Headquarters U. S. Air Force

Integrity - Service - Excellence

Luke AFB
15 MW Solar Array
Challenges and Lessons Learned

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Overview

- Authorities
- Regional Utility Overview
- Initial Project Concept
- Unforeseen Site Conditions
- Current Project
- Lessons Learned
Authorities

- Legal Authorities to be used by the project
- FAR Part 41 (utility service contract)
  - Arizona Public Service (APS) is electrical service provider
  - Utility Law Field Support Center/Rates and Renewables Team negotiated a Solar Service Agreement
- Land use authority (10 USC 2667)
  - Initial Concept was to provide utility an easement
Regional Utility Overview

- Arizona Corporation Commission (ACC) sets state energy policies
- Directed a Renewable Energy Standard for providers
  - 15% of power must come from alternative sources by 2025 (standard established during settlement of a rate case)
- Arizona Public Service is the Luke AFB provider
  - Luke’s Solar Array was in initial set of projects to assist in meeting goal
Initial Project Concept

- Negotiated rate for renewable electricity with Arizona Public Service (APS) – base utility provider
  - Utility builds, owns, and operates PV array
  - Anticipate 15 MW based on 106 acres
  - Luke uses 100% of production 99% of time
  - Special contract to purchase array output-
    - fixed “solar rate” for life of array
- Array output fed directly into APS side of grid
- Air Force provides clear site allowing reduced generation rate
Unforeseen Site Conditions

- On-going archeological mitigation effort discovered more extensive and significant sub-surface artifacts than expected
- Known archeological location; surface artifacts discovered during 2004 land purchase
- Construction of two lane ammo haul road – 2005
  - Bi-sects solar array project site
  - Did not uncover any buried items
  - Surface artifacts removed
- Expectation that only surface artifacts would be encountered
Unforeseen Site Conditions
Discovery of Artifacts

- Exploratory trenching discovered features 12-18 inches below surface
- Trenching expanded to discover limits/boundaries
  - 44 of 106 acres impacted
- Initial estimates of range/numbers resulted in acceptable risk decision
- Site mitigation/stripping revealed numbers and significance greater than initially estimated
  - Numbers of pit houses, fire pits, etc twice as numerous as estimated
  - Carbon dating revealed some features 5000 years old
  - Oldest discovery in Phoenix area after 130 yrs searching
Current Project

- Economic conditions/Utility Co needs changed in AZ during mitigation period (~ 2 years)
- “Fixed solar price” exceeds expected “brown power” rate
- Project changed from purchase project to leasing project
- Air Force will lease land to utility/collect rent instead of granting easement/purchasing electricity
- 10 USC 2911 goal implications
Lessons Learned

- Strong teamwork between utility and agency vital
  - Utility/Installation team in weekly contact during initial project planning
  - When artifacts discovered, team communication already established
  - Utility archeologist integral part of mitigation planning
    - Strong connection with SHPO/Tribes helpful
- NEPA process is “long pole in the tent”
  - Start early!
  - Communication lines must stay open
- Flexibility in the approach ensured project will be completed
  - AF team re-evaluated desired outcomes to redesign project
  - New project structure first “floated” by utility co
QUESTIONS?