The United States Air Force Exists to DOMINATE Air, Space, and Cyberspace for America

The mission of the United States Air Force is to fly, fight and win... in air, space, and cyberspace

Global Vigilance, Global Reach and Global Power
Air Force 2008 Energy Use

Over $9 billion spent for energy in 2008

Energy Cost and Consumption Trends

Energy Cost Breakdown

Energy consumption is decreasing
While costs are increasing

Aviation 84%
Facilities 12%
Ground Vehicles and Equipment 4%
We can't rest until we harness the renewable energy that can create millions of new jobs and new industries. ...That's how we can grow our economy, enhance our security, and protect our planet at the same time.  
- President Obama, 29 Apr 2009

The Air Force energy strategy furthers an energy future that is secure, efficient, and environmentally sound.  
- Michael Donley, Secretary of the Air Force, Jan 2009

We must continue to identify innovative ways to conserve energy and take actions to build upon our success. Let’s be passionate energy advocates, set the example, and remind those around us that our individual actions can make a significant difference in creating a more energy-efficient Air Force.  
- General Norton Schwartz, USAF Chief of Staff, Jan 2009
Formally established the AF Energy Program: Strategy, Goals, Objectives and Metrics
3-Part Strategy
Reduce Demand
Increase Supply
Change the Culture

Vision
Make Energy A Consideration In All We Do
Air Force Energy Program: “Reduce Demand” Goals

- Increase Conservation
  - Implement pilot fuel efficiency measures
  - Incorporate pilot fuel efficiency elements in UPT training syllabus

- Improve Efficiency
  - Reduce installation energy intensity by 3% per annum
  - Reduce aviation fuel consumption by 10% (from a 2006 baseline)
  - Reduce motor vehicle fleet fuel use by 2% per annum

- Enhance Energy Security

Goals

2009 - 2015
Reduce Demand: Focus Area Initiatives

Aviation
- Reducing aircraft weight
- Optimizing flight routes
- Evaluating training fuel loads

Infrastructure
- Decreasing energy use
- Purchasing energy efficient supplies and low-speed vehicles
- Reducing vehicle fossil fuel use

Acquisition & Technology
- Designing more efficient and adaptive engines
- Pursuing more energy efficient aircraft
Air Force Energy Program: “Increase Supply” Goals

- **Increase Alternative Fuels**
  - Acquire 50% of AF’s domestic aviation fuel requirements via an alternative fuel blend

- **Increase Renewable Energy**
  - Increase facility renewable energy at annual targets:
    - 5% by FY10, 7.5% by FY13, 25% by FY25 — 50% of increase must come from new renewable sources

- **Utilize Public-Private Partnerships**
  - Increase non-petroleum-based fuel use by 10% per annum in the motor vehicle fleet

- **Enhance Energy Security**
Air Force Energy Program: “Change the Culture” Goals

Leadership
- Implement an Energy Curriculum
- Educate and train all personnel in energy awareness

Training

Education
- Communicate energy awareness across the enterprise consistently and regularly

Communication
- Provide energy leadership by example and through energy governance framework

Goals
2009 2011 2013 2015
Change the Culture: Focus Area Initiatives

- Make Energy A Consideration In All We Do
- Lead by example, build a movement
- Train & Educate
  - Basic Training, Air University, USAFA, Technical and Leadership Schools
- Communicate
  - Measure & publish progress constantly
  - Celebrate success vigorously
- Collaborate with Allies, sister services, agencies, on energy best practices

Lead, Educate, Train, Communicate
Increase Supply: Focus Area Initiatives

Infrastructure
- Largest Federal green power purchaser and 8th largest in US
- Exploring commercial-scale energy projects
- Using ethanol and biodiesel flex-fuel vehicles
- Testing deployable alternative fuel stations

Acquisition & Technology
- Testing and certifying alternative aviation fuels
- Design energy conversion systems to be fuel-flexible
Secretary of the Air Force Challenge:

- **Test**… alternative fuel in Air Force fleet
- **Certify**… fleet on synthetic fuel blend by 2011
- **Fly**… be prepared to cost-competitively purchase 50% of domestic aviation fuel via “greener” alternative fuel blend by 2016
Increase Supply: Synthetic Fuel Certification Timeline

<table>
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<th>Aircraft Type</th>
<th>Certification Timeline</th>
<th>FY08</th>
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Gap Analysis: 1-Oct-07
Cert. Completion: 1-Oct-08
FSE: 1-Oct-09
Engine Test: 1-Oct-10
Cert Complete: 1-Oct-11
Flight Complete: 1-Oct-11

Increase Supply: Synthetic Fuel Certification Timeline
Identifying and characterizing biomass jet fuel
- Foundation for next certification step

“Hydrotreated Renewable Jet” (HRJ)
- Rapid certification possible due to composition similarities to Fisher-Tropsch
- Reduce lifecycle greenhouse gases (joint FAA/DOE/EPA studies underway)
- Testing DARPA 100% biojet candidates
- Evaluating Syntroleum/Tyson “yellow grease” HRJ

Other biomass-derived fuels
- Non-food seed oils (near term)
- Halophytes, algae (far term)
- Cellulosic materials (far term)
Help us identify sustainable biomass sources for aviation

Help us understand lifecycle carbon footprint implications, supply & logistics, conversion technologies and deployment potential

Identify gaps in R&D, policy, environment and deployment that the Air Force could fill
Air Force Energy Initiatives are Many and Varied

- 3.2 MW Landfill Gas Power plant, Hill AFB
- 14.2 MW PV Array, Nellis AFB
- 460 KW PV Project, March AFB
- 122 KW PV Project, Luke AFB
- Oxygenated biodiesel test site, Minot AFB
- Wind Turbine Project, Tin City
- Wind turbines, FE Warren AFB
- Ice Storage System, Dyess AFB
- Sites Under Construction
- Demonstration Sites
- Center of Excellence
- Alternative Fuels Certification Office & AF Research Lab, WPAFB
- Hybrid Aviation Refueler, Shaw AFB
- Advanced Power Technology Office, Robins AFB
- Facility Energy Office, Tyndall AFB
- 1.5 MW Wind Project, MMR
- Alternative Fueled Vehicles, Hickam AFB
Achieving Air Force Energy Security

Energy Strategy
- Reduce Demand
- Increase Supply
- Change the Culture

Energy Security
- Economic Security
- National Security
- Environmental Security

Executing the AF Energy Program Increases Our Energy Security
U.S. AIR FORCE

http://www.safie.hq.af.mil/