

REDUCE DEMAND – WATER CONSERVATION

The Air Force has reduced potable water consumption per square foot 9% since 2007. For example, Misawa AB, Japan, installed low-flow showerheads in dormitories saving 4.7M gallons annually and Maxwell AFB, Ala., repaired an irrigation well, saving 70K gallons annually. Federal mandates require a reduction of 16% by 2015. The Air Force will invest \$111M to fix leaks, re-use gray water, upgrade facilities, and install rain sensors on irrigation systems.



Engineers at Tyndall AFB, Fla., are working on a plan to expand reclaimed water usage that would save more than 100M gallons of water a year.

Of the \$225M per year the Air Force has dedicated to meet federal mandates, \$18M is allocated for water conservation infrastructure improvements. For FY10, the Air Force awarded more than \$7M in water conservation projects using ECIP funds and is postured to execute another \$7M in FY11.

INCREASE SUPPLY – RENEWABLE ENERGY

The Air Force has renewable energy projects (solar, wind, landfill gas, ground source heat pumps) in operation on 45 bases. AFFEC engineers expect the number of generation sites to double by 2015 and plan to add biomass and waste-to-energy projects to the portfolio.

In FY09, the Air Force awarded two renewable energy projects using ECIP. The \$24M investment will produce 2.5MW. For FY10, the Air Force awarded \$8M in renewable energy projects and is postured to execute another \$5M in FY11.

AFFEC estimates \$500M in projects is needed over the next six years to meet renewable energy goals. Fortunately, 80% of that money is expected to come from private investments through Power Purchase Agreements. Companies competitively bid on contracts to produce renewable energy on installations. The Air Force is responsible for purchasing power only. Renewable energy credits, tax credits, incentive payments, and maintenance are kept by the successful bidders.



Engineers at Buckley AFB, Colo., installed more than 5,000 solar panels in 2010.

Hurlburt Field, Fla., is now home to the Air Force's first plasma waste-to-energy facility.

The Air Force Facility Energy Center, located at the Air Force Civil Engineer Support Agency, Tyndall AFB, Fla., is made up of more than 50 engineers and energy experts who identify, evaluate, and help implement technologies and funding strategies to enable the Air Force to meet and surpass federal energy goals. Achieving these goals will save an estimated \$3B dollars over the next 10 years.

AFFEC ENERGY HELPDESK (850) 283-6236 DSN (523) AFCESAENERGY.HELPDESK@TYNDALL.AF.MIL

AIR FORCE INFRASTRUCTURE ENERGY STRATEGY



REDUCE DEMAND

INCREASE SUPPLY

CHANGE THE CULTURE



AIR FORCE CIVIL ENGINEER SUPPORT AGENCY



AIR FORCE FACILITY ENERGY CENTER



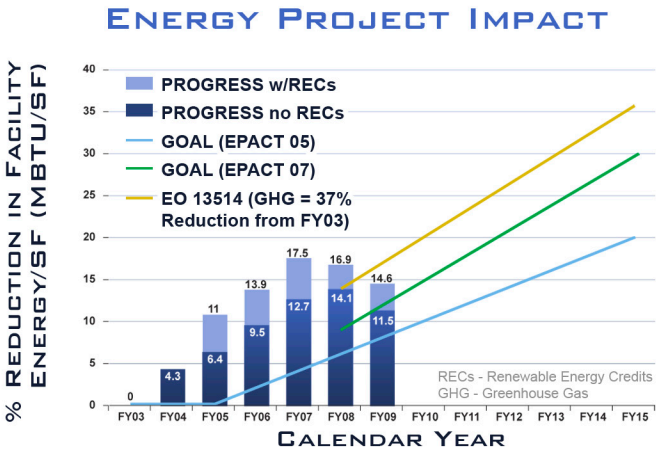
THE AIR FORCE IS THE LARGEST ENERGY USER IN THE DEPARTMENT OF DEFENSE, spending \$9B on energy a year. Although only 17% of that energy is used in our facilities (the rest is for aviation and ground fuels) facility energy attracts significant scrutiny because there is more than 600M square feet of facility space in the Air Force portfolio. Aggressive federal mandates require the Air Force to drastically reduce facility energy and water usage, and increase renewable energy production.

- ✔ Reduce facility energy used per square foot (i.e., energy intensity) 30% by 2015, using a 2003 baseline. The Air Force has reduced energy intensity 11.5%.
- ✔ Reduce potable water usage by 16% by 2015. From the 2007 baseline year, the Air Force has reduced potable water 9%.
- ✔ Increase renewable energy to 25% of all facility energy by 2025. In FY09 more than 5.8% of the Air Force’s electricity was from renewable sources, surpassing the 5% goal for the year.

The *Air Force Infrastructure Energy Plan*, an Appendix of the *Air Force Energy Plan 2010*, maps the way ahead for meeting these aggressive facility energy mandates through 2015. Recent additional requirements from the National Defense Authorization Act of 2010 and Executive Order 13514 signed by President Obama in late 2009 make the goals even more stringent by defining new greenhouse gas requirements and effectively doubling the renewable energy goal.

ENERGY FUNDING

The Air Force has programmed \$225M a year (FY10-15 POM and Energy Conservation funds) through 2015 for energy and water reduction projects. An additional \$30M a year will come from the Office of the Secretary of Defense’s Energy Conservation Investment Program (ECIP). OSD estimates that it takes a \$150 investment to achieve one million BTUs in savings; translated to the Air Force, this means \$100M to reduce energy consumption one percent. Energy experts at the Air Force Facility Energy Center (AFFEC), Tyndall AFB, Fla., say there are insufficient funds in the budget to accommodate the new, more stringent goals. Third-party investments are expected to help offset the potential funding shortfall.



The chart depicts the Air Force energy reduction success since 2004. The Energy Policy Act of 2005 set some of the earliest reduction goals, which the Air Force clearly obtained. The Energy Independence and Security Act of 2007 raised the bar. The new Executive Order 13514 added greenhouse gas requirements and a drastically higher goal based on a new 2008 baseline.

BENEFITS

Air Force and Congressional leadership support is critical to ensure current programmed funding levels continue and additional funding is established through 2015 and beyond. Proper investments in energy and water conservation help the Air Force:

- ✔ Avoid costs – Every dollar spent on energy conservation reduces the amount spent on future utility bills.
- ✔ Reduce fossil fuel dependence
- ✔ Improve mission support with reliable infrastructure
- ✔ Enhance energy security
- ✔ Meet legislative mandates

AIR FORCE ENERGY VISION

The Air Force vision is to reduce demand through conservation and efficiency, increase supply through alternative energy sources, and create a culture where all Airmen make energy a consideration in everything we do.



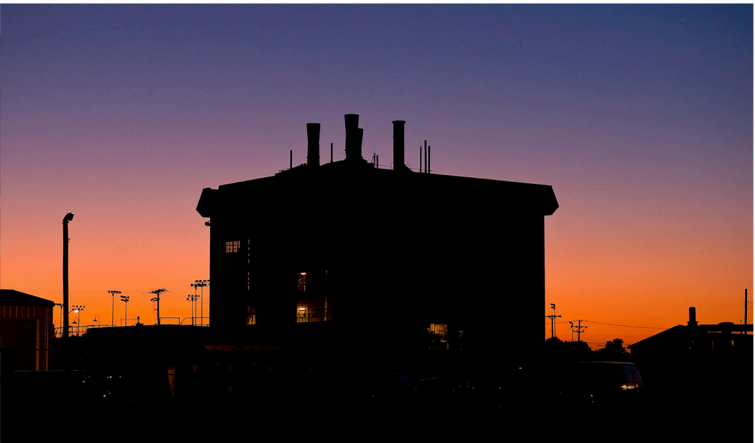
The Air Force has installed thousands of ground source heat pumps that use energy in the ground to heat and cool buildings. This project is at Minot AFB, N.D.

REDUCE DEMAND – ENERGY CONSERVATION

Air Force energy experts believe the majority of energy intensity reductions will come from efficiency improvements to existing infrastructure, such as retrofitting lighting; installation of ground source heat pumps; facility envelope upgrades; decentralizing heat plants; and paint hangar heating, ventilation and air conditioning recirculation systems.

Of the \$225M per year the Air Force has dedicated to meet federal mandates, almost \$190M is targeted for energy conservation infrastructure improvements.

In FY09, the Air Force funded 11 energy conservation projects through ECIP totaling \$23M. These projects will save enough electricity to power 4,000 homes. For FY10, the Air Force awarded more than \$20M in energy audit projects and is postured to execute another \$20M in FY11.



Engineers are evaluating plans to decentralize this heat plant at Dover AFB, Del. The project is expected to save \$1.9M a year and reduce energy consumption 15% at the base.