

Air National Guard

Developing an Energy Program



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Overview

- Why Reduce Energy Use?
- ANG 101
- Challenges
- Overall Energy Program Strategy
- The 4 Pillars
- How are we doing?
- What are we doing Centrally?
- Funding Sources
- Installation Energy Scorecard
- Misc Efforts

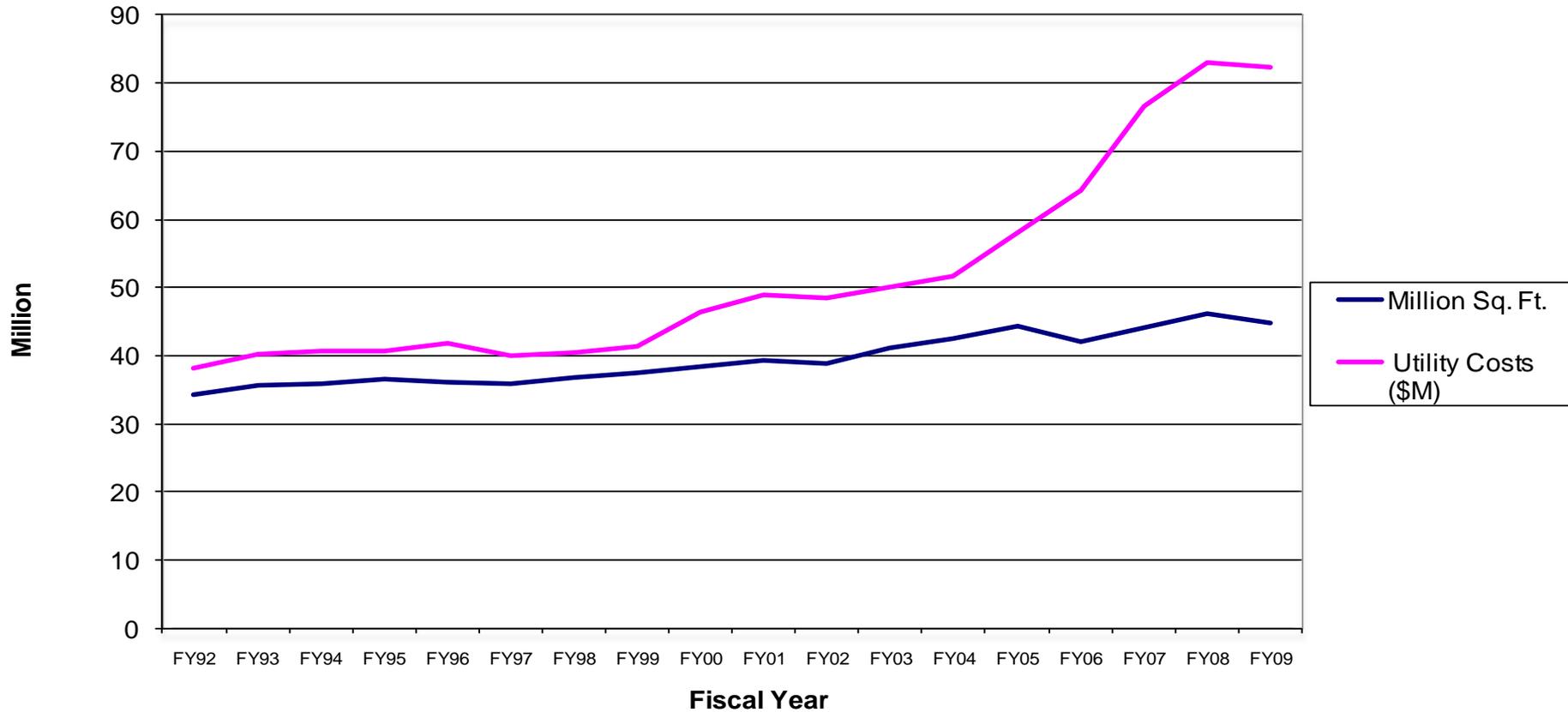


Why Reduced Energy Use is Important

- Federal Legislative Requirements
- Air Force Requirements
- Rising Utility Costs
- National Security and Energy Independence
- Limited Resources
 - Natural Resources
 - Money
- “It’s the right thing to do”
- Climate Change

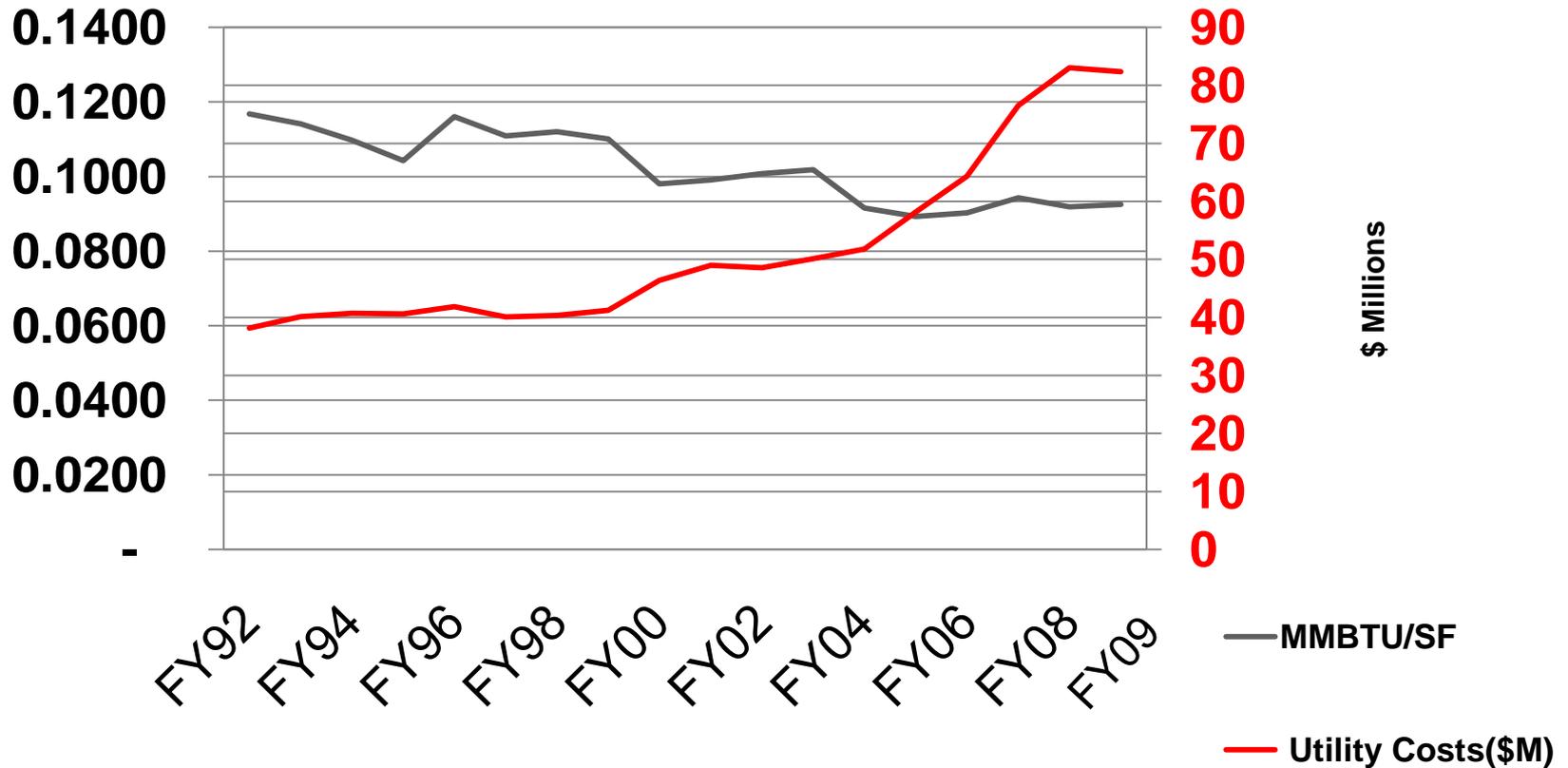


Historical Energy Cost v. Square Foot Comparison





2009 Energy Intensity v. Cost





The Guard



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ANG Physical Plant



- 2 ANG Bases
- 62 Civilian Airports
- 12 AF Bases
- 1 Naval Air Station
- 4 Air Reserve Bases
- 1 NASA Facility
- 1 ANG Stations

Footnotes:

- Located in all 50 states, 3 territories and District of Columbia
- 178 locations total
- Most locations leased to the AF and licensed to the State
- People excludes Federally funded State employees



Average ANG Base

- 400,000 Square Foot Facilities
- 300 – 400 Full Time Guardsmen
- 1000 -1300 Traditional Guardsmen
- Facilities Built for Traditional Staff
- Co-located on Civilian Airports
- Utilities & State Employee Cost shared
75% Federal, 25% State
- Typical Facilities Staff:
 - 8 – 10 Federal Employees
 - 15 – 20 State Maintenance Employees



Challenges Meeting Energy Mandates

- 178 Locations
- 54 Rules of Engagement
 - Facility Employee staffing
 - Energy Focus
 - Contracting Capabilities
- ANG Organizational Structure Decentralized
- Minimal Facilities Staff
- Rising Energy Costs
- Limited Resources
- **Technical Capabilities of O&M Staff**
- Lower Baseline Energy Intensity



Energy Program Strategy

- Implement Automated Operations Management Systems
- Upgrade & Lighting Control Systems to Direct Digital Controls (DDC)
- Aggressive Energy Audit Program
- Install Smart Meters
- Retro- Commissioning Program (RCx)
- Establish GSA Blanket Purchase Agreement (BPA) Program
- Energy Project Program for Existing Facilities
- Aggressive LEED Design Policy for Major Construction
- Energy Awareness Program
- Energy Scorecard
- Energy Incentive Awards Program
- Infrastructure Energy Strategic Plan
- Track Progress with Metrics



ANG Energy Pillars

GOALS

- Reduce Cost by 20% by 2020
- Reduce Energy Intensity by 3% per Annum
- Reduce Water Use by 2% per Annum
- Increase Renewables at Annual Targets (3%, 5%, 7.5%, 25%)
- Reduce Ground Fuel use by 2% Per Annum
- Increase Alternative Fuel Use by 10% Per Annum

Governance

Improve Current Infrastructure

- * Envelope
- * HVAC / controls
- * Plumbing
- * Water systems
- * Central plants
- * Interior lighting
- * Distribution
- * Recommissioning
- * Rightsize fleet
- * Low speed vehicles

Improve Future Infrastructure

- * Plan / program
- * Sustainable designs
- * Construct high- η performance buildings
- * Commissioning
- * Increase use of alternative-fuel, hybrid technology vehicles

Expand Renewables

- * Develop
 - solar
 - wind
 - geothermal
 - biomass
- * Purchase renewable energy credits
- * Explore hydrogen technology

Manage Costs

- * Plan
- * Negotiate / litigate
- * Educate
- * Operate and maintain

- | | |
|---------------------------|------------------------|
| Plan
Program
Budget | * 5 Year Project Plan |
| | * Effective Resourcing |
| | * Balanced Investment |

- | | |
|-----------------|---------------------------|
| Decision
Mgt | * Effective Data |
| | * Performance Measurement |
| | |

- | | |
|-----------|---------------------------|
| Awareness | * Strategic Communication |
| | * Awards / Incentives |
| | * Education & Training |

Asset Management

Optimize assets >>> performance, risk, and cost >>> enterprise-wide

Culture Change

See the waste >>> Acknowledge the waste >>> Eliminate the waste



Pillar 1 – Improve Current Infrastructure

- Automated Operations Management Program
 - Integrated Engineering Management System (IEMS) 2002
 - Recurring Maintenance Program
 - Work Order Management Program
 - Financial Tracking Program
- Upgraded Control Systems
 - Direct Digital Controls (started mid – 1990s)
 - Majority of Bases have DDC systems installed, with many in various stages of being upgraded
- Installed Gas Fired Infrared Heat in High Bay areas



Pillar 1 – Improve Current Infrastructure

- Centrally Managed Efforts
 - Energy Audits
 - Identifying Energy Conservation Opportunities/Measures (ECO/ECM)
 - Assisting with Programming Projects
 - Facilitating Advanced Meter Projects
 - Upgrading DDC Systems
 - Retro Commissioning (RCx)
 - Increased Energy Training
 - Certified Energy Management (CEM)



Pillar 1 - Improve Current Infrastructure

- Conduct Energy Audits
 - Invested \$5.7M in FY07-FY09
 - 84 Installations
 - 32 M SF
 - Remaining 17 Installations Schedule for FY10/FY11



Initial Audit Results

- Typical Conservation Measures Identified
 - Upgrade HVAC Controls
 - Upgrade HVAC Systems
 - Convert Highbay Lighting to T5
 - Retro-Commissioning(RCx)
 - Reduce Appliances (Vending/Fridges/TV's)
 - Low Cost/No Costs Items
 - Turn Off Computers
 - Door Weather stripping
 - Caulk Windows
 - HVAC Settings/Controls Programming



Pillar 1 - Improve Current Infrastructure

- Advanced Metering
 - Invested \$8.6M in FY07-09
 - Electric, Gas, Water
 - 65 Bases
 - Challenges
 - ANG Smaller Facilities, meters required on smaller facilities
 - Central Data Collection (both Internal and External)
 - Upgrade existing Infrastructure (DDC/EMCS Systems)



Pillar 1 - Improve Current Infrastructure

- RetroCommissioning (RCx)
 - In-house efforts in FY07-08
 - 5 Facilities (186,000 SF)
 - Invested \$5.1M in FY07-09
 - 2.8M Square Feet
- Typical Results
 - Improved Customer Satisfaction
 - Needed Maintenance completed
 - Estimated Energy saved
 - Average 10 to 15% of facility energy use
 - Recommended Capital Improvements to increase energy savings



RCx Results

- Typical Findings:
 - Lack of general maintenance
 - System Components not working
 - Lack of calibration
 - Dirty Coils
 - Poor Controls Sequence of operation
 - Space Utilization has changed
 - Inadequate design/construction
 - **Maintenance staff under skilled for modern systems**

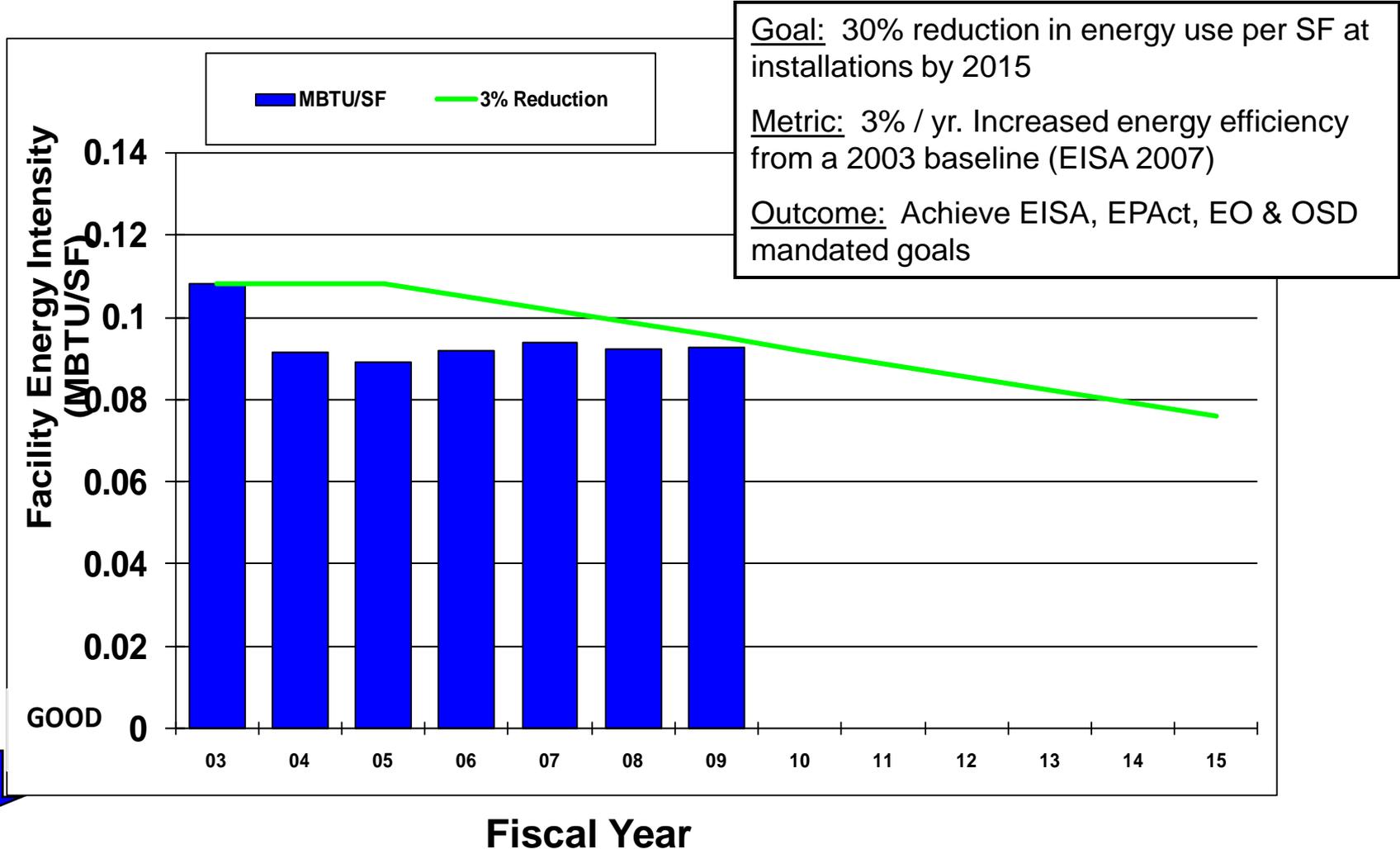


O & M Energy Issues

- Capabilities and Number of Maintenance Staff
- Building Envelope Critical
 - Weather stripping
 - Window Caulking
- Large Majority of Energy Savings must come from Existing Facilities
 - Existing HVAC/Lighting systems must operate efficiently
 - Controls systems must be operating properly
 - Requires effective RWP program
 - Rcxing

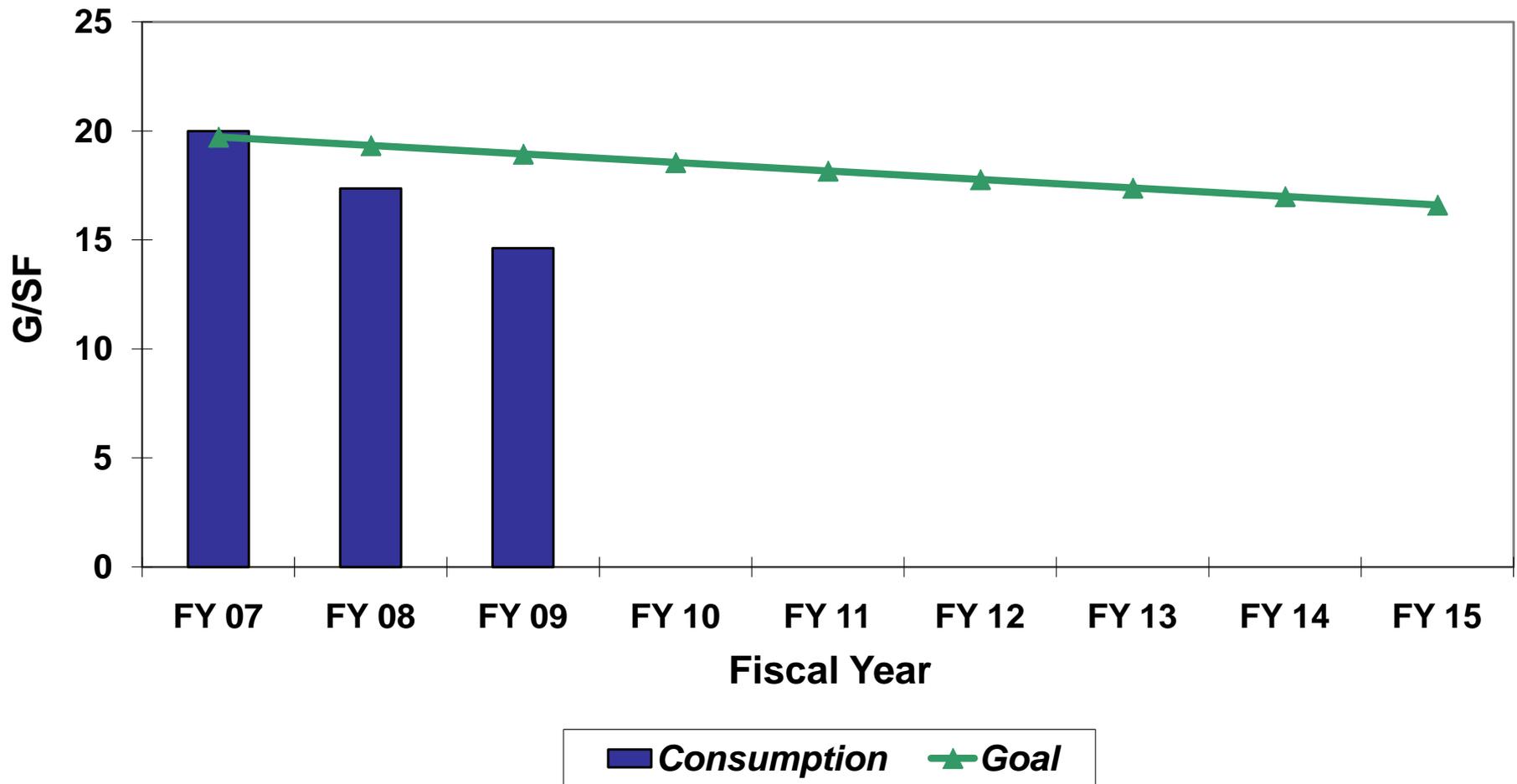


Energy Reduction Status





Water Conservation Status





Pillar 2- Improve Future Infrastructure

- Implementation of the ANG's Sustainable Design Policy.
- All ANG Milcon and select SRM projects shall accomplish the following LEED goals:
 - All Vertical Construction projects shall obtain, at minimum, a LEED Silver Rating
 - All Industrial Category projects shall achieve, at minimum, 28 to 32 points and a LEED Certified Rating
 - All Horizontal Category projects shall achieve a minimum of 11 to 13 points
 - All Utility Category projects shall achieve a minimum of 8 to 9 points



Pillar 3 - Expand Renewables

- Implement Renewables wherever Feasible
- Purchase Green Power through Local Utilities.
- Purchase Renewable Energy Credits
- Design New Facilities for future Renewables



Pillar 3 – Expand Renewables

- ANG Operational Renewable Systems
 - Fresno, CA – 660 KW
 - Toledo, OH – 734 KW
 - Camp Perry, OH – 220 KW
 - Phoenix, AZ – 16.8 KW
- ANG Systems in Development
 - Burlington, VT
 - Otis, MA
 - Tucson, AZ
 - Channel Is, CA
 - Buckley, CO



Fresno PV

660 KW System





Pillar 4 - Manage Costs

- Reduce Late Payments
- Reduce Power Factor Penalties
- Consider Centralize Purchasing of Utilities
- Understand Installation and Facility Load Profiles
- Understand Utility Rate Structure
- Insure Best Rate Structure for Your Load Profile



Energy Projects Funding

- ANG Energy Focus (Starting in FY 07)
 - Earmark up to \$10M SRM annually
 - Programmed 199 projects totaling \$108M, 2009-2013
 - Anticipate additional requirements through auditing
- ANG Energy Audit - \$1M SRM Annually
- ANG Advanced Meters - \$1M SRM Annually
- AF POM Wedge
 - ANG share \$26M annually, FY 10-15; augment ANG Focus Funds
- Energy Conservation Investment Program (ECIP)
 - DOD centrally managed/funded MILCON type program
 - 12 projects completed/pending award; \$15.7M
 - 11 projects programmed; \$20M
 - 15M PV



Scorecard

- Annually
 - Last Energy Audit
 - Base Strategic Energy Plan Status
 - Energy Reduction Status
 - Renewable Energy Status
 - Water Reduction Status
 - Energy Projects
 - Base Energy Manager
- Quarterly
 - Energy and Water Reduction Status



Other Misc. Energy Initiatives

- Increase Energy Focus in SAV's/Base Visits
- Increase Energy Emphasis in BCE/FM Training
- Establishment of Field Energy Assistance Team
- 1st ANG Energy Meeting
 - 101 participants from 58 Bases (GLOBALCON 08)
- Regional Resource Efficiency Manager (REM)
- 2 Certified Energy Manager Course
 - Jan 09, Minot – 20 Participants, 6 Bases
 - Next Course, July/Aug 09



Summary

- A Comprehensive Energy Program has Many Parts
- There is no Silver Bullet
- Leadership Support is Critical
- The last 15% reduction will be more difficult than the first 15%
- Most Energy Reductions need to come from Existing Facilities
- A Comprehensive O&M program is Critical to the Success of an Energy Program
- Must Develop Metrics to Track Progress

Questions?





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