

# Basin Energy Assessment Team

## Renewable Energy Analysis

October 2013



## Table of Contents

I. The Basin Energy Assessment Team: Process, Background and Position .....	3
II. Summary of BEAT Recommendations .....	5
Summary of Recommendations, Section IV: Economic Analysis of Industrial Solar Development.....	5
Summary of Recommendations, Section V: Conservation Values.....	5
Summary of Recommendations, Section VI: Local Strategies .....	6
Recommendations for Countywide and Desert Specific Codes and Policies.....	7
III. Legacy and Values .....	12
IV. Economic Analysis of Industrial Renewable Energy Development .....	15
V. Conservation Values .....	27
VI. Local Strategies .....	35
VII. Conclusion.....	44
VIII. BEAT Participants.....	45
IX. References .....	48

## **I. The Basin Energy Assessment Team: Process, Background and Position**

### **Process**

The Basin Energy Assessment Team is comprised of local stakeholders, community leaders, non-profit staff and members of local government. We have taken on an assignment from Third District Supervisor James Ramos to evaluate both the importance of protecting critical lands and the potential for renewable energy development in the Morongo Basin, but also to make selected relevant recommendations about these topics regarding San Bernardino County. We welcomed the opportunity to make recommendations about renewable energy to San Bernardino County, but because of the enormity of this task, the majority of our BEAT members believed that more time would have been beneficial for this project. Nonetheless, our approach has been to provide San Bernardino County with recommendations by melding the best available science about renewable energy and natural and cultural resources while reflecting the values of our communities. These are citizen generated planning recommendations and reflect areas of community concern based on our experiences with renewable energy projects. We recognize that further planning expertise will be necessary to make the recommendations viable. A consultant has been engaged to develop a Transmission Report that will be submitted to the County as soon as it is available.

### **Background**

The Morongo Basin is a sparsely developed and populated, high-desert region comprised of a string of rural, scenic communities nestled around nationally recognized conservation lands. Those communities serve as gateway communities for the greater Mojave Desert. The Basin has many thriving local businesses in the service, hospitality, and retail sectors of the economy. These businesses provide local employment and many of them are locally owned. The Basin is a center for the arts and is home to numerous visual artists and musicians that attract and support a unique and flourishing culture of art galleries, community theatre, music festivals, second homes, bed and breakfasts, cultural and recreation-based tourism. This cultural and recreation-based tourism supports stable property values. Our Basin is also fortunate to have the Marine Corps Air Ground Combat Center in Twentynine Palms, our largest single employer and conservation partner in the entire Hi Desert. There are many areas of ecological, historical and recreational significance in the Morongo Basin including Joshua Tree National Park, Big Morongo Canyon Preserve, Johnson Valley Off-Road Vehicle Area and Pioneertown. We also enjoy significant and lasting conservation and recreation investments which include the following:

- Joshua Tree National Park (JTNP) , Big Morongo Canyon Preserve, The Wildlands Conservancy's acquisitions and preserves, Mojave Desert Land Trust acquisitions Johnson Valley OHV area and Bureau of Land Management lands

- Ecotone transition area between the San Bernardino Mountains, Mojave desert and the Sonoran desert
- Significant pristine wildlife habitat and sensitive, rare, threatened and endangered species
- Unfragmented wildlife corridors and extensive wildlife corridor and linkage design modeling analyses, including three South Coast Wildlands Linkage Design studies and development pattern scenario analyses performed by Craighead Institute
- Marine Corps Air Ground Combat Center conservation investments through the Readiness and Environmental Protection Initiative (REPI), Proposed Ate'ivyat Area of Critical Environmental Concern (ACEC) on Black Lava Butte
- City of Twentynine Palms Preservation Overlay areas and proposed Sand to Snow and Mojave Trails National Monuments
- *Morongo Basin Conservation Priorities Report* (Morongo Basin Open Space Group)
- Town of Yucca Valley Ordinance to protect Joshua Trees and Mojave Yuccas
- The Bobcat Protection Act (Note: this legislation has passed both the Assembly and Senate and is currently as of this writing awaiting the Governor's signature.)

### **BEAT's Position**

BEAT believes that the Morongo Basin's quality of life and conservation values are economic drivers that attract businesses, homeowners and cultural opportunities to our area. These quality of life and conservation values also attract tourists from around the world. They eat in our restaurants, rest and rejuvenate in our lodging and buy gas and souvenirs and may even purchase property, infusing our local economy with millions of dollars annually. BEAT believes that industrial scale renewable energy development will harm scenic vistas, wildlife, open space, clean air, watersheds, free-flowing traffic, small town sense of community and access to recreation--the very elements that support our recreational tourism economy. Finally, BEAT is very concerned that industrial scale renewable energy development conflicts with the quality of life in residential neighborhoods, in light of current county regulations. Additionally, the presence of industrial scale solar projects in Rural Residential Zones in the Morongo Basin will jeopardize property values and have an adverse impact on San Bernardino County's tax base. We feel strongly that renewable energy goals for the state and county can be met through distributed solar and wind in the built environment and lands identified by the Environmental Protection Agency without harming conservation lands.

## II. Summary of BEAT Recommendations

### General

- We advise that land use planning for renewable energy be consistent with the County General Plan and guided by local Community Plan values. It is also critical that planning documents have clearly articulated enforcement mechanisms and are proactively enforced by San Bernardino County.
- We advise all land use decisions in San Bernardino County are based on unbiased science, informed research, verified data collection, and monitoring.
- We advise all land use decisions should enhance the County Vision, not be compromising to our future.

### Summary of Recommendations, Section IV: Economic Analysis of Industrial Solar Development

- Increase the energy efficiency of the built environment by providing incentives for and prioritizing this measure in County buildings and communities throughout San Bernardino County.
- Require the preparation and consideration of economic studies that examine the impact of industrial scale renewable energy development on regional tourism, giving special attention to cumulative effects, for all proposed projects in San Bernardino County.
- Throughout San Bernardino County, adhere to Environmental Protection Agency recommendations that renewable energy projects be sited preferentially on brownfields, superfund sites, landfills, mining sites, parking lots and residential, commercial and industrial rooftops.

### Summary of Recommendations, Section V: Conservation Values

- Prioritize the protection of Joshua Tree National Park (Park) and adjacent and connected conservation lands, the mission of the Marine Corps Air Ground Combat Center (Marine Base) and the Morongo Basin's rural character and quality of life.
- Prioritize the protection of viewsheds and night sky resources.
- Prioritize the protection of buffers and separators that maintain distinct community identity, promote compatible adjacent land uses and prevent encroachment on the Marine Base.
- Prioritize the protection of wildlife corridors and connectivity as identified in the Morongo Basin Conservation Priorities Report and SC Wildlands Reports: *A Linkage Design for the Joshua Tree-Twenty-nine Palms Connection*; *A Linkage Network for the*

*California Deserts; South Coast Missing Linkages: A Linkage Design for the San Bernardino-Little San Bernardino Connection* and other SC Wildlands corridor studies.

- Analyze and consider in the approval of proposed projects the impacts of water use by renewable energy projects in the Morongo Basin and throughout San Bernardino County. Prioritize the protection of watersheds, washes, and associated natural processes, including sheet flow, to protect native plant communities, surface infiltration, and air quality. Groundwater throughout the Mojave Desert, away from the San Bernardino Mountains edge, is a non-renewable, finite resource as demonstrated by overdraft in some of the Morongo Basin groundwater sub-basins.
- If projects are approved in San Bernardino County, implement robust restoration and mitigation requirements that address significant long term impacts of renewable energy projects that threaten conservation priorities and that last well beyond the life of the project.
- Evaluate the true aesthetic cost of solar projects in the Morongo Basin as *"Significant" in environmental documents* using the Morongo Basin Conservation Priorities Report analysis for reference.
- Do not permit renewable energy projects on unstable lake beds and dune deposits.
- Analyze the cumulative impact of renewable energy projects on water resources, scenic vistas, wildlife habitat, wildlife corridors and air quality in the Morongo Basin and throughout San Bernardino County and require mitigation of impacts.
- Request the United States Geological Survey (USGS) to map county soils and analyze for their slope and stability.

### **Summary of Recommendations, Section VI: Local Strategies**

- Prioritize locally-produced electricity in the built environment as it equals locally-produced jobs and supports local economic vitality.
- Create covered transportation systems with solar energy canopies that feed the transport vehicles with electricity.
- Incentivize a program for energy efficiency in the built environment.
- Shade shopping centers with solar panels so that heat is reduced from direct sunlight, thereby reducing air conditioning needs and energy use.
- Develop and implement programs to compete with current solar companies in rooftop lease based systems where the investment is made with long term returns in lease payments to San Bernardino County.
- Develop collaboratively based programs for public benefits that capitalize on the need for renewable energy. For example, these programs can help people who have been incarcerated reintegrate into society by providing jobs and training related to renewable energy products and services.

- Analyze and implement alternative renewable energy development approaches that protect the environment while enhancing San Bernardino County’s economy and creating jobs. Alternative renewable energy models and programs that can provide starting points include the City of Anaheim, CA, the City of Richmond, CA, the City of Lancaster, CA and the Sierra Club’s My Generation Campaign.

### **Recommendations for Countywide and Desert Specific Codes and Policies**

BEAT has the following general suggestions for San Bernardino County’s recent renewable energy planning effort. ***These are citizen generated planning recommendations and reflect areas of community concern based on our experiences with renewable energy projects. We recognize that further planning expertise will be necessary to make the recommendations viable and implementable.***

Develop a ***Renewable Energy Overlay***, dividing San Bernardino County into appropriate geographically distinct zoning overlay areas such as: desert communities, open space desert, mountain and urban. Each area will correspond to reflect specified concerns of that geography associated with Renewable Energy Development.

### Countywide Recommendations

1. Create 30 mile Recreational Tourism Zones with no industrial renewable energy development around Joshua Tree National Park; Big Morongo Canyon Preserve; Wildlands Conservancy Preserves and acquisitions; Mojave National Preserve; Mojave Desert Land Trust lands; existing and proposed ACEC’s, proposed Sand to Snow and Mojave Trails National Monument and federally designated wilderness. The Recreational Tourism Zones will server to preserve ecotourism and local economies. JTNP studies conducted by University of Idaho, Robert Richardson, Ph.D and Harvard demonstrate the number one reason visitors come to the area is open, unobstructed vistas.
2. Power Purchase Agreements (PPA’s) need to be sent to the County by the utility when applied for and made public for early evaluation. The earliest notification possible benefits all stakeholders.
3. Maintain and update at least monthly a county webpage where all RE projects remain listed from initial application to completion of project.

4. Maintain an easily accessible map showing project locations and project footprint to allow for visual comprehension of the spatial extent and distribution pattern of projects. See for example, BLM website- [blm.ca.gov/renewableenergy](http://blm.ca.gov/renewableenergy)
5. Expanded Conditional Use Permit (CUP) notification that allows individuals and concerned groups to sign up for email notification on all Renewable Energy (RE) projects: see for example, BLM and CEC project listserves.
6. Expand CUP notification distances to correlate with project size and potential impact area.
7. Focus and prioritize renewable energy projects in the built environment, such as warehouse and residential rooftops and parking structures.
8. Offer incentives for higher density housing developments that include rooftop solar.
9. Permits for renewable energy projects should only be in the name of the current applicant. If a property changes hands, a new or updated permit and all associated compliance documentation should be required.
10. Final approval of renewable energy projects should not be done by staff. All renewable energy projects should be reviewed by the entire Planning Commission.
11. Minimize visual impact and maintain appropriate monitoring at the expense of the applicant throughout the lifetime of the project through a land management and/or ecology plan. Applicant must submit the required monitoring reports with photo documentation including, but not limited to light pollution, species data, air quality and water resources.
12. Solar panel installations should not exceed 8 feet in height.
13. It is important that current technology be utilized in approved projects. Maintain a public database of current renewable energy technology and studies to semi-annually assess and audit County renewable energy generation goals. Establish a “shut-off” when goals are reached.
14. Ensure that assessed value of the project and all improvements reflects the true value of project and is taxed accordingly. How does this project pay its fair share of supporting improvements and infrastructure and not pass its costs on to others?



15. Until the General Plan is updated and appropriate zoning is established for renewable energy projects, industrial projects should be sited in industrial zones.

### Desert Specific Development Code and Policy Recommendations

General Plan amendments should support adopted Community Plans (Homestead Valley, Joshua Tree, and Morongo Valley). Development standards should incorporate into Development Code the conservation values and community priorities stated in the Community Plans. The intent of this Development Code is to insure that renewable energy developments are compatible with, and do not negatively impact, the surrounding uses.

1. Renewable Energy utility scale projects (non-residential) should be classified as Industrial.
2. Submit Plans in a pre-application meeting with planning staff: Vegetation inventory plan; sediment and erosion control plans; identified wildlife corridors; infrastructure plan; will serve letter from water district; water usage plan; dust control plan; economic impact report; plot plans illustrating proximity to transmission and their cumulative impacts.
3. Performance Bonds. Require the posting and maintenance of a monetary security deposit where necessary to ensure the completion of the required mitigation measures in compliance with existing codes and plans.
  - a. Mitigation plans and development standards cannot be enforced without accurate baseline studies of areas.
  - b. At the end of the project life, return the land to its previous state utilizing deposit secured at the time of permit approval. Maintain tracking of used solar panels and associated hardware for proper disposal.
4. No Commercial RE projects in Single Family Residential, Multi Family Residential, Rural Living, Floodway or Open Space Zoning Districts.

Much of the Morongo Basin is zoned Rural Living, a zoning district that has seen limited application within the county, mainly in the Basin and a few other rural areas that surround populated areas of the county. The County's Development Code states: "The RL (Rural Living) land use zoning district provides sites for rural residential uses, incidental agricultural uses, and similar and compatible uses." Yet in contradiction of its own definition, the Development Code, in Table 82-7 on page 2-31, currently allows electrical power generation on RL lands with a Conditional Use Permit (CUP). Electrical

power generation is not allowed in any other residential land use zoning district (RS or RM), and clearly, by the County's definition, electrical power generation, most certainly industrial-scale projects, shouldn't be allowed on land zoned RL. Revise Table 82-7 of the County Development Code so that "Use Not Allowed" is designated for RL zoning.

5. Utilize identified wildlife corridor maps from SC Wildlands and the Morongo Basin Conservation Priorities Report in development standards. No industrial renewable energy projects in wildlife corridors and military flight paths. All industrial scale renewable energy projects must be fully evaluated in terms of their impacts on avian species and bats using the best available science.
6. Monitoring of fugitive dust and water use needs to be continued throughout the life of industrial scale ground mount renewable energy projects. To involve the local community in dust control, install a permanent sign that states: "If you see dust coming from this project call [insert contact name and phone number for County Code Enforcement]."
7. Any height change from typical residential utility poles (i.e 12 KV Poles) should be reviewed by San Bernardino County and the local community.
8. Update San Bernardino County Biotic Overlay and Cultural Resource Overlay to incorporate the best available science.
9. Commercial and residential parcels often show a decline in property value that is caused by nearby renewable energy projects. Such declines shall be compensated by the developer for the projected loss in value. The value will be determined by an independent appraisal.
10. Analyze the potential economic impacts on County tax rolls from inappropriately sited industrial scale renewable energy projects. Assessment should include a comparison of the projected taxes received from the parcel in three scenarios: industrial scale renewable energy development, status quo and alternate development.
11. Concerns about glare from industrial scale renewable energy development include impacts to traffic, aircraft, wildlife, viewsheds and residents. Glare impacts should be scientifically analyzed as part of project design and simulations should be required to evaluate post-construction impacts.
12. All photovoltaic solar farms shall be fenced with wildlife friendly fencing. At the time of permit application a current study of the most wildlife friendly fencing with the least

visual impact should be used to guide what type of project fencing is used. Best practices for wildlife friendly fencing from other renewable energy projects can also serve as a guide.

13. The use of barbed wire and unshielded outdoor lighting is prohibited.
14. Street setbacks for RE projects from a major or secondary roadway shall be required to minimize flooding and deposition of sediment on roadways. Native vegetation must be undisturbed in the setbacks.
15. Road access to projects is restricted to one entry/driveway. Roadway shall be maintained in a dust free manner and kept clear of debris.
16. We recommend that the applicant be required to do a visual impact analysis of renewable energy projects to ensure that they do not impair scenic viewsheds of national park units, federally designated wilderness, Bureau of Land Management Areas of Critical Environmental Concern, Johnson Valley Off Road Vehicle Area, Wildlands Conservancy Preserves or lands owned by the Mojave Desert Land Trust.
17. Earth moved on site, if not otherwise used in construction of a project, stays on property to create berming and aid in erosion control and restoration as needed.
18. Projects located within a water district must coordinate with the local water district and will be responsible for pipeline connection and infrastructure if needed for the project.
19. Require noise- muffled vehicles and construction equipment to mitigate noise impacts.
20. Confine renewable energy project hours of operation and maintenance to daytime only.
21. No additional above ground transmission should be permitted as a result of new Renewable Energy projects in the Morongo Basin. There should be thorough analyses of the environmental impacts of both aboveground and belowground transmission in San Bernardino County for industrial scale projects.

### III. Legacy and Values



Living in the shadow of a national park fosters personal responsibility and commitment to conservation of the land. The rural gateway communities of the Morongo Basin that are nestled against Joshua Tree National Park have risen to that challenge. They include Flamingo Heights, Johnson Valley, Joshua Tree, Landers, Morongo Valley, Pioneertown, 29 Palms, and Yucca Valley.

This region was built around a historical legacy that includes:

- Locally owned small businesses;
- A culture welcoming to artists and musicians;
- Protected conservation lands;
- Marine Corps Air Ground Combat Center [MCAGCC];
- Copper Mountain College;
- Opportunities for passive and active recreation;
- Historic, cultural and archaeological sites.

When the County General Plan was being updated, residents from Morongo Basin communities spoke up for the quality of life values they were eager to see preserved for future generations. Topping the list were:

- **Conservation values** such as dark skies, quiet, open space, wildlife, unique natural resources and environment.

- **Quality of life values** such as natural, unobstructed viewsheds, clean air and water, recreational opportunities and uncongested traffic.

Remarkably, our values were so widely shared that San Bernardino County incorporated them as Vision Elements of the General Plan, thus aligning our community's vision with the County Vision. These values have been clearly documented in the 2012 Morongo Basin Conservation Priorities Report, which was a collaborative effort between community leaders of the Morongo Basin.

In understanding where we come from and what we cherish, we learn that newcomers are attracted to this region for settlement (retirees, professionals, business owners, second home buyers) and as a destination (tourists, outdoor adventurers, artists, musicians and OHV recreationists) for many of the same reasons current residents make their homes here. Interestingly, this attraction also brings in its own prosperity, which has been documented in numerous economic studies [Univ of Idaho, Harvard] that report estimates of the eco-dollars that visitors bring into the County while visiting Joshua Tree National Park, Big Morongo Canyon Preserve Area of Critical Environmental Concern (ACEC), the Pioneertown Mountains Preserve,



and the nearby regional tourist attractions such as the Mojave National Preserve, Death Valley National Park and Bureau of Land Management Wilderness areas. Additionally, we believe property values have stabilized with the influx of second home buyers-- artists, musicians and urbanites choosing to come here to experience the unobstructed natural viewsheds, open space, and quiet-values we have been successful in protecting to date.

The interplay of economic drivers and quality of life values become blurred as changes in one affect the other. Significant changes to responsible land use and conservation can negatively affect the economic recovery that is taking place within the Morongo Basin. Industrial renewable energy development currently being positioned and proposed in the gateway communities prompts concerns about what will be lost in the future as a result of tradeoffs being bargained for now. We are concerned about compromises to conservation, decline of cultural enrichment, incompatible land use changes to open space and residential neighborhoods, property decline, and loss of tax dollars that support infrastructure, water recharge and delivery, and schools, and we advocate for options for the Morongo Basin other than large scale solar development. The siting of such projects directly conflicts with several

elements of the recently re-articulated County Vision Statement. Residents are skeptical about the exploitation of resources for out-of-county consumption and are not placated by developers' promised carrot of more wealth from temporary jobs as tracking the origin of renewable energy jobs created to date seems to lead to employers in other counties. ***In the end, residents may be dismayed to discover another boondoggle where renewable energy development costs are socialized, but the benefits are privatized.***

Our clear and thoughtful vision is for our future preserved. We are assured by the County's Energy Element Planning Funds, obtained as part of the Desert Renewable Energy Conservation Plan (DRECP) process, that renewable energy development here will be done right. To that end we advise that this land use planning effort be consistent with General Plan and local Community Plan values and that the effort produce a complementary development code that is:



- Clearly articulated,
- Has specific enforcement measures
- Is proactively enforced by San Bernardino County

We ask that land use decisions are based on informed research, verified data collection, unbiased science and subsequent monitoring. We expect fiscal responsibility via fair and equitable fees and assessments for all development representing the true cost of the resources that are used. Finally, we want land use decisions that enhance the County Vision, instead of decisions that compromise our future.

#### IV. Economic Analysis of Industrial Renewable Energy Development

The Basin Energy Assessment Team (BEAT) analysis examines the economic effects of industrial renewable energy projects in the California deserts with particular reference to such developments in the Morongo Basin region of San Bernardino County, and looks at the effects on businesses and residents in the Morongo Basin resulting from such developments both within and outside the Morongo Basin. These lessons can also be extrapolated beyond the Morongo Basin to the entirety of San Bernardino County.

BEAT's economic analysis examines:

1. Why people visit and use the Mojave Desert.
2. The economic effects of such visitation and other related uses such as film making, photo shoots, vacation homes, retirement homes, and ancillary businesses.
3. The ways in which industrial renewable energy development will impact these economic values.
4. The available alternatives to industrial renewable energy development in the Mojave Desert.
5. In the absence of badly needed research, what interim review and approval steps should be taken to mitigate harmful effects of industrial solar development in the desert?
6. Public Policy – Why industrial renewable energy development in the California deserts is not the solution to climate change.
7. Quality of life and the principal of the 7<sup>th</sup> Generation.

##### **The DRECR Website**

***A key resource for accessing the latest research about renewable energy, land use planning and economics***

A compendium of research and studies by experts—***Desert Renewable Energy Conservation Resources***-- has been assembled by the BEAT participants, and is available at <http://dreocr.com>.

Desert Renewable Energy Conservation Resources (DRECR) is a website library with links to analytical writings, reports, and studies that demonstrate the economic and conservation benefits of point-of-use renewable energy generation in the already built environment as well as the conservation value of the Joshua Tree National Park area.

Point-of-use installation, like roof and parking lot solar, is the cleanest and least expensive way to ramp up renewable energy generation immediately, while creating the highest number of

local jobs, preserving and improving property values, protecting local water resources, and boosting the local economy. By using the already built environment for renewable energy generation, open spaces and wildlife corridors are protected.

Visitors to the DRECR website have access to resources that demonstrate ways in which other communities are already benefiting from using the already built environment for renewable energy generation. Website links illustrate the downfalls of utility scale projects that are transmission-dependent and how such approaches can be harmful to the local economies of the communities often forced to host them.

All of these expert sources in the DRECR website cry out for substantial peer reviewed studies about every environmental and socio-economic effect of industrial solar development in the California Desert.

In the words of Jeff Lovich Ph.D. of the USGS, the leading federal agency providing science advice to the Department of the Interior, desert alternative energy projects are “a giant experiment.”

### **Why People Visit and Use the Mojave Desert**

National Geographic, for over 130 years the world’s iconic expert on tourism, recently named the Mojave Desert as one of the world’s 100 most beautiful places. It described the Mojave’s stunning landscapes, breathtaking vistas, and awe-inspiring getaways.

*“Far from the maddening metropolitan crowds of Las Vegas and Los Angeles that surround it, the Mojave Desert offers the balm of silence and solitude. Canyons, giant mesas, mountains, towering dunes, and vast, dust-dry plains make up one of North America’s most elemental landscapes. It is a world little touched by humans, save for the odd crumbling mine or homestead, but one which nature adorns with the beauty of the Joshua tree and spring’s brief-lived wildflowers.”*

A 2010 Survey by the University of Idaho prioritizes why people visit Joshua Tree National Park each year.

This is why they come:

Views without development	90%
Clean air	89%
Quiet/sounds of nature	87%
Desert plants/wildflowers	83%



Native wildlife	81%
Solitude	73%
Dark, starry night skies	65%
Access to historical/cultural sites	52%

The survey indicates that for 49% of the visitors, Joshua Tree National Park was one of several destinations. Anecdotal interviews with hotel owners in Joshua Tree and 29 Palms indicate that many of these visitors travel over the 29 Palms-Shoshone Scenic Highway through the east Mojave to the Mojave National Preserve, Death Valley and ultimately Yosemite National Park. It is a wonderful journey and one that is described by National Geographic.

Large industrial scale solar and wind sites would adversely impact the aforementioned visitor goals and the character of the Mojave Desert. No scientific study has been done to measure the adverse impacts, but anecdotal interviews with hotel owners in Joshua Tree and 29 Palms suggest that such development can present a serious problem.

The University of Idaho reported that the economic effect of tourism to Joshua Tree National Park amounts to over \$64 million each year and supports over 700 jobs in the Morongo Basin.

In 2005, Dr. Robert Richardson prepared his study of *The Economic Benefits of California Desert Wildlands*. Richardson identified 30 distinct economic benefits of wilderness and natural areas in the California desert. He estimated the value of these benefits at \$1.3 billion per year, with \$556.7 million of those benefits accruing in San Bernardino County. These values would be higher today. No socio-economic study has been done to date regarding the effects of industrial solar developments on the benefits he describes, but they have to be serious.

The economic categories that Richardson studied are outlined below, with direct quotes from the study in italics:

Direct Use Benefits:

*“Direct uses of wildlands include on-site recreation and the enjoyment of cultural and heritage sites, and the economic value of these uses are measured by the benefit to the users.”*

Community Impacts:

*“Wilderness and other natural areas affect their surrounding human communities in a variety of ways. Proximity to wildlands affects the employment, population, and economy of many communities throughout the California Desert. Public land agencies employ rangers who live in nearby communities and are directly involved in the management of wilderness areas.*

*Popular wildland recreation sites often generate economic growth opportunities for businesses in the tourism sector. Recreation visitors, as well as students and research scientists studying wildlands, make purchases in towns and communities near such areas that support jobs and generate income for local residents.... It has been shown that the recreation and environmental amenities of wilderness and other natural areas contribute to the quality of life of nearby residents, and often attract new residents, retirees, and businesses who wish to locate near such places.... Among the fastest growing counties in the nation are those adjacent to federally designated wilderness areas."*

*"It has been demonstrated that counties near wilderness areas attract new residents who value such places for their scenic value."*

A study funded by the National Science Foundation found that "72% of new residents considered wilderness a "major factor" in their decision to move to the county; 55% of longer term residents stated that wilderness was an important reason for living in the area."

Off-site Benefits:

*"... wilderness areas provide scenic backdrops for resorts and residential areas on nearby lands, thereby enhancing the value of personal and commercial property and increasing tax revenues. Wildlands also provide picturesque views for pleasure travelers who drive across the region .... Underscoring the importance of scenic viewsheds along highways to counties throughout the desert region."*

And of course, there is a clear enhancement of value for property located near wide open wild places.

Scientific Benefits:

Open undisturbed wild lands are used as scientific benchmarks to study human and ecological processes. For example Sweeney Granite Mountain Reserve has done many studies on the structure and disturbance of soils, and wind erosion as it affects human health and visibility problems. Richardson estimated the scientific value of research in San Bernardino County at \$550,000 per year in 2004.

Educational Benefits:

The desert acts as a natural classroom for students of all ages. We are familiar with programs such as Outward Bound and the National Outdoor Leadership

School. There are many college level courses in the desert at places such as Zzyzx Desert Studies Center.

Ecosystem Service Benefits:

*“Ecosystem services are the conditions and processes through which natural ecosystems sustain and fulfill human life.”* An example is the study of erosion control which Richardson estimated as a benefit to the desert of \$255 million per year. These studies have large societal value in the analysis of air pollution and the effects of particulate matter on a range of health problems.

Biological Diversity Benefits:

Biological diversity is the interconnected web of all forms of life. Scientists stress the importance of maintaining this diversity. The California desert is one of the most important biologically diverse ecosystems in the world. Industrial solar utilities are a major threat to that diversity.

Passive Use Benefits:

*“Passive use values include “existence” value (the benefit of simply knowing that wilderness resources exist in a preserved state), “option” value (the benefit of maintaining the option to visit the areas in the future), and “bequest” value (the benefit of knowing that future generations will also be able to enjoy the benefits of wilderness.”*

Using commonly practiced valuation techniques, Richardson estimates the passive use value of wildlands and natural areas in San Bernardino County at \$147.3 million per year.

Harvard University’s Kennedy School of Government recently completed an economic methodology study of Joshua Tree National Park. The Harvard study generally confirmed the economic methods of analysis used by Richardson. These include direct use and passive use values within the area of study, and a valuation category for cooperative programming outside that area.

In general, a comprehensive evaluation of the economic effects of industrial scale renewable energy projects have not, to date, been conducted in county, state or federal renewable energy plans. For example, the Desert Renewable Energy Conservation Plan (DRECP) has to date presented no socio-economic study of the effects of industrial solar and has no identified economists on its team of science advisors. This is a clear violation of the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

## **The Economic Effects of Tourism and Related Uses in the Mojave Desert**

Using the Univ. of Idaho study and the Richardson evaluation referenced above, we can safely estimate the value of tourism and related uses in the California Desert at over \$2 billion per year when updated to current usage levels. We estimate that the value of tourism and related uses in San Bernardino County would exceed \$1 billion.

Professional peer reviewed studies need to be done to achieve more accuracy and it is essential that such studies are undertaken by the county, state or federal government.

## **How Industrial Solar Development will Adversely Impact Tourism and Related Uses**

The federal and state planning efforts for solar development have failed to take into account the following factors, all of which will adversely impact the reasons why visitors come to the desert: viewsheds, wildlife, clean and clear air, culture:

- Professionally developed wildlife corridor studies
  - See <http://drecre.com> (Maps and Links, Linkage Designs) and <http://www.scwildlands.org/reports>
- Important tourism routes of travel
  - See <http://drecre.com> (Studies and Reports, Economic Information, Description of Important Tourism Areas)
- Presence of Desert Tortoise in significant quantities in the Morongo Basin, thereby precluding the use of the Morongo Basin for further solar industrial development
  - See <http://drecre.com> (Studies and Reports, Morongo Basin Tortoise Occurrence). A review of 252 tortoise surveys by Circle Mountain Biological Consultants from 1989 through 2013.

## **Alternatives to Industrial Solar Development in Reducing Greenhouse Gas Emissions (There are better ways to go!)**

There should be an aggressive campaign to increase the energy efficiency of our built environment. We should use our energy resources to follow the advice of the EPA.

The EPA's analysis and recommendations are published and available online, and its consultants are available for assistance at the following websites.

[www.epa.gov/renewableenergyland](http://www.epa.gov/renewableenergyland)

[www.nrel.gov/learning/re\\_solarhtml](http://www.nrel.gov/learning/re_solarhtml)

EPA recommendations and resources include the following:

1. *Decision Tree*. Through ongoing collaboration, the EPA and the Department of Energy's Renewable Energy Laboratory created a *decision tree* to guide local governments in the screening of sites for suitability.
2. *Targeted sites* include brownfields, Superfund sites, mining sites, landfills, abandoned sites, parking lots, and commercial/industrial rooftops.
3. The EPA encourages the development of the above targeted sites instead of "green sites."

The EPA recommends a process for screening sites as follows:

1. *Prescreening*
  - Solar resources
  - Available area
  - Topography
  - Local development priorities and land use exclusions
2. *Site Screening*
  - Ownership
  - System types: rooftop, ground mount, etc
  - Electricity costs
  - Energy demand
  - Contaminated site considerations, status and readiness
3. *Financial screening*
  - Policy considerations
  - Government rebates and incentives
  - Installation costs

The use of underutilized sites is referenced by Jared Blumenthal, Regional Administrator of the EPA's Pacific Southwest Region. He states:

*Opportunities to install renewable energy systems on vacant properties can be found in every community. . . . Tapping sun and wind power at brownfield sites, rooftops, parking lots, and abandoned land could provide untapped gigawatts of clean energy.*

### **Interim Review and Approval Steps**

In the absence of badly needed research, what interim review and approval steps should be taken to mitigate harmful effects of industrial solar development in the desert?

- Require applicants to prove that they are in compliance with rare and endangered species protocols as proscribed by the U S Fish & Wildlife Service, and the California Department of Fish & Wildlife
- Avoid tortoise habitat in the Morongo Basin, as described by biologist Ed Larue of Circle Mountain Biological
- Require a Wind Erosion Vulnerability study for all sites (see <http://drecr.com> Soil Surface Susceptibility to Wind Erosion USGS)
- Avoid sites with caliche due to large potential for release of carbon sequestration (see <http://drecr.com> UCR Gaps in Desert Research)
- Require an economic analysis of effects on local and regional economy
- Avoid impacts to important tourism routes (see <http://drecr.com> Description Important Tourism Areas)
- Require a scientific analysis of the construction, operation and eventual decommissioning of the site covering:
  - The direct mortality of wildlife
  - Environmental impacts of fugitive dust
  - Environmental impacts of dust suppressants, if proposed
  - Destruction and modification of wildlife habitat
  - Impact to roads
  - Off-site and on-site impacts related to wildlife habitat fragmentation and barriers to gene flow
  - Off-site impacts related to construction material acquisition, processing and transportation
  - Fire risks
  - Water consumption
  - Cumulative effects of the above with other projects planned or built (see <http://drecr.com> Lovich and Ennen Solar Unknowns)

**Public Policy: Why Industrial Solar Development in the California desert is the Wrong Answer to Climate Change**

USGS scientists Jeff Lovich and Josh Ennen investigated the science behind solar industrial development in the December 2011 issue of *BioScience*, a peer-reviewed, heavily cited monthly journal. In their article titled “Wildlife Conservation and Solar Energy Development in the Desert Southwest” they made the following points:

1. Implementation of large-scale solar energy development as an "environmentally friendly" alternative to conventional energy sources may actually increase environmental degradation on a local and on a regional scale.
2. Almost no information is available on the effects of (industrial) solar energy development on wildlife.

3. Tortoises are important as ecological engineers who construct burrows that provide shelter to many other animal species, which allows them to escape the temperature extremes of the desert...little is known about the effects of USSEDO (utility-scale solar energy development) on the species. (The recent Ivanpah solar utility experiment proves that the adverse affects are more serious than predicted.)
4. The construction and decommissioning of solar energy facilities will have impacts on wildlife, including rare and endangered species, and on their habitats in the desert. These activities involve significant ground disturbance and direct (e.g. mortality) and indirect (e.g. habitat loss, degradation, modification) impacts on wildlife and their habitat. Many of the areas being considered for the development of solar energy in the Mojave and Sonoran Deserts are, at present, relatively undisturbed.
5. Construction activities produce dust emissions. Dust can have dramatic effects on ecological processes at all levels. Dr. Lovich then explains these effects: alteration of fertility and water-retention capabilities of the soil, adverse influence on gas exchange, adverse influence on photosynthesis, changes in water usage of desert shrubs, root exposure and damage to leaves and stems.
6. There is a dearth of scientific research and literature on the effects of dust suppressants on wildlife.
7. Mortality of wildlife. We are not aware of any published studies documenting the direct effects of USSED on the survival of wildlife.
8. Other poorly studied effects referenced by Dr. Lovich include: Impacts to roads, off-site impacts, habitat fragmentation, noise effects, electromagnetic field generation, microclimate effects, pollutants from spills, water consumption by wet-cooled solar, increased fire risks, and light pollution.

Michael Allen and Alan McHughen at the University of California at Riverside authored an insightful analysis of the gaps in research for solar power in the desert. (<http://drecr.com> UCR Gaps in desert research). Their study reinforced the powerful points raised by Lovich but raised a new public policy question:

*“When desert plants grow, they absorb carbon dioxide. The carbon, as sugars, moves into roots and soil organisms. Carbon dioxide is respired back into the soil, part of which reacts with calcium in the soil to form calcium carbonate. This is how our deserts sequester large amounts of carbon and thus function to reduce atmospheric carbon dioxide....(from this process) our deserts have large amounts of carbon dioxide stored as caliche. The amount of carbon in caliche, when accounted globally, may be equal to the entire carbon as carbon dioxide in the atmosphere....Carbon in caliche may in fact be released, especially when vegetation and soils are disturbed.”*

It is thus possible that as desert solar utilities are constructed they may set in motion, together with the loss of plant life, the long term release of carbon dioxide which might exceed the reduction of such gases from the use of solar utilities.

The question: Is the cure worse than the ailment? As Dr. Allen states: *“Could large-scale solar developments in our deserts actually increase atmospheric greenhouse gas levels over the next centuries?”*

California deserts capture some of the highest rated solar energy in the world. But its solar power plants are offsetting power from gas fired generators which are much better than coal and oil in terms of reducing greenhouse gases. **Carnegie Mellon University compared California’s solar industry to the rest of the country and concluded that when compared to the other states, California was the least effective place for solar.** Yet here we are preparing to decimate one of the finest ecosystems in the world by covering that ecosystem with industrial solar plants.

### **Quality of Life and the Principle of the 7<sup>th</sup> Generation**

Jim Andre, highly regarded scientist and director of the University of California's Granite Mountains Desert Research Center tells us, "This area is treasured by scientists throughout the world for its unparalleled quality among deserts, one of the last functional ecosystems left on planet earth." And wildlife biologist Laura Cunningham indicates "This site is rich in life and needs to be preserved, not industrialized." Tourists understand these values and do not want to be surrounded and obstructed by huge solar farms with flashing red lights, 450 foot-plus tall wind towers, and outsized energy plants.

Some Native American tribes follow the rule of the 7th generation. When they sit in council they make decisions so that the 7th generation from now will be able to enjoy the same benefits we currently enjoy.



**A Realtor's Perspective**  
**Potential Negative Impacts on Property**  
**Values and Tourism Economics from Large Scale Solar Farms**

by John M. Simpson (License #01071928)  
Owner of All American Real Estate and Consulting  
61711 Twentynine Palms Hwy., Joshua Tree, CA 92252.

In developing policy for the approval or denial of solar farms, it must be considered that these types of projects typically have a negative impact on the value of the properties in their neighborhoods. While the negative impacts are of the greatest magnitude for the immediately adjacent properties, it must be understood that the negative impacts are realized throughout the neighborhood and beyond.

The size of the proposed projects range from about 40 to 640 acres, yet the residential lots in the surrounding neighborhoods typically ranges from about 1 to 5 acres. The tremendous disparity in size is in part what creates the impact on the whole neighborhood. The projects would typically be from 8 to 640 times the size of the other properties in the neighborhood. The second major factor is that the projects represent an industrial land use, which is generally accepted as incompatible with residential land uses.

The magnitude of the impacts on real estate values will vary, but in all or nearly all cases the impact will be substantial and negative. The greatest negative impacts will be suffered by those residences and residential lots that are immediately adjacent to a project site and have the project in constant view. In addition, homes and lots that are not immediately adjacent, but are influenced by the project via a compromised view or as something that must be driven by when accessing the home or lot will also suffer negative impacts. Some individual properties could suffer value losses in magnitudes of 90% or greater, but it is important to note that the entire neighborhood will most likely suffer value losses and an overall loss in the desirability of the neighborhood will occur.

There are currently +/- 20 private, residential land solar farms in the San Bernardino County approval process. If these projects were to be approved and constructed, at least as many neighborhoods would suffer value losses. The cumulative impacts of these projects will serve to generally devalue the lower-density and rural neighborhoods of San Bernardino County and threaten the long-term economic viability of these areas.

The revenues that currently support the lower-density and rural neighborhoods largely stem from property taxes and tourism economics. As values are diminished from the projects, so will be the tax revenues that the county uses to provide services such as 911 emergency responders, public works, etc. When the visual character of these areas is worsened, the maximum potential of the tourism economy is also negatively impacted. These factors are exacerbated by the fact the projects themselves do not create a local economic benefit. They are generally absentee projects that generate a few non-local construction jobs and, upon completion, only a couple of maintenance jobs. The completed projects only generate property tax revenue from the site improvements (fences, paving, etc.) but not from the actual project elements: photovoltaic panels and infrastructure. This adds significantly to the negative impacts these projects bring to the tax base and economic viability of San Bernardino County's lower-density and rural neighborhoods.

## V. Conservation Values

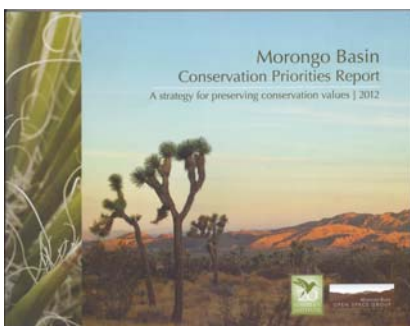
Over the last eighty years there has been a rich history of conservation investment in the Morongo Basin, starting with the creation of Joshua Tree National Monument in 1936 and continuing with the establishment of Big Morongo Canyon Preserve, creation of the California Desert Conservation Area, private acquisitions of The Wildlands Conservancy and Mojave Desert Land Trust, and passage of Senator Dianne Feinstein's 1994 California Desert Protection Act which designated wilderness and Joshua Tree National Park. Land management agencies, conservation non-profit organizations and desert communities continue to steward and restore these landscapes for the benefit of conservation and public recreation. Additional conservation designations are currently proposed in the California Desert Protection Act of 2011. All of these efforts are designed to protect these significant conservation investments which have benefitted countless residents, recreational users and businesses in the Morongo Basin and throughout San Bernardino County for over eight decades.

The conservation values analysis will cover:

1. The Morongo Basin Conservation Priorities Report 2012 and interactive website, and
2. Environmental considerations and development code suggestions for industrial-scale solar developments in the Morongo Basin:
  - a. Industrial solar projects are permanent and cumulative
  - b. Viewsheds and Aesthetics
  - c. Restoration and Mitigation
  - d. Unstable Soil Surfaces
  - e. Mapping Soils
  - f. Groundwater – a diminishing and non-renewable resource
  - g. Invasive Species
  - h. Federal Programmatic Environmental Impact Statement (PEIS) threat

For convenience, all referenced documents and reports may be found at <http://drecre.com/>.

### 1. The Morongo Basin Conservation Priorities Report- 2012



*We want to protect, long term, the things that we care about.* Dan Perlman, 2009

The Morongo Basin Conservation Priorities Report (MBCPR) is the result of a Basin wide community planning process that addressed growth and development through the selection of conservation values followed by priority setting and parcel based analysis. The report includes 11 maps.

The analysis covered more than 528,000 acres and over 62,000 parcels of public and private land across the Morongo Basin. The analysis excluded lands within the boundaries of the national park and Marine base. The analysis resulted in the identification of areas that have the highest conservation value and present the best opportunities for conservation, based on the criteria suggested by workshop and meeting participants (see page 4 of the report).

The participants - the Morongo Basin Open Space Group - included federal, state, county, municipal and non-governmental organizations and were open to any interested citizens. The multi-year project was facilitated by Regional Land Use Planner Stephanie Weigel, MS, PhD, AICP with funding and logistics support from the Sonoran Institute, based in Tucson, Arizona and Joshua Tree National Park. The priority setting process and workshops were facilitated by Dan Perlman, Brandeis University, and funded through The Lincoln Institute of Land Policy.

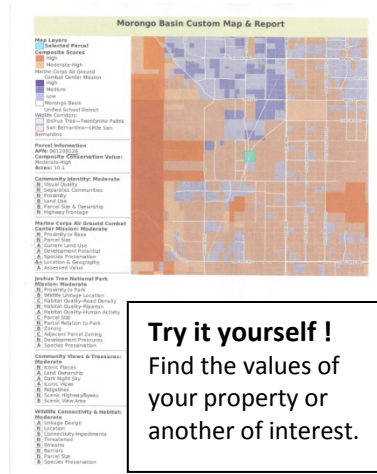
### **Priorities Values for Conservation**

- Protecting Joshua Tree National Park (Park) and associated connections to other protected lands
- Protecting the Mission of the Marine Corp Air Ground Combat Center (Marine Base)
- Wildlife Connectivity and Habitat
- Maintaining Community Identity
- Protecting Community Views and Treasures

### **Regional Planning Goals for Conservation:**

- **Buffers and separators** to maintain distinct community identity; to protect the mission of JTNP by promoting compatible adjacent land uses; and to prevent encroachment on federal and private lands that would jeopardize the mission of the Marine Base.
- **Connectivity** to protect and enhance wildlife movement between the Marine Base, JTNP, and the San Bernardino Mountains and National Forest; and to create a regional trails and open space network. The linkage designs for our region are products of South Coast Wildlands.
- **Community values** to create opportunities for economic vitality and development compatible with conservation; to support the missions of the county, city, and town; to preserve the basin's quality of life by preserving and protecting corridors and habitats, dark night skies, and community identity.
- **Water quality and quantity** to protect our watersheds, washes, and associated natural processes; to protect native groundcover and enhance natural infiltration.

## Interactive Report



The implementation plan for this report includes: getting the word out, distributing the results, putting the plan into action through mapping local projects, and developing capacity.

**Interactive Report:** Anyone with access to a computer and the internet can query the interactive parcel based analysis at <http://websites.greeninfo.org/morongo/mbcv/live/>

The map to the left is the report on APN 061209125, 10.1 acres of the 110 acre SEPV8 Solar Project on Lear Avenue in the community of 29 Palms. The current owner is Duke Energy.

## 2. Environmental considerations and development code suggestions for industrial-scale solar developments in the Morongo Basin and county lands

### a. All industrial solar projects are permanent and have cumulative impacts. No project stands alone.

Built and operating solar projects will permanently blight the landscape, scenic views, air-quality, and wildlife corridors -- all integral to the Morongo Basin tourism economy base and quality-of-life. It is our “plethora of sunshine”, level land and open space that attracts solar development companies to our area. The unintended consequences of their developments would be a shift from our tourism economy to a short-lived industrial economy and the permanent loss of our viewsheds, community treasures, and environmental integrity.

- Reference: MBCPR analysis
- Reference: Economic Analysis of Industrial Solar Development - BEAT

### b. Viewshed - Aesthetics

#### Cascade Solar, Joshua Tree and SEPV8 Solar, 29 Palms

CEQA requires that Aesthetics be analyzed. Without question any industrial solar project in the Morongo Basin has the *potential to significantly impact* (a) scenic vistas; (b) scenic resources within a state scenic highway; (c) degrade existing visual character; (d) create an artificial light source affecting day and nighttime views.

The Morongo Basin has three approved (two operating) industrial solar projects on private land. The SEPV8 Initial Study evaluation called the 100 acre project *Less than significant* with the explanation that it was “compatible with typical features

expected in rural living” and “the proposed project blends well with the existing view.”

The Morongo Basin is long and narrow and industrial scale projects are impossible to hide. Cascade Solar in the Sunfair area (under construction) and the SEPV8 Solar Project on Lear Avenue (operating) are clearly visible from Highway 62, from residential property on surrounding highlands, and from within Joshua Tree National Park.

Community residents spoke about these projects effects in their Rural Living neighborhoods on September 7, 2013 at the DRECP meeting in Yucca Valley and on September 10, 2013 at the Land Use Services (LUS) Workshop. Residents complained of the significant impact on their viewshed, loss of property values, and diminished quality-of-life

- Reference: MBCPR analysis
- Reference: Argonne National Laboratory: *Impacts of Utility Scale Solar Energy Developments on Visual Resources*. The report concludes that PV facilities can be visible for 20+ miles.

#### Wonder Valley SCEP

The 500 acre Wonder Valley SCEP Project, currently on hold, is located on Dale Dry Lake, adjacent to the 29 Palms – Shoshone Scenic Byway. This location diminishes the 29 Palms-Shoshone Scenic Byway, a major tourist route to the Mojave National Preserve and Death Valley NP that benefits businesses throughout the Morongo Basin.

- Reference: 29 Palms – Shoshone Scenic Byway
- Reference: Economic Analysis of Industrial Solar Development – BEAT

**Recommendation:** Evaluate the aesthetic cost of solar projects in the Morongo Basin as *significant* using the MBCPR analysis for reference.

#### **c. Restoration/Mitigation**

These large scale projects are novel – there are no guidelines in place for long range impacts. The Initial Study for the SEPV8 Project ignores all but the removal and recycling of infrastructure material at the end of its 25 year lifetime. There are no requirements to restore the land or to monitor it for invasive species, erosion, or dust control for some period of years after decommissioning.

- Reference: MBCPR analysis
- Reference: USGS Monitoring Ecosystem Dynamics in the Mojave Desert

**Recommendation:** The County should anticipate, with strong Development Code restoration/mitigation requirements, the significant long term impacts that threaten the basin conservation priorities beyond the life of the project.

**d. Unstable soil surfaces throughout the basin**

All County projects in the basin are built or scheduled to be built on mixed eolian and/or alluvial fine grained deposits. Cascade Solar and Wonder Valley SCEP are on dry lake deposit. According to the Cascade geotechnical report these deposits are “unsuitable for support of spread foundations or slabs that will support structures.” Excavation of at least 3 feet below grade, or more, is required with all footings underlain by a minimum of 18 inches of engineered fill.

**Air Quality not in compliance**

In the Morongo Basin industrial scale solar projects should not be permitted on unstable lake bed and dune deposits. Already the Basin is not in compliance with air quality standards and projects like this will only worsen the problem. The health effects of breathing PM 10 and PM2.5 dust particles are well known.

- Reference: *Soil Surface Susceptibility to Wind Erosion*. Jane Belknap and others. USGS

**Valley Fever, a consequence of soil disturbance**

Valley Fever is caused by fungal spores released when soils are disturbed. Potentially affected are construction workers and nearby as well as downwind residents. Valley Fever is an emerging health threat to be considered when evaluating and permitting projects. This is a new air quality threat and potentially devastating for community citizens at risk and tourists choosing more healthful areas to visit.

- Reference: Uh - Oh: Valley Fever outbreak Linked to Solar Development pdf

**Native Vegetation and Inspection**

According to the Initial Study, SEPV8 Solar was to leave native vegetation in place beneath the mirrors to hold the soil. The ground, however, was scraped completely bare.

**Recommendations:**

- All projects will result in substantial soil erosion and the impacts are potentially significant. The county needs to become proactive about air quality and protective of its citizens.

Codes should require that native vegetation be left in place. County inspection should be required and heavy fines imposed for noncompliance.

**e. Mapping the soils in desert areas of San Bernardino County**

The soils of the San Bernardino County have not been mapped so LUS has no reference when evaluating solar applications for air quality and ecological attributes. USGS scientists are assessing the geology of large footprint energy installations in the Mojave Desert and are able to assist the LUS in mapping soils, slope and ownership in the county and developing a check list for soil qualities to be studied. These studies are important for many reasons. One important reason is that recent scientific research shows that desert soils sequester significant amounts of carbon and that disturbance of these soils could result in an increase of greenhouse gases in the atmosphere. Therefore, disturbance of intact Mojave Desert soils as a result of industrial scale renewable energy development over a significant acreage of land, could actually counteract one of the primary goal of industrial scale renewable energy development: a reduction of greenhouse gas.

Furthermore, "About 48% of the entire area (Mojave Desert) is less than 5% slope, and 8.3% is less than 1% slope, the favored [for solar development] slope category. For this lowest-slope category, deposits underlying about 98% of the area are either mixed eolian-alluvial origin or are fine-grained alluvial deposits, and thus susceptible to eolian dust and sand transport, especially after disturbance. In addition, in this low-slope category, 89% of the area is susceptible to flooding, based on the age and geomorphology of alluvial deposits."

- Reference: *Assessing the geology and geography of large-footprint energy installations in the Mojave Desert, California and Nevada*. David R. Bedford and David M. Miller, U.S. Geological Survey, Menlo Park, CA. [dmiller@usgs.org](mailto:dmiller@usgs.org)
- Reference: *Soil Surface Susceptibility to Wind Erosion*. Jane Belknap and others. USGS

**Recommendation:** Request the USGS to map San Bernardino County soils and assist LUS in constructing a check list for erosion susceptibility.

- f. Groundwater -- a diminishing and non-renewable resource in the Morongo Basin and most of the Mojave Desert. Locally, Yucca Valley will receive water from the State Water Project to alleviate overdraft of the Warren Basin aquifer. Other water agencies are constructing recharge projects to sustainably manage their groundwater resources as well. Although industrial solar facilities provide a water use estimate for construction and maintenance, the actual water amounts needed remain best guesses. Water use must to be tracked and reported for all projects in order to know the actual usage.



- Reference: *Ground Water Recharge from Small Intermittent Stream in the Western Mojave Desert, California*. John A. Izbicki. USGS and others, Professional Paper 1703



Cascade Solar has used 17 acre-feet of water since beginning construction on July 9, 2013. This amount is sufficient for 50 families per year based on the average use of 1/3 acre-feet per connection in Joshua Basin Water District.

Cascade Solar from the Axio Power website

**Recommendations:**

- The county should be aware of the potential for underestimating water demand needed by solar projects for erosion and/or dust control. See Unstable Soils recommendation.
- The County Development Code should require that a construction and maintenance water budget for industrial solar projects be included in the water use assessment as part of a process of submittal to the water purveyor and county planning. During the life of the project, water usage should be reported to the county to better understand actual demands and for use in evaluating future applications.

**g. Invasive species**

Invasive species are a concern in the Basin and active eradication programs are managed by Joshua tree National Park, the Morongo Basin Conservation Association, and concerned citizens. The large scale surface disturbance makes the solar project areas extremely inviting to invasive species. This year, September 2013, heavy summer rains provoked an explosion of puncture vine (*Tribulus terrestris*) around Cascade Solar and SEPV8. This is a reminder that the footprint of a project extends beyond the perimeter fence. Puncture vine is particularly luxuriant adjacent to the Lear Avenue entrance. Waiting to burst forth is Sahara Mustard (*Brassica tournefortii*), a continuing scourge across our landscape.

**Recommendations:**

- Every project should have a weed management plan
- The County should consult with the Mojave Weed Management Area group (MWMA) to suggest and review language for the plan

- If there is need for a plan before consultation with MWMA please review the *Lucerne Solar Weed Control Plan*.
- h. **The Federal Solar Programmatic Environmental Impact Statement (Solar PEIS) has its eye on the Morongo Basin.** The BLM variance lands are located the width and length of the Basin. The federal/private checkerboard arrangement of parcels throughout the county makes it imperative that a Development Code be in place to prevent leapfrogging industrial sprawl with all its environmental and business problems.
- Reference: MBCPR analysis to understand the significance of our loss if PEIS projects are implemented



## VI. Local Strategies

The capture of energy from sunshine and thin air captures the imagination of those who dream of power from never-ending resources. The oil well that never runs dry, the coal seam that never peters out are worthy of Aladdin's lamp.

But, just like oil and coal, energy from the sun and wind comes at a steep environmental price if we rub the lamp the wrong way. Done on an industrial scale, large arrays of wind turbines and solar panels eat up irreplaceable open spaces and destroy the ground they stand on. Long transmission lines wasting power by the mile and access roads scraped and blasted through remote terrain only add to environmental devastation, dust and flood. This damage to the desert can never heal.

Industrial-scale solar and wind projects are proven detriments to the unique resources the desert offers. Income brought in by recreation, tourism and filmmaking suffers in their presence. These projects have promised benefits to state, county and nearby communities, but more and more studies prove these promises are unfulfilled.

Revolutionary energy technologies are superseding the 20th-century electrical grid centrally owned by large utility companies. Widely dispersed energy generation at the point-of-use is fast becoming more economical for the consumer and more beneficial for the economy. We also need to consider the advantages of independence from an antiquated grid vulnerable to weather, brownouts, and terrorist.

### **Locally-produced electricity equals locally-produced jobs and economic vitality.**

Solar on the rooftops of government and commercial buildings, school buildings, parking lots and housetops, trumps all benefits claimed by absentee investor-owned industrial-scale developers. Rooftop solar allows for immediate installation with no lead-in time. Local manufacture, wholesale and retail, of solar panels translates into local jobs. Installation and maintenance by local contractors also translates into local jobs. Local jobs support workers living locally, buying locally, and keeping their children in local schools.

Our priority is to keep our open spaces intact, *not* turning them into sacrifice zones for utility-scale development. We can meet and even exceed renewable energy goals by adopting policies already proven successful in other countries that incentivize solar in the already built environment. One recommendation is to provide incentives for solar energy generation on all new commercial and residential construction.

The Basin Energy Assessment Team is assembling a growing library of articles and scientific reports on the environmental merits of solar energy at the point-of-use, as well as hard statistics and studies relating to its benefits to our desert economies. We invite you to access this resource at: <http://drecre.com>.

The following report summarizes how and why we can achieve power from renewable resources and conserve the desert at the same time.

#### Economic enterprise in producing alternative energy resources

One possible action examined by the BEAT subcommittee on Local Strategies relates to the advancements in bringing renewable energy to the County of San Bernardino as an economic engine and productive enterprise that will support the communities and the citizens with good jobs and reliable energy production, while contributing to the positive aspects of reducing greenhouse gas production.

As the implementation of alternative energy resources have been brought to our county by the initiatives of the Desert Renewable Energy Conservation Plan (DRECP), the awareness of alternative ways to achieve the demands of these programs has also become apparent. Realizing the vast scope and intensity of these projects tells a story that, as of now, has only described one way of approaching the challenges and has left many potentially positive opportunities out of view. The primary strategy has been industrial, utility scale, developments. We believe other strategies offer a better and more prudent direction in achieving the same goals.

It is important to know that the long history of government subsidies in supporting alternative energy projects and programs have not met with great success. Investigation into other models of operation and design associated with the DRECP and how other communities have created plans that consider the need to meet difficult criteria of the required mandates have brought unique and innovative approaches into play. These findings are summarized below.

#### Findings related to success and failure of projects and programs as shown by historic examples.

Below is a small sampling of internet research, articles and reports, assembled to assist with historical reference of actual situations related to the success or failure of programs, policies, and project implementation. We believe they lend to the credibility of various scenarios in implementing renewable energy concepts.

**1. Cases of general failure due to underestimated economic competition, unsustainability in business models, and failed capitalized corporate enterprise based on government tax incentives.**

a. Coronus Solar, Inc. From Business Week, Investor synopsis highlights.

<http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapid=50170820>

This file shows a company that has current activity within the county and reflects on the potential success they can achieve based on past performance. However, there is good reason to doubt the sustained and viable nature of enterprises like these small foreign corporations who may not have the necessary means to do more than scrape the desert bare and leave the Power Purchase Agreements open for unknown outcomes. This example demonstrates planning that this is highly speculative and risky. It is typical of many non-resident venture groups who act without understanding local infrastructures, specific qualities of site limitations, and other factors outside of thorough factual investigation.

b. “The sun is setting on solar power” blog report.

<http://thepointman.wordpress.com/2012/04/13/the-sun-is-setting-on-solar-power-the-moneys-gone-and-nobodys-asking-any-questions/>

This blog report describes the false security found in the fast tracked government subsidized solar industry ventures and shows that the short term investments lack long term resolve in dependability. There has been a flurry of activity in the market that has drained billions of tax dollars into failed enterprise that now has no future sustainability. Public money has often been funneled into wishful plans that don’t reach fruition.

c. Chinese production of cheap solar panels collapsing competition.

<http://www.project-syndicate.org/online-commentary/the-eu-s-damaging-duty-on-chinese-solar-panels-by-emmanuel-guerin>  
<http://www.wbur.org/2011/08/16/evergreen-bankruptcy>

Shown here are prime examples of how the industry of making solar panels has been challenged by Chinese manufacturing at levels of competition that is

unmatched in other countries. There is doubt that sustainability of these kinds of businesses is possible and that they can ever adequately compete.

d. American investments of government tax subsidies fail and cost millions of dollars in losses and thousands of jobs.

[http://www.boston.com/business/articles/2011/08/16/evergreen\\_solar\\_files\\_for\\_chapter\\_11\\_bankruptcy\\_protection/](http://www.boston.com/business/articles/2011/08/16/evergreen_solar_files_for_chapter_11_bankruptcy_protection/)

When Evergreen Solar, Inc. began production of solar panels in an attempt to create jobs under government programs subsidized with tax money, a momentary flurry of activity occurred, then, soon failed. Approximately 800 workers had temporary employment and the company folded its American operations but continued to succeed in China, leaving a bankrupt effort behind for Boston, MA to clean up. Further research reveals repeat stories of attempts to be competitive in the American manufacturing sector.

More examples are easily found relating to bad investment strategies with tax incentive driven programs that were fast track ventures. Existing corporate entities gained huge rewards while immense amounts of tax payer money evaporated without the final projects ever being brought to reality.

***2. Models that are succeeding within the scope of available resources and have proven track records for sustainable forward momentum and continued growth.***

a. Throughout the State of California, many utilities are based on community structures. Non-profit, municipal, county and regional electric service providers can be found within the state. Some are emerging as new independent systems with strengths that come from the advent of new opportunities in renewable energy technologies.

[http://www.energy.ca.gov/maps/serviceareas/Electric\\_Service\\_Areas\\_Detail.pdf](http://www.energy.ca.gov/maps/serviceareas/Electric_Service_Areas_Detail.pdf)

This link leads to a detailed map of service providers throughout the state.

b. The City of Anaheim has been a Municipal Utility since the city was founded in 1857. Their economic health and sustainability has been tied to the economics of their public utilities. The bargaining power that allowed for service and supply has created strength in independence and ability to govern growth.

<http://anaheim.net/SolarMap/>  
<http://www.anaheim.net/articlenew2222.asp?id=5067>  
<http://m.anaheim.net/utilities/news/news.asp?id=1118>  
<http://www.anaheim.net/article.asp?id=4188>

These links lead to many resources for the City of Anaheim's public utility programs. Anaheim recognizes many tools for operating a successful community based system, responding to consumer needs, developmental growth, and sustainable destinations in achieving future mandates within the scope of many foreseeable obstacles to sustained energy needs.

c. The City of Richmond has been a leader in creating a grassroots effort in job creation and programs of education using solar energy systems to reduce poverty, crime and dependence on other government subsidies in social financial aid. Their model shows a track record of success in spite of less than optimal advantages. Richmond is coastal community with less solar resources than our desert communities, yet they are becoming a thriving solar community.

<http://solarrichmond.net/>  
<http://solarrichmond.net/our-services/solar-consulting-analysis>

These links bring insight into how a very small community effort can create local success in jobs, crime reduction, and education.

d. The City of Lancaster has taken a giant leap forward in grasping for the benefits of local strategies in renewable energy program management. Under the municipal system of implementation and enterprise, the future of their independence in energy economics will provide great benefits to their community and citizens. Jobs and finance all tie into a package of sustainable growth and security.

<http://www.solarlancaster.org/>  
<http://www.nytimes.com/2013/04/09/us/lancaster-calif-focuses-on-becoming-solar-capital-of-universe.html?pagewanted=all& r=0>  
[http://www.cbsnews.com/8301-35040\\_162-57598964/powering-the-future-small-city-has-big-solar-goals/](http://www.cbsnews.com/8301-35040_162-57598964/powering-the-future-small-city-has-big-solar-goals/)

e. The Sierra Club's new "My Generation Campaign" shows the strength behind community drives To keep the money that is generated by local energy systems

in the communities where production and supply is utilized, creates good jobs and build a financial foundation for stability in social support systems.

[http://sierraclub.typepad.com/compass/2013/07/how-a-southern-californian-community-organized-to-push-for-rooftop-solar-jobs.html?fb\\_action\\_ids=10100147213529730&fb\\_action\\_types=og.likes&fb\\_source=other\\_multiline&action\\_object\\_map={%2210100147213529730%22%3A357682834335435}&action\\_type\\_map={%2210100147213529730%22%3A%22og.likes%22}&action\\_ref\\_map](http://sierraclub.typepad.com/compass/2013/07/how-a-southern-californian-community-organized-to-push-for-rooftop-solar-jobs.html?fb_action_ids=10100147213529730&fb_action_types=og.likes&fb_source=other_multiline&action_object_map={%2210100147213529730%22%3A357682834335435}&action_type_map={%2210100147213529730%22%3A%22og.likes%22}&action_ref_map)  
<http://www.desertreport.org/?p=900>  
<http://evnewsreport.com/tag/my-generation-campaign/>

These links lead to many of the recent activities that have been happening right here in San Bernardino County. The effort is driven by many people who believe that it is time to take action to stop climate change and become involved in solutions that are outside of status quo large scale industrial systems.

f. State wide, California remains active in pursuing independent renewable energy programs in spite of corporate push back. A drive to achieve local control of energy production for local benefit is building momentum as rooftop systems prove themselves as pathways to the future of renewable energy.

<http://www.forbes.com/sites/uciliawang/2013/09/12/report-how-solar-remains-attractive-without-key-incentives-in-california/>

This link opens to discussions about challenges to independence in energy production. Feed-in tariffs, economic struggles and new enterprise developments.

g. Across the nation, solar alternatives are generating jobs. Even in coal fired states where the industrial base is fossil fuel production.

[http://www.huffingtonpost.com/2011/02/03/the-jobs-project\\_n\\_818006.html](http://www.huffingtonpost.com/2011/02/03/the-jobs-project_n_818006.html)

From this information comes an older post that remains relevant today, jobs continue to grow within the alternative energy opportunities being created nationwide.



**3. Conservation of resources and reduced energy use remain underachieved and higher efficiency systems lag in addressing issues related to meeting carbon reduction mandates.**

It has been thirty years since President Jimmy Carter initiated measures to deal with what he called the “energy crisis”. Not long after his administration came to a close, the mandate changed. Of the many programs President Carter promoted, conservation was the primary concern.

It is now obvious that conservation is more important now, than at any time before. Yet, it is the least talked about and most avoided part of the discussion on carbon reduction and energy management.

- a. A recent study by the Lawrence Livermore National Laboratory shows that 61% of generated energy is wasted across the United States. The losses are attributed to generation losses through transmission relying on centralized points of production far away from point of use destinations.

<http://www.kcet.org/news/rewire/conservation/americans-waste-or-lose-two-thirds-of-energy-finds-study.html>

[http://phys.org/news/2011-04-energy\\_1.html](http://phys.org/news/2011-04-energy_1.html)

These links will lead to information on technical details regarding the studies and results.

- b. The world is addicted to excess night lighting. It has become a prime directive in dealing with the issue on the part of the International Dark Sky Association and has impacts on the well-being of the environment and health of citizens, worldwide. In America the problem is exasperated by economic capitalization of advertising and excess use of bill boards. Continued nighttime use of lighting taxes excessively on systems where fossil fuel is required as solar generation is not possible at night.

<http://www.darksky.org/assets/documents/is026.pdf>

<http://darksky.org/component/content/article/38-ida/resources/186-set-a1-the-ida-standard-slide-set>

<http://www.darksky.org/assets/documents/PG2-wildlife-bw.pdf>

[http://www.darksky.org/assets/documents/ida\\_human-health\\_brochure.pdf](http://www.darksky.org/assets/documents/ida_human-health_brochure.pdf)

<http://spie.org/x42154.xml>

[http://en.wikipedia.org/wiki/Dark-sky\\_movement](http://en.wikipedia.org/wiki/Dark-sky_movement)

These links add to the current scientific knowledge about use of excess light and light being used inappropriately. Wasted energy is a primary concern when considering the need for additional energy production through the sacrifice of desert lands without having implemented realistic conservative measures first.

#### ***4. Current incentives for green initiatives and programs.***

Few current programs promote sensible development of renewable energy systems.

<http://www.energy.ca.gov/renewables/>

<http://www.eere.energy.gov/>

<http://www.cpuc.ca.gov/NR/rdonlyres/8A822C08-A56C-4674-A5D2-099E48B41160/0/LDPVPotentialReportMarch2012.pdf>

These links lead to information concerning financial incentives and analysis of potential applicability of distributive energy system. Most of the economic incentive programs are now finished, yet they are still listed on the CEC website. Adjustments to the distributed analysis are not included.

#### **Local Strategy Conclusions**

The local strategy for renewable energy projects must rely on a budget of extreme thrift in order to be successful in the realm of renewable energy enterprise.

There are ideas that will work, however. First is to assess the current level of available financial aid. Second would be to aim these resources at the multidimensional opportunities that can be supported by these resources. A financial reward from creating the projects must be an outcome and primary benefit of the enterprise.

Multidimensional opportunities are defined as co-generative benefits of system design. As an example, artworks in a park could be solar based and designed to provide energy for lighting at night throughout the park. They might also provide shade for protection from the sun in the daytime.

Another thought is to create covered transportation systems with solar energy canopies that feed the transport vehicles with electricity or to shade shopping centers so heat is reduced from direct sunlight, thereby reducing air conditioning needs and energy use while also generating energy.

Yet another idea is to compete with current solar companies in rooftop lease-based systems where the investment is made with long term returns in lease payments to the county. Revenue would build and sustained job opportunities that would be county based and bring financial advantages with the payoff that the systems are manufactured, installed, maintained and operated with community benefits such as jobs. Local savings to the citizens then become available for spending in the community for other consumer needs and the local economic benefits.

These are a few “win - win”, collaborative concepts that will provide jobs while creating positive citizen attitude and appreciation.

Success will be achieved by creating small, point of use, high efficiency power generating systems that are constructed by local labor and provide local resources in energy production, while building a reduced carbon footprint in local vicinities. One community at a time, block by block, and in harmony with manageable growth of a county based economic enterprise. Keep the economics local and build security within the county.

## VII. Conclusion

The Morongo Basin's sparse development and small population located in California's Hi Desert region is nestled around a string of national parks, federally designated wilderness areas and other nationally recognized conservation lands. Our rural, scenic communities serve as gateway communities for the greater Mojave Desert and derive a significant portion of their economies from recreational and cultural tourism. The Basin is a destination for outdoor enthusiasts, a cultural center that is home to numerous visual artists and musicians and the location of the Marine Corps Air Ground Combat Center (MCAGCC), the area's largest employer.

Our significant conservation investments, which include Joshua Tree National Park and Big Morongo Canyon Preserve to name just a few, have been recognized by conservation ordinances, wildlife linkage studies and the Morongo Basin Conservation Priorities Report (Morongo Basin Open Space Group). The area has also been the crucible for significant environmental legislation including the Bobcat Protection Act and the creation of the Sand to Snow National Monument, which is described in Senator Dianne Feinstein's California Desert Protection Act of 2013.

BEAT believes that the Morongo Basin's quality of life and conservation values are economic drivers that attract businesses, homeowners and cultural opportunities to our area. These quality of life and conservation values also attract tourists from around the world. We believe that industrial scale renewable energy development will harm scenic vistas, space, clean air, watersheds, free-flowing traffic, small town sense of community and access to recreation- the very elements that support our recreational tourism economy.

Finally, BEAT is very concerned that industrial scale renewable energy development conflicts with the quality of life in residential neighborhoods, in light of current county regulations. Additionally, the presence of industrial scale solar projects in Rural Residential Zones in the Morongo Basin will jeopardize regional property values, neighborhood characters, and have an adverse impact on San Bernardino County's tax base. Moreover, we feel strongly that renewable energy goals for the state and county can be met through distributed solar and wind in the built environment and lands identified by the Environmental Protection Agency without harming conservation lands.

In closing, we respectfully request that the San Bernardino County Supervisors and the Planning Commission adopt the recommendations in BEAT's report regarding industrial scale renewable energy to protect the economy, natural resources and quality of life in the Morongo Basin and other tourism destinations throughout San Bernardino County.

## VIII. BEAT Participants

**Pat Flanagan** moved to the Mojave Desert and Twentynine Palms, in 2002. She says it was about time, having lived, worked, and recreated in the other southwestern deserts and Baja California since getting her driver's license. She uses her science background to develop 'place based' science curriculum, train teachers, and pay attention to what is happening in our desert. She is an instructor for the Desert Institute, writes natural history essays, and is an enthusiastic weed puller. She is a board member of the Morongo Basin Conservation Association.

**Meg Foley** has been a desert resident for 30 years. She is Executive Director of the Joshua Tree National Park Association, a nonprofit partner of the Joshua Tree National Park. Foley is a Board member of the California Desert Coalition, the Morongo Basin Conservation Association and Friends of the Big Morongo Canyon Preserve. She is a member of local Chamber of Commerces: 29 Palms; Yucca Valley; Joshua Tree and Morongo Valley. She has nearly 25 years' experience in the nonprofit sector and 6 years' experience in local government. Foley developed a nature trail and interpretive booklet and coauthored a bird checklist for a Palm Springs resort. An avid hiker and amateur naturalist, she has led numerous hikes and desert expeditions to introduce visitors to the wonders of desert ecosystems.

**Victoria Fuller** is Vice President of the Joshua Basin Water District. Victoria has spent her summers hiking and camping in the Southwest and gained an appreciation for the beauty of the open spaces, wildlife, amazing night skies and notable history. She moved to Joshua Tree 16 years ago and has been involved in the Community since that time. She served as President of the Joshua Tree Community Association, worked with Community Off-Road Vehicle Watch and the statewide Alliance for Responsible Recreation. In March 2008 Victoria was invited to be on a panel of the Congressional House Natural Resources Committee, Subcommittee on National Parks, Forests and Public Lands, on "The Impacts of Unmanaged Off-Road Vehicles on Federal Land." She served on the Citizens Advisory Committee for the Joshua Basin Water District and worked on the Morongo Basin Dark Skies Alliance.

**Shari Long** and her husband retired and moved from the L.A. area to Joshua Tree in 2001. Shari is a retired Escrow Officer and her husband a retired Safety and Environmental Specialist. Shari worked with community members to begin the Joshua Tree Community Plan from 2002 to 2003. Her husband was elected to the Joshua Basin Water District Board from 2003 thru 2012. Shari served on the Joshua Tree Community Association Board as Treasurer and Secretary. Shari is currently a member of the Joshua Basin Water District's Citizen Advisory Committee.

Before moving to the Morongo Basin in 1979, **Ruth Rieman** was an insurance underwriter for State Farm. Since 1979 Ruth has managed the day to day business for her artist husband, Steve, while serving on various committees and boards within the communities. Ruth is a past President of the Bighorn-Desert View Water Agency, the Copper Mountain College Foundation and the Joshua Tree National Park Association. Currently Ruth serves as the vice chair of the California Desert Coalition, treasurer of the Morongo Basin Conservation Association and board member of the newly formed Joshua Tree Highlands Artist Residency.

**Mickey Luckman** is the current President of the Joshua Basin Water District Board of Directors. She also serves on the boards of the Joshua Tree Kids Club, the Desert Resorts Tourism Agency that oversees the California Welcome Center in Yucca Valley, and was on the Morongo Basin Open Space Group. She is a graduate of the University of San Diego and Coro Foundation's Fellowship in Public Affairs. Before she was elected to the water board, she was chair of the Joshua Tree MAC and is a 44 year resident of Joshua Tree.

**April Sall** currently works as Conservation Director and land manager for the Wildlands Conservancy, chairs the California Desert Coalition and serves on the Bureau of Land Management's Desert Advisory Committee. She manages several preserves in the California desert and northern California, organizes community members to advocate for conservation initiatives and educates the media and elected officials about key land use and environmental issues. Thanks to Ms. Sall's outstanding leadership and vision, our Morongo Basin communities defeated a misguided Los Angeles Department of Water and Power proposal in 2009 that would have constructed power lines across sensitive conservation lands, harming the desert ecosystem and the communities that rely on the recreational tourism economy. Over the past 7 years, April has continued to demonstrate exceptional leadership by working with state government, federal agencies and other non profits to develop sensible energy policies that protect conservation lands while investing in our nation's renewable energy future.

**Seth Shteir** works in Joshua Tree as the National Parks Conservation Association's California Desert Field Representative. Seth developed a love of arid lands while visiting Arizona's national parks as a child with his father. Prior to working at NPCA, Seth shared his passion for the natural world for 13 years as an outdoor educator and classroom teacher at the New Jersey School of Conservation, Fresh Air Fund, Lorado Taft Field School and Children's Community School. Seth also served eight years on the board of the San Fernando Valley Audubon Society and has published his environmental writing in a variety of newspapers and magazines, including The Los Angeles Times, Christian Science Monitor, High Country News, National Parks Magazine and Bird Watcher's Digest.

**John Simpson** is a Realtor® and a Certified General Real Estate Appraiser, with over 24 years of commercial, residential and industrial real estate experience. His real estate services experience includes buyer and seller representation, property tax assessment appeal representation, valuation and consulting services, highest and best use/feasibility analysis and market research. He graduated from UCLA with a Bachelor of Arts Degree and has been employed by [CB Richard Ellis](#), [Cushman & Wakefield](#) and First Interstate Bank. His current company is All American Real Estate & Consulting in downtown Joshua Tree.

Since retiring as a procedural writer in 2000, **Donna Thomas** has devoted her efforts to environmental and renewable energy issues in the Morongo Basin and Coachella Valley. These efforts include her work on numerous biological field studies for the Bureau of Land Management and for the University of California at Riverside (UCR). Donna sits on the board of the California Desert Coalition and is a docent at the Big Morongo Canyon Preserve.

**Stephanie Weigel** is a planner, researcher and geographer who lives in Joshua Tree. Her endeavors are centered on assisting communities as they gather and develop the resources they need to make good decisions about how and where growth takes place. A current interest is the realm of resilient communities, and better understanding the types of social networks that allow more resilient places to thrive and adapt to challenges.

**Marina D. West** is a California Registered Professional Geologist with 26+ years experience in public sector water resources as hydrogeologist, distribution operator and currently general manager of Bighorn-Desert View Water Agency (5+ yrs.) with prior employment at Joshua Basin Water District (4 yrs.) and Orange County Water District (16 yrs.). Marina graduated from Cal Poly Pomona in 1988 with a Bachelor's degree in Geological Sciences, in 2002 obtained a Certificate of Water Distribution from Santiago Canyon College and in 2011 completed a Master's degree in Public Administration from Cal State San Bernardino. Marina is certified by the California Department of Public Health in Water Distribution (Level D5) and Water Treatment (Level T2). Marina currently resides in Landers, CA with her husband Randy of 26 years. Their two children Kaylee (21) and Daniel (18) recently relocated out of the area to attend college.

## IX. References

Allen, M. and McHughen, A. 2011. Solar Power in the Desert: Are the current large-scale solar developments really improving California's environment? Gaps in Desert Research. Center for Conservation Biology, UC Riverside. <http://www.escholarship.org/uc/item/2ff17896>

Bedford, David R. and Miller, David M. 2010 *Assessing the geology and geography of large-footprint energy installations in the Mojave Desert, California and Nevada*. Workshop Presentation for Climate Change in the Great Basin and Mojave Desert: Workshop on Natural Resource Needs. U.S. Geological Survey, Menlo Park, CA. [dmiller@usgs.org](mailto:dmiller@usgs.org)

Belnap, J. and Lange, O.L., eds. 2001. Biological Soil Crusts and Wind Erosion. In *Biological Soil Crusts: Structure, Function and Management*, Chapter 25. Berlin: Springer-Verlag. [http://sbsc.wr.usgs.gov/products/pdfs/Belnap\\_ch25\\_wind\\_erosion.pdf](http://sbsc.wr.usgs.gov/products/pdfs/Belnap_ch25_wind_erosion.pdf)

Belnap, Jayne et al. Accessed September 2013. Soil Surface Susceptibility to Wind Erosion. USGS Powerpoint presentation. <http://drecr.com/Soil%20Surface%20Susceptibility%20to%20Wind%20Erosion%20USGS.pdf>

Choi, F. and Marlowe, T. 2012. The Value of America's Greatest Idea: Framework for Total Economic Valuation of National Park Service Operations and Assets and Joshua Tree National Park Total Economic Value Case Study. A report provided to the National Park Service. Developed for the Policy Analysis Exercise Requirement at the Harvard Kennedy School of Government. <http://www.nps.gov/resources/upload/Task-4-Joshua-Tree-Case-Study-The-Value-of-America-s-Greatest-Idea-Choi-and-Marlowe-2012.pdf>

Cook, Philip S. 2012. Impacts of Visitor Spending on the Local Economy, Joshua Tree National Park, 2010. Natural Resources Report NPS/NRSS/EQD/NRR --- 2012/511. National Park Service, Fort Collins, Colorado. <http://www.drecr.com/ImpactsVisitorsJTNP.pdf>

Izbicki, John A. et al. 2007. *Ground Water Recharge from Small Intermittent Streams in the Western Mojave Desert, California*. USGS, Professional Paper 1703G. <http://pubs.usgs.gov/pp/pp1703/g/pp1703g.pdf>

Jette, C, Blotkamp, Y.Le, Y., and S. J. Hollenhorst. 2011. Joshua Tree National Park: Winter 2010. National Park Service, Fort Collins, Colorado. <http://www.nps.gov/jotr/parkmgmt/upload/2010VSPrept.pdf>



Lovich, J. E. and Ennen, J. R. 2011. Wildlife Conservation and Solar Energy Development in the Desert Southwest, United States. *Bioscience* 61(12): 982-992.

<http://www.jstor.org/stable/10.1525/bio.2011.61.12.8>

Penrod, K. et al. 2005. *South Coast Missing Linkages: A Linkage Design for the San Bernardino-Little San Bernardino Connection*. South Coast Wildlands, Fair Oaks, CA. [www.scwildlands.org](http://www.scwildlands.org).

Penrod, K. et al. 2008. *A Linkage Design for the Joshua Tree-Twenty-nine Palms Connection*. South Coast Wildlands, Fair Oaks, CA. [www.scwildlands.org](http://www.scwildlands.org).

Penrod, K. et al. 2012. *A Linkage Network for the California Deserts*. Produced for the Bureau of Land Management and The Wildlands Conservancy. Science and Collaboration for Connected Wildlands, Fair Oaks, CA [www.scwildlands.org](http://www.scwildlands.org) and Northern Arizona University, Flagstaff, AZ.

Richardson, Robert B. 2005. The Economic Benefits of California Desert Wildlands, 10 Years Since the California Desert Protection Act of 1994. Prepared for The Wilderness Society. <https://partners.tws.org/wildscience/Publications1/Economic%20Benefits%20of%20CA%20Desert.pdf>

Siler-Evens, K., Azevedo, I. L., Morgan, M. G., and Apt, J. 2013. Regional variations in the health, environmental, and climate benefits of solar and wind energy. *Proceedings of the National Academy of Sciences of the United States of America* 110(29): 11768-11773.

<http://www.pnas.org/content/110/29/11768> or

<http://assets.njspotlight.com/assets/13/0805/2103>