



The Premier Energy Training Workshop
and Trade Show for Federal Agencies

A River of Energy Solutions



U.S. AIR FORCE

Building an Investment Portfolio



Mike Rits, PE, CEM
AF Facility Energy Center - Capital Investments

Overview

- **How to Identify Requirements**
- **What to Validate and How to Prioritize**
- **What to do with Competing Requirements**
- **How to Manage the Program Centrally**
- **Sources of Federal Funds**
- **When to Measure and Verify**
- **How to Forecast Results for Success**

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Identifying the Requirements

- **Understand the goal requirements and how they compete for funding**
- **Central Pgm Mgt helps target funds across the organization to meet goals most efficiently**
- **Energy Audits combined with Facility Condition Assessments and planned future use**
 - **AF has over 500MSF of facilities**
 - **Auditing 75% of highest energy SF**

GOOD NEWS!
EVEN IN THIS BLEAK
ECONOMY, WE'VE FOUND
ONE GUARANTEED
GROWTH INDUSTRY!

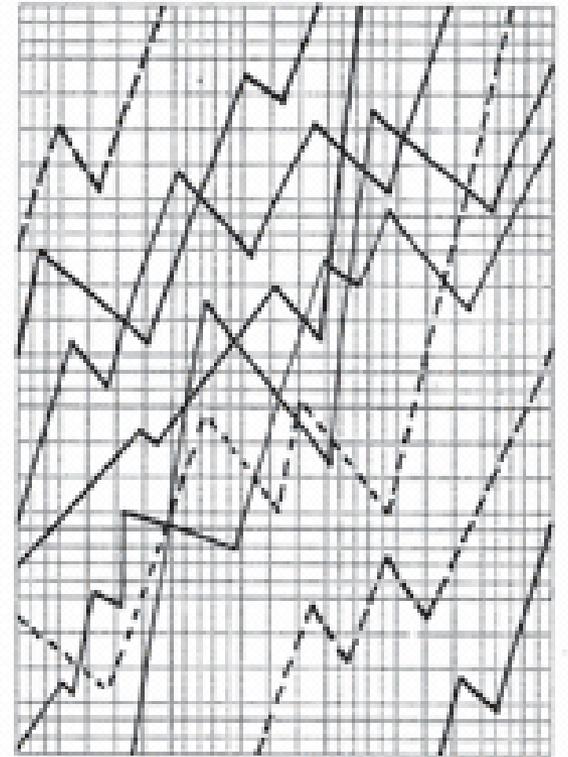
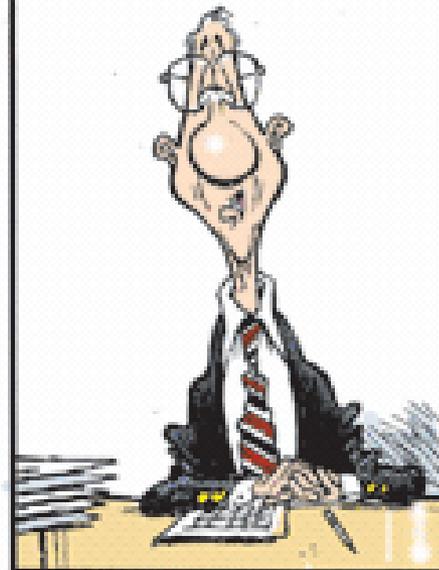


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Government Mandates for Energy

NOW FOR THE
BAD NEWS.



Goals and Mandates

Goal Title	Driver	Baseline (FY)	Annual Target	Final Goal	Goal (FY)	Future Target	Final Goal (FY)
Reduce Facility Energy	EISA 07	2003	3%	30%	2015		
Reduce Facility Energy	EO 13514	2015	1.5%	37.5%	2020		
Reduce GH Gases	EO 13514	2008	3%	35.1%	2015	1.5%	2020
Renewable Energy Use	EPAAct 05	2005	5%	7.5%	2013	7.5%	2025
Renewable Energy Use	USC 2911	2013	1.5%	25%	2025		2025
On-Base Renewable Energy	AF	2008	--	1%	2012	3%	2015
Reduce Water Use	EO 13514	2007	2%	26%	2020		2020
Reduce Industrial Water Use	EO 13514	2010	2%	20%	2020		2020
Audit Covered Facilities	EISA 07	2009	25%	100%	2012		Indef
Meter Facilities (elec)	EPAAct 05	2008	--	100%	2012		2012
Meter Facilities (gas/steam)	EISA 07	2008	--	100%	2016		2016

Investment Strategy/Allocation

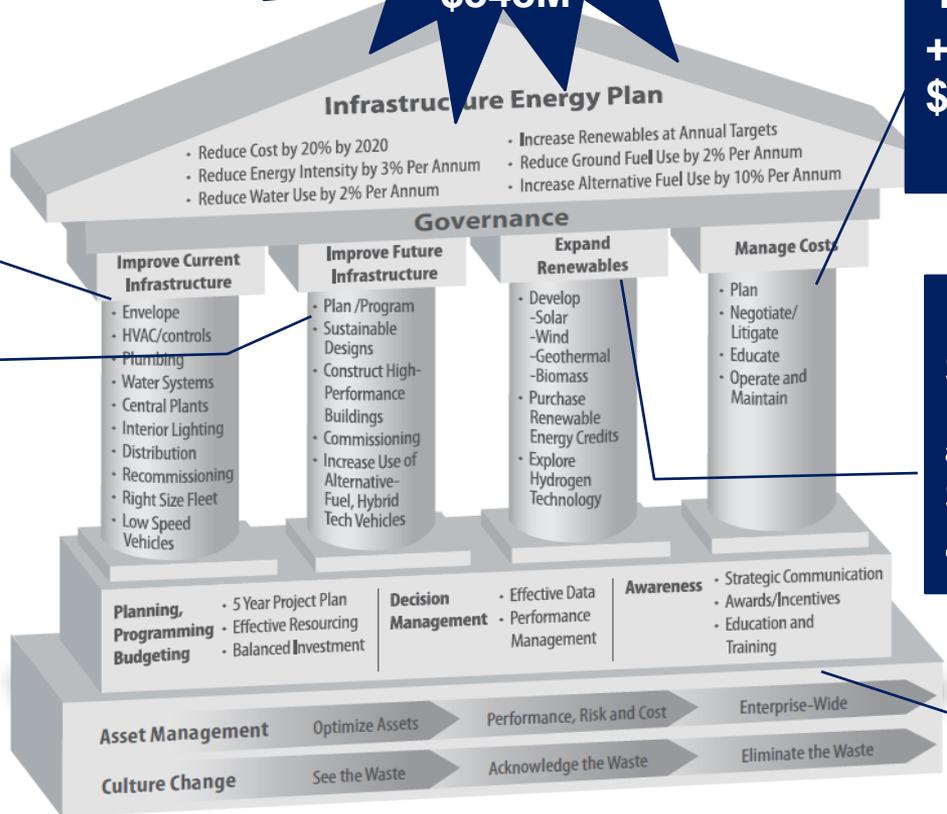
- **Two goals: Save \$\$ and meet mandates**
 - Prioritize w/in each allocation by SIR *BTU or Gal
 - Target meeting all AF Infrastructure Energy Strategic Plan goals and Federal mandates
- **Estimated funding requirements:**
 - Audits based on SF cost; design historical costs
 - Renewables - bottom up evaluation of requirement
 - Water Conservation based on pro-rata share
 - Centrally procured RECs
- **Balance goes to Energy Conservation projects**
- **Update Investment Strategy annually**

Capital Investment Allocations

Total Force Funding Allocations (Combined ECIP/NRG \$M)								
PROGRAM	FY10	FY11	FY12	FY13	FY14	FY15	FY16	TOTALS
BUYOUTS	20.2	0.0	0.0	0.0	0.0	0.0	0.0	20.2
AUDITS	20.0	20.0	22.0	22.0	15.0	15.0	0.0	114.0
WATER CONS	13.7	18.9	23.0	24.0	26.0	26.0	6.0	137.6
RENEWABLES	8.0	4.9	17.2	3.4	11.1	0.0	6.0	50.6
DESIGN	17.0	18.7	19.8	20.6	23.5	23.5	3.5	126.6
RE PROJ DEV	1.0	1.5	1.5	2.0	1.0	1.0	0.0	8.0
ENERGY CONS	211.1	224.5	205.1	191.5	186.9	198.0	17.5	1234.5
TOTALS	291.0	288.5	288.5	263.5	263.5	263.5	33.0	1691.5

FY11 Facility Investment

FY 11 Investment \$348M



Reduce Demand
\$180M Focus Funds
 -- energy & water conservation projects
\$27M ECIP

Manage Costs
 + Project savings of **\$10M+** from FY 11 base utility bill audits

Reduce Future Demand
\$ 38M Audits
\$ 20.2M Design
\$25M MILCON
 -- 2% of FY10 MILCON pgm dedicated to sustainable design features

Increase Supply
\$14M Focus Funds
 -- Small renewable projects and RE studies
\$14M ECIP
 -- GSHP and PV projects

\$29.4M
 -- Energy initiative for People and training

Facility Energy Audit Strategy

- Audits are first step in pgm dev't
 - Base identifies/prioritizes facilities for investment lvl audits
 - AF has 4-yr plan to audit covered facilities
 - FY11- program (\$20M) funds audits at 39 locations
 - Audits now part of Sustainable Infrastructure Assessments
 - Facility Condition Assessments
 - Space use data
 - HPSB reqt identification



Energy Audit 4-Year Program

MAJCOM	Base	Total SF	Covered Fac	FY09	FY10 (SF)	FY11 (SF)	FY12 (SF)
ACC	OFFUTT AFB	6,333,000	4,749,750		2,335,636		2,414,114
ACC	LANGLEY AFB	5,093,000	3,819,750		1,916,607	1,903,143	
ACC	MT HOME AFB	3,197,000	2,397,750		1,190,902		1,206,848
ACC	NELLIS AFB	5,642,000	4,231,500		2,121,785		2,109,715
ACC	DAVIS MONTHAN AFB	4,560,000	3,420,000			3,420,000	
ACC	DYESS AFB	3,351,000	2,513,250			2,513,250	
ACC	BEALE AFB	2,941,000	2,205,750			2,205,750	
ACC	SHAW AFB	2,941,000	2,205,750			2,205,750	
ACC	HOLLOMAN AFB	5,363,000	4,022,250			4,022,250	
ACC	ELLSWORTH AFB	4,492,000	3,369,000			3,369,000	
ACC	SEYMOUR JOHNSON AFB	3,107,000	2,330,250			2,330,250	
ACC	MOODY AFB	2,609,000	1,956,750			1,956,750	
ACC	CREECH AFB	459,000	344,250			344,250	
ACC	TONOPAH	2,607,000	1,955,250				1,955,250
ACC	JB AVON PARK-MOODY					193,234	
ACC	JB FT EUSTIS-LANGLEY						

Energy Audit 4-Year Program

MAJCOM	Base	Total SF	Covered Fac	FY09 (SF)	FY10 (SF)	FY11 (SF)	FY12 (SF)
AETC	KEESLER AFB	6,953,000	5,214,750		4,488,766	725,984	
AETC	MAXWELL/GUNTER	4,503,000	3,377,250	2,060,599		1,316,651	
AETC	LACKLAND AFB	14,947,000	11,210,250		9,161,210	2,049,040	
AETC	SHEPPARD AFB	8,189,000	6,141,750	4,443,416		1,698,334	
AETC	GOODFELLOW AFB	2,241,000	1,680,750	901,248			779,502
AETC	TYNDALL AFB	3,970,000	2,977,500		2,399,761		577,739
AETC	RANDOLPH AFB	3,945,000	2,958,750	2,498,133			460,617
AETC	LUKE AFB	3,649,000	2,736,750	1,397,914	1,000,887		337,949
AETC	ALTUS AFB	2,779,000	2,084,250	1,848,713			235,537
AETC	COLUMBUS AFB	1,513,000	1,134,750	955,730			179,020
AETC	LAUGHLIN AFB	1,938,000	1,453,500	1,800,664			
AETC	VANCE AFB	1,362,000	1,021,500	990,942			30,558
AFDW	ANDREWS AFB	5,858,000	4,393,500		2,386,892		2,006,608

Energy Audit 4-Year Program

MAJCOM	Base	Total SF	Covered Fac	FY09 (SF)	FY10 (SF)	FY11 (SF)	FY12 (SF)
AFMC	ARNOLD	2,895,000	2,171,250		1,085,915	1,085,335	
AFMC	TINKER AFB	17,699,000	13,274,250		6,635,755	6,638,495	
AFMC	WRIGHT PATTERSON	15,818,000	11,863,500		5,931,166	5,932,334	
AFMC	ROBINS AFB	13,262,000	9,946,500		4,967,957		4,978,543
AFMC	HILL AFB	13,450,000	10,087,500		5,351,860		4,735,640
AFMC	EGLIN AFB	9,371,000	7,028,250		3,560,006		3,468,244
AFMC	L G HANSCOM AFB	3,399,000	2,549,250		1,297,943		1,251,307
AFMC	KIRTLAND AFB	7,437,000	5,577,750		2,670,357		2,907,393
AFMC	EDWARDS AFB	7,771,000	5,828,250		2,879,156		2,949,094
AFSPC	THULE AB	2,094,000	1,570,500				1,570,500
AFSPC	CLEAR AFS	870,000	652,500			652,500	
AFSPC	BUCKLEY AFB	3,060,000	2,295,000		1,149,302		1,145,698
AFSPC	VANDENBERG	6,719,000	5,039,250	4,238,475			800,775
AFSPC	SCHRIEVER/FALCON	1,910,666	1,433,000		958,196		474,804

Energy Audit 4-Year Program

MAJCOM	Base	Total SF	Covered Fac	FY09 (SF)	FY10 (SF)	FY11 (SF)	FY12 (SF)
AFSPC	PETERSON AFB	3,687,000	2,765,250		1,382,163		1,383,087
AFSPC	CAPE CANAVERAL	3,707,000	2,780,250		1,344,612		1,435,638
AFSPC	CHEYENNE MT AFB	496,000	372,000		371,633		
AFSPC	PATRICK AFB	3,290,000	2,467,500				2,467,500
AFSPC	LOS ANGELES AFS	1,192,000	894,000			894,000	
AFSPC	ASCENSION IS.	395,000	296,250				
AFSPC	ANTIGUA	168,000	126,000				
AFSPC	NEW BOSTON	137,000	102,750			102,750	
AFSPC	CAPE COD	99,000	74,250				
AFSPC	CAVALIER	402,000	301,500			301,500	
AMC	McGUIRE AFB	5,141,000	3,855,750	1,599,099			2,256,651
AMC	MACDILL AFB	4,404,000	3,303,000	1,197,994			2,105,006
AMC	DOVER AFB	3,446,000	2,584,500	1,093,693			1,490,807
AMC	GRAND FORKS	3,039,000	2,279,250	891,958			1,387,292
AMC	SCOTT AFB	4,691,000	3,518,250	1,500,159		2,018,091	

Energy Audit 4-Year Program

MAJCOM	Base	Total SF	Covered Fac	FY09 (SF)	FY10 (SF)	FY11 (SF)	FY12 (SF)
AMC	FAIRCHILD AFB	4,909,000	3,681,750	1,121,471			2,560,279
AMC	MCCONNELL	2,581,000	1,935,750	959,658			976,092
AMC	TRAVIS AFB	6,563,000	4,922,250	2,009,030		2,913,200	
AMC	CHARLESTON	3,317,000	2,487,750	999,696			1,488,054
AMC	LITTLE ROCK AFB	3,884,000	2,913,000	1,163,020			1,749,980
AMC	Joint Base Fort Dix	5,798,000	4,348,500			4,384,500	
AMC	Joint Base Lakehurst	2,760,706	2,070,530			2,070,530	
AMC	Joint Charleston	6,653,054	4,989,791			4,989,791	
AFGSC	BARKSDALE AFB	3,599,000	2,699,250			2,699,250	
AFGSC	FEWARREN AFB	3,241,000	2,430,750	1,387,954	1,043,050		
AFGSC	MALMSTROM AFB	3,048,000	2,286,000		1,196,328		1,089,672
AFGSC	MINOT AFB	3,600,000	2,700,000		1,303,606		1,396,394
AFGSC	WHITEMAN AFB	3,686,000	2,764,500		1,378,349		1,386,151

Energy Audit 4-Year Program

MAJCOM	Base	Total SF	Covered Fac	FY09 (SF)	FY10 (SF)	FY11 (SF)	FY12 (SF)
USAFE	RAMSTEIN AFB	13,201,000	9,900,750		4,950,320		4,950,430
USAFE	RAF LAKENHEATH	5,044,000	3,783,000		1,473,543		2,309,457
USAFE	RAF CROUGHTON	1,112,000	834,000		688,841		145,159
USAFE	AVIANO AB	4,840,000	3,630,000		1,812,857		1,817,143
USAFE	RAF MILDENHALL	2,955,000	2,216,250		1,072,251		1,143,999
USAFE	SPANGDAHLEM AB	6,018,000	4,513,500		2,256,167		2,257,333
USAFE	RAF ALCONBURY	1,637,000	1,227,750		621,589		606,161
USAFE	INCIRLIK AB	3,390,000	2,542,500			2,542,500	
USAFE	LAJES FIELD	1,872,000	1,404,000			1,404,000	
USAFE	RAF FAIRFORD	962,000	721,500			721,500	
USAFE	MORON AB	725,000	543,750			543,750	
USAFE	IZMIR AS	517,000	387,750			387,750	

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Validate and Prioritize

- **Validation**
 - All applicable fields in data system filled in
 - $SIR > 1$, $Cost > \$100K$
 - DD1391, data system and BLCC data all match
 - Cost estimate is detailed and reasonable
 - Energy savings, O&M savings, utility rates, discount and inflation rate and economic life correct
- **Prioritize: $SIR * BIR$**

$BIR = \text{Annual BTU saved} / \text{Investment}$

$SIR = \text{NPV of lifecycle \$ savings} / \text{Investment}$

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Competing Requirements



- Program central SRM funds
- Combine sources of funds to allocate funding
- Allocate funds for each competing requirement and prioritize within each allocation
- Track execution/goal impact and adjust allocation as needed (or program add'l \$\$)

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Central Program Management

- **Manage energy audits – review results**
- **Validate projects by allocation type**
- **For decentralized execution**
 - **Issue Advance Authority to Advertise**
 - **Track bid openings, issue funds for valid bids and track contract awards**
 - **Track construction progress**
- **Track program impact**

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Sources of Federal Funds

Program	OPR	Scope	Limits
ECIP	OSD/ AFCEA	Large “game changers”; can be major construction	5yr \$\$; SIR>1.25 Congress notified
SRM	AFCEA	Can not be major construction>\$750K	1yr \$\$; SIR>1
ESTCP	OSD	Environmental Security Technology Certification Program	
RDT&E	AFRL	New technologies, yet unproven in DoD	5yr \$\$; must garner SME approvals
ESPC	AFCEA	3 rd party investment; high SIR, with large investment and long term savings	Authorities; no
UESC	AFCEA	3 rd party investment; limited to what utility provider can support	Authorities
RE PPA	AFCEA	3 rd party investment; meets power reqts for base	Must have land and opportunities for RE
RE EUL	AFRPA / AFCEA	3 rd party investment; typically produces power for off-base	Must have land, RE and grid to feed

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Measurement & Verification

- **ECIP and ESPC require M&V**
- **SRM will require M&V in future**
- **UESC not required**
- **PPA and EUL metered**

- **Benefits:**
 - **Helps with program impact projections**
 - **Helps with preventative maintenance justification**

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Almanac

AF-Level Data



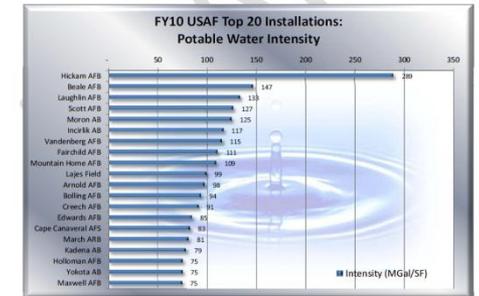
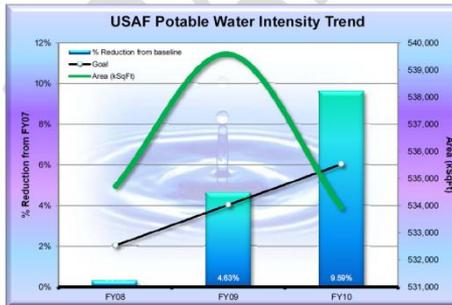
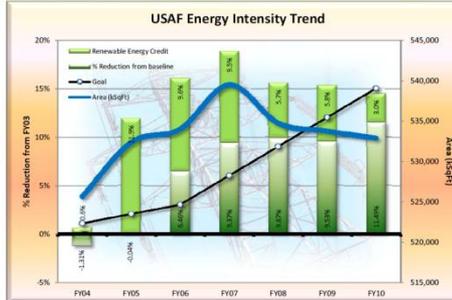
AIR FORCE RESULTS

USAF ROLLUP³

MAJCOM	Energy Intensity Reduction	Potable Water Intensity Reduction	AMR Installation Compliance
ACC	<11.49% from FY09 AND < 3% from FY09 (Red)	<6% from FY07 AND <2% from FY09 (Red)	68.88% Required Meters Installed (Yellow)
AETC	<11.49% from FY09 AND < 3% from FY09 (Red)	<6% from FY07 OR <2% from FY09 (Yellow)	<60% Required Meters Installed (Red)
AFDW	=15% from FY09 OR =2% from FY09 (Green)	<6% from FY07 AND <2% from FY09 (Red)	66.99% Required Meters Installed (Green)
AFGSC	=15% from FY09 OR =2% from FY09 (Green)	=2% from FY07 OR =2% from FY09 (Yellow)	<60% Required Meters Installed (Red)
AFMC	<11.49% from FY09 AND < 3% from FY09 (Red)	=2% from FY09 (Blue)	68.88% Required Meters Installed (Yellow)
AFRC	<11.49% from FY09 AND < 3% from FY09 (Red)	=2% from FY09 (Blue)	<60% Required Meters Installed (Red)
AFSOC	=15% from FY09 OR =2% from FY09 (Green)	=2% from FY09 (Blue)	68.99% Required Meters Installed (Green)
AFSPC	<11.49% from FY09 AND < 3% from FY09 (Red)	=2% from FY09 (Blue)	68.93% Required Meters Installed (Yellow)
AMC	=15% from FY09 OR =2% from FY09 (Green)	=2% from FY09 (Blue)	68.99% Required Meters Installed (Green)
ANG	=11.49-15% from FY09	=2% from FY09 (Blue)	68.88% Required Meters Installed (Yellow)
PACAF	=15% from FY09 OR =2% from FY09 (Green)	=2% from FY09 (Blue)	68.88% Required Meters Installed (Yellow)
USAFA	<11.49% from FY09 AND < 3% from FY09 (Red)	<2% from FY09 (Blue)	68.88% Required Meters Installed (Yellow)
USAFE	<11.49% from FY09 AND < 3% from FY09 (Red)	<2% from FY09 (Blue)	<60% Required Meters Installed (Red)
USAF Summary	<11.49% from FY09 AND < 3% from FY09 (Red)	=2% from FY09 (Blue)	68.88% Required Meters Installed (Yellow)

³ The three categories are color-coded for an "at-a-glance" overview of compliance and achievement, and each cell contains the rule which defines the color displayed. In general, the performance rankings are red - below current goals and negative trending, yellow - below current goals or negative trending, green - above current goals or positive trending, and blue - above current goals and positive trending.

ENERGY, AREA, AND WATER TREND CHARTS



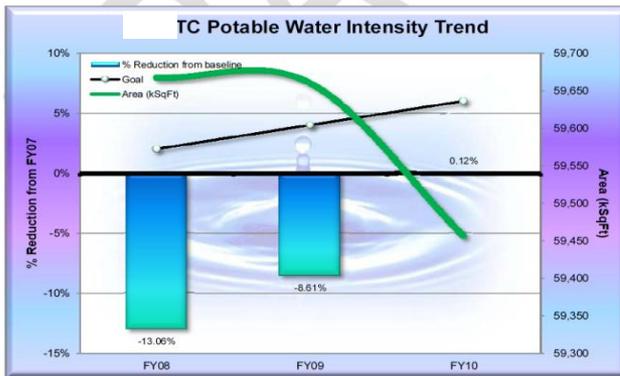
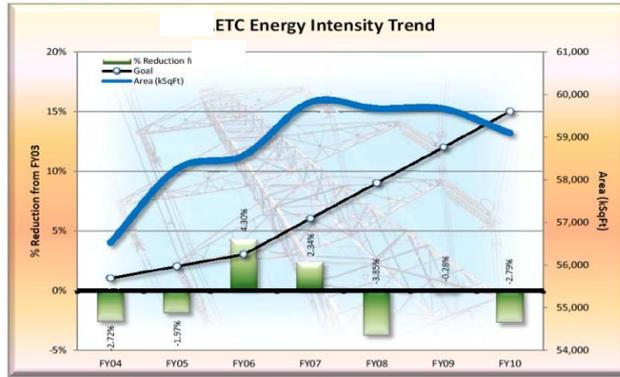
Almanac

USAF Energy Almanac, FY 20

esults

May 2011

ENERGY, AREA, AND WATER TREND CHARTS



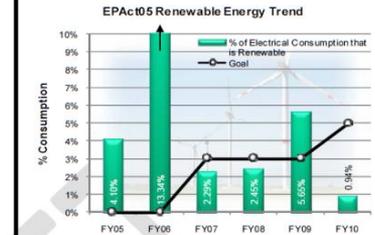
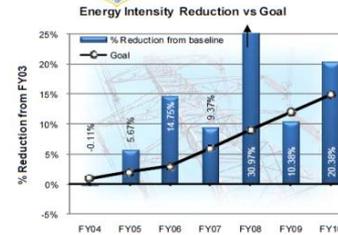
MAJCOM

USAF Energy Almanac, FY 2010 - AE

May 2011



L B Combined Energy and Water Information

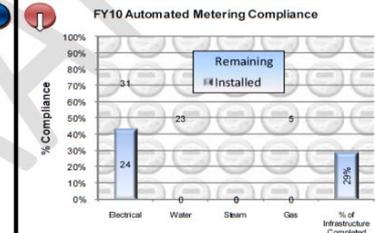
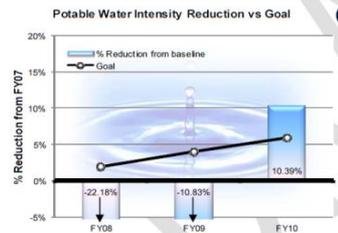


Installation Input:

- Assessment of historical data
- Prognosis for future
- Other relevant facts

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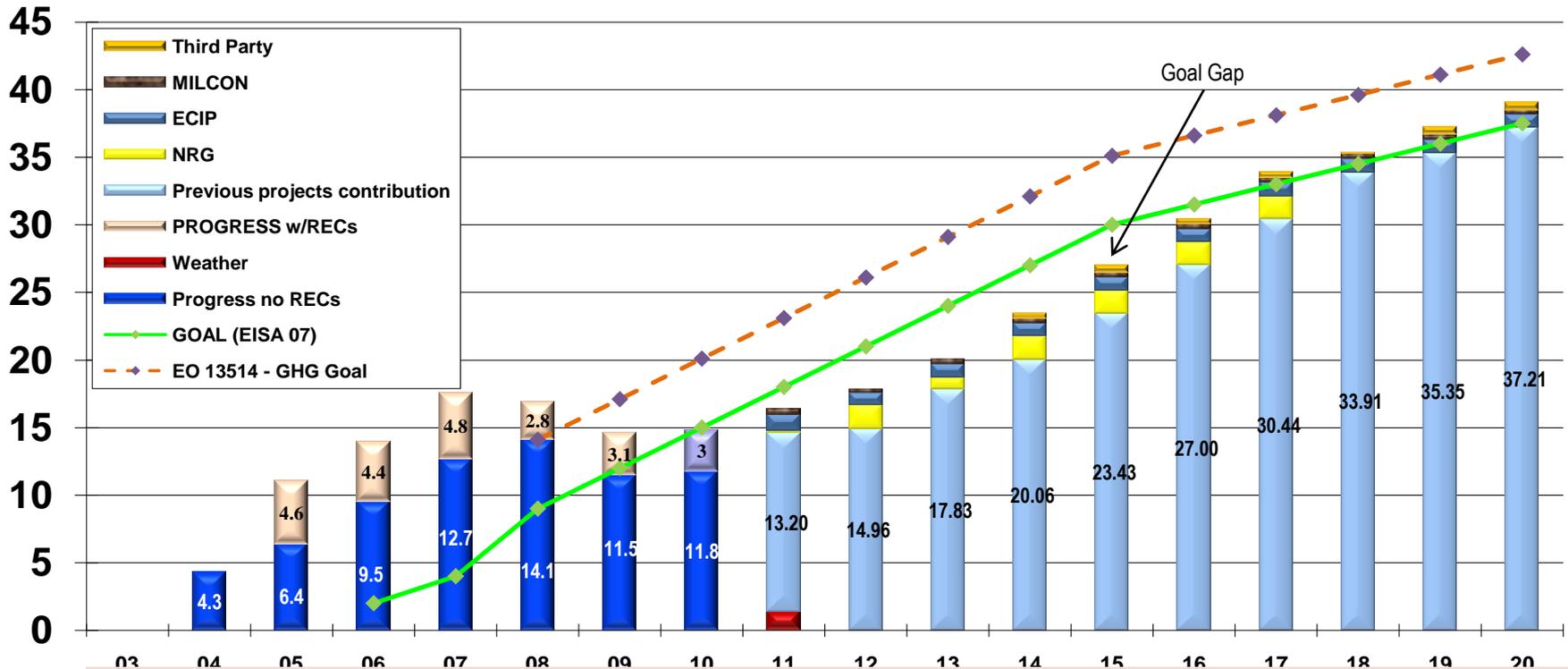
- Assessment of historical data
- Prognosis for future
- Other relevant facts

Comments

- Continue any overflow comments from above metric charts to this space
- Weather impacts: (Heating degree days and cooling degree days) for the base as compared to baseline
- Demolition/MILCON impacts
- Mission changes: increased/decreased ops tempo? Extended operating hours? Influx of personnel?
- Audit results: ECMs identified? Projects programmed? What's in the pipeline? Summary of funded projects (all funding sources) and expected impact on metrics.

Base

Energy Intensity

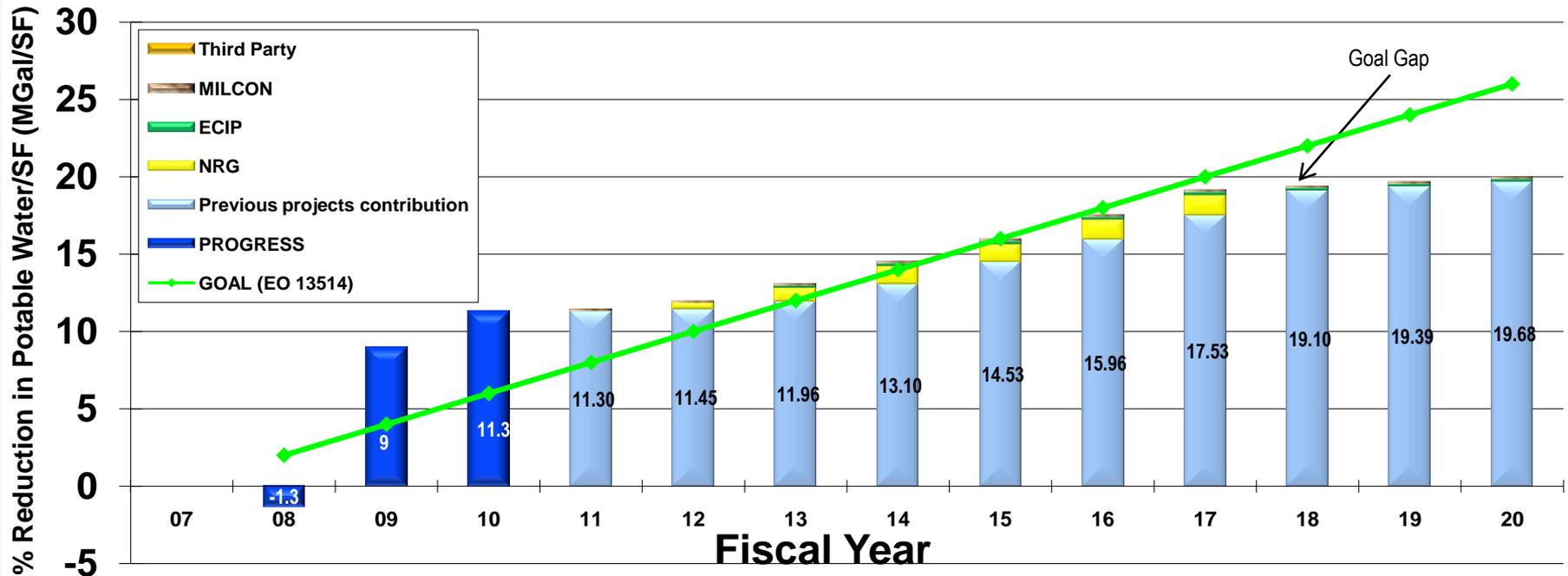


➤ This chart assumes...

- ... a 0.4% AF systems energy degradation factor & an 80% “realization” factor
- ... no renewable energy benefits to intensity metric as it is phased to zero in 2012
- ... a 1.4% positive weather adjustment as FY10 was more severe than the 2003 baseline year
- ... newly received MILCON & Demo data from AFCEE

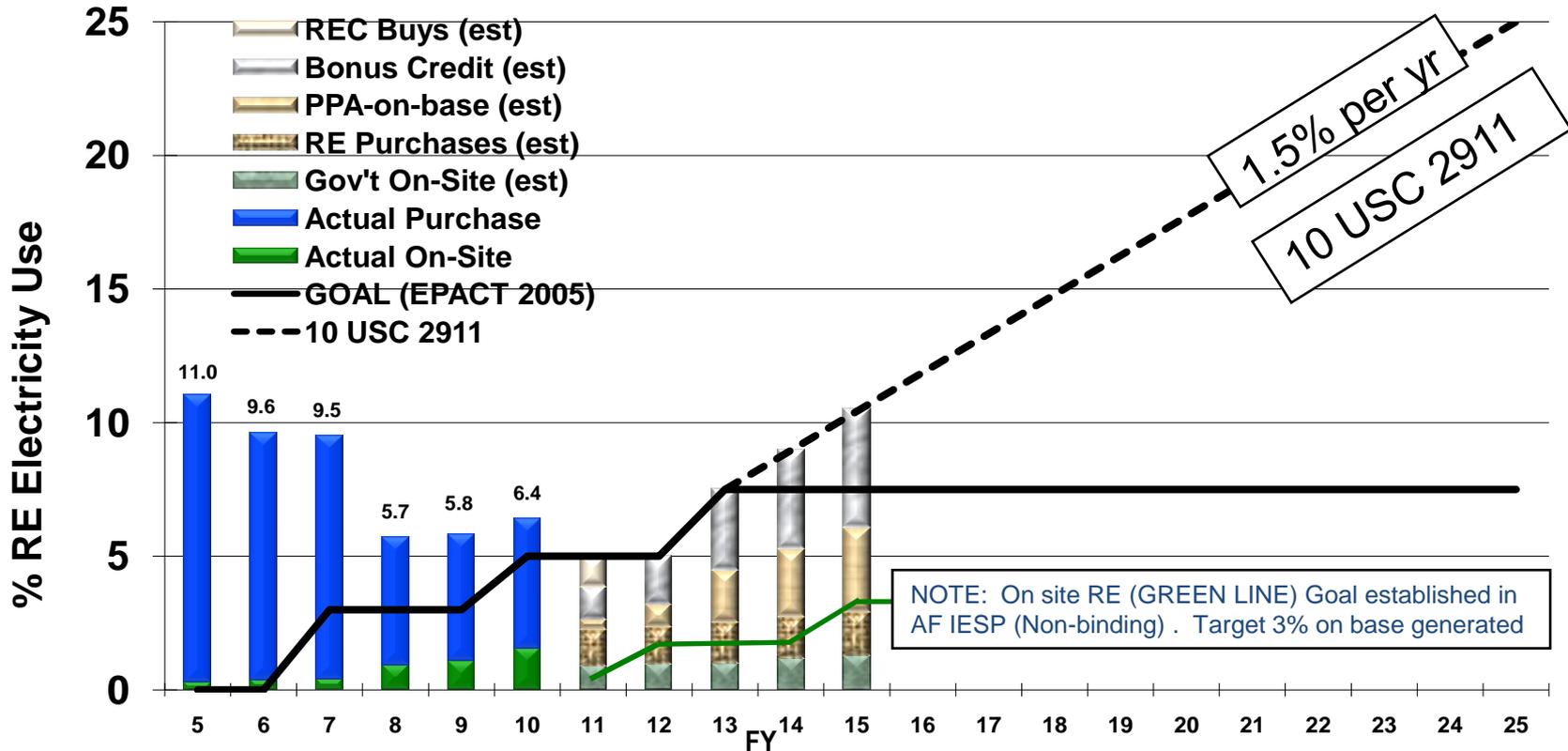
➤ **Estimate \$300M total additional investment in FY13-14 to close the gap**

Potable Water Intensity



- Includes a .1% overall AF systems water-loss degradation factor
- Recommend no additional total additional investment in FY12-15
- Assess performance for the next few years before committing more \$'s

Renewable Energy



- KPI developed - Developing new “project impact” algorithms
- Purchase RECs only as needed to meet the goals
- Develop as much 3rd party RE as economically feasible

Summary

- How to Identify Requirements
- What to Validate and How to Prioritize
- What to do with Competing Requirements
- How to Manage the Program Centrally
- Sources of Federal Funds
- When to Measure and Verify
- How to Forecast Results for Success

- **Advocate for resources based on data and projections to meet goals**
- **Target best ECOs - avoid “peanut butter spread”**
- **Be flexible but maintain some consistency**