserved per year.

Motor replacements included 379 premium efficiency motors, ranging in size from 2 to 60 HP, in fifty seven buildings. Electricity consumption was reduced by 148 kW or 1.2 million kWh per year.

Heating, Ventilating, and Air Conditioning modifications added economizer controls, return air CO₂ sensors, optimum start/stop capabilities, and new time of day fan coil controllers in twenty six buildings. In addition, eighteen buildings were retrofitted with new controllers for air handling units, pumping systems, and VAV boxes. Operating parameters and control schemes for this equipment can be modified remotely from the Central Plant control room. New air handling units were installed in two buildings, and units in five other buildings were converted to Variable Air Volume systems. These improvements provide optimum indoor air quality while minimizing equipment run hours and trim 45 kW from our electrical demand rate or 3.3 million kWh per year.

The Central Plant was equipped with ten new 2000 ton centrifugal (R134a refrigerant) chillers, cooling towers, condenser water pumps and motor control centers. This retrofit replaces ozone depleting CFC and HCFC refrigerants with environmentally friendly HFCs.

Modification of Central Plant steam and hot water systems provided boiler blow down heat recovery to reduce heat loss 3.3 mmBTU and the temperature of discharge into the sanitary sewer was reduced with less water required to cool the discharge.

Exposed steam and hot water piping was insulated with removable blanket covers in building mechanical rooms and in the central plant.

A 30 kW solar photovoltaic carport covering forty two parking spaces was installed on the Tyler Street parking structure. The system satisfies the full daytime load requirements for lighting inside the structure, as well as providing a visible expression of the ASU commitment to renewable and sustainable energy sources.