

UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20240

October 20, 2004

In Reply Refer To:  
2800 (WO 350) P

EMS TRANSMISSION 10/21/2004  
Instruction Memorandum No. 2005-006  
Expires: 09/30/2006

To: All Field Officials  
From: Director  
Subject: Solar Energy Development Policy

**Program Area:** Right-of-Way Management, Use Authorization, Facilities Management

**Issue:** This Instruction Memorandum (IM) establishes policy for the processing of right-of-way applications for solar energy development projects on public lands administered by the Bureau of Land Management (BLM), and evaluating the feasibility of installing solar energy systems on BLM administrative facilities and projects.

**Background:** The President's National Energy Policy encourages the development of renewable energy resources, including solar energy, as part of an overall strategy to develop a diverse portfolio of domestic energy supplies for our future. The BLM prepared a National Energy Policy Implementation Plan that included a variety of tasks related to the development of energy resources on the public lands, including renewable energy resources. While the current contribution of renewable energy resources to our energy supply is relatively small, renewable energy generating sectors of our economy is the fastest growing in the United States. Continued growth in solar energy development will be important in delivering larger supplies of clean, domestic power for America's growing economy.

Solar energy has significant potential in the western United States for converting the sun's light into electricity using technology that is rapidly improving. Solar energy currently accounts for less than one percent of total U.S. electricity supply. About 370 megawatts (MW) of solar power are currently installed in the western United States. Of this, approximately 20 MW of electricity is produced from photovoltaics and 350 MW from concentrating solar power (Renewable Energy Atlas of the West, Hewlett Foundation and the Energy Foundation, 2002). As the cost of producing solar energy declines, there may be a greater interest in locating large solar power systems on public lands.

On June 22, 2004, the Western Governors' Association unanimously agreed to collaborate in finding ways to increase the contribution of renewable energy in meeting the energy needs of the West. The Governors' are actively engaged with the solar industry and interested stakeholders in evaluating an initiative that may result in the construction of concentrating solar power plants in the southwestern United States with a total capacity of 1,000 MW.

There are two basic types of solar energy installations that produce electrical power: photovoltaics (PV) systems, and concentrating solar power (CSP). These can be combined with natural gas or other fossil fueled power systems to form hybrid systems. To work effectively, the solar installations require consistent levels of sunlight (solar insolation) and are backed up with batteries, thermal storage, or other forms of energy.

Solar insolation is a measurement that has become increasingly more accurate in evaluating specific sites for solar energy installations. Solar insolation is the amount of sunlight hitting an area on the surface of the earth over a specific period of time. The higher the exposure of sun measured on an annual basis, the more electrical power that can be produced.

The quality of the solar resource, over a month or a year, is an important indicator in determining the viability of a site for commercial solar development. Other site attributes include access to available water for concentrated solar power steam generation and cooling, proximity to electric transmission facilities, and site slope. The most promising areas for development on public lands are in Arizona, southern California, Nevada, and New Mexico. Parts of Texas, Utah, and Colorado also have excellent levels of solar insolation.

### **Photovoltaic Systems**

Photovoltaic (PV) systems use semiconductor materials similar to those used in computer chips to capture the energy in sunlight and convert it directly into electricity. Photovoltaic cells are electrically connected into a weather tight module. These modules can be further connected to form an array which can include electrical connections, mounting hardware, power conditioning equipment, and batteries that store solar energy. The size of the array depends on the amount of sunlight and the needs of the customer. Large PV electrical generating systems have not generally been used for commercial utility applications due to the high upfront cost.

Most PV applications are small, use little or no land, and have minimal or no environmental impact since electricity created is generally used on site or as part of an existing authorized use. They generally provide power to individual homes and small buildings. They are also found in rural areas on communication towers, water pumps, and road and traffic signs.

The environmental impact of small distributed PV systems is minimal, as they require no water for system cooling, and generate no by-products. Most installations of solar PV systems are less than 5 kW in capacity, and tend to be most cost-effectively applied in isolated locations where construction of electric transmission and distribution networks would be

more costly than a PV system. These types of solar PV systems will likely be installed on an existing facility or structure or as part of an existing authorization.

### **Concentrating Solar Power Plants**

Concentrating solar power plants are generally large systems that use mirrors to focus sunlight to create high temperatures. The high temperatures generated by the focused sunlight are used to generate electricity either by a) a heat engine causing gas to expand moving a piston or b) or a conventional power cycle using boiling water to create steam that turns a turbine. For steam-driven concentrating solar system, facilities include a solar collection system, a system for transferring the collected energy to a working fluid or to a storage system, and a system such as a turbo-generator for converting the thermal energy to electricity. Many of these power plants have a hybrid solar/fossil fuel capability that can be used during periods of low solar energy. Many also include thermal storage. These capabilities enable concentrating solar power plants to supply energy to a utility grid when it is most needed (day or night).

The lands having the best solar resources are usually arid or semi-arid. Unlike PV systems, concentrating solar power systems require sunlight that is not diffused by clouds. This limits their use to the West, with the southwest possessing some of the best solar energy resources.

There are currently three different types of centralized concentrating solar power systems; parabolic trough, solar “power tower” and solar dish. These systems require relatively flat land with slopes not exceeding 3% to accommodate the solar collectors. The area of land required depends on the type of plant, but is about 5 acres per produced megawatt. It is anticipated that a commercial scale concentrating solar power facility may be in the range of 100 MW or larger and will require in excess of 500 acres. This large land base requirement can involve significant surface disturbance with an associated potential impact on a variety of resources and resource uses on the public lands. These types of facilities also require roads, water, protection from gusty winds, and security fencing, and can involve significant surface disturbance. Electricity generated is sold to the utility under an agreement.

Additional information on solar energy technology is available from the Department of Energy at <http://www.eere.energy.gov/RE/solar.html> or the National Renewable Energy Laboratory (NREL) at <http://www.nrel.gov>.

**Policy/Action:** The BLM’s general policy is to facilitate environmentally responsible commercial development of solar energy projects on public lands and use solar energy systems on BLM facilities where feasible. Applications for commercial solar energy facilities will be processed as right-of-way authorizations under Title V of the Federal Land Policy and Management Act (FLPMA) and Title 43, Part 2802 of the Code of Federal Regulations (CFR). Commercial CSP or PV electric generating facilities must, however, comply with BLM’s planning, environmental and current right-of-way application requirements, as do other similar commercial uses. BLM right-of-way project managers are available to coordinate the planning, environmental, application, permitting, and monitoring process.

The BLM will evaluate the feasibility of installing PV systems on administrative facilities and projects involving resource monitoring, range improvements, public safety and recreation projects. Project planning and design should incorporate an appropriate analysis to determine the feasibility, cost and benefits of using PV systems. Trent Duncan, BLM Utah State Office at 801-539-4090 or Pat Fleming, BLM National Science and Technology Center at 303-987-6856 can provide additional information on installing PV systems on BLM administrative facilities or for other project uses.

### **Inventory and Planning**

The Department of Energy's National Renewable Energy Laboratory (NREL) has prepared solar insolation potential maps at the request of BLM for Arizona, California, Nevada, and New Mexico. The maps identify areas with 1 percent or less slope with high levels of solar insolation that have potential for commercial solar energy development. These maps are available at [ftp://ftp.nrel.gov/pub/dheimill-out/dni\\_sw.zip](ftp://ftp.nrel.gov/pub/dheimill-out/dni_sw.zip). A PowerPoint presentation showing the maps is at [ftp://ftp.nrel.gov/pub/dheimill-out/dnisw\\_st.ppt](ftp://ftp.nrel.gov/pub/dheimill-out/dnisw_st.ppt).

New or updated BLM land use plans are required to consider NREL maps showing areas having commercial solar energy development potential. The land use plans or revisions should address potential impacts of solar energy development and related environment and local community issues. The land use plans should sufficiently analyze and consider the potential for solar energy development, opportunities for reducing environmental costs and delays for other similar projects in the area, and the and local community issues related to making lands available (or not available) for commercial solar energy development. When necessary, the land use plan amendment and the environmental analysis for the solar energy development proposal can be prepared and processed concurrently. This policy does not require all recently completed plans to be updated to include an analysis of solar or renewable energy development.

### **Right-of-Way Applications**

Pre-application meetings should be held with the BLM Field Offices prior to submitting an application to use public lands. The pre-application meeting is an opportunity to discuss the scope of the proposed project, discuss potential environmental and land use conflicts, and develop a schedule and commitments for submitting an application. Applications for commercial solar energy facilities, both PV and concentrating solar power, will be processed as right-of-way authorizations under Title V of the FLPMA and Title 43, Part 2802 of the CFR. No separate authorization is necessary if the installation of a PV system is part of another authorized facility or use. As an example, oil and gas operators may install PV facilities for operating metering equipment and lighting systems on their lease area as part of an approved lease operation. In addition, oil and gas pipeline right-of-way authorizations would allow for the use of PV facilities at pump station locations. Those are valid uses that we can encourage and allow.

Right-of-way applications for solar energy development projects will be identified as a high priority Field Office workload and will be processed in a timely manner. This priority is consistent with the President's National Energy Policy and adequate resources should be provided to review and process the application. The applicant must submit a complete and acceptable application and provide a cost recovery payment before BLM will initiate processing of a right-of-way application. It is anticipated that most right-of-way applications for solar energy development will be full cost recovery applications. BLM will apply sound business practices in expediting the application process.

Applications submitted to BLM for commercial solar energy development projects will use Form SF-299, Application for Transportation and Utility Systems and Facilities on Federal Land, consistent with the requirements of 43 CFR 2802.3.

The BLM authorized officer should schedule pre-application meetings with applicants (43 CFR 2802.1). This facilitates preparation and processing of applications, identifies potential issues and land use conflicts impacting the authorized officer's decision to grant or not grant the right-of-way authorization. The pre-application process will identify any environmental or cultural resource studies that may be needed, assess public interest and concerns, identify other authorized uses within or near the area, allow consideration of potential alternative site locations, and outline arrangements for paying the costs associated with processing a right-of-way grant. Early public notification and involvement of local communities and other interests is also important in increasing public acceptance and avoiding potential conflicts, especially in areas where other uses exist on the public lands. The application process is pre-decisional and may or may not result in BLM granting a right-of-way authorization.

A BLM State or Field Office right-of-way project manager will be assigned to process the application, ensure appropriate cost recovery and monitor construction, and use of the land for the authorized purpose. As an option, the BLM State Director may request the BLM Washington Office (WO-350) assistance of a National Right-of-Way Project Manager.

Solar energy right-of-way applications and authorizations are subject to appropriate cost recovery and rental payments required by 43 CFR 2808.1 and 43 CFR 2803.1-2, and bonding requirements of 43 CFR 2803.1-4.

### **Right-of-Way Authorizations**

A right-of-way grant (Form 2800-14) will be used to authorize all facilities, held by the holder of the grant, on the public lands related to a commercial solar energy development project. This authorization will include the solar collectors, tower, turbine/generator, fossil fired generator for hybrid systems, thermal storage, as well as the access roads, electrical and transmission facilities, and other testing and support facilities. It should not be necessary to grant a separate right-of-way authorization for site testing.

The lands involved in the right-of-way grant will be defined by aliquot legal land descriptions and be configured to minimize the amount of land involved.

The right-of-way authorization will contain appropriate stipulations, relating to all aspects of project development including but not limited to road construction and maintenance, vegetation removal, natural, cultural and biological resources mitigation and monitoring, and site reclamation. In addition, an approved Plan of Development (POD) for construction and operation of the solar facility must be completed prior to beginning construction. When possible, the right-of-way authorization and POD can be processed simultaneously.

The right-of-way holder should be encouraged, through terms and conditions of the right-of-way authorization, to work with BLM to increase public acceptance and awareness of the benefits of solar energy development by providing information and public viewing areas at safe locations near the development. The BLM and right-of-way holder can provide a positive message on the responsible use of renewable resources and the multiple resource use on public lands.

A bond will be required for solar energy development right-of-way grants to ensure compliance with the terms and conditions of the authorization and the requirements of the regulations, including reclamation. The reclamation provisions within the POD should include not only removal of solar collectors and other structures, but also the reclamation of access roads and disturbed areas. The amount of the bond will consider potential reclamation and administrative costs to BLM.

The term length of the authorization is not limited by regulation; however it should recognize the overall costs and useful life of solar energy facilities (43 CFR 2801.1-1(h)). The term of the solar energy authorization for a commercial facility should not exceed the design life of the project, typically 30 years. The authorization may be renewed consistent with the provisions of the regulations (43 CFR 2803.6-5). Other compatible uses may be authorized, but are unlikely due to the intensive use of the site for PV or concentrated solar power facility equipment.

The right-of-way grant may be assigned consistent with the provisions of the regulations (43 CFR 2803.6-3). However, all assignments shall be approved by the BLM authorized officer and the qualifications of all assignees must comply with the Due Diligence section of this IM and the requirements of the regulations (43 CFR 2802.3(a)(4) and 43 CFR 2802.4(a)(5)). The assignment shall not interfere with BLM's enforcement of the terms and conditions of the authorization or management of the associated public lands.

All final decisions issued by the Authorized Officer in connection to the authorization of solar energy projects can be appealed under 43 CFR part 4 and 43 CFR 2804.1(a). It should also be noted that right-of-way grants are issued as full force and effect decisions (43 CFR 2804.1(b)) and will remain effective during any appeal period.

## **Rental**

All solar energy right-of-way authorizations are subject to rent in accordance with this IM, unless they are specifically exempt from rent by statute or regulation. Some holders or facilities may be exempt from rent pursuant to the Rural Electrification Act of 1936, as amended 43 CFR 2803.1-2 (b)(1)).

The holder of a right-of-way authorization shall pay an annual rent established by the BLM using real estate appraisals and reviews procured from the Department of the Interior, Appraisal Services Directorate. The rents paid will be in conformance with 43 CFR 2803.1-2. The appraisal should consider the value of the rights to be conveyed and the lease of comparable lands in an early or similar stage of potential development, e.g., commercial or industrial, as of the date of the appraisal. The procured appraisal and review report will be prepared on a site specific basis and reflect market conditions for setting rental payments.

The appraisal assignment to estimate annual rental should include a request to identify an appropriate rental index for updating the rental payment. The justification for the index should reflect normal market conditions for updating rental payments on similarly used land.

The rental payment will be phased in over a 3-year period to permit additional data collection that may be required after the approval of the grant, preparation and approval of a POD, and construction of the facility. The rent for the first year will be 25 percent of the BLM approved rent, 50 percent the second year and 100 percent the third year.

## **Competitive Interest**

Right-of-way applications for solar energy development will be accepted and processed on a first-come, first-serve basis. The right-of-way regulations (43 CFR 2803.1-3) provide authority for offering public lands under competitive bidding procedures for solar energy right-of-way authorizations. Currently the market for sites with high solar resource potential is very limited and no competitive interest has been expressed for sites on public lands. However, BLM will initiate a competitive process, if a land use planning decision has specifically identified an area for competitive leasing. Competitive bidding, if provided for by a land use plan decision, will follow the procedures required by 43 CFR 2803.1-3.

## **Due Diligence**

BLM will discourage applicants from holding right-of-way authorizations for purposes of speculating, controlling or hindering development of solar energy on public lands. Speculative interest can be mitigated by ensuring the applicant meets qualification requirements of the regulations 43 CFR 2802.3(a)(4) and 43 CFR 2802.4(a)(5) and requiring certain due diligence provisions in the right-of-way authorization for solar energy development.

The regulations clearly provide authority to require that the application include information on the applicant's technical capability to construct, operate, maintain and dismantle the solar energy facilities (43 CFR 2802.3(a)(4)). This technical capability can be demonstrated by obtaining the funding, designing, constructing or successfully operating an energy generating project. Actual ownership, development, or successful management of similar sized electric energy related facilities within the last five years by the applicant would generally constitute evidence of financial capability. If sufficiently adequate and complete, BLM may be able to rely on financial and technical capability information provided to the utility awarding the purchase agreement. The regulations provide the authority to deny the application if the applicant cannot demonstrate adequate technical ability to construct, operate, and maintain the solar energy facilities 43 CFR 2802.4(a)(5).

In addition, the solar energy development right-of-way grant shall include a due diligence requirement for installation of facilities consistent with an approved Plan of Development. If construction of solar energy facilities has not commenced within 3 years after the effective date of the grant, the right-of-way holder shall provide BLM just cause as to the nature of any delay, evidence of progress toward beginning of construction and the anticipated date of start-up operations. Failure of the holder to comply with the due diligence provisions of the solar energy development right-of-way grant provides the authorized officer the authority to terminate the authorization 43 CFR 2803.4(b).

### **Environmental Review**

The scope of the environmental analysis required by the National Environmental Policy Act (NEPA) for a solar energy development project should address all aspects of the solar project, including direct, indirect, and cumulative effects of the proposed action.

The scope of the NEPA analysis and the compliance requirements with the Endangered Species Act, the Migratory Bird Treaty Act, the National Historic Preservation Act, and other laws for a solar energy development right-of-way application should address the installation and maintenance of solar collectors, water for steam generation and cooling purposes, oil or gas used by backup generators, thermal or electrical storage, turbines or engines, access roads, and electrical inverters and transmission facilities. The scope and level of site clearances should include the areas of proposed surface disturbances and areas potentially affected by the project.

The level of NEPA analysis will be determined by project scoping and the anticipated potential impacts on the environment. The level of analysis will reflect the amount of land needed for the solar energy collection and associated support facilities, the amount of surface to be disturbed, water requirements and potential impacts on wildlife and land resources. It may be possible to combine the required environmental review process for a solar energy development project with other required State or local environmental requirements. This would streamline the process and be consistent with Departmental policy on intergovernmental cooperation.



## **LR 2000 Data Entry**

Use the commodity code (**975**) for solar energy facilities and identify under the comment section whether the authorization is for a PV or concentrated solar power facility. This will allow BLM to identify solar energy related right-of-way authorizations and to track these uses within LR 2000.

**Time Frame:** This policy is effective immediately.

**Budget Impact:** The application of this policy will have a minimal budget impact. Any land use planning associated with this policy will be part of existing planning efforts. Currently there are no applications for commercial solar energy facilities on public lands. However, it is assumed that any solar energy commercial development will probably meet the criteria for full cost recovery. In addition, BLM post authorization monitoring activities are also subject to the cost recovery provisions of the regulations. These procedures will minimize any unnecessary work.

**Manual/Handbook Sections Impacted:** This Instruction Memorandum and policy affect BLM Manual 2801, Right-of-Way Management and Handbook H-2801-1.

**Coordination/Contacts:** This policy was developed with the assistance of the Washington Office Planning, Assessment and Community Support Group (WO 210) and the Property, Acquisition and Headquarters Services Group (WO 850). BLM State Offices were also provided an opportunity to review the policy and provide input prior to finalization.

**For Further Information:** Any questions concerning the content of this IM should be directed to the Washington Office, Lands and Realty Group (WO 350) and the attention of Ray Brady, Group Manager at (202) 452-7773 or by Email at [ray\\_brady@blm.gov](mailto:ray_brady@blm.gov).

Signed by:  
Kathleen Clarke  
Director

Authenticated by:  
Barbara J. Brown  
Policy & Records Group, WO-560