

Headquarters U.S. Air Force

Integrity - Service - Excellence

U.S. Air Force Energy Program



**Mr. Mike McGhee
Acting SAF/IEE
1 September 2009**

U.S. AIR FORCE

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



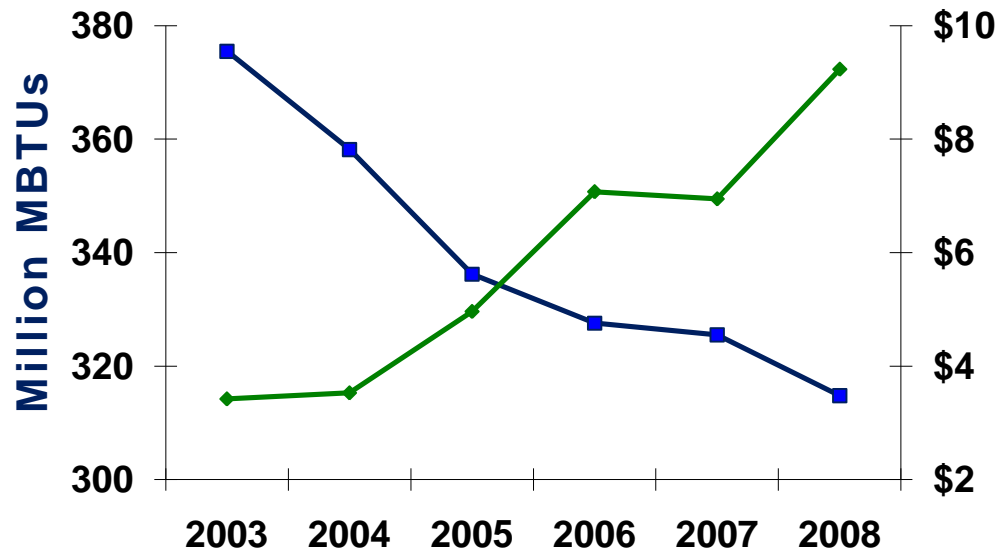


Air Force 2008 Energy Use

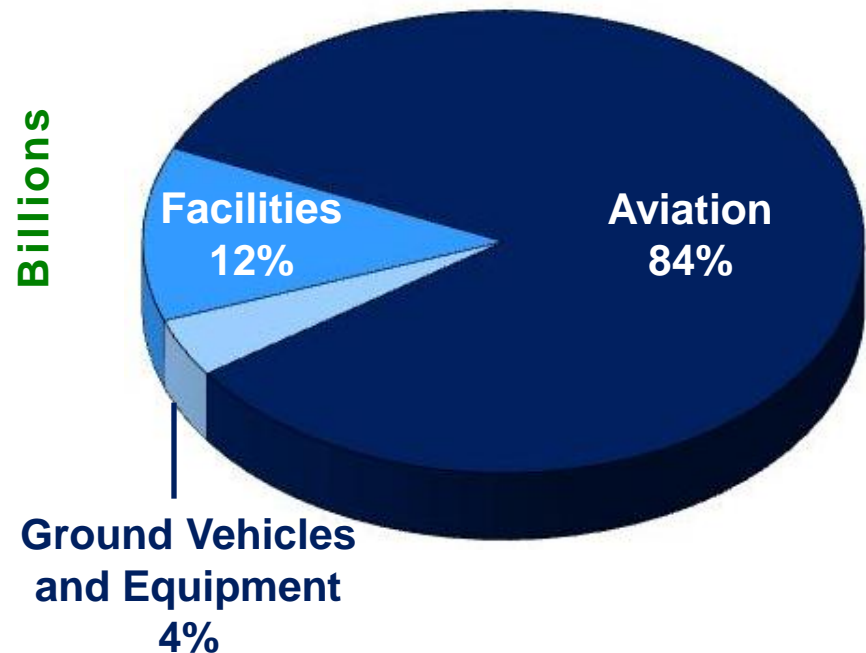
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Over \$9 billion spent for energy in 2008

Energy Cost and Consumption Trends



Energy Cost Breakdown



***Energy consumption is decreasing
While costs are increasing***



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Energy is an Administration Priority



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



Air Force Energy Policy

U.S. AIR FORCE



AIR FORCE POLICY DIRECTIVE 90-17
16 JULY 2009
Special Management
ENERGY MANAGEMENT

BY ORDER OF THE SECRETARY OF THE AIR FORCE

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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Supersedes: AFPD 23-3, 7 September 1993, AFPM 110-1, 16 June 2009

Certified by: SAF/EE (Ms. Debra K. Walker)
Pages: 17

This directive implements Department of Defense (DoD) Instruction 4170.10, *Energy Management Policy*, August 8, 1991; DoD Directive 4170.11, *Installation Energy Management*, November 22, 2005; DoD Directive 5126.47, *Department of Defense Energy Policy Council*, December 2, 1995; and Office of the Under Secretary of Defense (AT&L) Memorandum, implementing Executive Order 13423, December 21, 2007. This Air Force Policy Directive (AFPD) applies to all military and civilian Air Force personnel; it also applies to all Air Force Reserve Command (AFRC) units and to the Air National Guard (ANG). This publication shall be applied to contractors or other persons through the contract or other legally binding agreement with the Department of the Air Force. Radar recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using AF Form 147, *Recommendation for Change of Publication*, route AF Form 147 from the field through the appropriate functional chain of command. Entries that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-561, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located at <http://www.af.mil/afm33-561.htm>. See Attachment 1 for a glossary of references and supporting information.

SUMMARY OF CHANGES

The original AFPD 23-3, dated 7 September 1993, required updating to meet mission changes. Major changes include establishing energy goals, objectives, and metrics and establishing an Energy Senior Force Group and Energy Management Steering Groups in the Headquarters.

AFPD 90-17



AIRFORCE INSTRUCTION 90-1701
16 JULY 2009
Special Management
ENERGY MANAGEMENT

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This publication implements Air Force Policy Directive (AFPD) 90-17, *Energy Management*, and is consistent with the Air Force Energy Plan. This Air Force Instruction (AFI) applies to all military and civilian Air Force personnel; it also applies to the Air Force Reserve Command (AFRC) units and to the Air National Guard (ANG). This publication shall be applied to contractors or other persons through the contract or other legally binding agreement with the Department of the Air Force. Radar recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 147, *Recommendation for Change of Publication*, route AF Form 147 from the field through the appropriate functional chain of command. Entries that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-561, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located at <http://www.af.mil/afm33-561.htm>. See Attachment 1 for a glossary of references and supporting information.

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2.1. Energy Goals, Objectives, and Metrics	13

AFI 90-1701

**Formally established the AF Energy Program:
Strategy, Goals, Objectives and Metrics**

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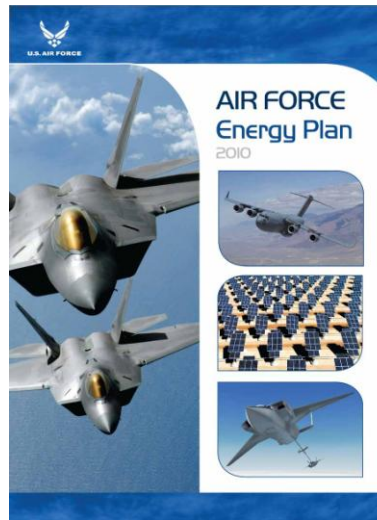
Air Force Energy Plan

3-Part Strategy

Reduce Demand

Increase Supply

Change the Culture



Vision

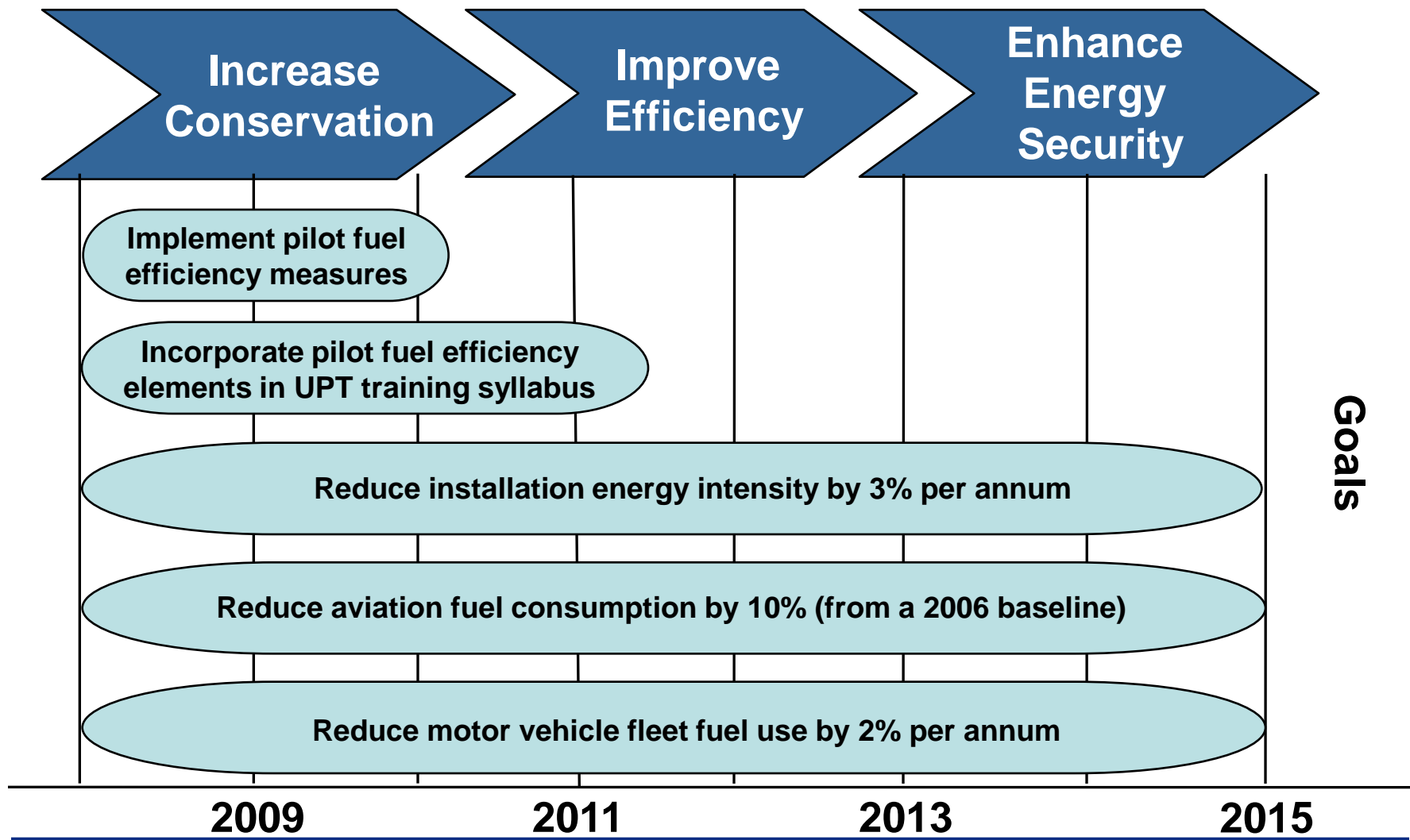
Make Energy A Consideration In All We Do

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Air Force Energy Program: “Reduce Demand” Goals

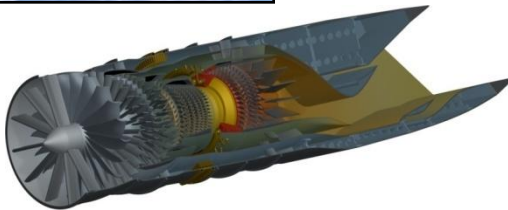


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Reduce Demand: Focus Area Initiatives



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

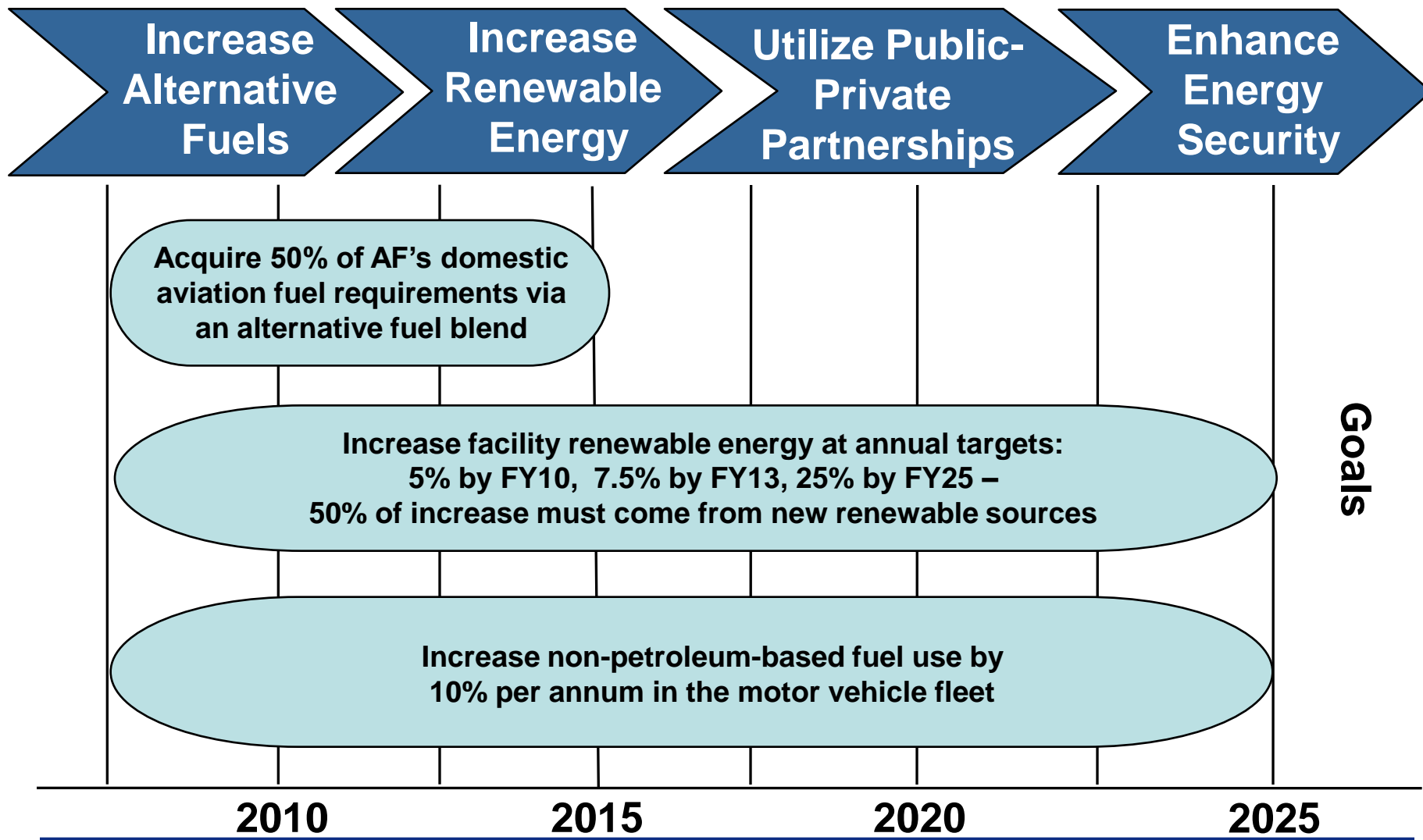
Acquisition & Technology

- Designing more efficient and adaptive engines
- Pursuing more energy efficient aircraft



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Air Force Energy Program: “Increase Supply” Goals

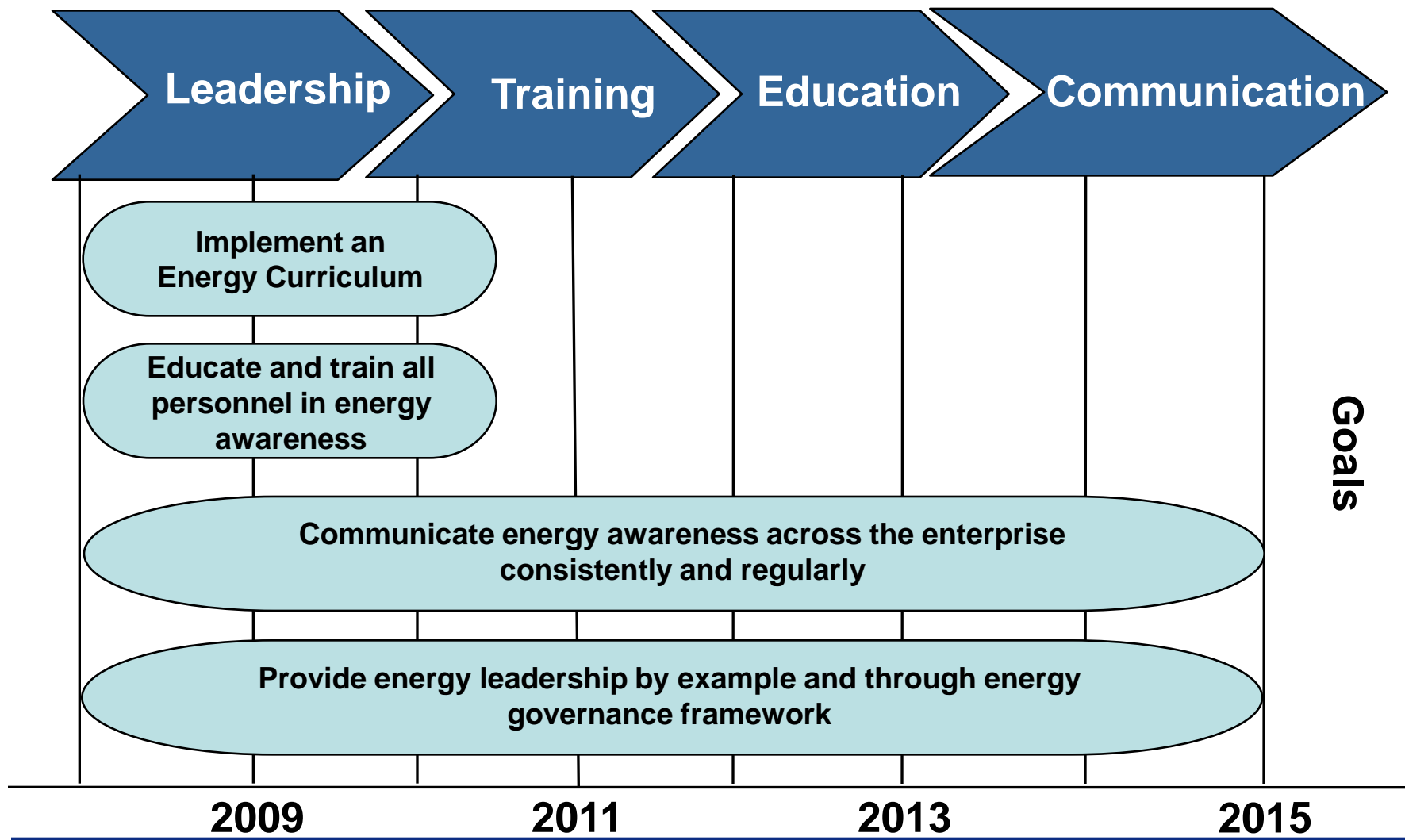


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Air Force Energy Program: “Change the Culture” Goals



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- **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**





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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**





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Increase Supply:

Alternative Aviation Fuel Certification Initiative

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

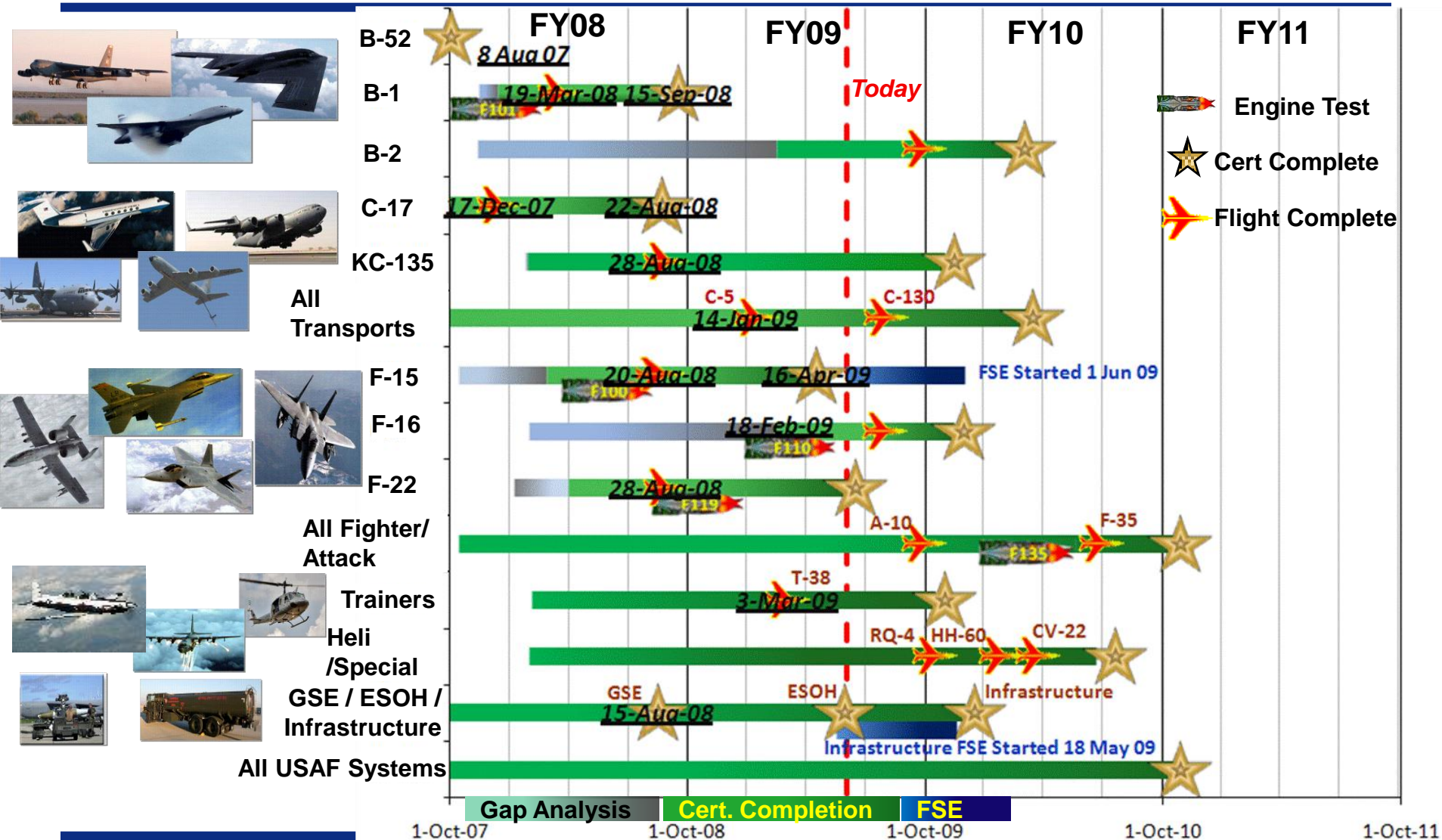


Ensure Domestic Fuel Availability



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Increase Supply: Synthetic Fuel Certification Timeline



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2 Jun 09¹⁴



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Increase Supply:

Biomass-Derived Fuel Blend Certification

- 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)



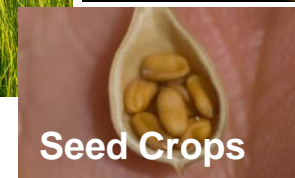
Jatropha



Algae



Halophytes



Seed Crops





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- **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

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3.2 MW Landfill
Gas Power plant,
Hill AFB



14.2 MW PV Array,
Nellis AFB

Oxygenated
biodiesel test site,
Minot AFB



Alternative Fuels
Certification Office
& AF Research Lab,
WPAFB

1.5 MW Wind
Project, MMR

Hybrid Aviation
Refueler,
Shaw AFB



Wind turbines,
FE Warren AFB



Advanced Power
Technology Office,
Robins AFB

460 KW PV Project,
March AFB

122 KW PV Project,
Luke AFB



Wind
Turbine
Project,
Tin City



Ice Storage System,
Dyess AFB

Facility Energy
Office, Tyndall AFB

Alternative
Fueled Vehicles,
Hickam AFB



Sites Under Construction

Demonstration Sites



Center of Excellence

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Achieving Air Force Energy Security

Energy Strategy

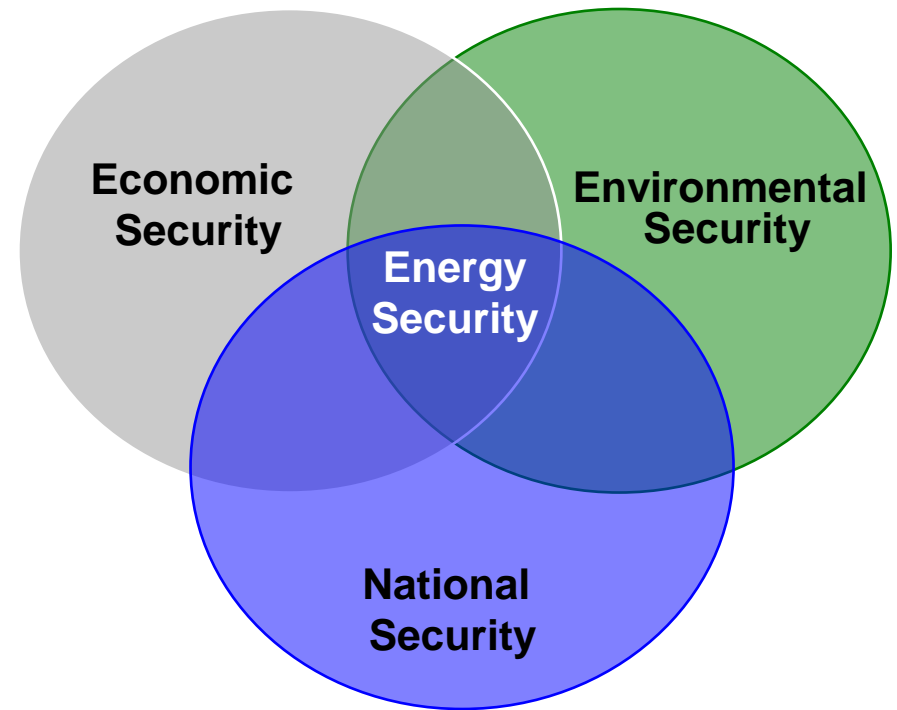
Reduce Demand

Increase Supply

Change the Culture



Energy Security



***Executing the AF Energy Program Increases
Our Energy Security***

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

