

Thank you for your comment, San Luis Valley EcoSystem Council Citizens for San Luis Valley Water .

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Solar Energy Development PEIS
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Attachment: BLM PEIS Comments SLVEC & CSLVWPC.pdf

Comment Submitted:

[See Attachment.](#)



July 15, 2008

Delivered via electronic mail and hard copy U.S. post

Solar Energy PEIS Scoping
Argonne National Laboratory
9700 S. Cass Ave. – EVS/900
Argonne IL 60439

Re: Scoping Comments on the Solar Energy Programmatic Environmental Impact Statement

To Whom It May Concern:

Please accept and fully consider these scoping comments on behalf of the San Luis Valley Ecosystem Council and the Citizens for San Luis Valley Water Protection Coalition. Serving a region that is roughly 8,100 square miles, we collectively serve six rural counties located at the headwaters of the Rio Grande River.

The mission of the San Luis Valley Ecosystem Council (SLVEC) is to protect and restore - through research, education and advocacy - the biological diversity, ecosystems, and natural resources of the upper Rio Grande bioregion, balancing ecological values and human needs. With a membership of 500 and a mailing list of 4,000 supporters, SLVEC conducted a multi-year Roadless Inventory Project (RIP) to document nearly one million acres of Rio Grande National Forest (RGNF) and Bureau of Land Management (BLM) lands. SLVEC has worked extensively with Federal agencies (including the BLM) to identify priorities, make recommendations and develop prescriptions for travel management and vegetation, watershed, wetland, wildlife habitat and corridors, and cultural and Natural Heritage Program sites using a GIS/landscape-level approach.

The Citizens for San Luis Valley Water Protection Coalition (WPC) is a grassroots organization representing a broad spectrum of interests. It's members are united by the belief that the vital ecological, wildlife, cultural, agricultural and water resources of the upper Rio Grande and Closed Basins of the San Luis Valley should not be jeopardized by destructive industrialization of any kind. By working with communities, local government and organizations, WPC is actively engaged in promoting an emerging culture of sustainability in the San Luis Valley that is responsive to climate change while protecting the vital natural resources that maintain the healthy functioning of ecosystem processes and services.

We appreciate the opportunity to respond to, and offer input on the BLM and Department of Energy (DOE) Programmatic Environmental Impact Statement (PEIS) for agency-wide solar energy programs and policy. We agree that action must be taken to limit increases and even reverse dangerous levels of carbon emissions and greenhouse gases. While the urgency to reduce fossil fuel emissions, which are undeniably jeopardizing global climate systems is foremost, we urge the DOE and BLM to take a reasoned approach when considering the scale, siting and water demands of Concentrated Solar Power (CSP) plants in culturally and ecologically sensitive areas on or near public lands in the San Luis Valley (SLV).

We encourage the ongoing protection of our many natural resources from large-scale industrial development. At a time when ecosystem processes are being taxed to an extreme, and biological diversity is collapsing, the relatively pristine, intact ecosystems still extant in the SLV are priceless and constitute vital life and economic sustaining resources for our region and beyond.

The SLV is rapidly emerging as major foci for utility-scale solar generation development. We understand that BLM may have received as many as 130 applications representing more than 70 gigawatts of solar potential, some of which are targeted for public lands in the SLV. The Valley was recently highlighted in a state report entitled “Connecting Colorado’s Renewable Resources to the Markets” authorized by Senate Bill 07-091. The report designated the SLV as *one of two regions with the highest* “direct isolation” in the state. In addition, the National Renewable Energy Lab (NREL) in Golden, Colorado has identified the SLV as having *the highest and most concentrated* concentrating solar power prospects in the state of Colorado (see Attachment A).

The SLV has piloted a creative solution to producing energy for the grid in the form of the SunEdision solar plant located at the central Valley near Alamosa. SunEdision’s 8.2 MW photovoltaic grid-interface is situated near a heavily loaded substation, demonstrating that small-scale solar electrical applications can co-exist in a rural environment if plants are interfaced with existing substations.

While we support the development of solar energy production as a much more desirable and appropriate energy solution for the SLV, we are concerned that intensified, industrial-scale development could jeopardize the broader environmental values, in particular the extensive but fragile aquifers that underlie these values, that we, and the citizens of the SLV have worked long and hard to protect.

Decentralized solar-power collection is proving to be a safe, cost and energy effective and, community-empowering solution in European countries such as Germany and Holland where land and water resources are scarce. An earmark of alternative energy development in those countries is three fold; emphasis on flexibility in size and scale appropriate to location and need, constructing flexible systems that can rapidly integrate new technologies, and appropriately subsidized research and development of a range of alternative energy sources.

The San Luis Valley is uniquely situated to serve as a ‘pilot study’ area for the balanced of alternative energy development; where appropriate scale technologies enhance rather than overwhelm existing natural and cultural systems, and strengthen and diversify rather than dominate economic markets.


The Valley is already the site of a US Environmental Protection Agency Pilot Study on regional sustainability (EPA Office of Research and Development, Cincinnati, Ohio), and, through various other initiatives has hosted Valley wide community problem solving and planning processes addressing issues of concern to the bioregion.

Stakeholder participation is important at this early stage of development, and will continue to be for years to come. As organizations with long-standing and proven successes in community education and organizing around environmental issues, and extensive knowledge and involvement in important water and landscape issues in the Valley, we request that DOE and BLM give serious consideration to including us as a Cooperating Organization as the PEIS moves forward.

We welcome the opportunity to serve as an active stakeholder in creating a model for the future that embraces both the need for new energy solutions and rigorous protection of our fragile ecosystems. We believe that if done right, energy production and environmental protection are not mutually exclusive.

Thank you for considering these scoping comments and for your collective commitment to supporting responsible renewable energy development. We look forward to continuing to participate in this process.

Sincerely,



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Re: Scoping Comments on the Solar Energy Programmatic Environmental Impact Statement submitted jointly by the San Luis Valley EcoSystem Council and the Citizens for San Luis Valley Water Protection Coalition (con't)

Issues Addressed

I. Considerations for Siting of Energy Corridors

- A. Areas to Avoid

II. Water Use and Protection of the Closed Basin Aquifer

III. Right-of-Way Terms and Conditions

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- D. Restoration and Bonding
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- F. Termination for Non-Compliance
- G. Revisions to BLM's ROW Process

III. BLM Proposed Planning Criteria

- A. Comply with e Applicable Laws and Policies
- B. Use PEIS as Analytical Basis for Amending Land Use Plans
- C. Develop RFD scenarios and Identify Lands Available for Development, Lands Available for Development with Restrictive Stipulations and, Lands Not Available
 - 1. RFD Scenario
 - 2. Identification of Available Lands
- D. Limit Amendments to Utility-Scale Solar Energy Development and Associated Transmission Lines
- E. Continue to Manage Other Resources Based on Current Terms of RMPs
- F. Recognize Valid Existing Rights
- G. Coordinate with Other Governments/Agencies and Seek Consistency
- H. Take Into Account Protection of Cultural Resources and Engage in Required Consultation
- I. Recognize Special Importance of Public Lands to People Who Live in Nearby Communities and to Nation as a Whole
- J. Environmental Protection and Energy Production are Both Desirable and Necessary, Not Mutually Exclusive
- K. Consider and Analyze Climate Change Impacts, Including Anticipated Benefits from Solar

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- B. Special Management Areas
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- D. Opportunity Costs
- E. Scope of NEPA analysis
- F. Range of Alternative
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I. Considerations for Siting of Energy Corridors

While we enthusiastically support the development of environmentally responsible solar energy development, we have serious concerns that over-development of utility-scale solar power generation facilities will undermine the unique values in the Valley – the world’s largest alpine valley. Given the agricultural base and fragile nature of the SLV desert ecosystem, we are particularly concerned that industrial-scale development will deplete already over-allocated surface and groundwater resources.

As the BLM noted, other concurrent uses of these sites are “unlikely due to the intensive use of the site for Concentrating Solar Power (CSP) facility equipment,” (Instruction Memorandum (IM) No. 2007-097). **Many traditional uses, by humans and wildlife, may also be assumed to be excluded in the future (barring ineffectively costly remediation) as the growing number of difficult-to-utilize industrial brownfields worldwide attests.** According to “New Policy Encourages Solar Energy Development on America’s Public Lands,” (BLM Website Release 21 October 2004), the agency implemented a “Solar Energy Development Policy to establish guidelines for authorizing commercial solar facility on public land.” The production goal to develop 30 GW of renewable energy in the West by 2015 was established by the Western Governors Association and DOE.

An inappropriately sited and constructed CSP plant has the potential to cause significant damage to the environment and to human health. Accordingly, it is crucial that the BLM commit to avoiding sensitive areas, obtain necessary information on lands with wilderness, sensitive areas or other traditional use characteristics, and maximize photovoltaic grid-interface on seventeen existing utility substation facilities in the Valley.

A. Areas to Exclude:

We appreciate the BLM’s acknowledgment that certain places are not appropriate for large solar energy facilities and agree that detailed categories of lands to be avoided should be included in the PEIS. Based on their important natural values and potential for damage from the construction, use and maintenance of solar facilities, transmission lines, service roads and water use, we recommend that the PEIS include a commitment not to permit siting of utility-scale solar energy facilities in areas of critical environmental concern including the following Federal lands:

1. Great Sand Dunes National Park;
2. Baca Alamosa and Monte Vista National Wildlife Refuges;

3. Sangre De Cristo National Heritage Area;
4. National Inventory Wetlands;
5. Riparian and significant (aquifer) recharge areas;
6. Colorado Division of Wildlife identified wildlife habitat, corridors, wintering & calving grounds;
7. Colorado Natural Historical Program Potential Conservation Areas (PCA's)
8. State designated Natural Areas;
9. Sites registered or eligible for registry under the National Historical Preservation Act.

In addition, we recommend that the PEIS include a commitment to protect and exclude utility-scale solar energy facilities from the following categories of federal lands within the San Luis BLM District and the Rio Grande National Forest:

1. Wilderness Areas;
2. Wilderness Study Areas (WSAs);
3. Conservation Areas;
4. Other lands within BLM's National Landscape Conservation Systems such as Rio Grande Natural Area;
5. National Historic and National Scenic Trails;
6. National Wild, Scenic, and Recreational Rivers, study rivers and segments, and eligible rivers and segments;
7. Areas of Critical Environmental Concern (ACECs);
8. Threatened, endangered and sensitive species habitat, as well as critical cores and linkages for wildlife habitat;
9. Citizen-proposed wilderness areas such as San Luis Hills/Flat Top Mesa pending legislation for designation in one of the above categories;
10. Designated or proposed Unique and Irreplaceable Areas;
11. Significant (aquifer) recharge areas.

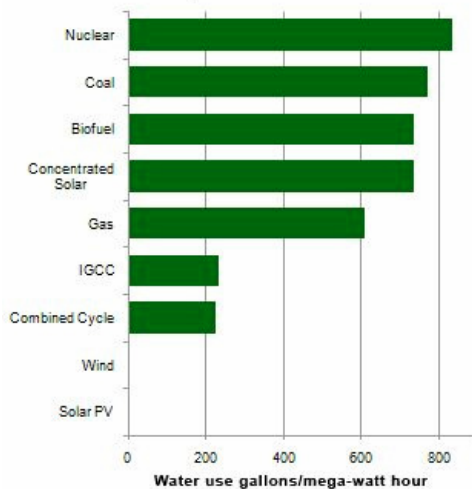
We believe it is of primary importance that no solar energy facility, electrical substation, transmission corridor, or service roads be sited within or pass through the above listed landscapes. It is equally important that solar energy facilities should not infringe on scenic view sheds or impede the recreational enjoyment of open space, or otherwise interfere with their natural function and special values.

Recommendation: Solar energy facilities should not be sited in the categories of lands listed above and should not be sited immediately adjacent to these areas, if doing so would degrade the view shed of scenic areas and/or negatively impact the ecological values for which these areas were designated.

II. Water Use and Protection of the Closed Basin Aquifer

Current concentrated solar technology uses large amounts of water. This is a fundamental conflict for the arid and semi-arid solar rich but water poor areas like the SLV. As the technology currently exists, concentrated solar power requires nearly as much water to generate as nuclear, coal, biofuels, or natural gas do -- about 600 to 800

Water Use By Source Generation



gallons of water per megawatt hour of energy produced. (See adjacent table from The Land and Water Fund of the Rockies, *The Last Straw: Water Use by Power Plants in the Arid West*, April 2003). It is possible that dry cooling in solar thermal units could lower the volumes of water released as steam to the atmosphere.

The American West is a water-short region where we are already planning for 20 percent reductions in water supply over the next 20-30 years due to the projected drought impacts of climate change. The San Luis Valley is no exception. Situated between the Sangre de Cristo and San Juan Mountains, mountain streams feed the Closed Basin confined and

unconfined aquifers – the lifeblood to wildlife, wetlands, agriculture and communities. This vital water resource and the hydro-geological processes that maintain it must be protected to sustain life in the bioregion. Below are some specific legal, political and environmental concerns that require serious consideration in the PEIS and Federal management plan amendments for all Colorado lands under consideration:

- a. Colorado water rights, rules and stipulations;
- b. Cumulative affects on aquifer depletion;
- c. Protection of significant aquifer recharge areas (stream runoff areas, wetlands, artisan wells, etc.);
- d. Rio Grande Compact conflicts;
- e. Compliance with Federal, state, and county water use statutes, regulations and rules, specifically, but not limited to;
 - i. The Great Sand Dunes National Park and Preserve Act of 2000. A unique aspect of this legislation, outlined in Section 6, is its adoption to specifically protect the unique hydro-geology which supports the Great Sand Dunes formation;
 - ii. Colorado 98-1011;
 - iii. Findings of the Rio Grande Decision Support System (RGDSS) (Among other things, the RGDSS created the framework for Colorado State Law 04-222 by establishing the geo-hydrological context for not allowing additional water allocation in Water

- District 3 based on the finite nature of the hydro-geological system.)
- iv. Colorado State Law 04-222, “Rules Governing New Withdrawals of Groundwater in Water Division 3 Effecting the Rate or Direction of Movement of Water in the Confined Aquifer System”. Promulgated pursuant to the authority granted to the State Engineer in section 37-90-137 (12)(b)(I), C.R.S. (2003), and section 37-92-501, C.R.S. (2003) as amended by Senate Bill 04-222. *“These rules have as their objective the optimum use of water consistent with preservation of the priority system of water rights and protection of Colorado’s ability to meet its interstate compact obligations...allowing fluctuations in the artesian pressures in the Confined Aquifer within the ranges that occurred during the period of 1978 through 2000, and allowing artesian pressures to increase in periods of greater water supply and to decline in periods of lower water supply in much the same manner and within the same ranges of fluctuation as occurred during the period of 1978 through 2000, while maintaining average artesian pressure levels similar to those that occurred in 1978 through 2000.”*
 - v. The Land Use, Master Planning and 1041 Codes and Regulations of the six counties comprising the San Luis Valley. In particular, Saguache County’s Land Development Code, Article XVIII “Significant Groundwater Recharge Zones”; adopted to *“...regulate identified areas designated as significant groundwater recharge zones, to prevent immediate or foreseeable degradation of quality to the ground water and/or connecting subsurface water, surface water, flood plains, wet lands, or riparian areas, To prevent material impact to aquatic life, wildlife, agricultural, and the health, safety and welfare of Saguache County residents...to otherwise plan for and regulate the use of land overlying ground water recharge zones so as to provide for planned and orderly use of land and protection of the environment and health, and safety and welfare of Saguache residents in a manner consistent with Federal, State and County regulations.”*

Depending on what type of solar system is built, chemicals used in the process of solar electricity can include, heat transfer fluids (oils), engine fluids, heat transfer system cleaners, molten salt, and gasses--hydrogen or helium. Maintenance of solar array fields rely heavily on the use of herbicides to keep vegetation from blocking the collectors. All of these chemicals can have negative impacts on ground waterways and aquifers. Reclamation after the site is no longer in use is also an issue such as disposal of batteries and the structures themselves as well as chemicals at the end of the life of the solar electric plant. Leeching from these products presents a danger to water sources if products are not properly disposed of.

III. Right-of-Way Terms and Conditions

The BLM will permit solar energy development subject to right-of-way (ROW) authorizations under Title V of the Federal Land Policy and Management Act (FLPMA) and implementing regulations, 43 C.F.R. Part 2800, which also requires a plan of development (POD). These documents should contain key terms for responsible development, including:

A. Reasonable Term and Diligent Development

While the BLM's ROW regulations do not impose specific limits on the terms for ROW's, as acknowledged in IM 2007-097, the term for the ROW should not exceed the design life of the project, typically 30 years. ROWs should also require that companies exercise reasonable diligence in developing and producing solar energy, such that the ROW can be terminated if progress is not being made and other uses of the land are not precluded without justification.

B. Changes in Applicable Laws and Regulations are Incorporated

If applicable laws and regulations change during the term of the ROW, then they should be automatically incorporated. For example, species such as the sage grouse are currently being considered for listing under the Endangered Species Act. Should such a listing occur, the terms of the ROW must be clear that compliance with activities triggered by such a listing are required and are not subject to challenge.

C. Monitoring, Phased Development and Adaptive Management

Plans of development should require that a minimum footprint first be developed, so that monitoring can determine not only if the project is likely to be technically successful but also if projected damage to the environment is consistent or requires additional mitigation measures or other changes to the project before proceeding. Only after all technical and environmental considerations are addressed, should the project be permitted to proceed to the next level of development.

Detailed monitoring plans should be required for the construction and operation of the project to identify key indicators of environmental effects on-site and on adjacent lands. These plans should also provide for changes to the project to be made to ensure that environmental effects do not exceed expected and acceptable levels and to allow for incorporation of new technologies as they become available.

D. Restoration and Bonding

Restoration of the site includes not only removal of equipment but also reclamation of surface disturbance, including the facility footprint and access roads, and revegetation with native species in a distribution comparable to that of surrounding lands. Bonding should be sufficient to cover the costs of restoration, as well as the cost of compliance with other terms of the ROW grant, including actions that the agency may take if the ROW grant is terminated for noncompliance. See, IM No.2007-097.

E. Management Practices to Limit Impacts on the Environment

Right-of-way grants should include a standard term requiring that operations are conducted in a manner that minimizes and seeks to avoid adverse impacts to air, land, water, wetlands, biodiversity, as well as cultural, economic, visual, and other resources in a way that avoids conflicts with other land and water uses and users. The BLM should retain the right to require reasonable measures be taken to fulfill this requirement, such as modification to facility siting or design, timing and location of construction activities, and specification of interim and final reclamation measures. The agency's standard oil and gas lease terms contain a comparable term, which could be used as a starting point. (We recommend the strengthening of these terms however to avoid the near routine waiver of restrictive stipulations currently occurring in oil and gas development fields on BLM lands in Wyoming, for example.) However, because the ROW should also include a right to require phased development and other changes based on monitoring results, the BLM's ability to require "reasonable measures" should be more broadly defined.

Other management practices that will limit the overall impact of utility-scale solar development should also be included in the terms of the ROW, such as:

- locating roads and maintaining the site to avoid erosion and sedimentation, limit number of roads needed, and minimize habit disruption;
- protection plans for adjacent habitat and species;
- off-site mitigation where habitat disruption is unavoidable;
- locate facilities in proximity to existing transmission infrastructure, roadways and sources of other necessary resources;
- minimize the overall size of the facility;
- submit proof of water rights, undergo adjudication for change of use, provide a verifiable plan that minimizes and monitors use;
- periodically assess feasibility of incorporating technological advances that improve efficiency and/or reduce impacts on wildlife and other natural resources.

F. Termination for Noncompliance

Should the ROW holder fail to comply with any of the terms set out in the grant or the plan of development, the BLM should have the ability to terminate the ROW if the failure continues for 30 days after written notice. The ROW grant should also explicitly provide that, in the event of termination, the BLM has the right to use the bonded funds to dispose of the facility and restore the site. Once again, while the agency's standard oil and gas lease contains a comparable term, it is important that the ROW grant for development of utility scale solar energy contain explicit remedies for not only termination but also for restoring the land to its previous condition.

Recommendation: The BLM should develop an expanded set of standard terms that will be set out in the PEIS and incorporated into all ROWs and plans of development where applicable.

G. Revisions to BLM's ROW Process

The BLM's right-of-way process was designed primarily for short-term uses and linear ROWs, such as pipelines, or ROWs with a relatively limited footprint, such as

communication sites. Even in the case of ROWs for wind energy projects, there is still land that is not in active use and is available for other uses. ROWs for utility-scale solar energy development is a long process that will disrupt the land to the virtual exclusion of all other uses, as acknowledged in IM No. 2007-097. Accordingly, the agency should consider revisions to the ROW process, both procedures and regulations, to address this important difference. For instance, the federal government is currently compensated for ROWs by a relatively low cost monthly payment per acre of land. Due to the way that federal land will be exclusively devoted to the solar project, the agency could consider revising the payment scheme to reflect this reality and could include some form of royalty payment to acknowledge the profits that will be made by solar energy developers.

In addition, the BLM's current ROW policy is to process applications on a first-come, first-served basis. However, this approach may not yield the best return for the agency and also may not lead to the most thoughtful development of parcels. In some instances a wind energy project and a solar energy project could be situated in the same area. On occasion one project may have less of an environmental impact. As the BLM acknowledges in IM No. 2007-097, the ROW regulations (43 CFR § 2804.23(c)) provide authority for offering public lands under competitive bidding procedures for solar energy right-of-way authorizations. Competitive bidding and comparison of projects based on their likely success, taking into account the ability to limit environmental effects, the applicant's technical and financial capability, and the amount of power to be generated, could be used to improve the process of awarding ROW grants to ensure that the best use is made of our public lands when they are provided for energy development.

Recommendation: The BLM should consider revisions to its ROW process to address the current explosion in applications for ROWs for solar development, as well as the particularly high impacts of utility-scale solar development. Adjustments to the pricing of ROWs that provide for a mechanism to choose amongst competing projects will allow BLM to make a more informed decision.

III. BLM Proposed Planning Criteria

The Notice of Intent identifies a list of planning criteria to incorporate the BLM's solar energy program when amending applicable land use plans. We agree that the following criteria should be applied to properly analyze solar energy development and have added points of further clarification for the BLM to consider under each criterion.

A. Comply with Applicable Laws and Policies

In complying with applicable laws and policies, we urge the BLM to consider the U.S. Fish and Wildlife Service and the Colorado Division of Wildlife as cooperating agencies in this effort, and to actively seek consultation with those agencies to ensure compliance with the requirements of the Endangered Species Act, during the PEIS scoping and development process instead of deferring consultation until specific projects are proposed. There is an abundance of in-situ scientific data on the San Luis Valley that can be accessed and seriously considered. These data can lead to a landscape level understanding of long-term cumulative impacts of single and multiple site facilities.

B. Use PEIS as Analytical Basis for Amending Land Use Plans

In order for BLM and other interested Federal agencies to support amendment of land use plans and to tier to the PEIS in connection with subsequent decision-making processes, the analysis conducted under the National Environmental Policy Act (NEPA) must be sufficiently robust to support the determination that specific lands are suitable for development. The PEIS and subsequent amendments should also require a site-specific environmental review with opportunities for public comment prior to approval of projects.

C. Develop Reasonable Foreseeable Development Scenario and Identify Lands Available for Development, Lands Available for Development with Restrictive Stipulations, and Lands Not Available

1. Reasonable Foreseeable Development Scenario

We commend the BLM for developing a reasonable foreseeable development scenario (RFD) for solar energy development, which provides a projection of expected levels of development as a basis for evaluating and managing environmental effects. The RFD should project development for each resource management plan (RMP) that is amended by the PEIS and associated surface disturbance, including from associated infrastructure, such as roads and transmission. In addition, the RMP amendments established by the PEIS must include methods for monitoring impacts to other resources managed by BLM and a specific plan for conducting further NEPA review should the RFD appear likely to be exceeded. The specific applications for solar projects that the BLM is currently reviewing can serve as models for the PEIS and can provide valuable information for assessing the RFD. The BLM should incorporate the specifics of these projects into the PEIS to provide examples for detailed impact analysis.

2. Identification of available lands

Due to the nature of solar energy production, mitigation measures and restrictive stipulations are severely limited. The most important aspect of mitigation for solar energy will be establishing lands that are closed to development. Therefore, the PEIS must specifically identify lands open to solar and lands closed to solar in addition to best management practices that minimize adverse impacts and degradation of ecosystems.

D. Limit Amendments to Utility-Scale Solar Energy Development and Associated Transmission Issues

After analyzing impacts from solar energy projects on other resources, it may become necessary for BLM to change management prescriptions for other resources in order to best protect them in the context of making lands available for utility-scale solar energy development. These additional prescriptions can and should be included in the RMP amendments.

E. Continue to Manage Other Resources Based On Current Terms of RMPs

The PEIS should address whether current RMP terms are satisfactory for protecting other resources after potential impacts from solar development have been analyzed and make changes as appropriate as part of the RMP amendments.

F. Recognize Valid Existing Rights

While we realize the obligation of the BLM to recognize existing rights, we request to be informed of changes in current conditions of use including foreclosing changes in those rights and engaging in negotiations and/or cooperative collaboration to effectuate important changes that will impact BLM lands.

G. Coordinate with Other Governments/Agencies and Seek Consistency

We understand that BLM has and continues to receive many proposals for solar projects in the SLV. Stakeholder participation is important at this early stage of development, therefore we request that DOE/BLM consider including us as a cooperating organization as the PEIS moves forward.

FLPMA requires that the BLM's guidance and management policies shall "be consistent with officially approved and adopted resource related policies and programs of other Federal agencies, State and local governments and Indian tribes." 43 U.S.C. § 1712(c)(9); 43 C.F.R. § 1610.3-2. There are currently three major planning processes underway in the Western United States, workings and results of which should be addressed by the Solar PEIS because of the potential overlap in goals: the state of California's Renewable Energy Transmission Initiative (RETI), the Western Governors Association's (WGA) Western Renewable Energy Zones (WREZ), and the West-wide Energy Corridors PEIS.

According to the Colorado Clean Energy Development Authority (CCDA) website <http://www.colorado.gov/energy/utilities/clean-energy-development-authority.asp>, there are already plans - SLV Electric System Improvement Project with Tristate electric - to improve transmission support for renewable energy and for exporting solar energy to major load centers. Their proposal is for a 230-kilovolt transmission line between the Walsenburg and San Luis Valley Substations.

The **WREZ**, the **West-Wide Energy Corridor PEIS**, and the CCDA project in particular, and other similar planning projects, should be utilized in order to maximize efficiency of solar energy while minimizing impacts to landscapes and wildlife in the SLV.

In addition, the WGA has recently produced the Wildlife Corridors Initiative Report (available at <http://www.westgov.org/wga/publicat/wildlife08.pdf>), which identifies important wildlife corridors and habitats in the western states and makes recommendations for best protecting these crucial areas. BLM should consult this report for information on the areas identified and/or confer with the WGA Western Wildlife Habitat Council while preparing the PEIS.

H. Take Into Account Protection of Cultural Resources and Engage in Required Consultation

The SLV has an abundance of cultural resources dating as far back as the last ice age - over 11,500 years ago. The area is currently being proposed for inclusion in the Sangre de Cristo National Heritage Area. In recognition of the SLV's many cultural and historical resources that, properly preserved, foster understanding of our nation's history, and support a burgeoning tourism industry, we urge BLM to fully comply with FLPMA stipulations to protect cultural, geologic, and paleontologic resource values. 43 U.S.C. §§ 1701(a)(8) 1702(c).

In the context of the Valley's rich historical and cultural resources, the National Historic Preservation Act of 1966 ("NHPA") (16 U.S.C. § 470 et seq.) affords heightened protection to these resources, establishing a cooperative federal-state program for the protection of historic and cultural resources. In particular, the review process set out in Section 106 (16 U.S.C. § 470f) obligates the BLM to consider the effects of management actions on historic and cultural resources listed or eligible for inclusion under NHPA. Additionally, Section 106 requires the BLM to consider the effects of its management actions on all historic resources and to give the Advisory Council on Historic Preservation an opportunity to comment before the BLM takes action. Section 110 of the NHPA requires the BLM to assume responsibility for the preservation of historic properties it owns or controls (16 U.S.C. § 470h-2(a)(1)), and to manage and maintain those resources in a way that gives "special consideration" to preserving their historic, archaeological, and cultural values. Section 110 also requires the BLM to ensure that all historic properties are identified, evaluated, and nominated to the National Register of Historic Places. Id. § 470h-2(a)(2)(A).

Further, the President's "Preserve America" initiative (See Exec. Order 13287, March 3, 2003) requires the BLM to advance the protection, enhancement, and contemporary use of its historic properties. The BLM must ensure that "the management of historic properties in its ownership is conducted in a manner that promotes the long-term preservation and use of those properties as Federal assets."

The San Luis Valley has fragile historical vernacular structures, cultural landscapes, and diverse rural-oriented cultures. The BLM should proactively consult and obtain information on cultural and historical resources in the areas proposed to be available for solar development so that irreplaceable resources are identified and protected.

I. Recognize Special Importance of Public Lands to People Who Live in Nearby Communities and to Nation as a Whole

Extensive research exists demonstrating the key role that wildlands play in the economic sustainability and vitality of nearby communities. The PEIS should acknowledge the ecological and natural values of the San Luis Valley and take them into account as part of considering whether the benefits from use of an area of public land for solar energy development are sufficient to justify the long-term loss of that same land to local and national citizens.

J. Environmental Protection and Energy Production are Both Desirable and Necessary, Not Mutually Exclusive

While SLVEC and WPC agree that these goals are not mutually exclusive, BLM is legally obligated to ensure protection of the environmental resources it manages. For instance, FLPMA requires that: “In managing the public lands the [Secretary of Interior] shall, by regulation or otherwise, take any action necessary to prevent unnecessary or undue degradation of the lands.” 43 U.S.C. §1732(b). FLPMA also mandates that the public lands be managed “without permanent impairment of the productivity of the land or quality of the environment.” 43 U.S.C. 1702(c). Similar obligations to prioritize protection of the environment and other resources of the public lands arise are contained in the Clean Air Act, Clean Water Act, Endangered Species Act, and National Historic Preservation Act. In complying with these laws, environmental protection must be given priority.

K. Consider and Analyze Climate Change Impacts, Including Anticipated Benefits from Solar

We support the BLM’s recognition of the importance of analyzing the effects of its action on climate change. While there are many anticipated benefits to solar energy production over fossil fuels, the PEIS must also address the potential for solar energy development projects to have adverse impacts. For example, many western landscapes are fragile and especially susceptible to adverse global climate change impacts. This is especially true of desert and arid landscapes that also have high solar energy potential. While this land may be undeveloped, open space has value as potential habitat as wildlife migrates to respond to climate changes. The destruction of these lands for solar energy production would thus amplify the negative impacts of climate change. The PEIS should seek to mitigate negative climate change impacts through the careful designation of appropriate lands open (and closed) to solar energy development.

In order to properly analyze the impact solar development will have on climate change, the process must be considered as a whole. The savings in carbon emissions that solar energy provides may easily be cancelled out depending on how much carbon is emitted in the construction and operation phases and in transporting workers and supplies to the site. Therefore, in assessing impacts to climate change, the BLM must analyze net emissions. Equally important is consideration of whether fossil fuels will be transmitted on lines designated for solar and renewable energy.

BLM must analyze net impacts of solar energy development on climate change and include consideration of landscapes and wildlife that already are or have the potential to be affected by climate changes. Lastly, BLM should establish best management practices to mitigate potential climate change impacts.

As stated above, because siting of solar energy development will have significant and long lasting impacts on public lands, it is critical that the agency gather, analyze, and make available to the public any GIS layers that describe sensitive or protected areas. In addition to the lands with wilderness characteristics, citizen proposed wilderness, and wilderness inventories discussed above, we recommend that the agencies collect and use

the following GIS data layers to map areas that are unacceptable for siting solar energy projects and in siting projects to avoid impacting the identified areas:

1. National Inventory Wetlands;
2. Riparian and significant (aquifer) recharge areas;
3. Colorado Division of Wildlife identified wildlife habitat, corridors, wintering & calving grounds;
4. Colorado Natural Historical Program Potential Conservation Areas (PCA's)
5. State designated Natural Areas;
6. Sites registered or eligible for registry under the National Historical Preservation Act (available from the Colorado Historical Society)
7. Designated Wilderness Areas and Wilderness Study Areas (WSAs);
8. National Conservation Areas;
9. Other lands within BLM's National Landscape Conservation Systems such as Rio Grande Natural Area;
10. National Historic and National Scenic Trails;
11. National Wild, Scenic, and Recreational Rivers, study rivers and segments, and eligible rivers and segments;
12. Areas of Critical Environmental Concern (ACECs);
13. Citizen-proposed wilderness areas such as San Luis Hills/Flat Top Mesa pending legislation for designation in one of the above categories;
14. Threatened, endangered and sensitive species habitat (available from USFWS¹, the Colorado Division of Wildlife and, for BLM lands, from NatureServe²; critical cores and linkages for wildlife habitat (available from USFWS and state wildlife agencies) and the Colorado Natural Heritage Program; and
15. Riparian areas (available from SWReGAP³, except for California, which is available from the UCSB Biogeography Lab⁴).

Recommendations: The PEIS should apply the proposed planning criteria with the additional clarification provided above.

IV. Issues for Further Analysis

As stated in the Notice of Availability:

As currently envisioned, the PEIS will evaluate direct, indirect, and cumulative impacts to wildlife, wildlife habitat, threatened and endangered species, and vegetation; proximity to wilderness or other special management areas; and impacts to cultural, paleontological, socioeconomic, visual, and water resources.

¹ http://www.fws.gov/southwest/es/newmexico/ES_home.cfm

² NatureServe was contracted to identify and map locations of threatened and endangered species habitat that exist only on BLM lands – making these areas even more critical to the survival of the species. This data can be found at www.natureserve.org

³ <http://ftp.nr.usu.edu/swgap/>

⁴ http://www.biogeog.ucsb.edu/projects/gap/gap_home.html

These resources are recognized as significant issues associated with utility-scale solar energy development.

We support the issues identified above and in the proposed planning criteria as those that could lead to significant impacts and/or merit further, in-depth analysis in the PEIS. We have highlighted certain additional issues below for further discussion of the analysis required.

A. Protection of Wildlife Habitat

Significant portions of the land that will be considered for solar energy development in the PEIS contain core habitat areas and migration linkages between those core areas, all of which need to be preserved in order for the regional ecosystems to continue to function. Fragmentation of wildlife habitat affects the ecological composition, structure, and functions of a landscape. Habitat fragmentation has been defined as the “creation of a complex mosaic of spatial and successional habitats from formerly contiguous habitat” (Lehmkuhl and Ruggiero 1991). Although fragmentation can be difficult to measure, there are a variety of metrics that can be used to assess the degree of existing habitat fragmentation and the condition of the landscape, then applied to available data regarding distribution of wildlife and habitat, and ultimately used to make decisions regarding appropriate locations for energy corridors. We recommend that the agencies complete such an analysis as part of the PEIS.

Existing road density can be calculated by measuring the length of linear features in a given sub-area at regular intervals and then reported as miles of route per square mile (mi/mi²). The degree of habitat fragmentation, the distribution of un-roaded areas, or core areas, can also be measured and calculated based on the amount of land beyond a given distance or effect zone, from transportation routes (Forman, 1999). Wildlife species respond to disturbances related to this type of network at varying distances, so determining the size distribution of core areas for a range of effect zones (i.e., of 100ft, 250ft, 500ft and 1320ft) from all routes is also important. Wildlife literature will yield information on the effect zones for different species. For instance, Rost and Bailey (1979) used mule deer pellet counts as an indication of winter habitat use, reporting lower density of deer in more open mixed shrub and forest habitat than in sites with more forest cover. Their data show that deer were three times more likely to occur 984 - 1312 feet from a road than 328 feet from a road. An ongoing study by Sawyer et al. (2005, 2004, 2001) of GPS collared deer on the Pinedale Anticline observed that deer utilized habitat progressively further from roads and well pads over three years of increasing gas development and showed no evidence of acclimating to energy-related infrastructure.

In addition to solar energy plants themselves, habitat fragmentation can be caused by transmission corridors, which will be necessary to transmit solar power to electricity grids. Wildlife habitat fragmentation caused by transmission lines (including branch powerlines), pipelines (including feeder pipelines) and roads generally fall into three broad categories:

1. Construction impacts (access, right-of-way clearing, construction of towers, stringing of cables);
2. Line maintenance impacts (inspection and repair); and
3. Impacts related to the physical presence and operation of the transmission line.

As such, wildlife habitat must be examined on an individual project and site-specific basis. The only way to accomplish this requirement is to ensure that each individual solar project is spatially evaluated for direct, indirect and cumulative impacts.

Specific activities that negatively impact wildlife and cause destruction of core habitat or habitat fragmentation include the construction of facilities, blading and scraping of the ground, disturbance of soil by the use of heavy machinery, noisy machinery during construction and maintenance, noise from helicopters, removal of vegetation, blasting, filling depressions (a.k.a. re-contouring the landscape), disposal of waste and chemicals on site, use of herbicides, and the use of borrow pits.

The effects of these activities on wildlife can be severe and include removal of habitat, fragmentation of habitat, and the creation of edge effect vegetation and habitat (changes in composition, structure, microclimate, etc. of area adjacent to facility and transmission corridor). Species shown to avoid edges include red-backed vole, snowshoe hare, pine marten and red squirrels. In addition, it is logical to suspect that construction of facilities and transmission in previously undisturbed areas will lead to a direct loss of life to wildlife during construction, operation and service of transmission lines.

B. Special Management Areas

The Notice of Availability identified a number of different types of special management areas where utility-scale solar development is not appropriate. Areas in the National Landscape Conservation System including National Heritage Areas are governed by other laws requiring protection as a priority to protect objects of historic or scientific interest, and must be managed to protect those values as a priority over other uses. It has been recently discussed that eventually the entire SLV will become part of the Sangre de Cristo National Heritage Area.

National Conservation Areas are designated for the express purpose of protecting other natural values and management priorities are set out in enabling legislation.

Section 10(a) of the Wild and Scenic Rivers Act provides similar management direction for wild and scenic river segments:

Each component of the national **Wild and Scenic Rivers System** shall be administered in such manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public uses and enjoyment of these values.

National Historic Trails closely follow a historic trail or route of travel of national significance in order to identify and protect their history for public enjoyment. National Scenic Trails provide maximum outdoor recreation potential and to support the conservation and enjoyment of the various qualities – scenic, historical, natural, and

cultural – of the areas they pass through. See, e.g., BLM website on National Scenic and Historic Trails (<http://www.blm.gov/nlcs/nsht/>). The purposes for which the trails were created, as summarized in the National Trails System Act, is “to promote the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources of the Nation.” 16 U.S.C. § 1241(a).

BLM is obligated to manage the Wilderness Study Areas (WSA) in accordance with the Interim Management Policy (IMP) for Lands Under Wilderness Review (BLM Manual H-8550-1), which requires that WSAs are managed to protect their wilderness values. The IMP requires the BLM to manage WSAs in accordance with the non-impairment standard, such that no activities are allowed that may adversely affect the WSAs’ potential for designation as wilderness. As stated in the IMP, the “overriding consideration” for management is that:

. preservation of wilderness values within a WSA is paramount and should be the primary consideration when evaluating any proposed action or use that may conflict with or be adverse to those wilderness values. (emphasis in original)

The IMP also reiterates that WSAs “must be managed to prevent unnecessary or undue degradation.”

FLPMA requires the BLM to “give priority to the designation and protection of areas of critical environmental concern [ACEC].” 43 U.S.C. § 1712(c)(3). ACECs are areas “where special management is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes.” 43 U.S.C. § 1702(a).

Recommendation: The BLM is required to prioritize management to protect and enhance conservation values for special management areas, which is inconsistent with the development of solar energy development; these areas should be excluded from availability.

C. Benefits to the Local Economy from Undeveloped Public Lands

The Solar PEIS should fully address the impacts that utility-scale solar energy development on undeveloped public lands will have on the local economies throughout the study area. The San Luis Valley in particular actively maintains the strong economic and cultural values based on agriculture and ranching. The Valley produces 92% of the potatoes grown in Colorado, which ranks fourth among potato producing states in the U.S. The SLV is also known for its organic beef, and garden crops – award winning products which are exported nationally. Outdoor recreational tourism, including mountain climbing are big business here, and are dependent on wild lands and open spaces.

In the San Luis Valley these wild and undeveloped lands also provide historic subsistence livelihoods in the form of wood harvesting and small and big game hunting for both Native American and Hispanic cultural groups.

The economic benefits of undeveloped lands for local economies is well documented and has grown in importance as the U.S. moves from a primary manufacturing and extractive economy to one more focused on service sector industries. This shift means that many businesses are free to locate wherever they choose. The “raw materials” upon which these businesses rely are people, and study after study has shown that natural amenities attract a high-quality, educated and talented workforce – the lifeblood of these businesses.

Retirees and others who earn non-labor income are also important to rural western communities. Non-labor income makes up an average of 27% of total personal in the six-state region covered by the Solar PEIS.¹⁰ If investment and retirement income were considered an industry it would be one of the largest in all of the states potentially impacted by proposed utility-scale solar energy development. Retirees are attracted by natural amenities that are available on undeveloped public lands. The potential impact that solar energy development will have on this source of income and economic activity must be accounted for in the Solar PEIS.

Research into what motivates entrepreneurs and businesses to choose particular locations consistently finds that amenities and quality of life top the list (Rasker and Hansen 2000, Snepenger et al. 1995, Rasker and Glick 1994, Whitelaw and Niemi 1989). Developing the proposed utility-scale solar energy projects on undeveloped public lands may hinder western communities ability to attract more small businesses into the region to further enhance this sector.

These findings together point to the value of public lands to strong local economies. Development of large scale centralized solar energy projects on these western lands could be seriously problematic, and this must be addressed in the Solar PEIS. To site solar energy development in a way that impairs these natural amenities would be short-sighted at best. The Solar PEIS should address this issue and provide detailed criteria to protect the economic benefits associated with undeveloped public lands.

While solar generation facilities will themselves provide economic opportunities to the Valley, we must ensure that they are one of many such opportunities in a diverse economic sector, and do not eliminate or crowd out other important economic possibilities – especially those dependent on pristine water resources (agricultural, recreational, wildlife dependent) and on the intrinsic values of pristine landscapes and wide-open spaces.

Recommendations: The Solar PEIS must include a thorough examination of the full socioeconomic impacts likely to occur if utility-scale solar energy projects impact undeveloped lands. Some suggested analyses and sources of data can be found in “Socio-Economic Framework for Public Land Management Planning: Indicators for the West’s Economy” and in a recent study prepared on the short and long term economic impacts, including injury to other economic drivers, of energy development on public lands in the west by the Headwaters Economic Research Group, Bozeman Montana. (“Energy Development in the West”)

D. Opportunity costs

All relative costs of solar energy development on public lands should be fully examined in the Solar PEIS, especially benefits to the public and local economies. As discussed above, there is potential for the loss of economic opportunity from tourism, hunting, fishing, wildlife viewing, and other forms of recreation if solar facilities are installed on lands that hold special value to people, wildlife, and other elements of the ecosystem. These costs should be assessed by the BLM or the DOE for every site on which there is a plan to construct and operate a solar power facility.

These emissions have costs beyond the impairment of ecological services. Each year, effluence affects people across the country. Annually, there are hundreds of thousands of hospital visits and millions of lost worker days attributed to gases and particulate emitted by fossil fuel-based power plants.¹⁵

Land is another finite resource that is necessary for all types of infrastructure, including power facilities.

Recommendations: In order to ensure that any proposed utility-scale solar energy development results in maximum net public benefits, the analysis of such development must account for the all opportunity costs. This includes the costs associated with siting utility-scale solar energy development on undeveloped public lands, and the resulting loss of economic benefits, as well as the potential jobs and income to local communities. The analysis should also compare the relative costs of other forms of energy development and the benefits of siting facilities on private lands

Within a consideration of reasonable alternatives, the BLM should consider whether siting a power facility on private lands has greater potential benefits than the equivalent project on public holdings.

E. Scope of NEPA analysis

NEPA requires the agencies to take a “hard look” at the potential environmental consequences of this proposed action, so that they must assess impacts and effects that include: “ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative.” 40 C.F.R. § 1508.8.

1. Analysis of environmental impacts should be conducted at the landscape level.

The scope of NEPA analysis must be appropriate to the scope of the proposed action. *Kern v. United States Bureau of Land Management*, 284 F.3d 1062, 1072 (9th Cir. 2002). In the context of this PEIS, the agencies should look to the overall effect on the landscape of these six connected Western States, and the many resources it contains. A landscape level analysis of proposed energy corridors will take into account the

distribution of resources across the affected states, complying with the agencies' legal obligations to truly assess potential impacts and yielding management decisions that will balance and protect the multiple resources of these public lands. The placement of and conditions placed on energy corridors can define which areas will remain or become roadless, and which areas will be disturbed and how. By altering the slope and increasing fragmentation of the landscapes, energy corridors can affect how naturally or unnaturally a landscape will behave in terms of the directional flow of water, groundwater, aquatic ecosystem, wetland and quality of the unconfined aquifer, wildlife migration, and species composition and function. In considering the potential impacts of permitting a network of energy corridors, the agencies must consider how this placement will change the landscape and interfere with the functioning of groundwater/aquifer systems and wildlife species' ability to migrate, adapt to climate change and, ultimately, survive.

The correct scope of analysis necessitates consideration of the connected landscapes of these states. As documented in the Heart of the West Conservation Plan (a science-based spatial analysis of the relative importance of various wildlife habitat cores and linkages throughout the Heart of the West eco-region) the areas of northeastern Utah, northwestern Colorado, and southwestern Wyoming are inextricably linked in an ecoregion with core habitat areas and key migratory linkages. As a result, impacts to wildlife habitat in one part of the Heart of the West ecoregion will affect wildlife viability throughout the ecoregion. Similarly, there are basin-wide impacts, in terms of changes to the water quantity and quality in the Green River system, and cumulative impacts to the common airshed, all of which affect the entire Heart of the West ecoregion.

A landscape approach is supported by NEPA guidance on cumulative impacts, which requires that the entire area potentially affected be included in a cumulative analysis and holds that a failure to include an analysis of actions within a larger region will render NEPA analysis insufficient. See, e.g., *Kern v. U.S. Bureau of Land Management*, 284 F.3d 1062, 1078 (9th Cir. 2002) (analysis of root fungus on cedar timber sales was necessary for entire area).

Thus, in order to accurately evaluate the potential environmental consequences of west-wide designation of energy corridors, the cumulative impact analysis would necessarily look at the cumulative impacts on all of the directly and indirectly affected landscapes. The Environmental Protection Agency, in providing direction to its reviewers, emphasizes the importance of ensuring that the cumulative impact analysis is based on “geographic and time boundaries large enough to include all potentially significant effects on the resources of concern. The NEPA document should delineate appropriate geographic areas including natural ecological boundaries, whenever possible, and should evaluate the time period of the project's effects.” U.S. Environmental Protection Agency, 1999, *Consideration Of Cumulative Impacts In EPA Review of NEPA Documents*. (emphasis original).

The Council for Environmental Quality's (CEQ) guidelines on cumulative effects analysis provide the following steps for determining the appropriate geographic boundary of cumulative impact analysis:

1. Determine the geographic area that will potentially be directly affected by an action – known as the “project impact zone”;
2. Identify resources in the project impact zone that could be affected by the action;
3. Determine the geographic areas occupied by the resources outside the project impact zone.
4. Identify the appropriate area for analysis of cumulative effects based on the largest of the areas determined in step 3. Council on Environmental Quality, 1997, Considering

2. Cumulative Effects Under the National Environmental Policy Act.

For the energy corridors, the geographic area of impact should include a comprehensive inventory of resources (including but not limited to significant recharge areas, wetlands, riparian areas, wildlife habitat, wintering and birthing grounds), within areas of proposed development and their habitat extending outside such areas. The agencies can and should take the overall impacts of the corridors on the affected landscapes into account when considering their potential environmental consequences. *See, e.g., Newmont Mining Corp., 151 IBLA 190 (1999)* (Where the Bureau of Land Management could take into account the overall degradation from existing and connected proposed operations, a cumulative analysis of all impacts was required); *Kern v. United States Bureau of Land Management*, *supra*. (BLM must perform cumulative impact analysis of reasonably foreseeable future timber sales on spread of root fungus before approving single proposed sale). A landscape level analysis is an important part of a programmatic EIS, even if site-specific analysis might be deferred until authorization of specific projects. For instance, the U.S. Court of Appeals for the Ninth Circuit has held that analyzing the overall environmental risks involved in transporting oil from off-shore leases was appropriate and necessary in a PEIS, although specific analysis of individual pipeline locations could be deferred. *County of Suffolk v. Secretary of Interior*, 562 F.2d 1368, 1376-1377 (2nd Cir. 1977) (It was “essential to consider and weigh the environmental aspects of transportation, as well as of exploration and production.”). In order to fulfill the mandate of NEPA that the agencies make an informed assessment of the environmental consequences of its actions, the landscape level effects of an expanded large-scale corridor system must be assessed.

3. Cumulative impact analysis should include other pending programmatic efforts and additional development to be supported by new corridors.

As noted above, NEPA requires the agencies to consider the cumulative impacts of the proposed corridors. The CEQ’s NEPA regulations define “cumulative impact” as:

the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future

actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

40 C.F.R. § 1508.7. (emphasis added).

The analysis of impacts in the PEIS must address the cumulative impacts of both the development of utility-scale solar energy projects and other foreseeable connected activities within the same general area. The resources that allow an ecosystem to function often share a common geography, such that changes in the water quantity and/or quality in an aquifer or river system or impacts to an air shed (which may be affected by activities such as oil and gas drilling), all contribute in common. Similarly, changes to these resources may affect the core habitat and linkages that are critical for survival of wildlife and vegetation in a region. Accordingly, where there are shared environmental resources that can act as indicators of the health of ecosystems, the agencies must analyze all of the direct and indirect impacts that affect them.

The Environmental Protection Agency provides the following guidance to its reviewers on assessing the range of other activities to be considered in cumulative impacts analysis:

1. the proximity of the projects to each other either geographically or temporally;
2. the probability of actions affecting the same environmental system, especially systems that are susceptible to development pressures (such as in an aquifer system);
3. the likelihood that the project will lead to a wide range of effects or lead to a number of associated projects;
4. whether the effects of other projects are similar to those of the project under review;
5. the likelihood that the project will occur -- final approval is the best indicator but long range planning of government agencies and private organizations and trends information should also be used; and
6. temporal aspects, such as the project being imminent. U.S. Environmental Protection Agency, 1999, *Consideration Of Cumulative Impacts In EPA Review of NEPA Documents*.

In this case, the BLM's obligation to analyze impacts must encompass not only the proposed and projected solar energy projects, but also the cumulative impacts of the projects, taken together with the impacts of existing, proposed, or reasonably foreseeable projects, (including proposals currently being considered) on the environment. Thus, the BLM must analyze the cumulative impacts not just of the solar development projects, but also of other projects that will impact resources in common with this proposed action. As discussed above, there are other initiatives to support development and transmission of renewable energy projects and it is critical that the BLM coordinate with these processes and consider the cumulative impacts, which presumably can be reduced by proactive coordination, as well.

In determining the appropriate scope of environmental analysis for an action, the Government must consider not only the single proposed action, but also three types of related actions:

(1) Connected actions - Actions which are closely related and:

- (i) Automatically trigger other actions which may require environmental impact statements.
- (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously; or
- (iii) Are interdependent parts of a larger action and depend on the larger action for their justification.

(2) Cumulative actions – Actions, which when viewed with other proposed actions, have cumulatively significant impacts.

(3) Similar actions – Actions, which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography. 40 C.F.R. § 1508.25. Under any of these classifications, the coordinated actions that the agencies are taking through this PEIS trigger a broader assessment of the cumulative impacts.

The increased level of solar energy development projects that will follow the completion of this PEIS are also connected to new transmission projects that are likely to trigger preparation of an EIS. Impacts from transmission projects include direct effects to lands, wildlife and natural resources from the construction, ongoing maintenance and monitoring of transmission infrastructures and rights-of-way (ROW). These impacts include direct impacts to soils and vegetation due to clearing ROW, as well as direct wildlife impacts in terms of avian collisions and electrocutions. Indirect impacts include wildlife displacement, increased raptor prey opportunities on vertical structures and habitat fragmentation impacts on a variety of wildlife species. Additional transmission/ROW impacts to consider include noise, EMF, visual and aesthetic concerns.

In addition, the clustering of solar energy development projects with projects to develop more traditional forms of energy in order to access the new transmission corridors proposed in the West-wide Energy Corridor PEIS are likely to have a cumulatively significant effect on the resources in the area. And, since the energy corridors and new transmission will be tied, at least to some extent, on the location of developable energy sources, including solar, these projects are certainly similar in terms of geography. Both the various programs and the increased development projects will have a connected and cumulative effect on resources ranging from elk and pronghorn herds to bird of prey populations, sage grouse populations, air quality, water quality (and erosion and sedimentation), and overall potential for primitive recreation. Therefore, their combined impact should be taken into account as part of the analysis of cumulative impacts associated with this PEIS.

With the western U.S. already possessing over 100,000 linear miles of power lines, the Solar PEIS should analyze opportunities to maximize current grid assets to transport newly developed solar energy instead of new power lines in new ROW. In addition, the PEIS should analyze opportunities at the major population centers to reduce generation import (and therefore transmission) needs by maximizing efficiency, distributed generation resources and other demand-reducing efforts.

4. Site- and use-specific analysis must be conducted prior to designation and approval of energy corridors.

As noted above, the scope of NEPA analysis must be appropriate to the scope of the proposed action. *Kern v. United States Bureau of Land Management*, 284 F.3d at 1072. In the context of this PEIS, the future approval of individual solar development projects must be based on specific analysis of the proposed locations and uses of the corridors. If the PEIS will not seek to approve individual projects or take the place of site-specific analysis, then the scope of NEPA analysis can be focused more on the general types of impacts and the overall effect of this policy initiative, as is most common for a programmatic EIS. See, *Northcoast Env't'l v. Glickman*, 136 F.3d 660, 688 (9th Cir. 1998) (Programmatic EIS is used to examine “an entire policy initiative.”). However, if the PEIS will commit the BLM to a specific course of action, such as authorizing actual projects, then a site-specific and use-specific analysis of each corridor must be completed. See, *State of California v. Block*, 690 F.2d 753, 765 (9th Cir. 1982); *County of Suffolk v. Secretary of Interior*, 562 F.2d at 1378.

Recommendation: We recommend that the PEIS include definitive commitments to conduct site-specific NEPA analyses when individual project locations and specifications are identified. In fact, BLM’s resource management plans and project-level EISs often state that site-specific analysis is not possible until a particular activity, such as a pipeline, is proposed. This approach would also be consistent with the NEPA regulation governing tiering environmental analysis for a site-specific action to a broader programmatic EIS. The regulation envisions that agencies can tier to a “broad environmental impact statement” so that the subsequent environmental document “shall concentrate on the issues specific to the subsequent action.” 40 C.F.R. § 1502.20. In the context of the PEIS, this broader programmatic document should analyze the general effects of an increased level of development of utility-scale solar development. However, tiering to this type of analysis cannot support the approval of projects, which would require a NEPA analysis of the environmental consequences, as “specific to the subsequent action,” be included in the PEIS.

F. Range of alternatives

The range of alternatives is “the heart of the environmental impact statement.” 40 C.F.R. § 1502.14. NEPA requires BLM to “rigorously explore and objectively evaluate” a range of alternatives to proposed federal actions. See 40 C.F.R. §§ 1502.14(a) and 1508.25(c).

NEPA's requirement that alternatives be studied, developed, and described both guides the substance of environmental decision-making and provides evidence that the mandated decision-making process has actually taken place. Informed and meaningful consideration of alternatives -- including the no action alternative -- is thus an integral part of the statutory scheme. Bob Marshall Alliance v. Hodel, 852 F.2d 1223, 1228 (9th Cir. 1988), cert. denied, 489 U.S. 1066 (1989) (citations and emphasis omitted).

An agency violates NEPA by failing to "rigorously explore and objectively evaluate all reasonable alternatives" to the proposed action. City of Tenakee Springs v. Clough, 915 F.2d 1308, 1310 (9th Cir. 1990) (quoting 40 C.F.R. § 1502.14). This evaluation extends to considering more environmentally protective alternatives and mitigation measures. See, e.g., Kootenai Tribe of Idaho v. Veneman, 313 F.3d 1094, 1122-1123 (9th Cir. 2002) (and cases cited therein); see also Env'tl Defense Fund., Inc. v. U.S. Army Corps. of Eng'rs, 492 F.2d 1123, 1135 (5th Cir. 1974); City of New York v. Dept. of Transp., 715 F.2d 732, 743 (2nd Cir. 1983) (NEPA's requirement for consideration of a range of alternatives is intended to prevent the EIS from becoming "a foreordained formality."); Utahns for Better Transportation v. U.S. Dept. of Transp., 305 F.3d 1152 (10th Cir. 2002), modified in part on other grounds, 319 F.3d 1207 (2003); Or. Env'tl. Council v. Kunzman, 614 F.Supp. 657, 659-660 (D. Or. 1985) (stating that the alternatives that must be considered under NEPA are those that would "avoid or minimize" adverse environmental effects).

The current range of alternatives does not contain a sufficient range of alternatives that avoid or minimize environmental effects. Both the "no action" alternative and the "limited development" alternative are ways to proceed with considering solar application on a case-by-case basis. The "facilitated development" alternative (the proposed action) provide for the BLM to develop a solar energy program. There is no consideration of alternatives that would ensure more environmentally responsible approaches to solar energy development.

In the San Luis Valley in particular an alternative that presents smaller scale facilities located proximate to existing sub-stations and transmission lines should be presented.

In order to comply with the requirements of NEPA, the PEIS should include additional alternatives that consider:

1. A facilitated program with exclusions for all lands with wilderness characteristics, critical habitat and migration corridors in addition to those exclusion areas identified in the Notice of Availability;
2. A facilitated program that would be limited by disturbance of only a specific percentage of lands with solar potential at any given time – both for the entire planning area and for the individual field offices affected – to ensure that ecological functions are preserved. Additional disturbance would only be permitted once affected lands with existing disturbance had been restored;
3. A facilitated program that prioritizes projects that can show that they will have a net benefit in impacting climate change; and/or

4. A facilitated program that would only permit construction of solar projects in close proximity (i.e., within 5 miles) to existing transmission lines or within zones being designated through the RETI or WREZ processes.

Recommendations: NEPA analysis in the PEIS should be conducted at the landscape level, address cumulative impacts, set out standards for additional site-specific analysis for proposed projects, and include more environmentally protective alternatives.

G. Transmission

The Notice of Intent states: “The PEIS will consider whether designation by BLM of additional electricity transmission corridors on BLM-administered lands is necessary to facilitate utility-scale solar energy development.” As discussed in detail above, the designation of new corridors should be considered in relation to not only existing transmission lines and the corridors currently being planned by the West-wide Energy Corridors PEIS, RETI, and WREZ processes, as well as others. If the BLM is going to designate new corridors in the PEIS, then BLM must complete all of the necessary NEPA analysis for those corridors, including a thorough discussion as to why the ongoing corridor designation processes will not be sufficient. In making a determination about the need for additional corridors, the BLM should commit to first coordinating with the ongoing designation processes and prioritize using those corridors, instead of designating still more corridors without coordination.

Recommendations: The PEIS must clearly address whether it is merely determining the potential need for new corridors to facilitate new solar energy projects or if the PEIS will also be designating corridors based on projected development. We would recommend that the PEIS focus on using existing and planned corridors, and coordinate with ongoing designation processes to ensure that corridors to support project solar energy development are being designated, instead of designating new corridors. Like the BLM, the DOE must adequately assess all impacts, market and non-market, associated with the development of the agency’s solar energy program.

H. Current DOE Solar Energy Program

DOE should disclose the types of solar projects that it currently funds, as well as the specific environmental concerns that are currently addressed by the DOE Solar Energy Technologies Program. This will foster public understanding and participation in the PEIS process. DOE should also establish which program offices, in addition to the Solar Energy Technologies Program, will potentially utilize the PEIS in decision-making.

1. Range of Alternatives

The DOE should provide a broader range of alternatives than BLM because the agency can fund projects on tribal, state, private, and other federal lands in addition to BLM-administered lands and has no affirmative obligation to process ROWs. These alternatives can include prioritizing projects that have economic benefits, prioritizing

projects that are the least environmentally destructive, and prioritizing projects on already degraded lands such as Brownfield or Superfund sites. The Draft PEIS should establish a range of alternatives for the agency to analyze and the public to comment on.

Recommendations: DOE should use this opportunity to mirror the process and analysis being conducted by the BLM, so it can develop a comprehensive set of principles for funding solar projects.

Partial List of Documents Used to Formulate these comments:

Acharya, G. and L. L. Bennett. 2001. Valuing open space and land-use patterns in urban watersheds. *Journal of Real Estate Finance and Economics* 22(2-3): 221-237

American Solar Energy Society. 2008. Concentrated Solar Power, Solar Electric Division. (www.ases.org/divisions/electric/facts_csp.pdf, accessed July 8, 2008)

Barrens, R., J. Talberth, J. Thacher, M. Hand. 2006. Economic and Community Benefits of Protecting New Mexico's Inventoried Roadless Areas. Center for Sustainable Economy, Santa Fe, NM. Available at: <http://www.sustainable-economy.org/uploads/File/Final%20Report.pdf> (accessed February 22, 2007)

Bennett, K., and M.K. McBeth. 1998. Contemporary western rural USA economic composition: Potential implications for environmental policy and research. *Environmental Management* 22(3): 371-381.fs

Bengochea Moranco, A. 2003. A hedonic valuation of urban green areas. *Landscape and Urban Planning* 66(1): 35-41.

Bishop, R. C. and M. P. Welsh. 1992. Existence Values in Benefit-Cost Analysis and Damage Assessment. *Land Economics* 68(4): 405-417.

Bolitzer, B. and N.R. Netusil. 2000. The impact of open spaces on property values in Portland, Oregon. *Journal of Environmental Management* 59(3): 185-193.

Bowker, J. M., J. E. Harvard III, J. C. Bergstrom, H. K. Cordell, D. B. K. English, and J. B. Loomis. 2005. The net economic value of wilderness. In: Cordell, H. K., J. C. Bergstrom, and J.M. Bowker (eds), *The Multiple Values of Wilderness*. State College, PA: Venture Publishing.

Breffle, W. S., E. R. Morey and T. S. Lodder. 1998. Using contingent valuation to estimate a neighbourhood's willingness to pay to preserve undeveloped urban land. *Urban Studies* 35(4): 715-727.

California Energy Commission. July 1, 2008. Ivanpah Solar Electric Generating System. (<http://www.energy.ca.gov/sitingcases/ivanpah/index.html>, accessed July 9, 2008)

Center for the Study of Rural America. 2006a. Regional Asset Indicators: Human Amenities. May 16, 2006.

http://www.kansascityfed.org/RegionalAffairs/Indicators/Humanamenities_506.pdf

Center for the Study of Rural America. 2006b. Regional Asset Indicators: The Creative Workforce. July 2006.
http://www.kansascityfed.org/RegionalAffairs/Indicators/Creative%20Workers_706.pdf

Cordell, H.K., M.A. Tarrant, B.L. McDonald and J. C. Bergstrom. 1998. How the public views wilderness: More results from the USA survey on recreation and the environment. *International Journal of Wilderness* 4(3): 28-31.

Cure for the Common Coal: Can Wind Power Replace Traditional Fossil Power? Time2Time. June 3, 2008. <http://uva72.blogspot.com/2008/06/cure-for-common-coal-can-wind-power.html>

Deller, S.C. 1995. Economic Impacts of Retirement Migration. *Economic Development Quarterly* 9(1): 25-38.

Deller, S.C., T. Tsai, D.W. Marcouiller, and D.B.K. English. 2001. The Role of Amenities and Quality of Life in Rural Economic Growth. *American Journal of Agricultural Economics* 83(2): 352-365.

Duffy-Deno, K. T. 1998. The Effect of Federal Wilderness on County Growth in the Intermountain Western United States. *Journal of Regional Science* 38(1): 109-136.

Earnhart, D. 2006. Using contingent-pricing analysis to value open space and its duration at residential locations. *Land Economics* 82(1):17-35.

Earth Policy Institute. 2008. Data for U.S. Moving Toward Ban on New Coal-Fired Power Plants. (http://www.earth-policy.org/Updates/2008/Update70_data.htm, accessed July 9, 2008)

Espey, M. and K. Owosu-Edusei. 2001. Neighborhood parks and residential property values in Greenville, South Carolina. *Journal of Agricultural and Applied Economics* 33(3): 487-492.

Energy Justice Network. 2007. "Fact Sheet: 'Clean Coal' Power Plants (IGCC)." (<http://www.energyjustice.net/coal/igcc/factsheet-long.pdf>, accessed July 9, 2008)

European Commission. 2007. "Concentrating Solar Power: From Research to Implementation." (http://ec.europa.eu/energy/res/publications/doc/2007_concertrating_solar_power_en.pdf, accessed July 9, 2008).

The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (German) 2003. Concentrating Solar Power Now – Clean Energy for Sustainable Development. (<http://www.escocyprus.com/epa/Specifications/CSP1.pdf>, accessed July 9, 2008)

Freeman, A.M. III, 2003, *The Measurement of Environmental and Resource Values*, 2nd Edition, Resources for the Future, Washington, D.C.

FutureGen Industrial Alliance, Inc. 2007. Final Site Selection Report, Submitted to the U.S. Department of Energy, Dec. 18, 2007.

FutureGen Alliance, Inc. 2006. Frequently Asked Questions. (<http://www.futuregenalliance.org/faqs.stm>, accessed July 9, 2008)

Geoghegan, J. 2002. The value of open space in residential land use. *Land Use Policy* 19(1): 91-98

Geoghegan, J., L. Lynch, and S. Bucholtz. 2003. Capitalization of open spaces into housing values and residential property tax revenue impacts of agricultural easement programs. *Agricultural and Resource Economics Review* 32(1): 35-45.

- Gowdy, J. M. 1997. The Value of Biodiversity: Markets, Society, and Ecosystems. *Land Economics* 73(1): 25-41.
- Haefele, M., P. Morton, and N. Culver. 2007. *Natural Dividends: Wildland Protection and the Changing Economy of the Rocky Mountain West*. Washington, D.C.: The Wilderness Society. (available at: <http://www.wilderness.org/Library/Documents/NaturalDividends.cfm>).
- Haynes, R. W.; Horne, A.L. 1997. Economic Assessment of the Basin. In T.M. Quigley and S.J. Arbelbide (eds.), *An assessment of ecosystem components in the Interior Columbia Basin and portions of the Klamath and Great Basins: Volume IV. 1715-1870*. USDA Forest Service, PNW-GTR-405, Pacific Northwest Research Station, Portland, OR.
- Hoekstra, T.W., Alward, G.S., Dyer, A.A., Hof, J.G., Jones, D.B., Joyce, L.A., Kent, B.M., Lee, R., Sheffield, R.C., Williams, R. 1990. Analytical tools and information. *Critique of Land Management Planning, Volume 4*. USDA Forest Service, FS-455. 47 pp. Available at: http://www.fs.fed.us/institute/planning_center/1990_Critique_First_Planning_Round/critique%20of%20LMP-Vol%204%20ACR5%2090.pdf
- Holmes, F.P. and W.E. Hecox. 2004. Does Wilderness Impoverish Rural Regions? *International Journal of Wilderness* 10(3): 34-39.
- Irwin, E.G. 2002. The effects of open space on residential property values. *Land Economics* 78(4): 465-480.
- Johnson, J. and R. Rasker. 1993. The Role of Amenities in Business Attraction and Retention. *Montana Policy Review* 3(2).
- Johnson, J., and R. Rasker. 1995. The Role of Economic and Quality of Life Values in Rural Business Location. *Journal of Rural Studies* 11(4): 405-416.
- Johnson, T.G. 2001. The Rural Economy in a New Century. *International Regional Science Review* 24(1): 21-37.
- Kammen, D.M., K. Kapadia, and M. Fripp. 2004. *Putting Renewables to Work: How Many Jobs Can the Clean Energy Industry Generate?* RAEL Report, University of California, Berkeley. P. 10. (<http://rael.berkeley.edu/old-site/renewables.jobs.2006.pdf>, accessed July 9, 2008)
- Krieger, D. J. 2001. *Economic Value of Forest Ecosystem Services: A Review*. Washington D.C.: The Wilderness Society.
- Krikelas, A.C. 1991. *Industry structure and regional growth: A vector autoregression forecasting model of the Wisconsin regional economy*. Ph.D. Dissertation. University of Wisconsin-Madison.
- Krutilla, J. 1967. Conservation reconsidered. *American Economic Review*. 57: 787-796.
- Loomis, J. B. and R. Richardson. 2000. *Economic Values of Protecting Roadless Areas in the United States*. Washington, D.C.: The Wilderness Society and Heritage Forests Campaign.
- Loomis, J. B. and R. Richardson, 2001. Economic values of the U.S. wilderness system: Research evidence to date and questions for the future. *International Journal of Wilderness* 7(1): 31-34.
- Loomis, J., V. Rameker, and A. Seidl. 2004. A hedonic model of public market transactions for open space protection. *Journal of Environmental Planning and Management* 47(1): 83-96.

Lorah, P. 2000. Population Growth, Economic Security and Cultural Change in Wilderness Counties. In McCool, S.F., D.N. Cole, W.T. Borrie, and J. O'Loughlin, comps. Wilderness Science in a Time of Change Conference, Volume 2: Wilderness within the Context of Larger Systems, 1999 May 23-27. Missoula, MT. Proceedings RMRS-P-15-VOL 2., U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT.

Lorah, P. and R. Southwick. 2003. Environmental Protection, Population Change, and Economic Development in the Rural Western United States. *Population and Environment* 24(3): 255-272.

Low, S. 2004. Regional Asset Indicators: Entrepreneurship Breadth and Depth. *The Main Street Economist*, September, 2004. Center for the Study of Rural America, Federal Reserve Bank of Kansas City, Kansas City, MO.

Low, S., J. Henderson, and S. Weiler. 2005. Gauging a Region's Entrepreneurial Potential. *Economic Review (Third Quarter)* Federal Reserve Bank of Kansas City.

Luttik, J. 2000. The value of trees, water and open space as reflected by house prices in the Netherlands. *Landscape and Urban Planning* 49: 161-167

Lutzenhiser, M. and N.R. Netusil. 2001. The effect of open spaces on a home's sale price. *Contemporary Economic Policy* 19(3): 291-298.

McGranahan, D.A. 1999. Natural Amenities Drive Rural Population Change. U.S. Department of Agriculture, Economic Research Service, Food and Rural Economics Division. Agricultural Economics Report No. 781.

Morton, P. 1999. The economic benefits of wilderness: theory and practice. *Denver University Law Review*, 76(2): 465-518.

Morton, P. 2000. Wilderness, the Silent Engine of the West's Economy. The Wilderness Society, Washington, DC.

National Association of Regulatory Commissioners, 2007. "Land-Based Initiatives and Climate Change." (Power Point presentation) SRA International. EPA Land Revitalization Staff Office.

([http://www.narucmeetings.org/Presentations/NARUC%20Pres%20July%202015.ppt#486_2.Land-Based Opportunities](http://www.narucmeetings.org/Presentations/NARUC%20Pres%20July%202015.ppt#486_2.Land-Based%20Opportunities), accessed July 9, 2008) Navigant Consulting, Inc. estimates, June 2006.

Nelson, P.B. 1999. Quality of Life, Nontraditional Income, and Economic Growth: New Development Opportunities for the Rural West. *Rural Development Perspectives* 14(2): 32-37.

New York Times. October 24, 1998. "A Flurry of Proposals for Gas-Fired Power Plants." By Eleanor Charles
(<http://query.nytimes.com/gst/fullpage.html?res=9504EFDC173FF936A15753C1A96E958260> accessed July 9, 2008)

Payne, C., J. M. Bowker, and P. C. Reed. (compilers) 1992. The economic value of wilderness: Proceedings of the conference; 1991 May 8-11; Jackson, WY. Gen. Tech. Rep. SE-78. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station. 330 pp.

Power, T. 1995. Economic Well-Being and Environmental Protection in the Pacific Northwest: A Consensus Report by Pacific Northwest Economists. University of Montana, Missoula, MT.

Power, T. M. 1996. Lost Landscapes and Failed Economies. Island Press, Covelo, CA.

- Rasker, R. and D. Glick. 1994. Footloose Entrepreneurs: Pioneers of the New West? *Illahee* 10(1): 34-43.
- Rasker, R. and A. Hansen. 2000. Natural Amenities and Population Growth in the Greater Yellowstone Region. *Human Ecology Review* 7(2): 30-40
- Rasker, R., B. Alexander, J. van den Noort, and R. Carter. 2004. Public Lands Conservation and Economic Well-Being. The Sonoran Institute, Tucson, AZ. Available at: <http://www.sonoran.org/programs/prosperity.html>.
- Reeder, R. J. and D. M. Brown. 2005. Recreation, Tourism and Rural Well-Being. U.S. Department of Agriculture, Economic Research Service. Economic Research Report Number 7. 38 pp.
- Richardson, H.W. 1985. Input-Output and Economic Base Multipliers: Looking backward and forward. *Journal of Regional Science* Vol. 25(4).
- Rudzitis, G. 1999. Amenities Increasingly Draw People to the Rural West. *Rural Development Perspectives* 14(3): 9-13.
- Rudzitis, G., and H.E. Johansen. 1989. Amenities, Migration, and Nonmetropolitan Regional Development. Report to National Science Foundation. Department of Geography, University of Idaho, Moscow, ID.
- Rudzitis, G. and R. Johnson. 2000. The Impact of Wilderness and Other Wildlands on Local Economies and Regional Development Trends. In McCool, S.F., D.N. Cole, W.T. Borrie, and J. O'Loughlin, comps. *Wilderness Science in a Time of Change Conference, Volume 2: Wilderness within the Context of Larger Systems*, 1999 May 23-27. Missoula, MT. Proceedings RMRS-P-15-VOL 2., U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT.
- Salt Lake City Weekly. May 3, 2007. "Killer Coal" by Jonah Owen Lamb (<http://www.slweekly.com/index.cfm?do=article.details&id=1CA7B2DC-2BF4-55D0-F1FC484A425B4016>, accessed July 9, 2008)
- Shumway, J.M. and S.M. Otterstrom. 2001. Spatial Patterns of Migration and Income Change in the Mountain West: the Dominance of Service-Based, Amenity-Rich Counties. *Professional Geographer* 53(4): 492-501.
- Snepenger, D.J., J.D. Johnson, and R. Rasker. 1995. Travel-Stimulated Entrepreneurial Migration. *Journal of Travel Research* 34(1): 40-44
- Sonoran Institute. 2006. "The Potential Economic Impacts of Wilderness in Dona Ana County, New Mexico."
- Stoddard, L., J. Abiecunas, and R. O'Connell. 2006. Economic, Energy, and Environmental Benefits of Concentrating Solar Power in California. Golden, CO: National Renewable Energy Laboratory. 69 pp. (<http://www.nrel.gov/docs/fy06osti/39291.pdf>, accessed July 9, 2008)
- Tajima, K. 2003. New estimates of the demand for urban green space: implications for valuing the environmental benefits of Boston's Big Dig project. *Journal of Urban Affairs* 25(5): 641-655.
- Tiebout, C.M. 1956. Exports and regional economic growth. *Journal of Political Economy* 64:160-64.
- Thompson, E., G. Hammond, and S. Weiler. 2006. Amenities, Local Conditions, and Fiscal Determinants of Factor Growth in Rural America. RWP 06-08, Research Working Papers, The Federal Reserve Bank of Kansas City, Economic Research Department.

Union of Concerned Scientists. 2005. "Environmental Impacts of Coal Power: Air Pollution." (http://www.ucsusa.org/clean_energy/coalvswind/c02c.html, accessed July 9, 2008).

Union of Concerned Scientists. 2005. "Environmental Impacts of Coal Power: Water Use." (http://www.ucsusa.org/clean_energy/coalvswind/c02b.html accessed July 9, 2008)

United States Congress, Office of Technology Assessment. 1992. Forest Service planning: Accommodating uses, producing outputs, and sustaining ecosystems, OTA-F-505. Washington, DC.

U.S. Environmental Protection Agency. 2008."Energy Department Announces National Initiative to Redevelop Brownfields with Renewable Energy." (<http://www.epa.gov/brownfields/html-doc/brightfd.htm>, accessed July 9, 2008)

U.S. Department of Energy, Energy Efficiency and Renewable Energy. National Renewable Energy Laboratory. 2004 PV FAQ's. (www.hubbartpeak.com/Apollo2/photovoltaics/HowMuchLandNREL.pdf, accessed July 9, 2008)

U.S. Department of Energy, Energy Efficiency and Renewable Energy. National Renewable Energy Laboratory. "Concentrating Solar Power." solareis.anl.gov/documents/docs/NREL_CSP_1.pdf

U.S. Department of the Interior, Office of Surface Mining. 2006. Annual Report Data Tables and Figures.(<http://www.osmre.gov/annualreports/06AR11.pdf>, accessed July 9, 2008)

Walsh, R. G. J. B. Loomis, and R. A. Gillman 1984. Valuing Option, Existence, and Bequest Demands for Wilderness. *Land Economics*, 60(1): 14-29.

Washington Independent Harnessing the Sun: April 11, 2008."The Future of Green Jobs." by Suemedha Sood. (<http://washingtonindependent.com/view/harnessing-the-sun>, accessed July 9, 2008)

Weiler, S. 2004. Racing Toward New Frontiers: Helping Regions Compete in the Global Marketplace. *The Main Street Economist*, March 2004. Center for the Study of Rural America, Federal Reserve Bank of Kansas City, Kansas City, MO.

Western Governors' Association, Clean and Diversified Energy Initiative. 2006. Solar Task Force Report.

Whitelaw, E., and E.G. Niemi. 1989. Migration, Economic Growth, and the Quality of Life. In *Proceedings of the Twenty-Third Annual Pacific Northwest Regional Economic Conference*, Corvallis, OR, pp 36-38.

Whitelaw, E., et al. 2003. A Letter from Economists to President Bush and the Governors of Eleven Western States Regarding the Economic Importance of the West's Natural Environment. (100 total authors.) Available at: <http://www.ourforests.org/fact/120303letter.pdf> (accessed January 17, 2008)

