



---

# PROPOSED PHOTOVOLTAIC DEVELOPMENT HOLLOMAN AIR FORCE BASE

## BACKGROUND

The Analysis Office of the 49th Civil Engineer Squadron, Installation Management Flight, is preparing an Environmental Assessment (EA) to address proposed development of a photovoltaic (PV) solar energy project on open military land in the northeast portion of Holloman Air Force Base (HAFB), Otero County, New Mexico. The land was intermittently used by Native Americans until the late 1800s, served as European American livestock range until 1942, and since has been managed by the Air Force. Native American camp sites, grazing and an old livestock windmill and tank, the Atlas electrical power substation, power lines and a now removed water storage tower, are the known previous uses of this land.

The proposed action was originated by the 49th Civil Engineer Squadron (49 CES) Energy Manager in 2009 in response to new national and Air Force (AF) energy policies. The project is supported locally by the 49th Wing (49 WG) and at higher levels by Headquarters Air Combat Command (ACC).

## Purpose & Need

The purpose and need is to meet national requirements in the Energy Policy Act (EPA) of 2005 (Public Law [PL] 109-58); Executive Order (EO) 13423, "Strengthening Federal Environmental, Energy, and Transportation Management"; and EO 13514, "Federal Leadership in Environment, Energy, and Economic Performance". The 2008 United States Air Force Infrastructure Energy Strategic Plan provides a goal to produce 7.5 percent of energy use from renewable sources by FY 2015 and 25 percent by FY 2025. HAFB typically has over 300 days a year of sunshine (~80% of average annual possible sunshine) making HAFB an ideal location to achieve the purpose.

The HAFB Energy Manager researched various technologies and locations and prepared an Air Force Form AF-813 "Request for Environmental Impact Analysis" for the project specifying PV technology and a candidate location to meet the need. Use of the existing Atlas Power Substation is proposed in the AF-813 because it is an existing utility that would eliminate construction of a completely new substation to serve the solar energy project.

To address the environmental impacts of PV electrical power development, an EA is being prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [USC] 4321-4347), following Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] 1500-1508) and the Environmental Impact Analysis Process (EIAP) as defined in Air Force Instruction (AFI) 32-7061 and published in the Code of Federal Regulations at 32 CFR 989.

## PROPOSED ACTION

The proposed action is to develop a PV energy production facility on HAFB by means of a legal arrangement between the AF, a public utility and/or a private power producer to develop, operate and maintain the electrical generation facility with HAFB as the customer. Some forms of such an arrangement would require additional environmental documentation known as an Environmental Baseline Survey (EBS), although previous base wide research has found no indications of hazardous concerns associated with the proposed development location.

The development would require adequate acreage, ease of interconnection with existing utility infrastructure and long term access for operations and maintenance. Such a proposed action would result in relatively complete disturbance of the development area.

Solar PV technology captures energy directly from sunlight and converts it to electricity. There is a wide variety of PV panels available and a variety of ways they can be mounted. The details depend upon manufacturer, array design and the setting where the panels are to be placed. The choice of panels, mounting design and array configuration for HAFB will depend upon the developer's design, cost and panel efficiency decisions. Depending upon configuration of the panels and desired power output, the project would require clearing, grading, cable trenching and foundation excavations throughout the PV development site to be addressed by the EA.



*Photograph 1. Large solar panel array  
requiring extensive surface disturbance  
(Inhabit.com 2011)*

---

## DESCRIPTION OF ALTERNATIVES

### TECHNOLOGY

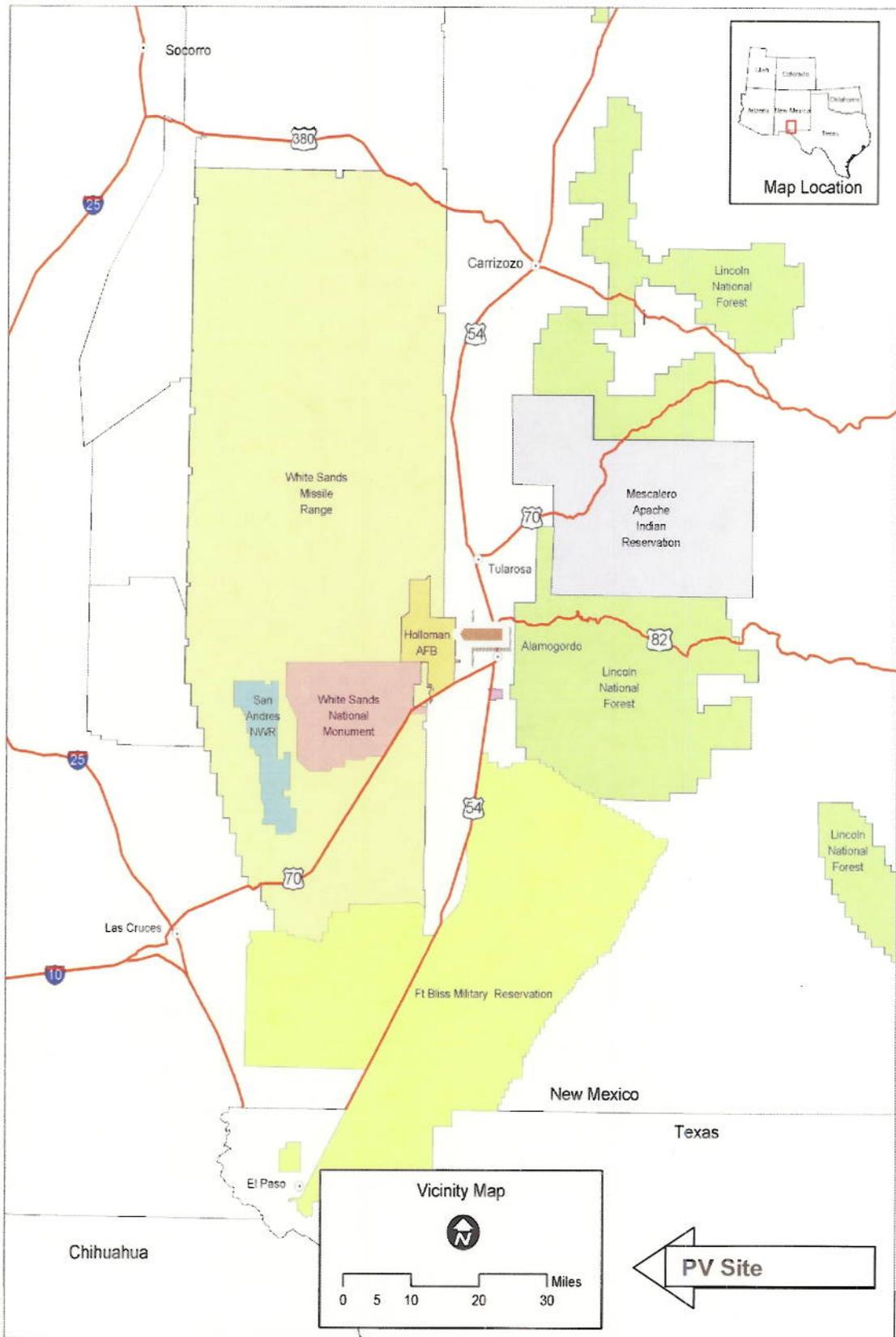
The PV technology proposed on the AF-813 was the chosen result of extensive research, consultation and coordination by the HAFB Energy Manager, the HAFB Engineering Flight and ACC Electrical Engineers and Energy Managers.

### Alternative Technologies

Development of a parabolic solar trough array was considered not reasonable due to a requirement for high quality water and the possibility of reflected glare affecting flying operations. A central tower heliostat would also entail reflectivity and water issues as well as possible air space obstruction. Biomass fueled power generation is not reasonable due to the lack of fuel stock in this low population desert location and the distances to potential fuel stock, as well as a similar requirement for high quality water. While ground level site impacts would be essentially similar to PV development, providing the water quantity and desalination processes required by the other technologies would cause environmental impacts beyond the site and add substantial costs to the development of alternate energy production. Wind generation is not a reasonable alternative as the rotating blades disrupt radar signals and typical tower heights are not compatible with air traffic. Photovoltaic panel power generation is the Preferred Technology.

### LOCATION

The general location proposed on the Air Force Form AF-813 "Request for Environmental Impact Analysis", was selected in coordination with the 49 CES Natural and Cultural Resources staff, Engineering staff and Base Comprehensive Planner, the 49th Wing Safety Office, the 49th Security Forces Squadron and the 49th Operations Group Airfield and Air Space staff. It is the only location that satisfies air and ground safety, security, accessibility, land ownership, flood plain/wetlands avoidance, physical size and economic reasonability criteria while causing apparently minimal environmental impacts. No other locations are known to meet these selection criteria. Alternative siting within the general location will be addressed in the EA.



---

## SITE ALTERNATIVES

The Preferred Site (Alternative Site 1, see Figure 1 and Table 1) for the construction of the PV array is 400 acres including the Atlas Power Substation near the La Luz Gate on HAFB. The Preferred Site includes the existing Atlas Substation and is bounded on the east by an existing high voltage transmission line and the east base boundary and on the north by the paved one-lane road to the Atlas Substation. The west limit is a line approximately 1,000 feet southeast of and parallel to Vandergrift Road. The south limit is a perpendicular to the west line that connects to the break-in-slope above Rita's Draw and the southeast limit follows the edge of Rita's Draw northward to the east base boundary. This Preferred Site is within the general location requested by project planners, within acreage intensively surveyed for cultural and natural resources, and thought to provide a balance between site size, site engineering, site construction effort and environmental impacts. Combined, a photovoltaic array on this site is the Preferred Alternative addressed in this EA.

Three other possibly developable areas (Alternative Sites 2, 3 and 4) were within the constraints and opportunities criteria of availability, air and ground safety, security, accessibility, land ownership, flood plain/wetlands avoidance and, to a lesser extent, physical size. These possible sites were considered based on existing field survey records, current resources and constraints knowledge and topography. The suitability of the sites is summarized in Table 1.

Alternative 5 is the No Action Alternative. Under the No Action Alternative, the area would remain in its current undeveloped status (Figure 1). There would be no ground disturbing activities with no consequent impacts to local natural and cultural resources. The Green Energy Initiative would not be implemented and AF goals would not be achieved.

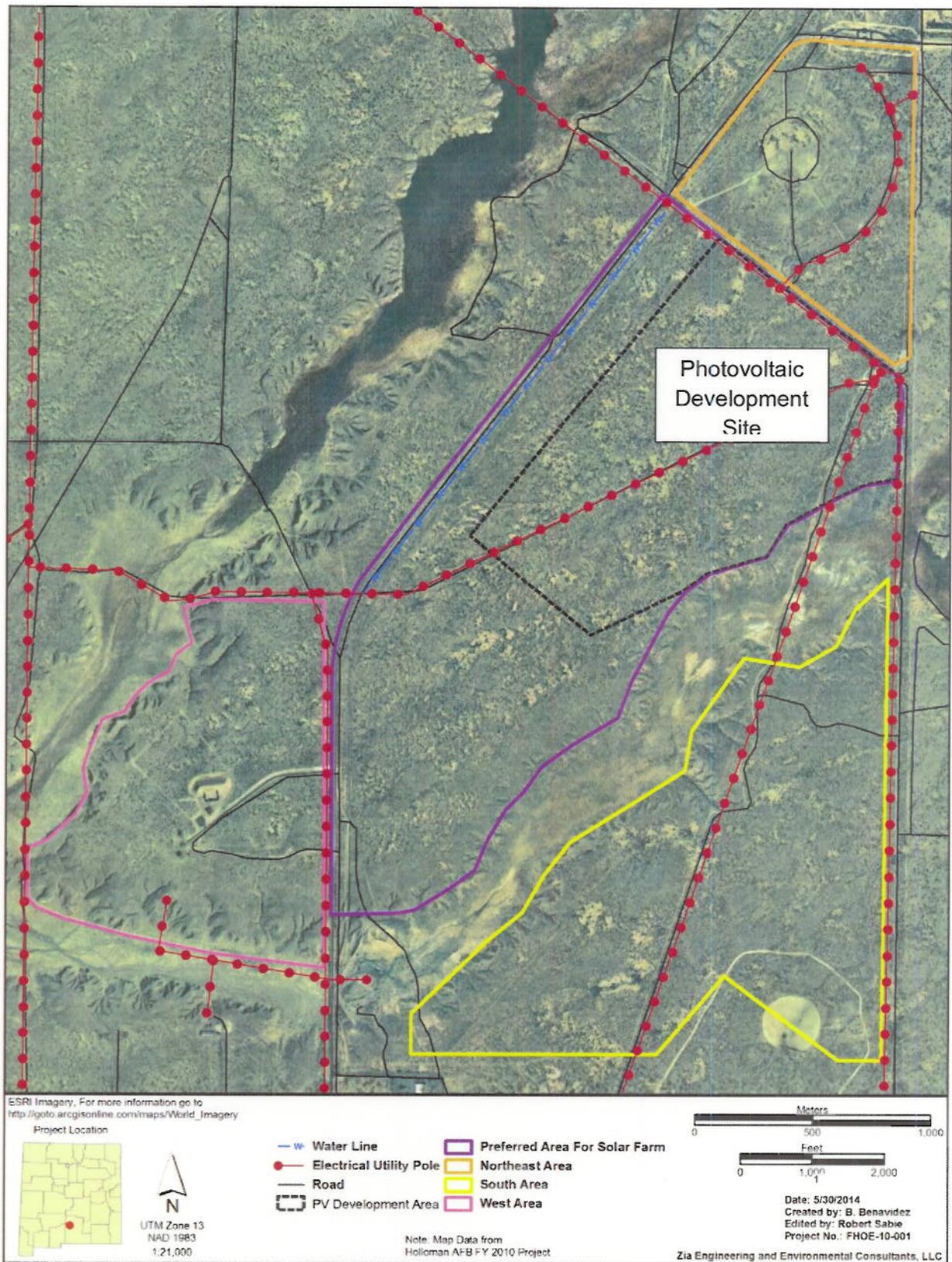


Figure 1. Alternative Locations

As the analysis has progressed it became apparent that the Preferred Alternative Site had clear advantages as exemplified in Table 1. Scoring is expressed in a simple order of magnitude, positive scores represent factors that make a greater contribution to the purpose of the proposed action. Negative scores represent levels of impact complexity at the sites.

*Table 1: Feasibility Criteria Table*

<b>Criterion</b>	<b>Preferred Alternative Site 1</b>	<b>Site 2</b>	<b>Site 3</b>	<b>Site 4</b>	<b>No Action Alternative 5</b>
1. Cultural Res	-2	-4	-1	0	0
2. Plants (NR)	-1	-1	-1	-1	0
3. Animals (NR)	-1	-1	-1	-1	0
4. Activity Conflicts	0	0	Various -1	0	0
5. Grid Access	On +1	Distant -2	Near -0-	Distant -3	0
6. Build Feasibility	+1	0	+1	-1	0
7. 100s of Acres	+4	+3	+2	+2	0
<b>Totals</b>	<b>+2</b>	<b>-5</b>	<b>-1</b>	<b>-4</b>	<b>0</b>

1. Cultural resources, higher (-) or lower (+) disturbance/ impact;
2. Plant resources (NR), higher (-) or lower(+) disturbance/impact;
3. Animal resources (NR), higher (-) or lower (+) disturbance/impact
4. Current military activities affected adversely (-);
5. Access to grid at Atlas Substation, higher (-) or lower (+) distance; and
6. Topography, road access,
7. Suitable size, 100s of acres provided (+).

---

## **ENVIRONMENTAL IMPACT ANALYSIS**

The categories to be analyzed are based on the nature of the location and the character of the proposed action in light of identified constraints and opportunities. Environmental categories considered possibly subject to impacts include geology, seismicity, soils, air quality, aesthetics, noise, surface and ground water resources, biological resources, cultural resources, land use, socioeconomics, environmental justice, health and safety, solid wastes, hazardous and toxic substances. Extant environmental documents such as base cultural and natural resources survey data, Installation Restoration Program reports and maps and Military Munitions Remediation Program reports and maps will be used in the analysis of the proposed action.

Field surveys to evaluate and record the cultural and natural resources present were conducted by archaeologists and biologists in October, 2010, demonstrating that the proposed action would cause adverse effects on cultural resources, but that impacts to species of concern could be avoided by a prudent choice of development location. Further field work was conducted in 2014 with similar results. Consultation with the New Mexico State Historic Preservation Officer is being conducted and archaeological work as required will be completed prior to development. The proposed action does not entail direct impacts on resources of known importance to Native Americans, nor on species of concern or Threatened and Endangered Species. The U.S. Fish and Wildlife Service, the New Mexico Department of Game and Fish and the Mescalero Apache Tribe have been provided an initial opportunity to comment and will receive the public draft EA for further comment.

## **SUMMARY OF REASONABLY EXPECTABLE ENVIRONMENTAL IMPACTS**

Implementation of the action would not significantly impact geology, seismicity, soils, ground water, land use, socioeconomic and environmental justice concerns, human health and safety, nor would there be hazardous or toxic materials concerns.

Negligible or brief transient impacts would occur in the local air quality (construction dust), aesthetics, noise, wildlife and solid waste categories.

Construction and operation of the proposed facility may have some potential to cause adverse impacts on surface water resources, vegetation, species of concern and cultural resources (archaeological sites). These impacts may or may not be reasonably expected to be significant. The levels of impact and significance will be presented and analyzed in the assessment.

Long-term beneficial cumulative impacts would include: lower stress on regional air quality through reduced HAFB load on carbon-fueled generators and reduced load on the regional service network; creation of a few high-tech jobs; possible energy cost savings as the price of carbon-fuels escalates, and a degree of energy self-sufficiency for the base.