

# ***Headquarters U.S. Air Force***

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*Integrity - Service - Excellence*

## **EUL Industry Forum USAF Renewable Energy**



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**James Snook, P.E.**

**Air Force**

**Facility Energy Center**

**Utility Rates Management Team**



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# *Overview*

- **ACRONYMS**
- **Air Force Facility Energy Center**
- **Renewable Energy Goals**
- **Air Force Renewable Energy Status**
- **Existing Renewable Energy Projects**
- **Execution Methods**
- **Summary**



# ***Air Force Facility Energy Center***

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## **Facility Energy Center Utility Revitalization & Facility Energy Division**

### **Facility Energy Division**

- **Energy Reduction (Demand)**
  - **Capital Investments**
- **Utility Rates Management Team (Supply)**
  - **Attorneys: Air Force Legal Operations Agency**
  - **Engineers: AFCESA**
- **Support the Air Force Civil Engineer and installations on facility energy procurement and conservation.**



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# ***Renewable Energy Goals***

- **EPA Act 2005 Renewable Goals**
  - **3% in FY07-09**
  - **5% in FY10-FY12**
  - **7.5% in FY13 & after**





# Renewable Energy Goals

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- **EPAct 2005 Renewable Goal**

- 3% in FY07-09

- 5% in FY10-FY12

- 7.5% in FY13 & after

- **Bonus: Statutory allowance to count kwh twice for renewable energy produced and used at a Federal facility**





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# *Renewable Energy Goals*

## Executive Order 13423

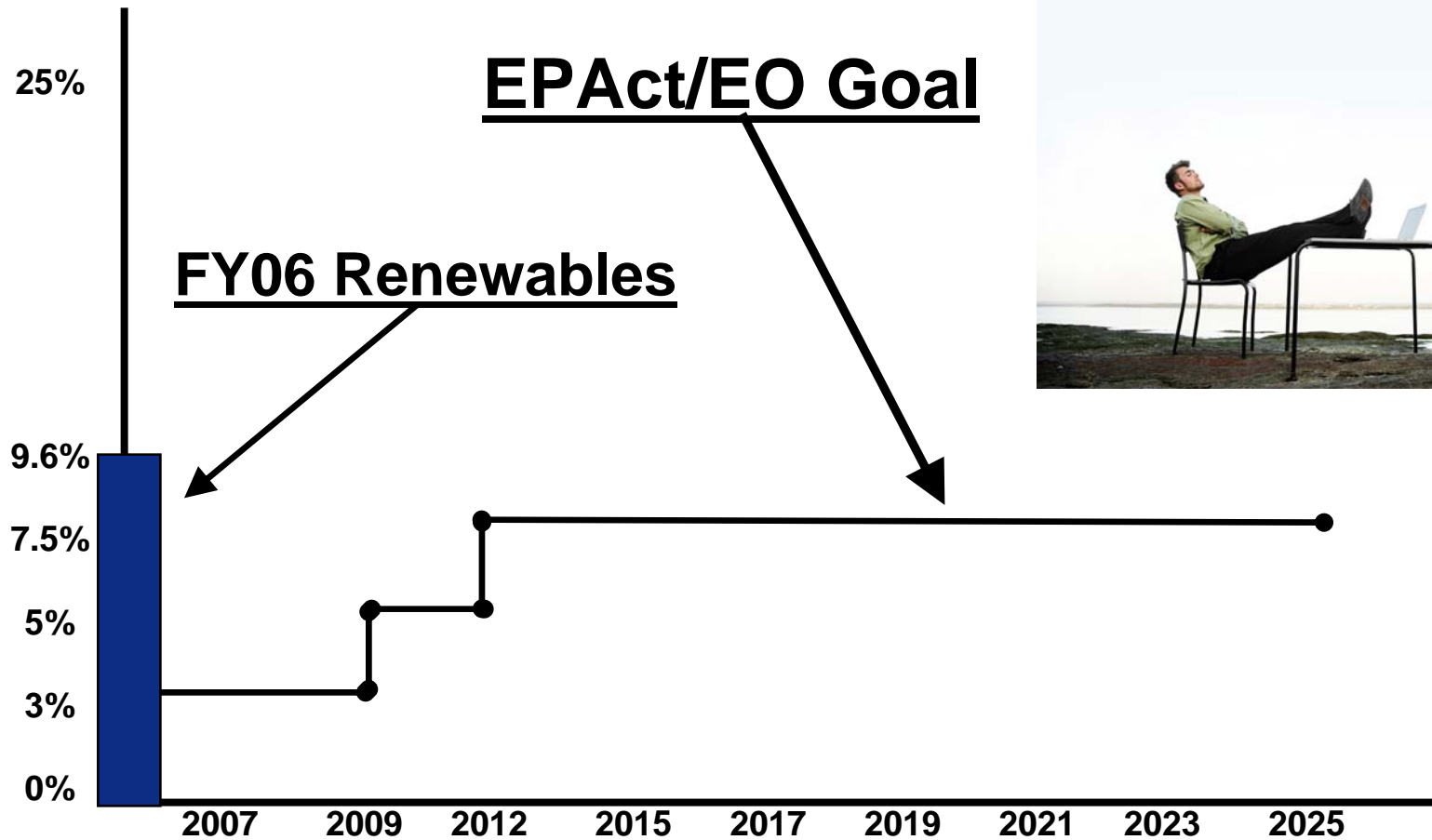
- Minimum of one-half from new sources
  - New: Jan 1, 1999





# Renewable Energy Goals

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# *Renewable Energy Goals*

## **FY07 National Defense Appropriation Act 10 USC §2911**

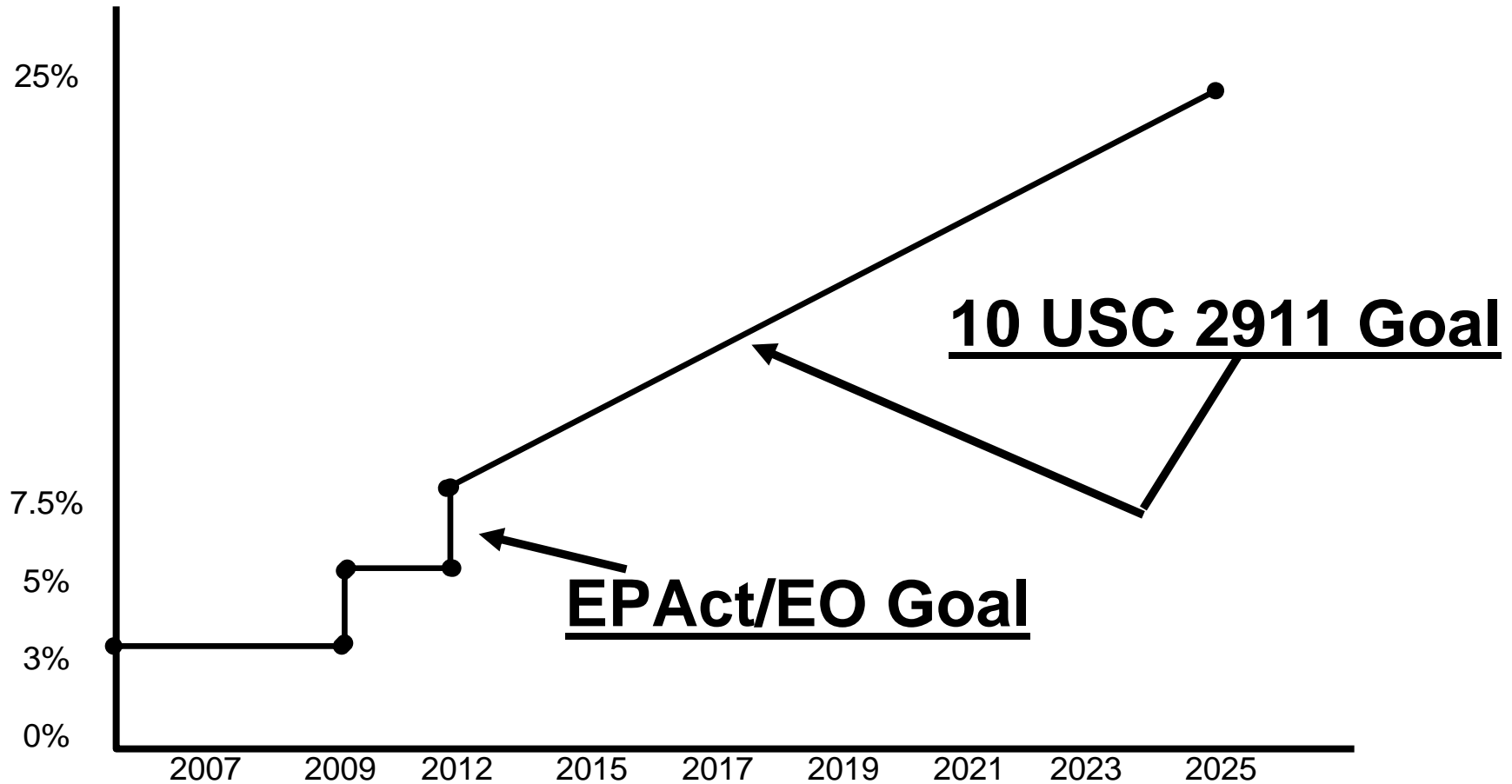
- **Produce or procure, from renewable energy sources, not less than 25% of electric energy by FY25**
- **This is for DoD only!!**





# Renewable Energy Goals

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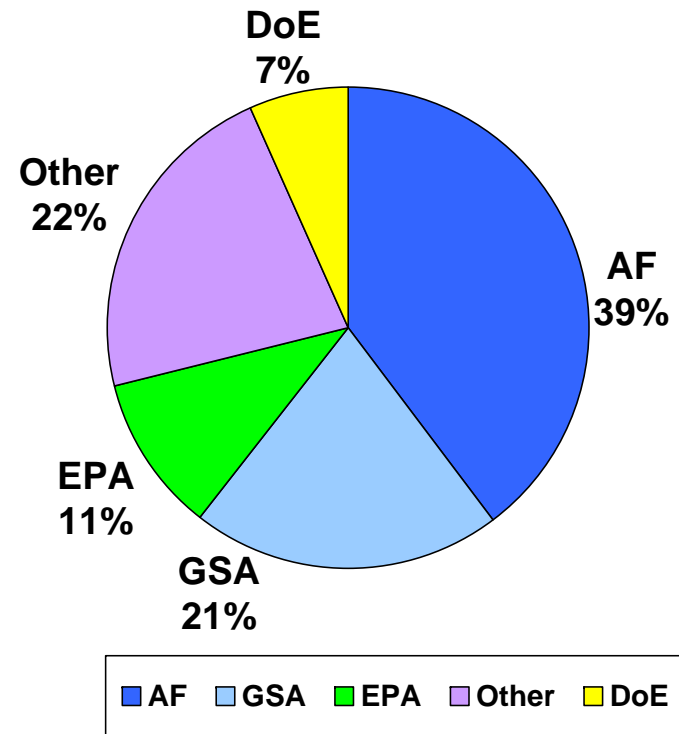


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# Renewable Energy Status

- Air Force: Top Federal purchaser of renewable power
- 990,000 MWh – 9.6% of FY06 purchase
- Multiple sources – wind, Biomass, geothermal & other
- AF Renewable Energy Awards - Nation's leading green power purchaser
  - EPA 2005 Green Power Partnership Award
  - EPA 2006 Climate Protection Award

Renewable Energy Purchased by the Federal Government (based on FY06 data)





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# ***Renewable Energy Status***

**Renewable Energy - 9.6% (990,000 Mwh) in FY06**

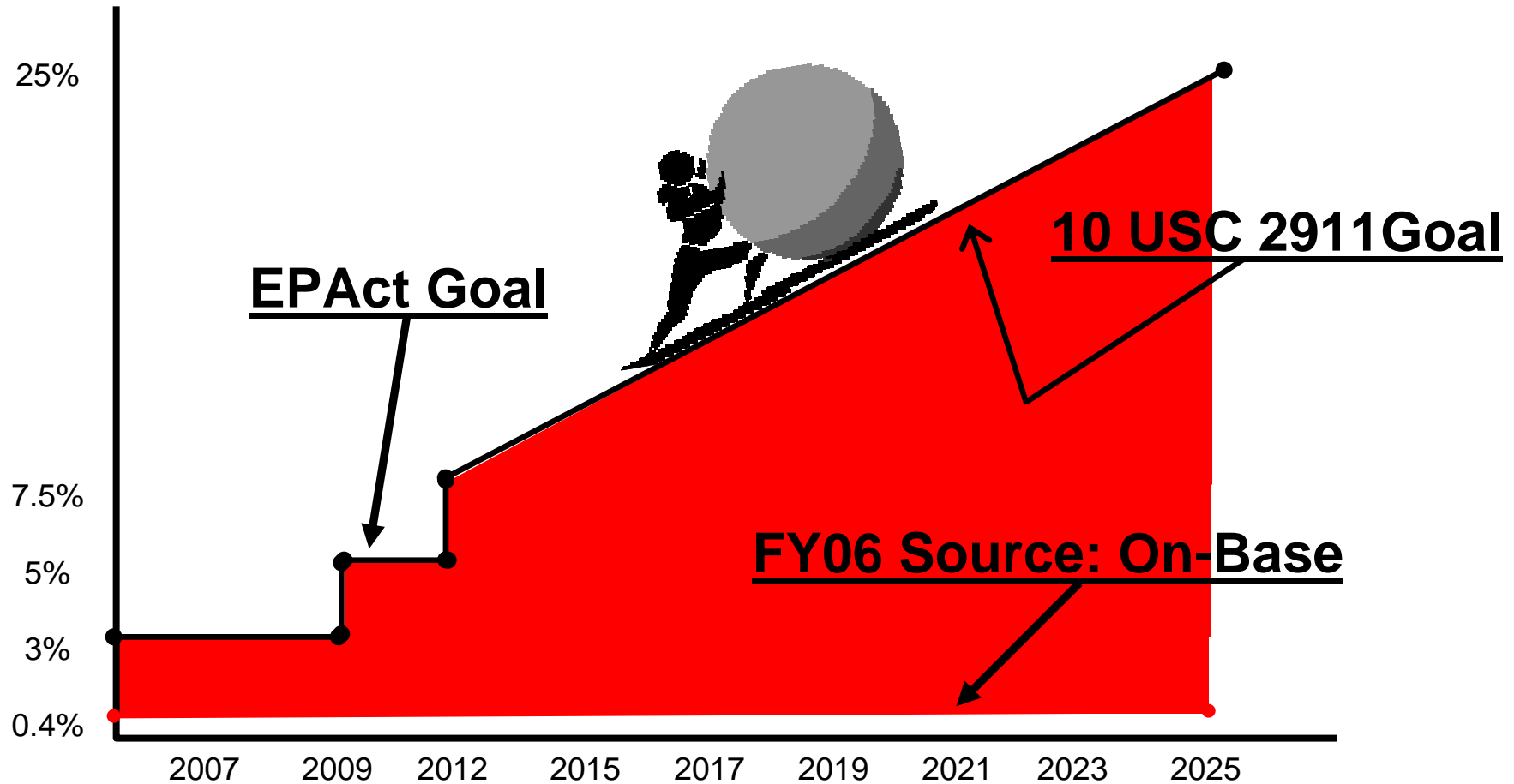
## **SOURCES**

<b>On base production</b>	<b>0.4%</b>
<b>Direct purchase</b>	<b>2.2%</b>
<b>Renewable Energy Credits (RECS)</b>	<b><u>7.0%</u></b>
<b>TOTAL</b>	<b>9.6%</b>



# Renewable Energy Status

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# ***Renewable Energy Projects***

- **Government funds –**
  - **ECIP: Energy Conservation Investment Program are Military Construction Funds**
  - **O&M: Operations & Maintenance funds**
- **UESC: Utility Energy Service Contracts**
- **ESPC: Energy Savings Performance Contracts**
- **PPA: Power Purchase Agreement**
- **EUL: Enhanced Use Lease**



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# *Renewable Energy Projects*

## Solar

- **Luke AFB AZ, PV roof, 388 KW, Energy Savings Performance Contract (ESPC)**





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# *Renewable Energy Projects*

## Solar

- March ARB CA, PV, 400 KW, Energy Conservation Investment Program (ECIP)
- Hickam AFB HI, Hot Water, 1176 sf
- Lackland AFB TX , Hot Water, 736 sf
- Mildenhall (England), Hot Water, 3014 sf
- Moron (Spain), Hot Water, 136 sf

## Biomass

- Hill AFB UT, Landfill Gas, 1.3 MW, ESPC



# *Renewable Energy Projects*

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## Wind

- FE Warren AFB WY, Wind, 1.3 MW, ECIP, operational
- Ascension Island, Wind, 2.7 MW, ECIP





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# *Renewable Energy Projects*

## Ground/Water Source Heat Pumps

- Charleston AFB SC, GSHP
- Offutt AFB NE, 1131 tons, GSHP
- Little Rock AFB AR, 2727 tons , GSHP
- Multiple locations, 1875 tons , GSHP
- Langley AFB VI, WSHP, 1200 tons





# Air Force Ground/Water Source Systems

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## Ground Source Heat Pumps

- ✓ 9600 Total Tons Installed
- ✓ 8.5 Million KWH Saved Annually
- ✓ \$5.5 Million Annual Savings!



Offutt Dorms with GSHPs

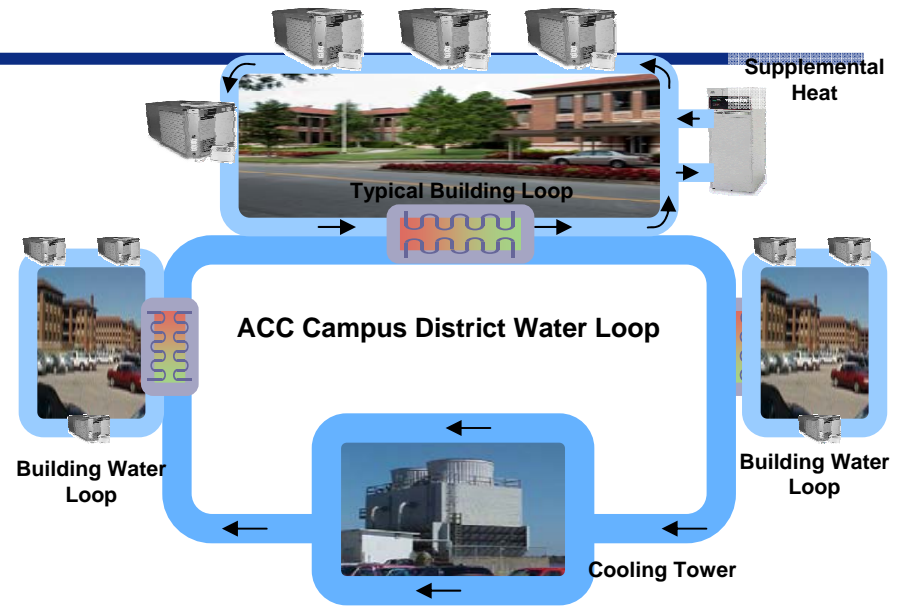


Well Field in Little Rock Housing



GSHP well field

## Langley Water Source Heat Pump System



## Water Loop System

- ✓ Allows individual heating or cooling in each space as needed
- ✓ Takes advantage of hot/cool spots by 'moving' BTUs within building
- ✓ Cooling tower increases cooling efficiency
- ✓ Decreased heating/cooling costs 45%!



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# ***Renewable Energy Projects***

**Nellis AFB**

**14 MW Solar PV  
Project**

■ **Construction  
schedule**

**Start - 1 Jun 07**

**Finish - Dec 07**





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# ***Renewable Energy Projects***

## **In Progress**

### **FE Warren AFB WY**

- **Demo project using 2.0 MW turbine, Congressional funding**

### **Hill AFB, UT**

- **Landfill gas generator 1.9 MW scheduled for this year**





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# *Execution Methods*

- **Key Factors**
  - **Renewable resource**
  - **Utility prices and regulatory conditions**
  - **Available land**
  - **Mission impact (e.g. radar, air space)**
  - **Rebate and/or REC sale**
  - **Environmental requirements**
- **Federal & state tax incentives**



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# ***Benefits & Drawbacks***

## **Government Funds**

### **Energy Conservation Investment Program & Operations & Maintenance**

- **Maximizes return to AF**
- **Saves current electric cost (Kwh/Kw)**
- **Rebate can be used for project**
- **No tax benefits**



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# ***Benefits & Drawbacks***

## **Third Party Financing Utility Energy Savings Contracts & Energy Savings Performance Contracts**

- **Save on current electric cost (Kwh/Kw)**
- **Savings pay for the project**
- **Rebate can be used for project**
- **No tax benefits**



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# ***Benefits & Drawbacks***

## **Power Purchase Agreement (PPA)**

- **Savings on current electric cost (Kwh/Kw)**
- **REC can be sold**
- **Rebate can be used for project**
- **Tax benefits accrue to owner**



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# ***Benefits & Drawbacks***

## **PPA Revenue to Developer**

- **Sale of kwh to installation**
- **Sale of RECs to local utility**
- **Tax benefits**



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# Execution Methods

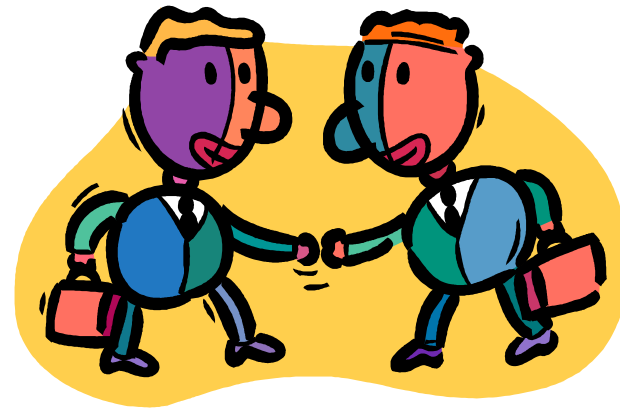
## PPA Factors

Developer secures:

- PPA contract to support financing

Air Force secures:

- Electric supply at stable price
- On-base energy source





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# ***Execution Methods***

## **Sale of electricity to installation**

- **40 USC 591 applies (Sect 8093)**
  - **Compliance with state utility service laws and rules required**
- **Compliance with Federal Acquisition Regulations required**



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# *Summary*

**“The Air Force believes that development of renewable energy sources for facility energy is one important element of our comprehensive strategy.”**

**Honorable Michael W. Wynne, SAF**

Air Force Renewable Energy Program brochure



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*The End*

# Questions?

