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Report on Investigation of the Potential for Enhanced-Use Lease as a Mechanism for Renewable Technologies Within the Department of Defense

David F. Menicucci

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Abstract

In FY 2006 the Department of Energy Federal Energy Management Program (FEMP) funded Sandia National Laboratories to investigate Enhanced-Use Leasing (EUL) as a means to encourage third-party-financed renewable energy projects on military bases. The purpose of the study was to develop a better understanding about EUL, identify potential obstacles for using it with renewable technologies, and to recommend the next steps for FEMP. This report presents the results of the study, including examination of EUL activities within the four military services and the Veterans Administration and summary comments and recommendations. The appendices contain pertinent information taken from presentations that were found in the open and free literature.

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NOMENCLATURE

AFCESA	Air Force Civil Engineering Support Agency
BCA	business case analysis
DOD	Department of Defense
DOE	Department of Energy
ESG	Energy Service Group
ESPC	Energy Savings Performance Contracts
EUL	Enhanced-Use Leasing
FEMP	Federal Energy Management Program
IEP	Independent Energy Provider
LLC	Limited Liability Company
MCLB	Marine Corps Logistics Base
NAVFAC	Naval Facilities Engineering Command
OMB	Office of Management and Budget
SAT	Solar Assessment Team
USAF	United States Air Force
USMC	United States Marine Corps
VA	Veterans Administration

BACKGROUND

In July 2004 the final report on the Renewables Assessment Program for the US Department of Defense (DOD) was presented to Congress. Sandia National Laboratories participated in this assessment by forming a group called the Solar Assessment Team (SAT) and leading the investigation of solar energy technology potential on military bases.

The SAT used high-level screening tools to identify over 1,090 potentially cost-effective applications for solar technologies within DOD bases in the continental United States. Subsequently, the SAT randomly selected 30 of those applications for a more detailed business case analysis (BCA). The purpose was to assess the validity of the screening tool and to enhance confidence in the results. The BCAs confirmed that most of the 30 projects in the sample had potential simple paybacks of less than 10 years, which is the maximum payback period for a project to be considered cost-effective. Thus, they concluded that most of the 1,090 projects that were initially identified in the screening process were potentially cost-effective.

However, the SAT also identified significant barriers to the inclusion of solar technologies on DOD bases. The most significant of these is limited capital for directly purchasing solar technologies, even for projects with short simple-payback periods.

As a consequence, the SAT recommended that DOD vigorously pursue Independent Energy Provider (IEP) contracts. IEP contracts, which are sometimes referred to as “third-party-financed contracts,” allow private contractors to build, own, and operate a renewable energy plant on a military reservation. As part of the deal the military facility contracts to purchase energy from that plant for a sufficiently long period to allow the IEP to recoup the initial investment and yield a profitable return. At contract termination the hardware is turned over to the installation at no cost. Thus, this process eliminates the need for DOD to supply capital funds for the project, theoretically removing a significant barrier to the implementation of solar systems.

Some third-party financing has been ongoing in the DOD for years. One of the most popular of these, Energy Savings Performance Contracts (ESPC), allows a private company to build and operate energy projects at its expense and share the energy savings with the government. At the end of the contract and after the private party has reaped a reasonable profit, the hardware is turned over to the base.

However, the rules and regulations for ESPC are complex and private sector profitability is constrained, so there have been limited applications of renewable technologies under this program. Therefore, as part of Sandia’s effort with the DOD Renewable Energy Assessment Project, the SAT recommended that other third-party financing mechanisms be pursued to augment the ESPC. Appendix A contains an excerpt from Sandia’s final (unpublished) report that was submitted to the DOD Renewable Energy Assessment Project.¹ It explains the potential value of IEP contracts applied to solar projects on military bases.

PURPOSE OF THIS STUDY

In FY 2006 the US Department of Energy (DOE) Federal Energy Management Program (FEMP) funded Sandia to investigate the potential for applying Enhanced-Use Leasing (EUL) to renewable energy applications on military bases. EUL is another form of third-party-financed contracts that has existed for about 10 years within the DOD complex but is not in widespread use for energy systems.

The purpose of the study was to develop a better understanding about EUL, identify potential obstacles for using it with renewable technologies, and to recommend the next steps for FEMP. The author, a lead research engineer on the project, presents the results of the study in this report.

It is important to note that this investigation was limited to the specific objectives noted above. It does not present any analysis of the potential number of projects that might be possible under the EUL mechanism, nor does it provide substantive comparisons or contrasts with existing third-party approaches, such as ESPC. Both of these efforts are above and beyond the scope of this effort. However, some comments in this regard are provided throughout the report.

The first section of the report presents fundamental information about how EUL works on a military base. Additionally, the applicable legislative authority and potential impediments are described.

The following sections describe how the Veterans Administration and the Army have used EUL for energy applications. Following this is a discussion of the author's attempt to engage the Navy and Marines in the evaluation process, an effort that bore little fruit. The section about the US Air Force's involvement with EUL is very limited because they never responded to the author's inquiries to discuss potential applications.

Summary comments and recommendations are provided in the last section. A number of appendices are included that contain pertinent information taken from presentations that were found in the open and free literature. Appendices B1, B2, C, and D can be accessed on the internet.

BACKGROUND AND DESCRIPTION OF HOW EUL WORKS

Enhanced-Use Leasing (EUL) allows US military organizations to leverage the private sector's expertise and financial resources for new construction and/or for redevelopment of buildings and other real estate assets.

The following legislative authority was identified for EUL within the Veterans Administration (VA) and DOD:

- VA – 38 USC 8161-8167 and Millennium Healthcare Act; 75 Years
- DOD – 10 USC 2667; 50 Years (Preferred)

Additional authority and regulations come from the Office of Management and Budget (OMB) Circular A-11. A copy can be obtained at this address:

http://www.whitehouse.gov/omb/circulars/a11/current_year/a_11_2006.pdf

Part 7 of Circular A-11, which covers planning, budgeting, acquisition, and management of capital assets, is applicable. EUL is specifically addressed in Section 300 of this chapter because the leasing of capital assets, such as land, is typically involved.

Fundamentally, EUL allows military organizations to lease underdeveloped real property for a variety of uses, presumably including energy production systems.

The following rules generally apply:

- Installations can lease available, non-excess real property to the private sector.
- Installations can receive cash or in-kind services while retaining ownership of the asset.
- Cash or in-kind consideration must equal no less than fair market value of the property.
- Cash payments must be deposited in a special treasury account and, thereafter, may be divided 50/50 between the installation and the Service.
- Service Secretaries may accept in-kind consideration for any property or facility under the control of the Service, rather than just the installation where the property is leased.

The leasing process is typically accomplished in phases under the authority to lease non-excess property. For example:

Phase I

The military organization evaluates potential partners before selection through a *notice of availability* to lease at a specified installation. Subsequently they host an industry conference.

The selection of an EUL partner is based on the potential to meet the goals and objectives of the leasing action and the ability to provide asset management expertise and experience. Typically the military organization looks for a partner who will be creative and professional in identifying issues, analyzing solutions, and in determining entrepreneurial processes to ensure successful implementation of the project.

The goals of the leasing action are to:

- find uses for the installation assets that are compatible with the requirements and mission of the installation;
- maintain positive relations with the communities surrounding the property;
- successfully integrate development activities with cultural resources and environmental policy management requirements in support of the mission;
- realize the full value of its real property assets; and
- employ the best commercial practices to the benefit of both the military entity and its partner.

Phase II

The military organization and the EUL partner work jointly to produce a *business and leasing plan* in close coordination with stakeholders in the local community. The plan will typically include financing strategies for the proposed lease arrangements, an approach for developing the leased property at the installation, and the cash or in-kind consideration to be provided by the partner to the military organization.

Phase III

The military organization and its partner implement the projects that were approved in the business and leasing plan. The implementation phase begins after approval by either the command level above the base or, if over \$500,000, the headquarters of the appropriate military department (i.e., Army, Navy, or USAF).

The Veterans Administration (VA) EUL Experience

In the late 1990s the VA apparently incorporated the EUL option as an integral part of their Energy Savings Initiative to meet their energy goals, including significant energy reduction in their facilities. Through their Integrated Service Network they encourage developers to seek energy projects through the EUL mechanism.

The VA's general EUL plan is intended to develop an owner trust structure with the following characteristics:

- Selected developer forms an *owner trust* as a single-purpose entity.
- Lease and energy services agreement is between the VA and the owner trust.
- Development, management and operation agreements are between the owner trust and the developer/operator.

In this arrangement, the owner trust holds title to the improvements to the end of the lease term, at which time the improvements may revert to the VA for compensation or are removed.

The first VA EUL project was at its Medical Center in Mountain Home, Tennessee, which was developed under the specified legislative authority. The objective was to have a private sector partner lease underutilized VA land—a building and other resources—and then to construct and

operate a co-generation facility that would produce both electricity and heat for the medical campus.

The term of the lease was authorized for 75 years, the maximum authorized under the enabling legislation. The VA Mountain Home facility agreed to a long-term energy purchase agreement for the energy products that would be produced by the generator.

The key elements of VA's EUL process included (a) the development of an approved concept plan, (b) a public hearing to ensure input from veterans and the community, and (c) a selection process that ensured procurement integrity through full and open competition.

The project at the Mountain Home Center was pursued for the specific purpose of replacing an outdated energy plant and to reduce energy costs. The VA contributed two acres of property valued at \$300,000.

The awardee for this project was Energy Service Group (ESG), LLC, based in Indiana. ESG is an energy service provider company that provides third-party-financed, turnkey energy systems for a variety of customers. They agreed to the following terms:

1. The developer/operator would construct, operate, and maintain a state-of-the-art energy production center.
2. The developer/operator would supply \$3M of energy conservation measures on the campus.
3. The VA would commit to buy electric and thermal energy via two-year, revolving energy service agreements that are contingent on annual appropriations and continuance of the medical center.

The VA noted the following benefits:

1. Reduced energy consumption and costs including \$11.6M Net Present Value of non-recurring cost savings in the first 25 years (based on 2004 dollars).
2. Capital avoidance of \$25M.
3. Reliable energy with 100% backup.

The Mountain Home project came on line in June 2001. More details about the success of this project can be found in Appendices B1 and B2, which contain presentations that were found in the open literature and can be accessed on the internet.

The VA subsequently completed two other very similar energy projects under EUL, one at its North Chicago Energy Center, which came on line in early 2005, and the other at its Chicago Westside Energy Center, which began operation in late 2003.

Following the completion of the North Chicago Energy Center project, the OMB found that the trust arrangement used in the three projects did not meet the fundamental requirements of Circular A-11 and ruled that in the future the public-private venture must have a non-federal

partner who has a majority ownership in the partnership and contributes at least 20% of the total value of the partnership assets.

As of November 2006, the VA has procured the construction of four more co-generation systems in Pennsylvania under the EUL program. The VA reconfigured the deals so that the private sector provider operated under a Limited Liability Company (LLC) structure and within which VA interest would be in the minority and non-economic. This means that at the end of the term, VA would not automatically take control and ownership of the assets, a necessary condition to meet the OMB requirement.

This structure apparently does meet OMB's requirements and most importantly, allows the VA to integrate the energy-purchase agreement into the EUL deal. This detail is extremely significant because it allows project risks to be shared between the energy provider and the government, which encourages free-enterprise involvement and investment, and promotes the rapid application of new energy technologies.

The Energy Systems Group (ESG) has been one of the most successful contractors for the VA's EUL efforts and has installed a number of energy systems that they are currently operating. More information about ESG is found at this web site: <http://www.energysystemsgroup.com>.

ESG's typical EUL energy deals with VA consist of the following elements:

- leasing of non-excess property in accordance with federal regulations,
- the creation of a trust that actually owns and operates the energy system on VA property, with minority and non-financial VA interest in the trust, and
- an energy purchase agreement in which the VA agrees to purchase the generated energy at a specific cost for two years after initiation, with an option to renegotiate the energy purchase price every two years thereafter.

At present, ESG has installed and is operating three EUL energy center projects within the VA complex. The VA currently has five sites in the midst of the EUL procurement process. ESG anticipates that the VA will issue RFPs for 10 to 15 additional sites within the next five years.

Representatives of ESG have expressed delight with the program but suggested that the VA's process for identifying projects has slightly retarded progress. Typically, the VA identifies potential projects for EUL using a criteria developed in-house. ESG suggested that energy service providers be given a freer hand to inspect and identify projects because they believe that their selection criteria is more inclusive and would result in the identification of more projects than are currently being flagged.

Apparently, the VA uses the energy that is produced by its EUL-based energy plants as credits against its energy reduction goals, which are mandated in EPACT 2005 and other internal directives.

VA representatives did not respond to the author's offers to review the contents of this section. ESG provided review and input on the portion of this section that was pertinent to its activities.

The US Army EUL Experience

The US Army maintains an active and robust EUL program that began in the middle 1990s. The Army's EUL website (<http://eul.army.mil/>) is chock-full of information including guidebooks and procedures, points of contact to provide help, a list of projects, frequently asked questions, and much more. More details about the Army's program can be found in Appendix C, a presentation that was found in the open literature and can be accessed on the internet.

There are many similarities between the Army and VA programs. First, they operate under basically the same enabling legislation and are both subject to OMB Circular A-11. However, there are two important differences.

First, while the VA is using EUL as one of the primary tools to accomplish its energy objectives, the Army program considers energy projects as just one of many types that can occur under the EUL umbrella and thus it is not emphasized.

Second, the Army has taken a very conservative approach to its compliance with Circular A-11 and the most substantial difference is that for energy systems it does not allow the energy purchase agreement to be incorporated with the EUL agreement. This is significant because it does not guarantee the private partner a sale of the energy that is produced by the generator located on the Army's leased property.

Typically the EUL deal does not exclude the possibility that the Army leasing facility might at some future time engage in an energy purchase agreement with the lessee. However, any energy purchase agreement must be completely separate from the EUL deal.

The exact reasons for this constraint are not clear, and even after repeated inquiries and numerous conversations with the Army's EUL representatives the explanation is not convincingly obvious. A reading of OMB Circular A-11, which is difficult due to its extensive detail and length, was also not useful because this specific subject is not addressed within it. One is forced to conclude, therefore, that the decision reached by OMB and the Army regarding the acceptable constructs for the EUL deal were made with consideration of other Army regulations coupled with applicable law and Circular A-11. The author was not able to obtain any written document explaining their rationale.

Nevertheless, the Army's EUL staff has worked closely with OMB to define its rules of operation and its EUL operational mantra is that it shall be "squeaky clean" and above reproach in all ways. Thus, the rules for EUL have been set and are closely followed by Army staff.

In sum, for any project involving energy production within the Army EUL program the onus is placed on the private party lessee to find a buyer for the energy that is produced by its generator. In these cases, the energy buyer is often the local utility that serves the base and the buy-back rates are frequently governed by local or state law, thus removing flexibility in negotiation. It also may render the deal less lucrative for both parties than it would have been if the lessee could sell its product directly to the Army. An unfortunate result is that the constraint could discourage EUL participants from engaging in energy projects on Army posts.

In spite of these restrictions, the Army has completed at least one EUL project that involves an energy generator. This co-generation project is at Fort Detrick, Maryland (<http://eul.army.mil/detrick/>). See Appendix D for additional information on this project (the presentation can be accessed by the public on the internet). Note that in slide 5 of this presentation it is specifically stated that Fort Detrick is a *potential* customer to purchase electricity, steam, or chilled water from the plant. However, it clearly states that the energy purchase agreement and the EUL deal involve “separate transactions.”

The exact disposition of the project at this time is unknown. Also unknown is whether Fort Detrick can credit any energy produced by the plant against its facility’s energy goals.

During the author’s investigation, Army EUL representatives provided much detailed information about their approach to EUL. However, they did not respond to requests to review the material contained in this section.

The Navy/Marine Corps EUL Experience

In August 2005, the author met with the USMC Energy Manager to discuss the potential for using EUL to promote energy projects within USMC facilities. The Marines had heard about the VA’s EUL program at the Energy 2004 meeting and they were interested in pursuing the concept for their bases.

After some discussion, they jointly identified Marine Corps Logistics Base Barstow (MCLB Barstow) in California as an attractive target for a renewable energy project under EUL. There were several reasons for this decision:

- The base had done few renewable energy projects but was interested in pursuing some.
- There was ample land available to lease.
- Based on the DOD Renewable Energy Assessment, the base was deemed to have good potential for cost-effective renewable energy projects.¹
- California provides many financial incentives for IEPs, which would make the project lucrative, with some of the benefits being passed onto the base in terms of discounted costs for the energy that is generated.
- The project could conceivably be quite large (e.g., 10 MW) and would help the base quickly meet its conventional energy goals.

The USMC Energy Manager and the author subsequently presented a proposal for an EUL energy project to the MCLB Barstow commanding staff. A copy of the presentation is provided in Appendix E. The presentation contained a plan based on the VA model in which an IEP would be sought under a competitive EUL solicitation to finance, install, and operate a renewable energy generator on site. The base would purchase the electrical energy from that generator at a price that was lower than they were paying to the local electric utility.

Sandia also produced and made available as handout materials a graphical summary of the various project financing mechanisms available to the DOD and their various attributes. A copy of this handout is presented in Appendix F.

Included in the presentation were the results of a detailed economic analysis for the project, assuming that a solar photovoltaic system were to be installed. The analysis used the same tool that was developed by Sandia for the DOD Renewable Energy Assessment and analyzed the potential from the point of view of the developer.

The tool, a verified Excel-based cash flow analysis methodology, incorporates all of the applicable federal, state, and local financial incentives that would be available to a successful lessee and produces two important summary metrics: (1) the debt coverage ratio and (2) the associated internal rate of return for the project.* The basic analysis methodology is based on that which is contained in FATE-2P, a comprehensive economic analysis program.²

The debt coverage ratio is important because it is a metric used by financial institutions to decide whether a project qualifies for a construction/operation loan including the accompanying interest rate.

The associated internal rate of return relates the potential return to the IEP. Effectively, this provides to the IEP a critical metric to assess the potential profitability of the project, the return on its equity investment.

An IEP would use such an analysis as the basis for deciding whether the proposed project at Barstow might be profitable, and thus whether to pursue a bid. The Sandia analysis showed a favorable profit potential for an IEP. Therefore, Sandia determined that the project idea was sound.

In sum, at this time all project indicators appeared to be positive. The VA had provided a working model, the base needed the project to meet its energy goals, and the economic analysis, performed from the point of view of an IEP, was favorable.

The MCLB commander's delegated authority approved the pursuit of the project and directed his staff to take appropriate action. In response, the MCLB Barstow staff contacted the Naval Facilities Engineering Command, Southwest (NAVFAC SW) for assistance.

The NAVFAC SW provides facilities engineering and acquisition support to Navy and Marine installations along the US west coast region and inland to the states of Nevada and New Mexico. This support includes projects in the following areas: Capital Improvements, Public Works, Environmental Base Development, Real Estate, and Contingency Engineering. If any EUL project were to occur at MCLB Barstow, it would be NAVFAC SW who would execute it.

The Sandia team supplied NAVFAC SW with all of the applicable material. NAVFAC SW responded that due to the Army's position relative to OMB Circular A-11 they believed that the project was potentially problematic from a legal point of view. The issue, it seems, was that they

* The economic model used by Sandia was developed in Excel format and was used to provide economic analysis that was the basis of the DOD Renewable Energy Assessment Project in which the economic potential for all solar technologies was estimated at all military bases in the United States. The model was verified for accuracy by comparing it to the Financial Analysis Tool for Electric Energy, developed by Princeton University and the National Renewable Energy Laboratory.

could not allow the energy purchase agreement to be included as part of the EUL deal, in spite of the fact that it is regularly done by the VA. No written analysis in this regard was produced by NAVFAC SW for review by the team.

The NAVFAC SW later provided an economic analysis of the proposed EUL project using its standard financial analysis software. The results are presented with the permission of NAVFAC SW in Appendices G1 through G3. This Navy analysis produces two metrics as the primary summary output. The first is the simple payback and the other is the savings-to-investment ratio. While these metrics are applicable to government-purchased capital equipment, they are essentially meaningless to an IEP who is concerned with the return on equity. Sandia and NAVFAC SW discussed these points, but no further analysis was produced. Sandia's previously supplied economic analysis was apparently not considered in the process.

NAVFAC SW organized a meeting at MCLB Barstow to discuss the project. They included by teleconference the Marine Corps Energy Manager and one of the Army's EUL coordinators. The author was also at the table.

Each party took its turn presenting information relative to EUL. The Army held the greatest sway because it had an active program, as noted above. But its self-imposed restriction that disconnects the energy purchase from the EUL deal effectively rendered the proposed Barstow project unfeasible. As was explained above, the author believes that this restriction places an inordinate amount of risk on the IEP and would effectively discourage any IEP bid.

From this point forward, the proposed EUL project slipped into hibernation with no individual group among the involved Navy organizations willing to challenge the NAVFAC SW position. The exact state of the Barstow EUL project is unknown, although NAVFAC SW has recently indicated that they are exploring renewable projects at MCLB Barstow under other mechanisms.

Recently, NAVFAC SW produced a document from its legal counsel regarding the legality of the originally proposed photovoltaic EUL project at MCLB Barstow. The analysis reportedly focused on OMB regulations relative to the inclusion of an energy purchase agreement within the EUL deal. While a copy of the report was not allowed to be included in this report, the essential conclusion was that they now believe it is uncertain how OMB regulations might apply. The reporting analyst indicated that the project's circumstances would be a determining factor in any ruling and therefore recommended that the Navy seek a final determination by requesting OMB's review of the specific details of the Barstow project.

To the best of the author's knowledge, neither the Navy nor Marine Corps has considered any other energy projects under EUL.

Representatives from NAVFAC SW have been generally responsive to the author's requests for information and provided review and comments on the material contained in this section.

The US Air Force EUL Experience

The author contacted Air Force officials at the Air Force Civil Engineering Support Agency (AFCESA) as part of this overall effort by Sandia. He had one conversation with two AFCESA representatives who were polite and appeared interested in pursuing an EUL-based energy project. However, there was no followup activity as was initially planned, and to the best of his knowledge no projects within the USAF have been conceived or pursued.

SUMMARY AND RECOMMENDATIONS

In FY 2006 the DOE FEMP funded Sandia to investigate EUL as a means to encourage third-party-financed renewable energy projects on military bases. The rationale for this work is that if more mechanisms can be identified to encourage third-party-financed projects, more renewable energy projects would be installed on DOD bases.

Sandia examined EUL activities within the four military services and the VA. Principal findings are summarized below:

- 1) The VA routinely uses EUL for energy projects and it is a critical part of their overall energy reduction strategy. They lease property to IEPs who in turn build, own, and operate energy plants using third-party financing. The IEPs sell the energy back to the VA at a discounted rate. The energy purchase agreement is embedded into the EUL deal. The VA has proven that EUL is an effective mechanism to meet their fossil energy reduction goals.
- 2) The Army operates a robust EUL program involving different types of projects, including energy ones. However, they do not allow energy purchase agreements within the leasing deal. This restriction increases perceived risk and discourages IEP interest. The Army has completed one energy project, but the details of the deal are unknown.
- 3) The USMC Energy Manager and the author proposed a solar photovoltaic project for MCLB Barstow, which was met with great enthusiasm at the base. However, the cognizant authority, NAVFAC SW, has not pursued it based on the Army precedent. However, among the military services, the Navy might be the one with the highest potential for near-term implementation of an EUL program that could benefit renewable technologies. The author's recent prodding of NAVFAC SW on the subject has spurred its renewed interest in this subject and fresh analysis from its legal counsel leaves open the possibility that an EUL deal based on the VA model for MCLB Barstow might still be possible
- 4) The Army has rested its policy regarding the structure of its EUL deal—specifically the disallowance of energy purchase agreements within—on rules within OMB Circular A-11. However, the author could obtain no written analysis or opinion from the Army relating to this policy. A detailed reading of the circular was inconclusive in helping to glean some understanding of the policy's rationale and basis.
- 5) The USAF showed no apparent interest in EUL for energy applications.

The author recommends that FEMP provide technical assistance to the Navy to enhance this possibility of developing an EUL-based energy project. The development of the Barstow project is the best one to pursue because much of the groundwork has already been completed. A success could spur many other projects and might encourage the Army to modify its restrictive policy and possibly pique interest within the Air Force.

The author also recommends that FEMP investigate further the exact rationale that the Army has used in deciding to separate the energy purchase agreement from the EUL deal. Only by understanding the exact basis for this policy is there any possibility of finding an acceptable alternative that would encourage more energy-related EUL projects.

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**APPENDIX A: Excerpt from Sandia National Laboratories’
Final Report to the Department of Defense Renewable Assessment
Project Greg Kolb and Bill Black, Sandia National Laboratories
Unpublished, December 2003**

Funding by the private sector could also use the traditional approach, like Energy Savings Performance Contracts (ESPCs) or United Energy Services Corporation (UESC). However, solar projects funded under this approach can suffer from contractor markups that can turn a marginally economic project into a project that is uneconomic. Sometimes this problem can be overcome by the use of “bundling” where non-viable projects are combined with enough viable projects to make the entire bundle economic. In addition, the ESPC/UESC approach leads to the less desirable result of military ownership. To avoid military ownership and to reduce the cost of solar, Sandia believe that solar systems could be owned, operated, and maintained by an Independent Energy Provider (IEP) and that solar energy could be sold to military base via an energy purchase agreement. However, this approach would only be of interest to IEPs if the number of solar projects achieves the “critical mass” necessary to make the business case compelling. Given critical mass, the IEP would seek funds from equity investors and banks. The IEP would develop a project “pro forma” to convince equity and the bank of the project’s viability. To support the proposed IEP approach, this study has developed preliminary project pro formas that a private developer can review/modify before approaching equity investors and banks.

Achieving a “critical mass” of solar projects is another matter. In order for this to happen, DOD must commit to purchasing energy from many, perhaps hundreds, of solar projects over a several-year period. For example, a photovoltaic (PV) developer has suggested that projects worth \$20 million per year (for 5 years) would be required before his equity investors/banks would pursue an IEP. This is equivalent to 3 MW of PV per year. If DOD is unwilling to commit to these levels, an alternative would be to join forces with other organizations that also want to purchase solar. For example, the California Power Authority (CPA) is launching a program that will allow IEPs to install and sell PV power to state government facilities. The CPA program has identified tens of MW of project opportunities.

This assessment is expected to test the assumption that DOD’s potential for large-quantity purchases will result in significant price discounts. Lower prices translate into multiple savings streams, beginning with a lower first cost, but also including lower borrowing costs for borrowed capital. This is a critical assumption that was tested through interviews with solar equipment suppliers and solar industry experts. The conclusion was that a single large purchase may not have the expected effect. It is possible a massive purchase would, in fact, temporarily increase prices by creating scarcity. Instead, the industry recommended significant but sustained purchases over many years. This would be especially important for the PV industry, which depends on economies of scale similar to the computer chip industry. The computer chip industry has grown because increases in demand result in new production facilities that are more efficient and result in permanent price reductions. Thus, to achieve cost reductions, DOD should install solar projects at a moderate rate over a several-year period, rather than a very large build during a short timeframe. Another advantage of a sustained program is the ability to capture a

larger fraction of available financial incentives. For example, PV projects in California can obtain a 50% capital-cost rebate for systems ≤ 1 MW. If a particular military base wants to install 3 MW, then three 1-MW blocks should be installed over several years to capture the rebate for each block.

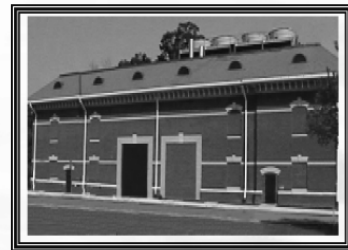
If DOD concludes that the best way forward is to purchase solar energy from IEPs through a sustained program, they should hold a workshop to discuss the issues and potential barriers associated with implementation of such a program. Invitees should include key DOD energy and funding managers, solar project suppliers and developers, as well as potential partners (like the CPA or other government agencies) who can help define the needed critical mass of projects. Before the workshop, this report should be distributed to the invitees to solicit comments. The comments will help define a detailed agenda for the workshop.

APPENDIX B1: Understanding Enhanced-Use Lease



Understanding Enhanced-Use Leasing A Case Study at the James H. Quillen VA Medical Center, Mountain Home

- ***E-UL – The Process***
- ***CHP (or co-gen) – The Result***
- ***Financing/Ownership Options***
- ***Mountain Home Case Study***
- ***Lessons Learned***



Integration of E-UL and CHP

- **Criteria for Successful E-UL Projects**
 - Age of existing energy infrastructure
 - Current energy costs, etc.
 - Extent of non-VA energy purchaser(s)
- **Agency-Specific Potential to use both**
- **FEMP's and National Labs' roles and assistance**

ESG Background

- **Wholly owned subsidiary of Vectren Corp. and Citizens Gas and Coke Utility**
 - Solid financial backing
- **High performance team of professionals**
 - Over 200 years experience in Performance Contracting
- **Over 80 ESPC Clients since 1994 start-up (over \$50 million annual revenues)**
- **National Awards for three Projects**
 - American Consulting Engineers Council 1997
 - Vice President's Hammer Award 2000
 - VA Scissors Award 2000
 - Energy User News "Best Medical Facility Award" 2001
- **DOE BIOMASS Super ESPC Awardee**

ESG Operations



Enhanced Use Lease -Innovative Legislation



- ***Title 38 USC 8161, et seq. and Millennium Healthcare Act***
- ***Authority is unique to VA (DOD has 10 USC 2667)***
- ***Authorizes a means to leverage underutilized assets into needed facilities, services, or revenue thru E-U leases***

Enhanced-Use Leasing Authority

- ESG/VA first public/private energy partnership via E-U leasing authority (38 USC 8161 et seq.)
- DOD also has authority in place (10 USC 2667)
- GSA has an E-UL bill pending in Congress
- DOE studying potential for integration of E-UL/CHP as part of their existing/future programs

How Does Enhanced-Use Leasing Work?

- ***A cooperative arrangement with state or local government, or with the private sector***
- ***Based on a long-term outlease (up to 75 years) of underutilized assets***
- ***Can include both VA and non-VA uses***
- ***In lieu of cash, VA can receive facilities, services, space and/or revenue as consideration***
- ***Benefits stay with local activity***



Veterans Health Administration's Capital Assets

- **Land rich and cash poor!**
 - 172 VA Medical Centers
 - 527 Ambulatory Care Clinics
 - 131 Skilled Nursing Facilities
 - 40 Domiciliaries (independent living facilities)
 - 75 Laundry Facilities
 - Serving 3.9 million veterans
- **Construction budgets have dropped from \$700M yearly to \$50M - \$100M yearly.**
- **With changing healthcare business, capital asset plans must be driven by veterans' healthcare priorities.**
- **VA must look to its capital assets as a means to provide benefits to veterans & VA programs.**

Accomplishing VA's Energy Goals Through E-UL

- ***Reduce VA's capital & operational costs.***
- ***Reduce energy consumption per Exec Order 13123.***
- ***Secure a reliable source of energy - with no long-term commitment - no penalties - maximum flexibility.***
- ***Improve customer service through energy upgrades.***
- ***Reinvest savings into better care for veterans.***
- ***Maximize the use of & return on VA's underutilized capital assets.***

Enhanced-Use Leasing Opportunities

- Child Development Centers
- Office Collocations
- Medical Center consolidations
- Parking Garages
- Temporary lodging, Nursing Homes/Assisted Living
- Energy Facilities/Production (Mt. Home, Chicago)
- Renovation of an American Memorial - Pershing Hall - in Paris, France



Enhanced-Use Leasing Development and Financing Goals/Strategies

- Solicited interest and proposals through an industry forum and a national RFP process (1997).
- Conducted oral presentations and obtained financial proposals from each development team (1998).
- Development mechanism: 35-year lease through VA's unique *Enhanced-Use* authority (38 USC 8161 et seq).
- Developer/lessee issued taxable, industrial revenue bonds through the local Industrial Development Board.

Financial Solution

- **24-year privatized energy services agreement.**
 - **2-year purchase agreements meet “no long-term commitment” requirement.**
 - **Operational savings exceed \$16 million.**
 - **No capital budgeting requirements.**
- Ownership solution protects VA from ESCO default.**

The Department of Veterans Affairs

...in partnership with...

Energy Systems Group
*at the James H. Quillen VA Medical
Center, Mountain Home, TN*



What was Mt. Home's Contribution?

- 35-year leasehold interest in 2 acres of land and facilities valued at \$300,000.
- A commitment to purchase energy from the Developer/Operator contingent upon annual appropriations and continued operation of the VAMC.
- Commitment to Purchase: Based on two-year, renewable contracts. Termination must be within first six months of any two-year term (structure complies with OMB requirements).

What was Mt. Home's Contribution?

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What Does Mt. Home Receive?

- Reduced cost energy and services, and a share in revenue from non-VA energy sales. Total savings and revenue = \$5-\$15 million over the term.
- Cost avoidance in capital budgeting of over \$35 million.
- Reduction of 25%-30% in energy usage/compliance with Executive Order 13123.
- Reliable source of energy, with 100% back-up at minimal risk to VA.
- Energy upgrades - at no capital cost - to improve facility environments for all VA customers.

Enhanced-Use Lease Energy Development/Operation

- November 1997 – RFP out to Prospective Developers
- February 1998 – Proposals Accepted
- July 1998 – Developer Selected
- September 1998 – Developer completed “Due Diligence”
- May 1999 – Final Scope of Work Negotiated
- December 1999 – Financial Closing
- June 2001 – Operation Commencement

Proforma Development

- **RFP Contained Basic Utility Data**
- **Due Diligence**
 - **Selected Developer only**
 - **Confirmed RFP Information**
 - **Gathered Additional cost Information as necessary**
- **Team Consensus and Documentation Keys to Success**

Proforma Development

- **Other Standard Values**
 - **Acceleration Rate**
 - **Discount Rate**
 - **NPV or Total Cashflow**
- **Approval Process**
 - **OMB**
 - **CIB**

Proforma Development

- **Potential Headaches**
 - **Electrical Standby Charges?**
 - **Replacing Existing Staff?**
 - **Team Involvement**
 - **Documentation**

Enhanced-Use Lease Energy Development/Operation

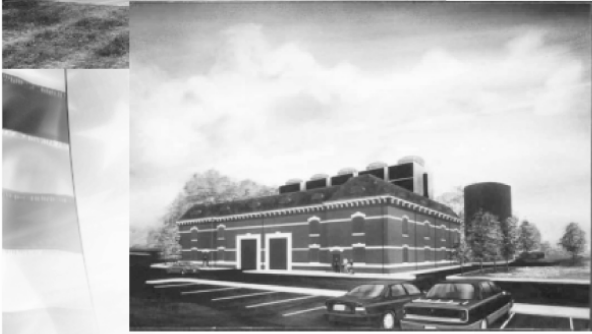
- Developer financed, designed, built, and is operating a \$20 million, co-generation energy center on the VA campus.
- Developer will undertake \$5 M in energy upgrades throughout VA and Medical School buildings.
- Over \$35 M in capital cost avoidance, \$5 M-\$10 M in savings, \$5 M in revenues and 20% reduction in energy consumption.

Chilled Water Storage System



- **A Primary Design Challenge**

- Installed for Peak Shaving
- Leveled Electrical loads
- Sized to meet campus needs
- Met Historical Board Restrictions



Summary of E-UL Energy Privatization

James H. Quillen VA Medical Center, Mt. Home, TN

- ESG financed, design-built, and is operating a \$20 million, CHP energy center on the VA campus (*E-UL Component*).
- ESG completed \$5 M in energy upgrades throughout VA and Medical School buildings (*ESPC-like Component*).
- Over \$35 M in capital cost avoidance, \$16 M in savings, \$5 M in revenues and 20% reduction in energy consumption (*Privatization- O&M cost savings, revenue*).

Case Study: Lessons Learned

James H. Quillen VA Medical Center, Mt. Home, TN

- *Project success required “commitment” and a solid partnership between VA and ESG.*
- *Always have a third party confirm baseline info.*
- *Non-federal energy purchasers improve financing terms and bring revenue to Feds.*
- *Recent “performance review” of ESG project indicates that actual savings exceed predictions by ESG.*

The Concept Does Work!

- **VA Chose E-UL concept as its model**
 - Mountain Home a strong success Model for VA
 - VA has asked ESG to duplicate its success at the North Chicago VAMC
- **E-UL/CHP: The Next Generation of Energy Enhancements for Federal Facilities**
 - Offers the best facets of Lease concepts
 - Includes standard ESPC methodologies
 - Provides a long term solution to difficult infrastructure issues
 - Available to all Federal Facilities through existing authorities for DoD, DOE, VA, etc.

APPENDIX B2: VA Enhanced-Use Leasing in Practice



The Solutions Network

Rochester, New York

VA Enhanced-Use Leasing in Practice

Edward (Ed) L. Bradley III
Energy Program Manager
Department of Veterans Affairs
Edward.Bradley@mail.VA.gov

August 9, 2004

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VA Enhanced-Use Leasing



- Contents

- What is Enhanced-Use leasing?
- VA's Past Experience
 - Mountain Home, TN
 - North Chicago, IL
 - Chicago Westside, IL
- Lessons Learned
- What's Next?

www.energy2004.ee.doe.gov

2

VA Enhanced-Use Leasing



- What is Enhanced-Use leasing (EUL)?
 - EUL permits VA to invest underutilized VA land, buildings and other resources to improve services, provide needed facilities or generate new revenues
 - Opportunities structured to minimize risk, limit obligations and maximize value of VA capital assets

VA Enhanced-Use Leasing



- How does EUL work?
 - VA makes cooperative arrangements with public or private partner
 - VA executes long term out-lease of land and / or buildings (up to 75 years)
 - In return, VA:
 - Obtains services, facilities, revenue or other in-kind considerations
 - Converts under-performing capital assets into productive assets

VA Enhanced-Use Leasing



• Enhanced-Use Lease Project Process

Project-specific Concept Plan to secure internal approval

Public Hearing to assure input from veterans and the community

Selection process ensures procurement integrity through full and opened competition

"Significant" projects require U.S. Office of Management and Budget (OMB) review

Congressional Notification

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VA Enhanced-Use Leasing



• Original Financing Parameters

– Owner trust structure

- Selected developer forms Owner Trust (single purpose entity)
 - VA sole beneficiary
- Lease and energy services agreement between VA and the Owner Trust
- Development and management agreements between developer/operator and Owner Trust

– Owner Trust holds title to improvements to end of lease term

- End of lease term; improvements revert to VA

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VA Enhanced-Use Leasing



- Mountain Home Energy Center



- Located in Johnson City, TN
- First VA co-generation facility procured via EUL
- Online June 2001
- **Reason for EUL:** Replace aging outdated energy plant and reduce energy costs

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VA Enhanced-Use Leasing



- Mountain Home Energy Center

- VA Contributed
 - 35-year outlease of 2 acres of property valued at \$300,000
- The Deal
 - Developer/Operator to construct, operate and maintain state-of-the-art energy center
 - Developer to accomplish \$3.0 M of energy conservation measures throughout the campus
 - VA Commitment to buy electric and thermal energy via automatic renewable 2-year energy service agreements, contingent upon
 - Annual appropriations
 - Continued operation of VA medical center (VAMC)

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VA Enhanced-Use Leasing



- Mountain Home Energy Center (cont'd)
 - Benefits to VA
 - Reduced energy consumption and costs
 - \$11.6 M NPV non-recurring cost savings
 - » First 25 years-2004 dollars
 - \$27.3 M in discounted life-cycle costs
 - » First 25 years - 2004 dollars
 - Capital cost avoidance
 - \$25.0M
 - Reliable energy - with 100% backup
 - Projected Revenue
 - \$1 M from non-VA energy sales

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VA Enhanced-Use Leasing



- North Chicago Energy Center



- Located in North Chicago, IL
- Phase I - online October 2003
- Phase II - projected online February 2005
- **Reason for EUL:** Reduce energy costs and eliminate dependence on others' thermal resources

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VA Enhanced-Use Leasing



- North Chicago Energy Center
 - VA Contributed
 - 35-year outlease of 1 acre of property valued at \$100,000
 - The Deal
 - Developer/Operator to construct, operate and maintain state-of-the-art energy center
 - VA Commitment to buy electric and thermal energy via 2-year energy service agreements, contingent upon
 - Annual appropriations
 - Continued operation of VAMC
 - Renewal contingencies

VA Enhanced-Use Leasing



- North Chicago Energy Center (cont'd)
 - Benefits to VA and other federal departments
 - Reduced energy consumption and costs to VA
 - \$44.2 M in discounted non-recurring costs
 - » First 25 years - 2004 dollars
 - Capital cost avoidance to VA
 - \$25.0M
 - Reliable energy - with 100% backup
 - Provides electric and thermal to new Navy barracks complex located on VA land
 - Projected Revenue
 - \$5 M from energy sales to non-Federal customers

VA Enhanced-Use Leasing



- Chicago Westside Energy Center



- Located in Chicago, IL
- Online November 2003
- **Reason for EUL:** Reduce energy costs and eliminate dependence on other thermal resources

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VA Enhanced-Use Leasing



- Chicago Westside Energy Center

- VA Contributed
 - 35-year outlease of 1 acre of property and existing facility valued at \$200,000
- The Deal
 - Developer/Operator to construct, operate and maintain state-of-the-art energy center
 - VA Commitment to buy electric and thermal energy via 2-year energy service agreements, contingent upon
 - Annual appropriations
 - Continued operation of VAMC
 - Renewal contingencies

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VA Enhanced-Use Leasing



- Chicago Westside Energy Center (cont'd)
 - Benefits to VA
 - Reduced energy consumption and costs to VA
 - \$32.7 M in discounted non-recurring costs
 - » First 25 years - 2004 dollars
 - Capital cost avoidance to VA
 - \$12.5M
 - Reliable energy - with 100% backup

VA Enhanced-Use Leasing



- Lessons Learned
 - Need to incorporate mechanism to ensure developer has an incentive to purchase commodities as economically as possible
 - Impose performance measures for developer/operator
 - Include language delineating responsibilities of developer for operating plant at maximum efficiency
 - Need to allow additional energy conservation measures to be implemented easily

VA Enhanced-Use Leasing



- **Lessons Learned (cont'd)**
 - Increase incentives and requirement for private third party sales
 - Developer to be responsible for conducting due diligence covering:
 - Regulatory requirements (e.g., interconnection, sales to grid and/or third parties, state public utility requirements)
 - Environmental permitting and emissions
 - Other state and local siting and permitting requirements

Enhanced-Use Leasing



- **What's Next - New Parameters**
 - Trust arrangement previously employed no longer feasible
 - OMB views original trust structure arrangement as not in compliance with current A-11 requirements
 - Per OMB A-11, public-private venture must now feature a non-Federal partner who:
 - Has a majority ownership share of the partnership and its revenues
 - Contributes at least 20% of the total value of the assets owned by the partnership
 - LLC structure a potential alternative
 - Proposed - VA interest to be minority, non-economic

VA Enhanced-Use Leasing



- **What's Next**

- VISN 4 Energy Co-Generation Centers
 - Pittsburgh, PA* (University Dr. and Heinz)
 - Coatesville, PA
 - Philadelphia, PA
 - Wilkes Barre, PA
- Feasibility studies - completed
- Financing - Pooled
- RFP Issuance - Soon

** Two Medical Centers in Pittsburgh*

VA Enhanced-Use Leasing



- **VA Contacts**

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Ben Corb
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"CJ" Cordova
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QUESTIONS?

APPENDIX C: Enhanced-Use Leasing – A Good Deal for Everyone



ENHANCED USE LEASING A GOOD DEAL FOR EVERYONE



Enhanced Use Leasing

TODAY'S OBJECTIVES

- Objective #1 Familiarize participants with property leasing theory and applicable regulatory guidance
- Objective #2 Participants gain experience by reviewing ongoing actions and lessons learned
- Objective #3 Familiarize participants with the EUL process



Enhanced Use Leasing

POLICY STATEMENT

Garrison Commanders should choose Enhanced Use Leasing (EUL) over the status quo for modernizing non-excess facilities. EUL is an important tool for leasing available non-excess real property for cash or in-kind consideration.



Enhanced Use Leasing

AUTHORITY - TITLE 10 USC 2667

- 2001 National Defense Authorization Act enhanced this out-leasing authority
- Military services may now out-lease available non-excess real property and receive cash back and/or “In-kind consideration” equal to no less than the Fair Market Value of the property
- Cash payments to be divided 50/50 between garrison and Army
- Garrison retains 100% of all in-kind consideration



Enhanced Use Leasing

REGULATORY GUIDANCE

- Title 10 USC 2667
- Title 16 USC 470h
- AR 405-80 Management of Title and Granting Use of Real Property
- AR 405-90 Disposal of Real Estate
- EUL Handbook



Enhanced Use Leasing

INTRODUCTION

- Every garrison seems to have a shortfall for funding
- EUL provides a tool for installations to make up some of the shortfall
- EUL has minimal pitfalls and requires modest initial investment by the garrison
- Garrison realizes special dividends from historic property



EXPERIENCE TO DATE



EXECUTED LEASES

- Fort Sam Houston
- Fort Leonard Wood
- Walter Reed Army Medical Center



DEVELOPER SELECTED

- Fort Bliss
- Picatinny Army Arsenal
- Fort Monmouth (2)
- Walter Reed Army Medical Center
- Aberdeen Proving Ground
- Fort Detrick

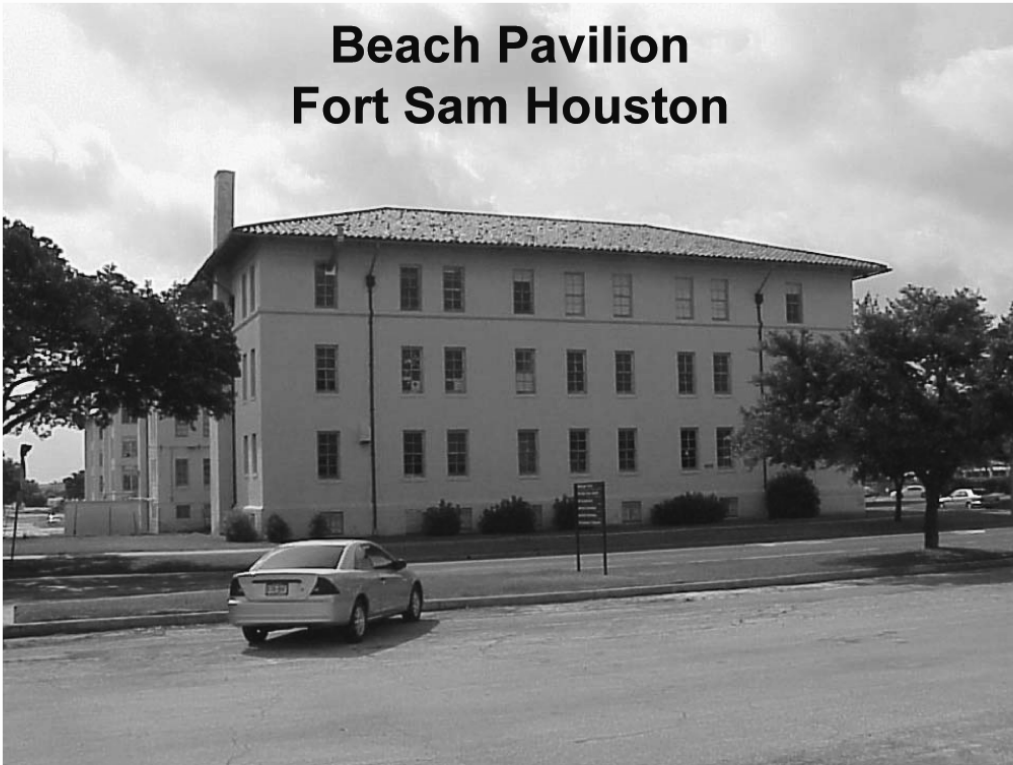
IN THE QUEUE

- Fort Meade, Fort Campbell,
Aberdeen Proving Ground, Fort Belvoir

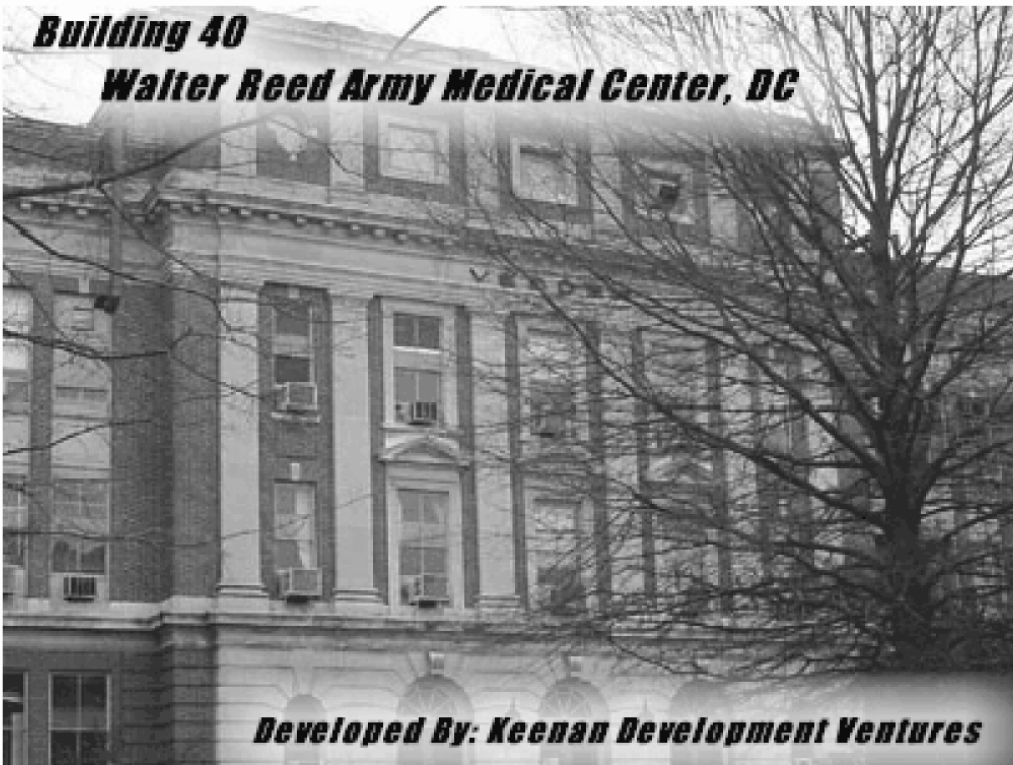
Brooke Army Medical Center (BAMC)



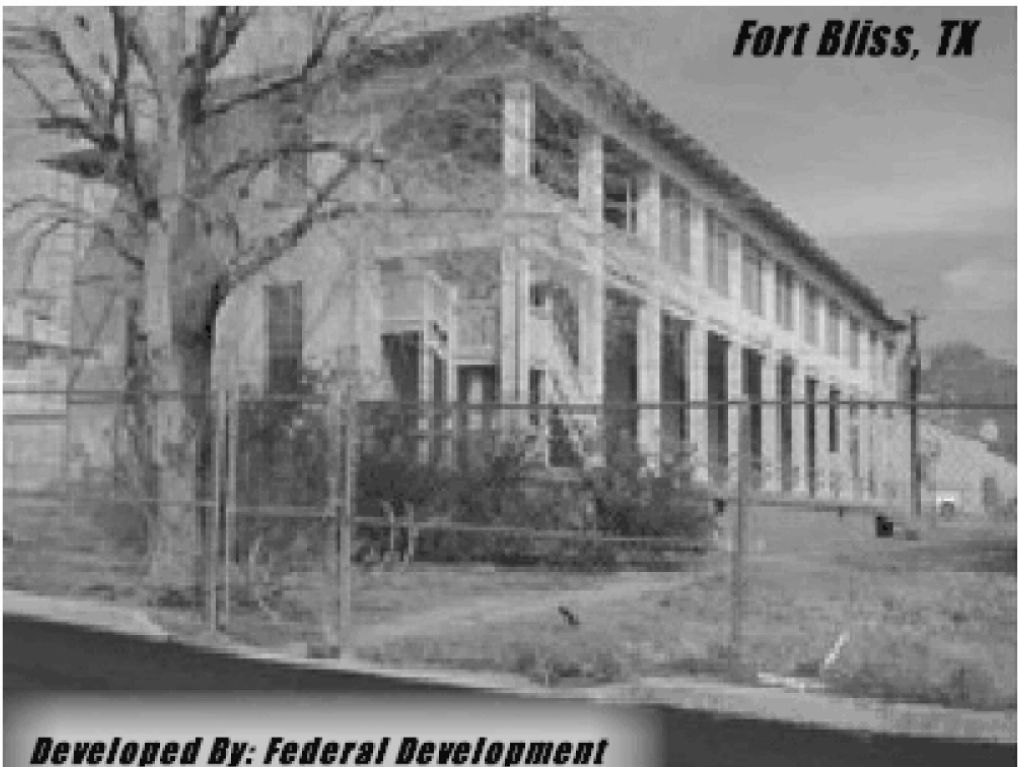
**Beach Pavilion
Fort Sam Houston**



***Building 40
Walter Reed Army Medical Center, DC***



Developed By: Keenan Development Ventures



Open Land Fort Bliss



***Barker Circle
Fort Monmouth, NJ***



Developed By: Weston Solutions



Enhanced Use Leasing

DISCUSSION 1 OF 2

- Non-excess real property
- Research indicates demand
- Cash or In-kind consideration
- Everybody wins





Enhanced Use Leasing

DISCUSSION 2 OF 2

RESOURCES AVAILABLE

- Office of Assistant Chief of Staff Installation Management
- Local District Engineers (Baltimore & Fort Worth)



Enhanced Use Leasing

GARRISON INCENTIVES 1 OF 2

- Training is available
- Support Is available to prepare
 - Feasibility studies
 - Environmental Baseline Surveys (EBS)
 - Reports of Availability (ROA)
 - NEPA documentation
 - Notice of lease (RFP/RFQ) Development



Enhanced Use Leasing

GARRISON INCENTIVES 2 OF 2

- Avoids high maintenance costs relative to the market for similar buildings
- A need to modernize facilities
- Unleashes captive value from property
- Provides in-kind funding source for needed and un-funded capital improvements
- Federal requirements



ARMY HISTORIC PROPERTY

- The Army has approximately 14,000 properties that are listed or eligible for listing on the National Register of Historic Places
- Over the next 30 years, another 50,000 Army buildings will be potentially eligible for listing
- Federal law requires the Army to preserve and maintain its historic properties, often at considerable cost



PRIVATE SECTOR INCENTIVES 1 OF 3

- Money
- A secure environment
- Potential tax credits
- Stature in the community
- Patriotic pride





Enhanced Use Leasing

PRIVATE SECTOR INCENTIVES 2 OF 3

- Developer captures market rates of return on design, construction, maintenance, leasing out to tenants, and property management activities
- Long-Term Relationship: Ground lease for assets could be for up to 50 years
- Sound Business Relationship with Federal government / Army



Enhanced Use Leasing

PRIVATE SECTOR INCENTIVES 3 OF 3

- Approach is to minimize time and effort of bringing a development entity on board to perform work
- EUL is still in its early development stages and many more projects are anticipated across the country



Enhanced Use Leasing

ISSUES



- Up front money
- Can't write off failures
- Shortage of expertise
- Building standards
- Scoring



Enhanced Use Leasing

SCORING 1 OF 2

OK

- Can provide prime lease underused real property to developer (can be 50 yrs)
- Must transfer ownership risks and costs to developer

NOT OK

- Cannot link prime lease to federal leaseback of space
- Cannot provide federal guarantee of developer financing



Enhanced Use Leasing

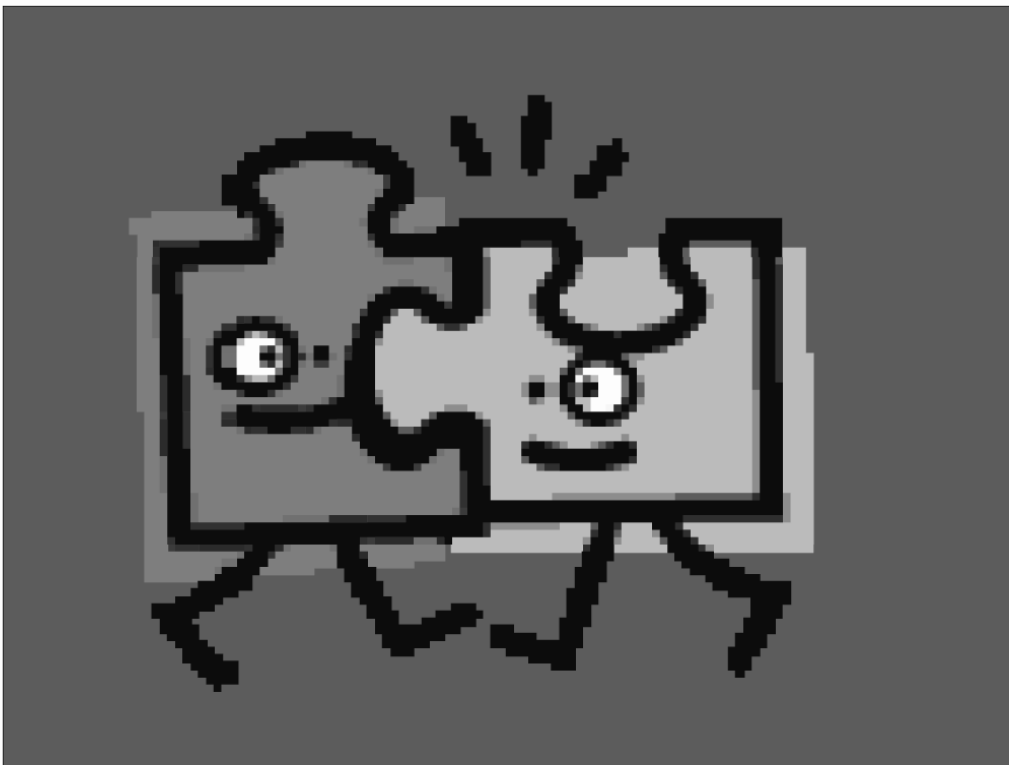
SCORING 2 OF 2

OK

- Prime lease “in-kind rent” can include provision of services or office space
- Space secured through competition under “operating lease” guidelines

NOT OK


- Variable/contingent rent on prime lease could trigger capital lease on lease back
- Cannot link decision-making on space lease and contingent prime lease rent






Enhanced Use Leasing

OACSIM HOME PAGE



Welcome
 ASSISTANT CHIEF OF STAFF
 FOR INSTALLATION MANAGEMENT
The Army Proponent for Installations



Organizational Links

- ACSIM Structure
- Army Environmental
- Army Reserve Division
- BRAC
- CFSC
- Competitive Sourcing
- ODEP
- Facilities and Housing
- IMA
- Plans and Operations
- Resource Integration

Topic Index

Last Update: 07 November 2003

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A Click on letter to return to top

- [ACSIM Action Officer's Orientation](#)
- [Active Army Base List FY 02](#)
- [Activity-Based Costing](#)
- [Army Performance Improvement Criteria \(APIC\) Course](#)
- [Army Baseline Services Task Force Files](#)
- [AR 405-45, Real Property Inventory Management](#)
- [Army Barracks Master Plan EV 03](#)



Enhanced Use Leasing

HISTORIC PROPERTY PAGE



[home](#) | [ASA\(I&E\) privatization & partnerships](#) | [contact info](#)

- ABOUT
- FAQ
- REFERENCE MATERIALS
- ENVIRONMENTAL
- PHOTOS
- RELATED LINKS
- CONTACT INFO
- WHATS NEW
- CURRENT ACTIVITIES →



Historic Properties

FORT MONROE
FORT BLISS



Enhanced Use Leasing

Kudos to the Walter Reed Army Medical Center EUL team for winning top honors from the National Association of Installation Developer's. The team received the Special Purpose Marketing award for their brochure. They also won the Excellence in Military Privatization for the two enhanced use lease projects at Walter Reed Army Medical Center. See What's New for detailed information.

WELCOME TO THE OFFICIAL ARMY WEB SITE
FOR ENHANCED USE LEASE (EUL)
Contacts for EUL are:

Corps of Engineers
Baltimore District:
Janet Kriner, (410) 962-4912,
email:
Thomas Kretzschmar, (410) 962-5602,
email:
Bob Penn, (410) 962-3000,
email:
Fort Worth District:
Rocky Lee, (817) 886-1023,
email:
Department of the Army:
ASA-I&E Office:
William Birney,
703-695-0867
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ACSIM:
Erich Kurre, (703) 602-5745,
email:

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U.S. Army Corps of Engineers

Last updated on October 12, 2004



Enhanced Use Leasing

APPROACH



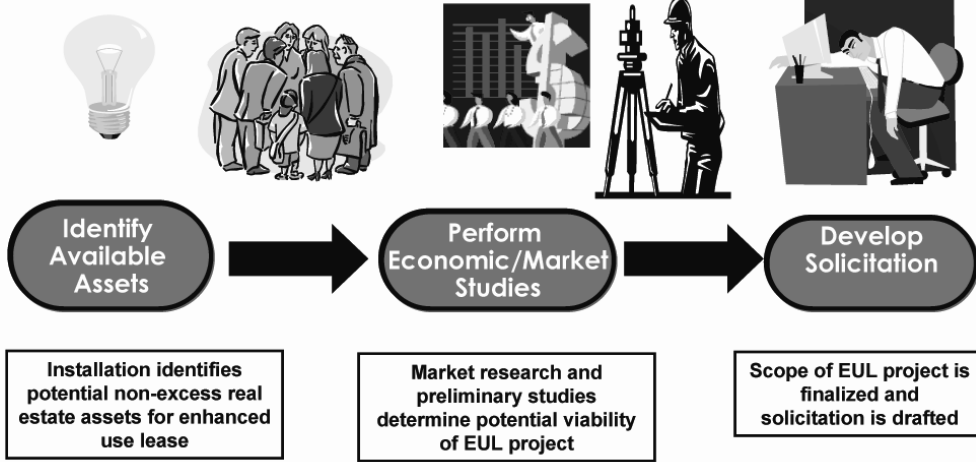
- Bottoms Up
- Garrison / Installation
- Region
- Installation Management Agency (IMA)
- Office Assistant Chief of Staff for Installation Management
- Deputy Assistant Secretary Army (Installations and Housing)
- Congressional Notification



Enhanced Use Leasing

ARMY EUL PROCESS

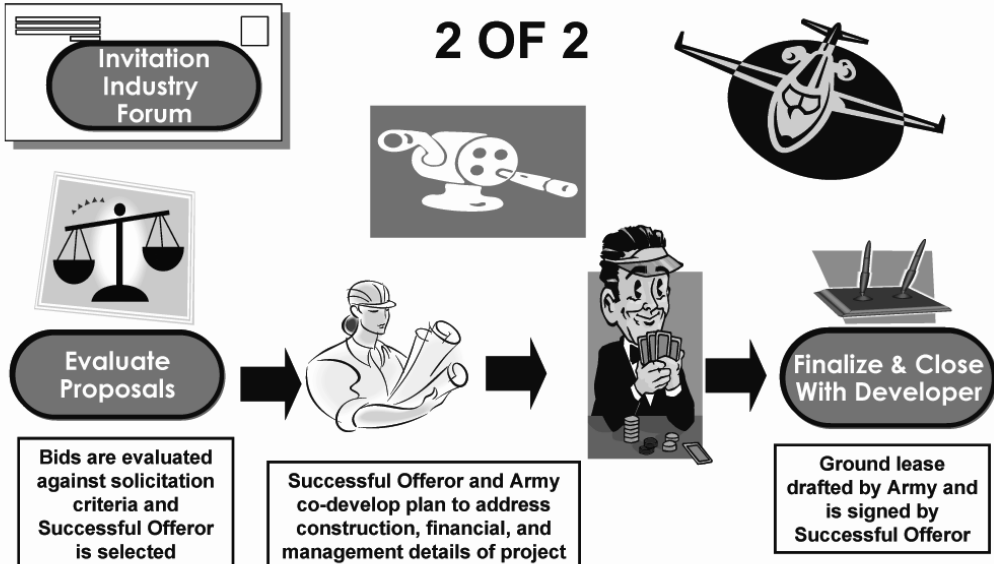
1 OF 2



Enhanced Use Leasing

ARMY EUL PROCESS

2 OF 2





TYPICAL ARMY EUL WORKING GROUP

OACSIM ACTION OFFICER
ERICH KURRE

USACE DISTRICT
BOB PENN

IMA ACTION OFFICER

GARRISON REAL ESTATE
OR ACTION OFFICER



REGION ACTION OFFICER

OTHERS MAY INCLUDE
GARRISON MASTER PLANNER,
ENVIRONMENTAL CONSERVATION OFFICER,
FORCE PROTECTION OFFICER



CONTACT INFORMATION

Office Assistant Chief
of Staff for Installation
Management

Baltimore District
United States Army
Corps of Engineers

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army.mil

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Bob.Penn@nab02.
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APPENDIX D: Concept Overview – Cogeneration Utility Plant Enhanced-Use Leasing Industry Forum

Concept Overview:

Cogeneration Utility Plant

Enhanced Use Leasing

Industry Forum



Larry Potter

Directorate of Installation Services

February 14, 2005

Overarching Goals:

- Fort Detrick receives consideration equal to the FMV of the ground lease
- Developer receives reasonable profit
- Long-term, mutually beneficial relationship established
- Fort Detrick tenants receive utilities at the best price



February 14th, 2005

Site Description

- Proposed Location
 - In proximity to major population centers
 - Located near the Southeast boundary of the NIBC, North side of Porter Street
 - 10+/- acres of relatively flat, undeveloped land
 - Accessible through Opossum Town gate
- Infrastructure
 - 34.5 kv lines and electric substation nearby
 - 10" gas main with 4.8 mcf of capacity nearby
 - Electric distribution system is owned by Fort Detrick



February 14th, 2005

Notional Concept

- Ground lease for up to 50-years
- Developer provides consideration to Fort Detrick equal to the FMV of ground lease
- Developer constructs, finances, operates and maintains power plant
- Developer identifies the market & secures the customers



February 14th, 2005

Notional Concept (continued)

- Possibilities and Options
 - Fort Detrick tenants are potential customers for electricity, steam & chilled water
 - The distribution system(s) could be included in the deal
- Caveat
 - The ground lease and any potential contract for electricity, steam or chilled water must be separate transactions
 - Ground lease should not be contingent upon a utilities provision contract
- Developer creativity is encouraged



February 14th, 2005

Utilities-Related Facts

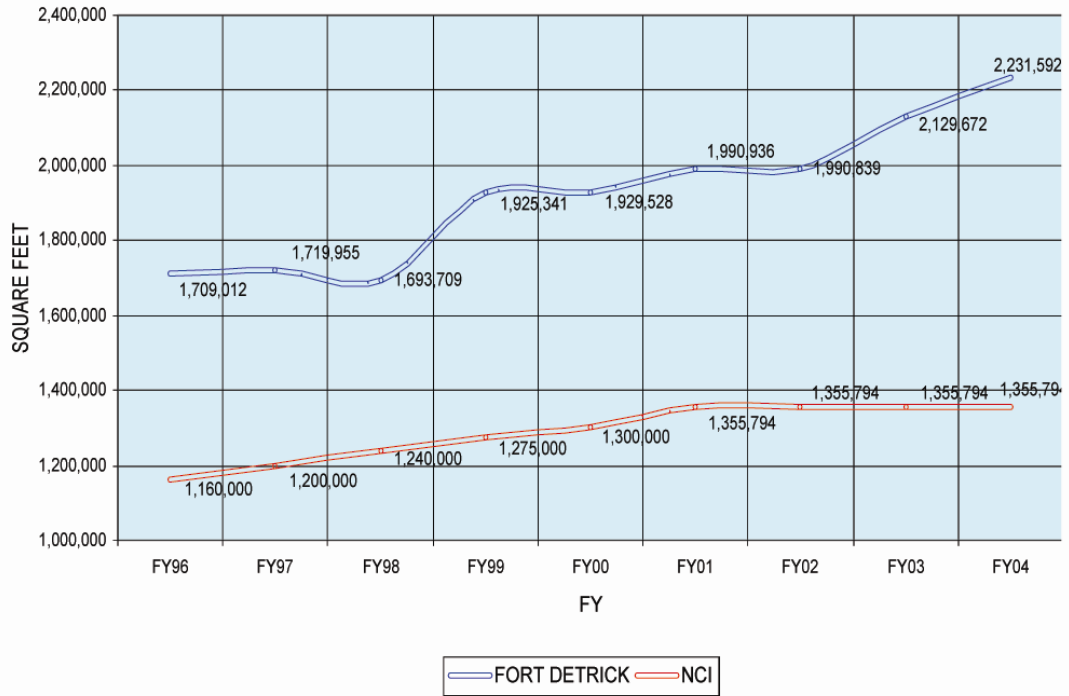
- Fort Detrick 2.2 million SF and NCI has 1.4 million SF of utilities consuming space
- Electricity consumption has been slowly increasing
- Steam production has been increasing
- Electrical demand is projected to increase



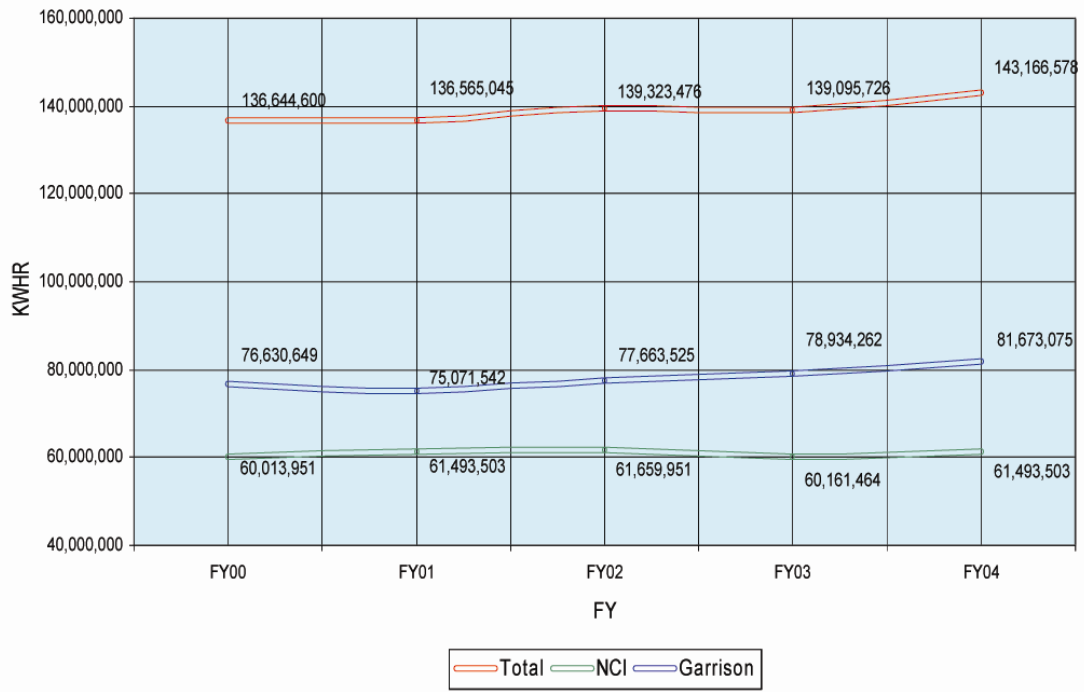
February 14th, 2005



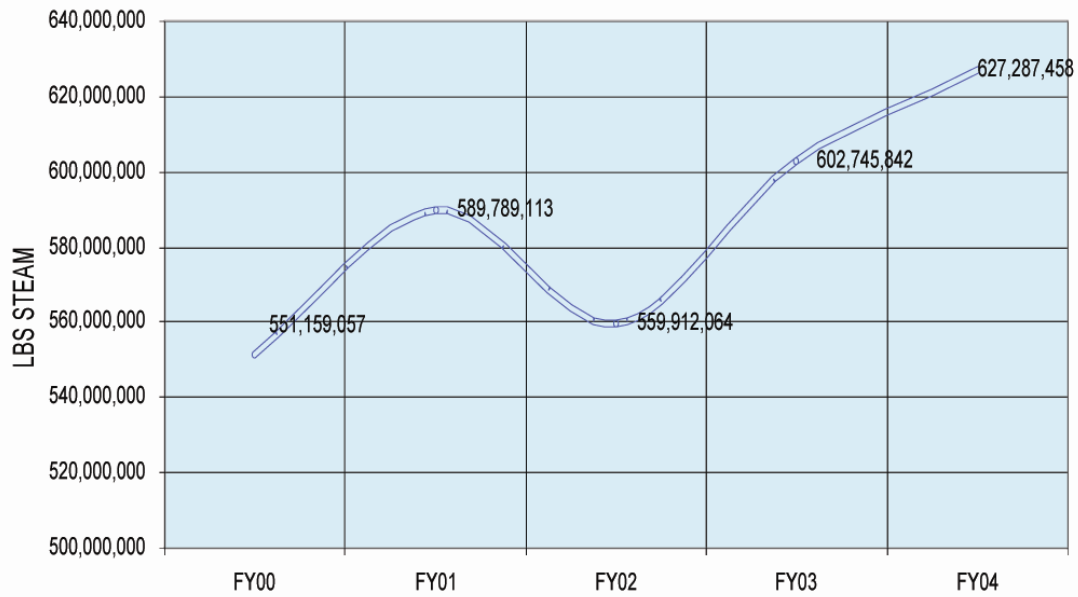
FORT DETRICK AND NCI BUILDING AREA



ELECTRICAL CONSUMPTION

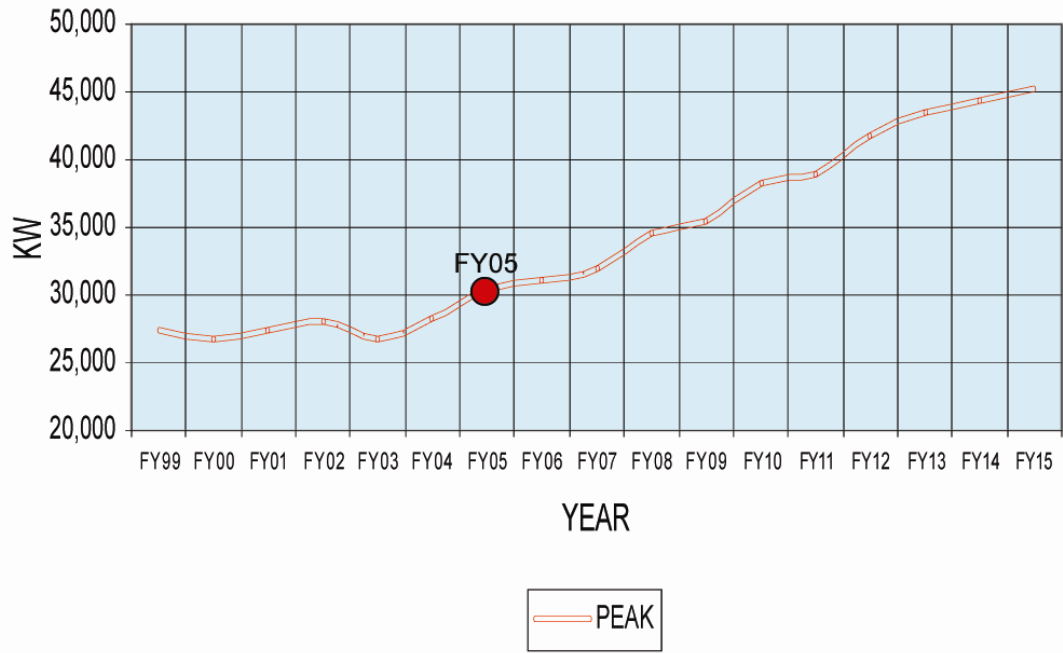


STEAM PRODUCTION




Existing Steam Plant has 393klbs/hr capacity FY

PROJECTED ELECTRICAL DEMAND



**APPENDIX E: Proposal to Develop an Enhanced-Use
Lease Energy Project at MLB/Barstow**

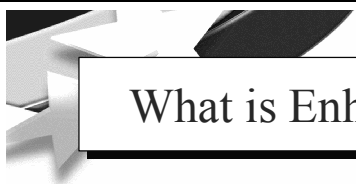



**PROPOSAL TO DEVELOP AN
ENHANCED-USE LEASE ENERGY
PROJECT AT MLB/BARSTOW**

Carl Zeigler
HQ/USMQ


and

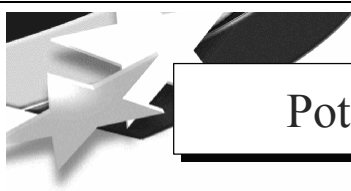
Dave Menicucci
Energy Surety Program Office
Sandia National Laboratories



What is Enhanced Use Lease (EUL)?

- DoD installations have the authority and incentive to obtain a broad range of financial and in-kind considerations for leasing opportunities. (Title 10 USC, Section 2667).
- Enter into long-term leases, providing greater flexibility for facility use
- Receive cash or in-kind consideration for income on leased property

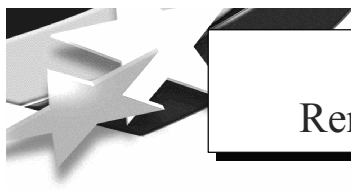




Potential Uses For EUL

- Office space
- Warehouses/industrial buildings
- Laboratories/Research and Development facilities
- *Energy Plants**
- Hotels/temporary lodging/conference centers

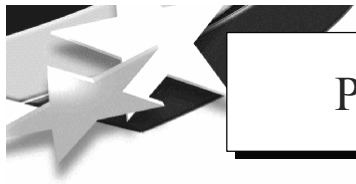
*Note: Based on Veteran's Administration Model



Utilizing EUL for a Renewable Energy Project

- Base provides real estate for renewable energy system
- Competitive bid process selects Independent Energy Provider (IEP)
- IEP finances, constructs, owns and maintains the system
- IEP arranges to sell energy to the base at a discount from that purchased from the local utility





Project Objective

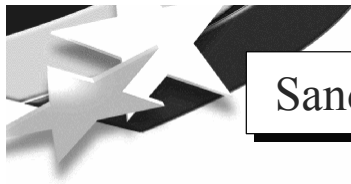
- 1) Identify a base with potential for renewable energy applications
- 2) Develop the project under Enhanced-Use Lease
- 3) Select IEP contractor
- 4) Install hardware
- 5) Monitor the project and report results
- 6) Replicate on other bases



Sandia National Lab's Help

- Is funded by FEMP to develop EUL projects in DOD
- Will help the base and/or Div develop the project
- Will assist in developing the solicitation (i.e., provide a sample SOW)
- Will help in contractor selection
- Will advise on technical portions of contract contents
- Will provide oversight on construction
- Will guide the development of a monitoring program
- Will assist in reporting success
- Will provide basic assistance at no cost to Navy





Sandia's Economic Analysis

- Used cash flow model developed by LBNL; modified for use with renewables
- Verified with FATE, detailed cash flow model developed by Princeton U/NREL
- Applied to an IEP 1MW PV project at Barstow
- Results presented today



Economic Analysis—Model Assumptions

ESCO: PROJECT FINANCE - 2 MW PV Barstow

ASSUMPTIONS:	Value	Notes:
Capacity (MW)	2	Actual Installation
Capacity Factor	0.262	Typical
Installed Capital Cost (\$/kW)	3500	\$7/Wac reduced by 50% Rebate
O&M Expense (\$/kW-yr)	12.00	From DOD study of 29 Palms
Land Expense (\$000s)	0	
Insurance (% of installed cost)	0.50%	Typical value for solar projects
Property Tax (% book value)	0.0%	Excluded in CA?
Admin. and Mngmt Fee (\$000s)	0	
Total First Year Operating Cost (\$/kWh)	0.013	(\$2001) Calculated
Effective Income Tax Rate	40.7%	35% Fed, 8.8% CA
Production Tax Credit (\$/kWh)	0	(\$1992) Increases with inflation
Renewable Energy Tax Credit	30.0%	EPACT (1992) 10% Fed. In 2006/07 will increase to 30%
Inflation Rate (%/yr)	3.0%	Assumed
5 Year Solar Equipment	100.0%	Using HERIGs new fed solar depreciation schedule
15 Year Property	0.0%	Assumed
Discount Rate (nominal)	5.1%	Calculated from Below - weighted cost of capital
Real Discount Rate	2.0%	Calculated
Energy Price Escalation Rate	3.0%	Optimized or input as a parameter
Alternate escalation rate	0.50%	

RESULTS:	Value
Min After Tax Equity Tax Flow	0
Average Debt Service Coverage	1.69
Minimum Debt Service Coverage	1.256
After-Tax IRR on Equity	10.13%
Real Levelized Price (\$2002/kWh)	0.1000
Nominal Levelized Price (\$2002/kWh)	0.1280
First Year Electricity Price	0.1000

const=real current=nominal

FINANCING ASSUMPTIONS:	Fraction	Term	Rate	Notes
Equity Fraction	61.3%	20	2.00%	Minimum equity return
Debt Fraction	38.7%	20	10.00%	Assumed



Economic Analysis – Cash Flow

PRO-FORMA CASH FLOW:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Note: NOT ACTIVATED - Annual electricity for 2 learning years assumed to be 50% and 75% of mature																						
Electric Output (MWh)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Electricity Sales Price (\$/MWh)	0.100	0.103	0.106	0.109	0.113	0.116	0.119	0.123	0.127	0.130	0.134	0.138	0.143	0.147	0.151	0.156	0.160	0.165	0.170	0.175	0.180	
Operating Revenues (\$000)																						
Revenues		459	473	487	502	517	532	548	565	581	599	617	635	654	674	694	715	737	759	781	805	
Operating Expenses (\$000)	Note: NOT ACTIVATED - O&M costs for 2 learning years assumed to 50% and 25% higher than mature																					
General O & M Expense	24.0	24.7	25.5	26.2	27.0	27.8	28.7	29.5	30.4	31.3	32.3	33.2	34.2	35.2	36.3	37.4	38.5	39.7	40.9	42		
Land Expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Insurance	35	36	37	38	39	41	42	43	44	46	47	48	50	51	53	55	56	58	60	61		
Property Taxes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Administration and Management Fee	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Operating Expenses	59	61	63	64	66	68	70	73	75	77	79	82	84	87	89	92	95	98	100	103		
Operating Income (\$000)	400	412	424	437	450	464	478	492	507	522	538	554	570	587	605	623	642	661	681	701		
Financing (\$000)																						
Debt Funds	2712																					
Equity Funds	4288																					
Total Capital Investment	7000																					
Depreciation Basis Adjustment (50%)	-1050																					
Depreciation Basis	5950																					
Cash Available Before Debt	400	412	424	437	450	464	478	492	507	522	538	554	570	587	605	623	642	661	681	701		
Debt Interest Payment	271	266	261	256	249	242	235	226	217	207	196	183	170	155	139	121	101	79	55	29		
Debt Repayment	47	52	57	63	69	76	84	92	101	112	123	135	149	163	180	198	218	239	263	290		
Total Debt Payment	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319		
Tax Effect on Equity (\$000)																						
Operating Income	400	412	424	437	450	464	478	492	507	522	538	554	570	587	605	623	642	661	681	701		
Depreciation (5 yr MACRS)	1190	1904	1142	685	685	343																
Depreciation (15 yr MACRS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Interest Payment	271	266	261	256	249	242	235	226	217	207	196	183	170	155	139	121	101	79	55	29		
Taxable Income	-1061	-1758	-979	-504	-484	-121	243	266	290	315	342	370	400	432	466	502	541	582	626	672		
Income Taxes	-432	-716	-399	-205	-197	-49	99	108	118	128	139	151	163	176	190	205	220	237	255	274		
Production Tax Credit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Renewable Energy Tax Credit	2100																					
Tax Savings (Liability)	2532	716	399	205	197	49	99	-108	-118	-128	-139	-151	-163	-176	-190	-205	-220	-237	-255	-274		
After Tax Net Equity Cash Flow (\$000)	-4288	2613	809	504	324	329	195	60	65	70	75	80	84	89	93	97	100	103	106	108	102	
Pre-tax Debt Coverage Ratio	1.26	1.29	1.33	1.37	1.41	1.46	1.50	1.54	1.59	1.64	1.69	1.74	1.79	1.84	1.90	1.96	2.02	2.08	2.14	2.20		



Economic Analysis—Cash Flow Close-up

PRO-FORMA CASH FLOW:	0	1	2	3	4	5	6	
Year	2005	2006	2007	2008	2009	2010	2011	
Note: NOT ACTIVATED - Annual electricity for 2 learning years assumed								
Electric Output (MWh)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Electricity Sales Price (\$/kWh)	0.100	0.103	0.106	0.109	0.113	0.116		
Operating Revenues (\$000)								
Revenues		459	473	487	502	517	532	
Operating Expenses (\$000)	Note: NOT ACTIVATED - O & M costs for 2 learning years assumed to 50%							
General O & M Expense	24.0	24.7	25.5	26.2	27.0	27.8		
Land Expense	0	0	0	0	0	0	0	
Insurance	35	36	37	38	39	41	42	
Property Taxes	0	0	0	0	0	0	0	
Administration and Management Fee	0	0	0	0	0	0	0	
Total Operating Expenses	59	61	63	64	66	68		
Operating Income (\$000)	400	412	424	437	450	464		
Financing (\$000)								
Debt Funds	2712							
Equity Funds	4288							
Total Capital Investment	7000							
Depreciation Basis Adjustment (50%)	-1050							
Depreciation Basis	5950							
Cash Available Before Debt	400	412	424	437	450	464		
Debt Interest Payment	271	266	261	256	249	242		
Debt Repayment	47	52	57	63	69	76		
Total Debt Payment	319	319	319	319	319	319		
Tax Effect on Equity (\$000)								
Operating Income	400	412	424	437	450	464		
Depreciation (5 yr MACRS)	1190	1904	1142	685	685	343		
Depreciation (15 yr MACRS)	0	0	0	0	0	0		
Interest Payment	271	266	261	256	249	242		
Taxable Income	-1061	-1758	-979	-504	-484	-121		
Income Taxes	-432	-716	-399	-205	-197	-49		
Production Tax Credit	0	0	0	0	0	0		
Renewable Energy Tax Credit	2100							
Tax Savings (Liability)	2532	716	399	205	197	49		
After Tax Net Equity Cash Flow (\$000)	-4288	2613	809	504	324	329	195	
Pre-tax Debt Coverage Ratio	1.26	1.29	1.33	1.37	1.41	1.46	1.50	



Economic Analysis—Results

Energy Price (\$/kWh)	% Debt	Debt Cover Ratio	IRR (%)
0.15	55	1.8	31
0.14	51	1.8	25
0.13	46	1.8	20
0.12	43	1.8	16
0.11	39	1.8	13
0.10	35	1.8	10



Summary

- EUL energy project at Barstow looks feasible from Government's point of view
- Project is supported by HQ/USMC
- Cash flow analysis suggests that IEP project is profitable, therefore potential bidders exist
- Sandia is ready to assist



APPENDIX F: Sandia DOD Project Approach Summary

Statutory Authority	Possible Energy Renewable Technologies	Goals/Benefits	Risks	Comments
10 USC § 2865 & 10 USC § 2866 Energy Savings Performance Contracts (ESPC) – contracting procedure in which private contractor evaluates, designs, finances, acquires, installs, and maintains energy savings equipment/systems for a client and receives compensation based on the energy savings performance of that equipment/system.	-Ground Source Heat Pumps -Cogeneration -Wind -Bldg. Photovoltaic -Solar plant	-Financing	-Fuel cost sensitivity -BRAC	
Utility Energy Services Contracts (UESC) -Sole Source w/utility company -Payment through utility budget w/financing option -10 year payback periods	-Wind -Bldg. Photovoltaic -Traditional Energy Projects (lighting & mechanical retrofit)	-Financing Option	-Fuel cost sensitivity -BRAC	-Measurement & verification for energy conservation process?

Statutory Authority	Possible Energy Renewable Technologies	Goals/Benefits	Risks	Comments
10 USC § 2667 <i>-Enhanced use lease, real or personal property</i> <i>-5 yr term, longer if approved by SECNAV</i> <i>-FMV required, cash or in-kind consideration</i>	-Cogeneration -Wind -Bldg. photovoltaic -Solar plant	- Renewable mandates -Env. cost savings - Low cost power/heat -Reduce maint. cost -Leverage assets -Minimize maintenance - \$ savings due to T&D costs avoidance	-Time horizon - Standby charges impact -Fuel cost sensitivity -Env., RE, Utility, Legal, ATFP liabilities -Implementation costs - BRAC - Scoring - Lease renewal and termination costs - Lease value change for the electricity produced	-Land Lease Agreement - Need to determine how long lease could go - FMV should be appraised to value as power generation site vice grazing land - Power as “in-kind” consideration
10 USC § 2689 -Development of geothermal energy -No time limitation -Proceeds to Treasury	Geothermal energy only	-Renewable mandates -Low cost power	Env., RE, Utility, Legal, ATFP liabilities -Implementation costs	-DON installation benefits?
10 USC § 2394 -Production and purchase of energy -30 years limitation -Contract cost paid from annual appropriation	-Cogeneration -Wind -Bldg. photovoltaic -Solar plant -Geothermal	-Renewable mandates -Env. cost savings -Low cost power/heat -Reduce maint. cost -Leverage assets -Minimize maintenance	-Standby charges impact -Fuel cost sensitivity -Env., RE, Utility, Legal, ATFP liabilities -Implementation costs -BRAC	-LCCA for renewables
10 USC § 2867 -Sale of electricity from cogeneration facility -No time limitation -Proceeds to Dept. appropriation account	-Alternate energy or Cogeneration	-Renewable mandates -Low cost power	-Fuel cost sensitivity -Env., RE, Utility, Legal, ATFP liabilities -Implementation costs -BRAC	

APPENDIX G1: Navy Analysis – Contractor Investment for PV Plan

LLC2006

Discount Rate: 3.0%		Renewable Energy Systems			FY2006 Version					
		<i>Contractor Investment for PV Plant</i>			Jan 24, 2006					
Activity UIC :	M62204				Project No.:	EUL 2006				
Location:	Barstow				Energy Category:	9				
State:	CA				Region:	4				
					Economic Life:	20				
Prepared By:	Phu Vu	Activity POC:	Joe Lloren							
Telephone:	619-532-2937	Telephone:	760-577-6911							
DSN:		DSN:								
e-mail:	chau.yu@navy.mil	e-mail:	joseph.lloren@usmc.mil							
INVESTMENT COSTS:				CREDITS:						
Construction Costs:		\$14,000,000			Salvage Value:	\$1,400,000				
SIOH:	6.0%	\$840,000			Rebate:	\$5,600,000				
Design:	5.0%	\$700,000								
Total Funds Required:		\$15,540,000	ECIP Programmed Amount:		\$14,840,000					
ENERGY SAVINGS (COSTS):										
	<i>Cost/Unit</i>	<i>Annual Utility Reduction</i>	<i>Annual Energy Saved</i>	<i>Annual Savings</i>	<i>Discount Factor</i>	<i>Life-Cycle Discounted Savings</i>				
Electricity:	\$95.00/MWh	4,116 MWh	14,048 MBtu	\$391,020	13.49	\$5,274,860				
Demand:	*	*	*		14.88	\$0				
Distillate Oil:	\$0.00/MBtu	0 MBtu	0 MBtu	\$0	14.52	\$0				
Residual Oil:	\$0.00/MBtu	0 MBtu	0 MBtu	\$0	12.75	\$0				
Natural Gas:			0 MBtu	\$0	12.91	\$0				
Coal:	\$0.00/MBtu	0 MBtu	0 MBtu	\$0	14.52	\$0				
LPG:	\$0.00/MBtu	0 MBtu	0 MBtu	\$0	11.94	\$0				
Gov Lease	\$75.00/MBtu	(300) MBtu	(300) MBtu	(\$22,500)	14.88	(\$334,743)				
Other	\$0.00/MBtu	0 MBtu	0 MBtu	\$0	14.88	\$0				
Water:	\$0.00/Kgal	0 Kgal	*	\$0	18.08	\$0				
Sewage:	\$0.00/Kgal	0 Kgal	*	\$0	18.08	\$0				
Annual Energy Savings:			13,748 MBTU	\$368,520		\$ 4,940,117				
NON-ENERGY SAVINGS (COSTS):										
	<i>Item</i>	<i>Savings</i>	<i>Year of Occurrence</i>	<i>Discount Factor</i>	<i>Discounted Savings</i>					
Annual Recurring:		\$0	*	14.88	\$0					
Non-Recurring Savings(Costs):										
1)	<i>Tax Incentive/Depreciation</i>	\$750,000	0	1.000	\$750,000					
2)	<i>Tax Incentive/Depreciation</i>	\$600,000	1	0.971	\$582,524					
3)	<i>Tax Incentive/Depreciation</i>	\$500,000	2	0.943	\$471,298					
4)	<i>Tax Incentive/Depreciation</i>	\$400,000	3	0.915	\$366,057					
5)	<i>Tax Incentive/Depreciation</i>	\$300,000	4	0.888	\$266,546					
6)	<i>Tax Incentive/Depreciation</i>	\$200,000	5	0.863	\$172,522					
Total Discounted Non-Energy Savings:					\$2,608,947					
SUMMARY:										
Mbtu Saved per \$1,000 Invested:				0.88						
Kgal Saved per \$1,000 Invested:				0.00						
Annual Savings:				\$506,020						
Discounted Energy Savings:				\$4,940,117						
Discounted Non-Energy Savings:				\$2,608,947						
Total Net Discounted Savings:				\$7,549,063						
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: center;">Simple Payback</td> <td style="width: 50%; text-align: center;">Savings to Investment Ratio</td> </tr> <tr> <td style="text-align: center;">16.53</td> <td style="text-align: center;">0.88</td> </tr> </table>							Simple Payback	Savings to Investment Ratio	16.53	0.88
Simple Payback	Savings to Investment Ratio									
16.53	0.88									
UPDATED BY: Phu Vu DATE: January 24, 2006										

Directions for Data Entry

On the LCC worksheet, use pull-down menus and enter data in cells [highlighted in blue text](#).

All other cells are locked. Please do not modify this form. Comments can be included in the energy project write-up in Attachment C "Savings Calculations."

Cells that contain an asterisk, *, are not used.

General Project Information

<i>Input Data</i>	<i>Cell</i>	<i>Description</i>
Short Description	E3 - K3	Enter a short project title or description
Activity UIC	E4	Unit identification number of the activity completing the project
Location	E5	Name of base/activity and city location
State	E6	Use pull-down menu to select state, district, or foreign base (Note: an abbreviation will appear on the hardcopy and print preview.)
Prepared By	E8	Enter your first and last name for reference
Commercial Telephone	E9	Enter your commercial telephone number
DSN Telephone	E10	Enter your Defense Switching Network telephone number
E-mail	E11	Enter your e-mail address
Activity POC	J8	Enter the activity point of contact (POC) for the project
Commercial Telephone	J9	Enter POC commercial telephone number
DSN Telephone	J10	Enter POC Defense Switching Network telephone number
E-mail	J11	Enter POC e-mail address
Date	M3	Enter the project date with the year expressed in 4 digits (e.g., 1999 instead of 99)
Project No.	M4	Enter project number to identify project
Energy Category	I2	Use pull-down menu to select the category of the energy project. The numeric energy category appears in M5. (see Categories worksheet for descriptions)

Investment Costs

<i>Input Data</i>	<i>Cell</i>	<i>Description</i>
Construction Costs	G14	Cost for hardware and labor
SIOH	E15	Cost for supervisory inspection and overhead (SIOH default 4%)
Design	E16	Percentage of construction allocated for project design (default 10%)
Salvage Value	M14	Recoverable value of hardware being replaced.
Rebate	M15	Non-federal project cost reimbursements

Energy Savings (Costs)

<i>Input Data</i>	<i>Cell</i>	<i>Description</i>
Utility Cost per Unit	E21 - E31	Cost per unit of utilities affected by project.
Utility Reduction	G21 - G31	Amount of the particular utility affected by project.
Demand Savings	J22	Calculated Annual Demand Savings. Actual calculations must be shown in the Project Package.

Non-Energy Savings (Costs)

<i>Input Data</i>	<i>Cell</i>	<i>Description</i>
Annual Recurring	G36 - G41	Amount of savings that is recovered each year that are not directly attributable to the reduction in energy consumption or demand
Non-Recurring Savings	G38 - G43	Amount of savings that occur once at a user specified year
Year of Occurance	I38 - I43	The number of years into the project life that a non-recurring non-energy savings occurs

Energy Project Categories

Energy Category	Energy Project Title	Economic Life	Description
1.	EMCS or HVAC Controls	10	Projects which centrally control energy systems with the ability to automatically adjust temperature, shed electrical loads, control motor speeds, or adjust lighting intensities.
2.	Steam and Condensate	15	Projects to install condensate lines, cross connect lines, distribution system loops, repair or install insulation, and repair or install meters and controls.
3.	Boiler Plant Modifications	20	Projects to upgrade or replace central boiler or ancillary equipment to improve overall plant efficiency. This includes fuel switching or dual fuel conversions.
4.	Heating Ventilation, Air Conditioning HVAC Systems	20	Projects to install energy efficient heating, cooling, ventilation or hot water heating equipment. This includes, HVAC distribution systems.
5.	Weatherization	20	Projects improving the thermal envelope of a building. This includes insulation, windows, vestibules, earth berms, shading, etc.
6.	Lighting Systems	15	Projects to install replacement lighting systems and controls. This includes daylighting, new fixtures, lamps, ballasts, photocells, motion sensors, light wells, etc.
7.	Energy Recovery Systems	20	Projects to install heat exchangers, regenerators, heat reclaim units or recapture energy lost to the environment.
8.	Electrical Energy Systems	20	Projects that will 1) increase the energy efficiency of an electrical device or system 2) reduce costs by reducing the peak demand
9.	Renewable Energy Systems	20	Any project utilizing renewable energy. This includes active solar heating, cooling, hot water, industrial process heat, photovoltaic, wind, biomass, geothermal and passive solar applications.
10.	Facility Energy Improvements	20	Multiple category projects or those that do not fall into any other category.
20.	Water Conservation Projects	20	Any project that reduces water consumption.

Uniform Present Value (UPV*) Discount Factors

Table Ba-1. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Census Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont)

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	7.37	7.57	7.16	6.73	8.28	7.48
15	10.7	10.72	10.14	9.51	11.53	10.5
20	13.74	13.51	12.87	12.08	14.38	13.19

Table Ba-2. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Census Region 2 (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin)

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	8.00	7.60	7.11	6.72	8.44	7.11
15	11.51	10.76	10.07	9.51	11.82	9.99
20	14.68	13.56	12.80	12.11	14.78	12.59

Table Ba-3. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Census Region 3 (Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia)

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	7.75	7.62	7.29	6.40	8.39	7.41
15	10.98	10.77	10.24	9.16	11.71	10.40
20	13.87	13.57	12.96	11.73	14.59	13.08

Table Ba-4. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Census Region 4 (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming)

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	7.80	8.13	7.14	7.31	8.20	6.78
15	10.82	11.51	10.07	10.18	11.50	9.47
20	13.49	14.52	12.75	12.91	14.52	11.94

Table Ba-5. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel. United States Average

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	7.78	7.75	7.21	6.64	8.40	7.23
15	11.05	10.97	10.16	9.42	11.74	10.15
20	13.99	13.83	12.88	12.02	14.67	12.79

Uniform Present Value Discount Factors

Table A-2. UPV N	DOE Discount Rate	Table A3-a UPV* @ 2% Water Non Fuel
10	8.53	9.48
15	11.94	13.89
20	14.88	18.08

Table A-1. Single Present Value (SPV) DOE Discount Factors

N	SPV	Entered Savings
0	1	750000
1	0.971	600000
2	0.943	500000
3	0.915	400000
4	0.888	0
5	0.863	200000
6	0.837	0
7	0.813	0
8	0.789	0
9	0.766	0
10	0.744	0
11	0.722	0
12	0.701	0
13	0.681	0
14	0.661	0
15	0.642	0
16	0.623	0
17	0.605	0
18	0.587	0
19	0.570	0
20	0.554	0

Payback Calculation

Investment Cost	Investment Less Savings	Investment Left	Logical Column	Payback Calc.
8,540,000	7,421,480.00	7,421,480	0	FALSE
	6,452,960.00	6,452,960	0	FALSE
	5,584,440.00	5,584,440	0	FALSE
	4,815,920.00	4,815,920	0	FALSE
	4,447,400.00	4,447,400	0	FALSE
	3,878,880.00	3,878,880	0	FALSE
	3,510,360.00	3,510,360	0	FALSE
	3,141,840.00	3,141,840	0	FALSE
	2,773,320.00	2,773,320	0	FALSE
	2,404,800.00	2,404,800	0	FALSE
	2,036,280.00	2,036,280	0	FALSE
	1,667,760.00	1,667,760	0	FALSE
	1,299,240.00	1,299,240	0	FALSE
	930,720.00	930,720	0	FALSE
	562,200.00	562,200	0	FALSE
	193,680.00	193,680	0	FALSE
	-174,840.00	0	1	16.53
	-368,520.00	0	2	17.00
	-368,520.00	0	3	18.00
	-368,520.00	0	4	19.00
	-368,520.00	0	5	20.00

Tables

5	State	Two Letter Abbreviation	Region	9	Energy Category	Energy Project Title	Economic Life
1	Alabama	AL	3	1	1	EMCS or HVAC Controls	10
2	Alaska	AK	4	2	2	Steam and Condensate Systems	15
3	Arizona	AZ	4	3	3	Boiler Plant Modifications	20
4	Arkansas	AR	3	4	4	HVAC	20
5	California	CA	4	5	5	Weatherization	20
6	Colorado	CO	4	6	6	Lighting Systems	15
7	Connecticut	CT	1	7	7	Energy Recovery Systems	20
8	Delaware	DE	3	8	8	Electrical Energy Systems	20
9	Dist of Columbia	DC	3	9	9	Renewable Energy Systems	20
10	Florida	FL	3	10	10	Facility Energy Improvements	20
11	Foreign Base	FB	5	11	20	Water Projects	20
12	Georgia	GA	3				
13	Hawaii	HI	4				
14	Idaho	ID	4				
15	Illinois	IL	2				
16	Indiana	IN	2				
17	Iowa	IA	2				
18	Kansas	KS	2				
19	Kentucky	KY	3				
20	Louisiana	LA	3				
21	Maine	ME	1				
22	Maryland	MD	3				
23	Massachusetts	MA	1				
24	Michigan	MI	2				
25	Minnesota	MN	2				
26	Mississippi	MS	3				
27	Missouri	MO	2				
28	Montana	MT	4				
29	Nebraska	NE	2				
30	Nevada	NV	4				
31	New Hampshire	NH	1				
32	New Jersey	NJ	1				
33	New Mexico	NM	4				
34	New York	NY	1				
35	North Carolina	NC	3				
36	North Dakota	ND	2				
37	Ohio	OH	2				
38	Oklahoma	OK	3				
39	Oregon	OR	4				
40	Pennsylvania	PA	1				
41	Rhode Island	RI	1				
42	South Carolina	SC	3				
43	South Dakota	SD	2				
44	Tennessee	TN	3				
45	Texas	TX	3				
46	Utah	UT	4				
47	Vermont	VT	1				
48	Virginia	VA	3				
49	Washington	WA	4				
50	West Virginia	WV	3				
51	Wisconsin	WI	2				
52	Wyoming	WY	4				

APPENDIX G2: Navy Analysis – Contractor Investment for PV Plant with Government Subsidized Carport

LLC2006

Discount Rate: 3.0%		Renewable Energy Systems		FY2006 Version					
		<i>Contractor Investment for PV plant with Government subsidized Carport</i>		Jan 24, 2006					
Activity UIC : M62204			Project No.:	EUL 2006					
Location: Barstow			Energy Category:	9					
State: CA			Region:	4					
			Economic Life:	20					
Prepared By: Phu Vu		Activity POC: Joe Lloren							
Telephone: 619-532-2937		Telephone: 760-577-6911							
DSN:		DSN:							
e-mail: phu.m.vu@navy.mil		e-mail: joseph.lloren@usmc.mil							
INVESTMENT COSTS:			CREDITS:						
Construction Costs:	\$13,000,000	(w/ \$1,000,000 gov't paid carport)	Salvage Value:	\$1,400,000					
SIOH: 6.0%	\$780,000		Rebate:	\$5,600,000					
Design: 5.0%	\$650,000								
Total Funds Required:	\$14,430,000		ECIP Programmed Amount:	\$13,780,000					
ENERGY SAVINGS (COSTS):									
	<i>Cost/Unit</i>	<i>Annual Utility Reduction</i>	<i>Annual Energy Saved</i>	<i>Annual Savings</i>	<i>Discount Factor</i>	<i>Life-Cycle Discounted Savings</i>			
Electricity:	\$95.00/MWh	4,116 MWh	14,048 MBtu	\$391,020	13.49	\$5,274,860			
Demand:	*	*	*		14.88	\$0			
Distillate Oil:	\$0.00/MBtu	0 MBtu	0 MBtu	\$0	14.52	\$0			
Residual Oil:	\$0.00/MBtu	0 MBtu	0 MBtu	\$0	12.75	\$0			
Natural Gas:			0 MBtu	\$0	12.91	\$0			
Coal:	\$0.00/MBtu	0 MBtu	0 MBtu	\$0	14.52	\$0			
LPG:	\$0.00/MBtu	0 MBtu	0 MBtu	\$0	11.94	\$0			
Gov Lease	\$75.00/MBtu	(300) MBtu	(300) MBtu	(\$22,500)	14.88	(\$334,743)			
Other	\$0.00/MBtu	0 MBtu	0 MBtu	\$0	14.88	\$0			
Water:	\$0.00/Kgal	0 Kgal	*	\$0	18.08	\$0			
Sewage:	\$0.00/Kgal	0 Kgal	*	\$0	18.08	\$0			
Annual Energy Savings:			13,748 MBTU	\$368,520		\$ 4,940,117			
NON-ENERGY SAVINGS (COSTS):									
	<i>Item</i>	<i>Savings</i>	<i>Year of Occurrence</i>	<i>Discount Factor</i>	<i>Discounted Savings</i>				
Annual Recurring:		\$0	*	14.88	\$0				
Non-Recurring Savings(Costs):									
1) Tax Incentive/Depreciation		\$750,000	0	1.000	\$750,000				
2) Tax Incentive/Depreciation		\$600,000	1	0.971	\$582,524				
3) Tax Incentive/Depreciation		\$500,000	2	0.943	\$471,298				
4) Tax Incentive/Depreciation		\$400,000	3	0.915	\$366,057				
5) Tax Incentive/Depreciation		\$300,000	4	0.888	\$266,546				
6) Tax Incentive/Depreciation		\$200,000	5	0.863	\$172,522				
Total Discounted Non-Energy Savings:					\$2,608,947				
SUMMARY:									
Mbtu Saved per \$1,000 Invested:				0.95					
Kgal Saved per \$1,000 Invested:				0.00					
Annual Savings:				\$506,020					
Discounted Energy Savings:				\$4,940,117					
Discounted Non-Energy Savings:				\$2,608,947					
Total Net Discounted Savings:					\$7,549,063				
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Simple Payback</td> <td style="width: 50%; text-align: center;">Savings to Investment Ratio</td> </tr> <tr> <td style="text-align: center;">13.51</td> <td style="text-align: center;">1.02</td> </tr> </table>						Simple Payback	Savings to Investment Ratio	13.51	1.02
Simple Payback	Savings to Investment Ratio								
13.51	1.02								
UPDATED BY: Phu Vu									
DATE: January 24, 2006									

Directions for Data Entry

On the LCC worksheet, use pull-down menus and enter data in cells **highlighted in blue text**.

All other cells are locked. Please do not modify this form. Comments can be included in the energy project write-up in Attachment C "Savings Calculations."

Cells that contain an asterisk, *, are not used.

General Project Information

<i>Input Data</i>	<i>Cell</i>	<i>Description</i>
Short Description	E3 - K3	Enter a short project title or description
Activity UIC	E4	Unit identification number of the activity completing the project
Location	E5	Name of base/activity and city location
State	E6	Use pull-down menu to select state, district, or foreign base (Note: an abbreviation will appear on the hardcopy and print preview.)
Prepared By	E8	Enter your first and last name for reference
Commercial Telephone	E9	Enter your commercial telephone number
DSN Telephone	E10	Enter your Defense Switching Network telephone number
E-mail	E11	Enter your e-mail address
Activity POC	J8	Enter the activity point of contact (POC) for the project
Commercial Telephone	J9	Enter POC commercial telephone number
DSN Telephone	J10	Enter POC Defense Switching Network telephone number
E-mail	J11	Enter POC e-mail address
Date	M3	Enter the project date with the year expressed in 4 digits (e.g., 1999 instead of 99)
Project No.	M4	Enter project number to identify project
Energy Category	I2	Use pull-down menu to select the category of the energy project. The numeric energy category appears in M5. (see Categories worksheet for descriptions)

Investment Costs

<i>Input Data</i>	<i>Cell</i>	<i>Description</i>
Construction Costs	G14	Cost for hardware and labor
SIOH	E15	Cost for supervisory inspection and overhead (SIOH default 4%)
Design	E16	Percentage of construction allocated for project design (default 10%)
Salvage Value	M14	Recoverable value of hardware being replaced.
Rebate	M15	Non-federal project cost reimbursements

Energy Savings (Costs)

<i>Input Data</i>	<i>Cell</i>	<i>Description</i>
Utility Cost per Unit	E21 - E31	Cost per unit of utilities affected by project.
Utility Reduction	G21 - G31	Amount of the particular utility affected by project.
Demand Savings	J22	Calculated Annual Demand Savings. Actual calculations must be shown in the Project Package.

Non-Energy Savings (Costs)

<i>Input Data</i>	<i>Cell</i>	<i>Description</i>
Annual Recurring	G36 - G41	Amount of savings that is recovered each year that are not directly attributable to the reduction in energy consumption or demand
Non-Recurring Savings	G38 - G43	Amount of savings that occur once at a user specified year
Year of Occurance	I38 - I43	The number of years into the project life that a non-recurring non-energy savings occurs

Energy Project Categories

Energy Category	Energy Project Title	Economic Life	Description
1.	EMCS or HVAC Controls	10	Projects which centrally control energy systems with the ability to automatically adjust temperature, shed electrical loads, control motor speeds, or adjust lighting intensities.
2.	Steam and Condensate	15	Projects to install condensate lines, cross connect lines, distribution system loops, repair or install insulation, and repair or install meters and controls.
3.	Boiler Plant Modifications	20	Projects to upgrade or replace central boiler or ancillary equipment to improve overall plant efficiency. This includes fuel switching or dual fuel conversions.
4.	Heating Ventilation, Air Conditioning HVAC Systems	20	Projects to install energy efficient heating, cooling, ventilation or hot water heating equipment. This includes, HVAC distribution systems.
5.	Weatherization	20	Projects improving the thermal envelope of a building. This includes insulation, windows, vestibules, earth berms, shading, etc.
6.	Lighting Systems	15	Projects to install replacement lighting systems and controls. This includes daylighting, new fixtures, lamps, ballasts, photocells, motion sensors, light wells, etc.
7.	Energy Recovery Systems	20	Projects to install heat exchangers, regenerators, heat reclaim units or recapture energy lost to the environment.
8.	Electrical Energy Systems	20	Projects that will 1) increase the energy efficiency of an electrical device or system 2) reduce costs by reducing the peak demand
9.	Renewable Energy Systems	20	Any project utilizing renewable energy. This includes active solar heating, cooling, hot water, industrial process heat, photovoltaic, wind, biomass, geothermic and passive solar applications.
10.	Facility Energy Improvements	20	Multiple category projects or those that do not fall into any other category.
20.	Water Conservation Projects	20	Any project that reduces water consumption.

Uniform Present Value (UPV*) Discount Factors

Table Ba-1. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Census Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont)

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	7.37	7.57	7.16	6.73	8.28	7.48
15	10.7	10.72	10.14	9.51	11.53	10.5
20	13.74	13.51	12.87	12.08	14.38	13.19

Table Ba-2. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Census Region 2 (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin)

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	8.00	7.60	7.11	6.72	8.44	7.11
15	11.51	10.76	10.07	9.51	11.82	9.99
20	14.68	13.56	12.80	12.11	14.78	12.59

Table Ba-3. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Census Region 3 (Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia)

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	7.75	7.62	7.29	6.40	8.39	7.41
15	10.98	10.77	10.24	9.16	11.71	10.40
20	13.87	13.57	12.96	11.73	14.59	13.08

Table Ba-4. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Census Region 4 (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming)

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	7.80	8.13	7.14	7.31	8.20	6.78
15	10.82	11.51	10.07	10.18	11.50	9.47
20	13.49	14.52	12.75	12.91	14.52	11.94

Table Ba-5. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel. United States Average

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	7.78	7.75	7.21	6.64	8.40	7.23
15	11.05	10.97	10.16	9.42	11.74	10.15
20	13.99	13.83	12.88	12.02	14.67	12.79

Uniform Present Value Discount Factors

Table A-2. UPV N	DOE Discount Rate	Table A3-a UPV* @ 2% Water Non Fuel
10	8.53	9.48
15	11.94	13.89
20	14.88	18.08

Table A-1. Single Present Value (SPV) DOE Discount Factors			Payback Calculation				
N	SPV	Entered Savings	Investment Cost	Investment Less Savings	Investment Left	Logical Column	Payback Calc.
0	1	750000	7,430,000	6,311,480.00	6,311,480	0	FALSE
1	0.971	600000		5,342,960.00	5,342,960	0	FALSE
2	0.943	500000		4,474,440.00	4,474,440	0	FALSE
3	0.915	400000		3,705,920.00	3,705,920	0	FALSE
4	0.888	0		3,337,400.00	3,337,400	0	FALSE
5	0.863	200000		2,768,880.00	2,768,880	0	FALSE
6	0.837	0		2,400,360.00	2,400,360	0	FALSE
7	0.813	0		2,031,840.00	2,031,840	0	FALSE
8	0.789	0		1,663,320.00	1,663,320	0	FALSE
9	0.766	0		1,294,800.00	1,294,800	0	FALSE
10	0.744	0		926,280.00	926,280	0	FALSE
11	0.722	0		557,760.00	557,760	0	FALSE
12	0.701	0		189,240.00	189,240	0	FALSE
13	0.681	0		-179,280.00	0	1	13.51
14	0.661	0		-368,520.00	0	2	14.00
15	0.642	0		-368,520.00	0	3	15.00
16	0.623	0		-368,520.00	0	4	16.00
17	0.605	0		-368,520.00	0	5	17.00
18	0.587	0		-368,520.00	0	6	18.00
19	0.570	0		-368,520.00	0	7	19.00
20	0.554	0		-368,520.00	0	8	20.00

Tables

5	State	Two Letter Abbreviation	Region	9	Energy Category	Energy Project Title	Economic Life
1	Alabama	AL	3	1	1	EMCS or HVAC Controls	10
2	Alaska	AK	4	2	2	Steam and Condensate Systems	15
3	Arizona	AZ	4	3	3	Boiler Plant Modifications	20
4	Arkansas	AR	3	4	4	HVAC	20
5	California	CA	4	5	5	Weatherization	20
6	Colorado	CO	4	6	6	Lighting Systems	15
7	Connecticut	CT	1	7	7	Energy Recovery Systems	20
8	Delaware	DE	3	8	8	Electrical Energy Systems	20
9	Dist of Columbia	DC	3	9	9	Renewable Energy Systems	20
10	Florida	FL	3	10	10	Facility Energy Improvements	20
11	Foreign Base	FB	5	11	20	Water Projects	20
12	Georgia	GA	3				
13	Hawaii	HI	4				
14	Idaho	ID	4				
15	Illinois	IL	2				
16	Indiana	IN	2				
17	Iowa	IA	2				
18	Kansas	KS	2				
19	Kentucky	KY	3				
20	Louisiana	LA	3				
21	Maine	ME	1				
22	Maryland	MD	3				
23	Massachusetts	MA	1				
24	Michigan	MI	2				
25	Minnesota	MN	2				
26	Mississippi	MS	3				
27	Missouri	MO	2				
28	Montana	MT	4				
29	Nebraska	NE	2				
30	Nevada	NV	4				
31	New Hampshire	NH	1				
32	New Jersey	NJ	1				
33	New Mexico	NM	4				
34	New York	NY	1				
35	North Carolina	NC	3				
36	North Dakota	ND	2				
37	Ohio	OH	2				
38	Oklahoma	OK	3				
39	Oregon	OR	4				
40	Pennsylvania	PA	1				
41	Rhode Island	RI	1				
42	South Carolina	SC	3				
43	South Dakota	SD	2				
44	Tennessee	TN	3				
45	Texas	TX	3				
46	Utah	UT	4				
47	Vermont	VT	1				
48	Virginia	VA	3				
49	Washington	WA	4				
50	West Virginia	WV	3				
51	Wisconsin	WI	2				
52	Wyoming	WY	4				

APPENDIX G3: Navy Analysis – Government Cost/Savings for PV Plant

LLC2006

Discount Rate: 3.0%	Renewable Energy Systems <i>Government Cost/Savings for PV Plant</i>	FY2006 Version Jan 24, 2006				
Activity UIC : M62204		EUL 2006				
Location: Barstow		Project No.: 9				
State: CA		Energy Category: 4				
		Region: 20				
		Economic Life:				
Prepared By: Phu Vu	Activity POC: Joe Lloren					
Telephone: 619-532-2937	Telephone: 760-577-6911					
DSN:	DSN:					
e-mail: phu.m.vu@navy.mil	e-mail: joseph.lloren@usmc.mil					
INVESTMENT COSTS:		CREDITS:				
Construction Costs: \$250,000		Salvage Value: \$0				
SIOH: 10.0% \$25,000		Rebate:				
Design: 0.0% \$0						
Total Funds Required: \$275,000		ECIP Programmed Amount: \$275,000				
ENERGY SAVINGS (COSTS):						
	<i>Annual Utility</i>	<i>Annual</i>				
	<i>Cost/Unit</i>	<i>Energy Saved</i>				
	<i>Reduction</i>	<i>Savings</i>				
		<i>Discount</i>				
		<i>Factor</i>				
		<i>Life-Cycle</i>				
		<i>Discounted Savings</i>				
Electricity:	\$140.00/MWh	200 MWh				
		683 MBtu				
		\$28,000				
		13.49				
		\$377,720				
Demand:	*	*				
		\$1,500				
		14.88				
		\$22,316				
Distillate Oil:	\$0.00/MBtu	0 MBtu				
		\$0				
		14.52				
		\$0				
Residual Oil:	\$0.00/MBtu	0 MBtu				
		\$0				
		12.75				
		\$0				
Natural Gas:	\$0.00/MBtu	0 MBtu				
		\$0				
		12.91				
		\$0				
Coal:	\$0.00/MBtu	0 MBtu				
		\$0				
		14.52				
		\$0				
LPG:	\$0.00/MBtu	0 MBtu				
		\$0				
		11.94				
		\$0				
DLC	(\$10.13)/MBtu	220 MBtu				
		220 MBtu				
		(\$2,229)				
		14.88				
		(\$33,156)				
Other	\$0.00/MBtu	0 MBtu				
		\$0				
		14.88				
		\$0				
Water:	\$0.00/Kgal	0 Kgal				
		*				
		\$0				
		18.08				
		\$0				
Sewage:	\$0.00/Kgal	0 Kgal				
		*				
		\$0				
		18.08				
		\$0				
Annual Energy Savings:		903 MBTU				
		\$27,271				
		\$ 366,880				
NON-ENERGY SAVINGS (COSTS):						
	<i>Savings</i>	<i>Year of</i>				
	<i>Item</i>	<i>Occurrence</i>				
		<i>Discount</i>				
		<i>Factor</i>				
		<i>Discounted</i>				
		<i>Savings</i>				
Annual Recurring:	(\$2,250)	*				
		14.88				
		(\$33,474)				
Non-Recurring Savings(Costs):						
1)		0				
		1.000				
		\$0				
2)	\$0	0				
		1.000				
		\$0				
3)	\$0	0				
		1.000				
		\$0				
4)	\$0	0				
		1.000				
		\$0				
5)	\$0	0				
		1.000				
		\$0				
6)	\$0	0				
		1.000				
		\$0				
Total Discounted Non-Energy Savings:		(\$33,474)				
SUMMARY:						
Mbtu Saved per \$1,000 Invested:		3.28				
Kgal Saved per \$1,000 Invested:		0.00				
Annual Savings:		\$25,021				
Discounted Energy Savings:		\$366,880				
Discounted Non-Energy Savings:		(\$33,474)				
Total Net Discounted Savings:		\$333,406				
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Simple Payback</td> <td style="width: 50%; text-align: center;">Savings to Investment Ratio</td> </tr> <tr> <td style="text-align: center;">10.99</td> <td style="text-align: center;">1.21</td> </tr> </table>			Simple Payback	Savings to Investment Ratio	10.99	1.21
Simple Payback	Savings to Investment Ratio					
10.99	1.21					
<p>UPDATED BY: Phu Vu DATE: January 24, 2006</p>						

Directions for Data Entry

On the LCC worksheet, use pull-down menus and enter data in cells [highlighted in blue text](#).

All other cells are locked. Please do not modify this form. Comments can be included in the energy project write-up in Attachment C "Savings Calculations."

Cells that contain an asterisk, *, are not used.

General Project Information

<i>Input Data</i>	<i>Cell</i>	<i>Description</i>
Short Description	E3 - K3	Enter a short project title or description
Activity UIC	E4	Unit identification number of the activity completing the project
Location	E5	Name of base/activity and city location
State	E6	Use pull-down menu to select state, district, or foreign base (Note: an abbreviation will appear on the hardcopy and print preview.)
Prepared By	E8	Enter your first and last name for reference
Commercial Telephone	E9	Enter your commercial telephone number
DSN Telephone	E10	Enter your Defense Switching Network telephone number
E-mail	E11	Enter your e-mail address
Activity POC	J8	Enter the activity point of contact (POC) for the project
Commercial Telephone	J9	Enter POC commercial telephone number
DSN Telephone	J10	Enter POC Defense Switching Network telephone number
E-mail	J11	Enter POC e-mail address
Date	M3	Enter the project date with the year expressed in 4 digits (e.g., 1999 instead of 99)
Project No.	M4	Enter project number to identify project
Energy Category	I2	Use pull-down menu to select the category of the energy project. The numeric energy category appears in M5. (see Categories worksheet for descriptions)

Investment Costs

<i>Input Data</i>	<i>Cell</i>	<i>Description</i>
Construction Costs	G14	Cost for hardware and labor
SIOH	E15	Cost for supervisory inspection and overhead (SIOH default 4%)
Design	E16	Percentage of construction allocated for project design (default 10%)
Salvage Value	M14	Recoverable value of hardware being replaced.
Rebate	M15	Non-federal project cost reimbursements

Energy Savings (Costs)

<i>Input Data</i>	<i>Cell</i>	<i>Description</i>
Utility Cost per Unit	E21 - E31	Cost per unit of utilities affected by project.
Utility Reduction	G21 - G31	Amount of the particular utility affected by project.
Demand Savings	J22	Calculated Annual Demand Savings. Actual calculations must be shown in the Project Package.

Non-Energy Savings (Costs)

<i>Input Data</i>	<i>Cell</i>	<i>Description</i>
Annual Recurring	G36 - G41	Amount of savings that is recovered each year that are not directly attributable to the reduction in energy consumption or demand
Non-Recurring Savings	G38 - G43	Amount of savings that occur once at a user specified year
Year of Occurrence	I38 - I43	The number of years into the project life that a non-recurring non-energy savings occurs

Energy Project Categories

Energy Category	Energy Project Title	Economic Life	Description
1.	EMCS or HVAC Controls	10	Projects which centrally control energy systems with the ability to automatically adjust temperature, shed electrical loads, control motor speeds, or adjust lighting intensities.
2.	Steam and Condensate	15	Projects to install condensate lines, cross connect lines, distribution system loops, repair or install insulation, and repair or install meters and controls.
3.	Boiler Plant Modifications	20	Projects to upgrade or replace central boiler or ancillary equipment to improve overall plant efficiency. This includes fuel switching or dual fuel conversions.
4.	Heating Ventilation, Air Conditioning HVAC Systems	20	Projects to install energy efficient heating, cooling, ventilation or hot water heating equipment. This includes, HVAC distribution systems.
5.	Weatherization	20	Projects improving the thermal envelope of a building. This includes insulation, windows, vestibules, earth berms, shading, etc.
6.	Lighting Systems	15	Projects to install replacement lighting systems and controls. This includes daylighting, new fixtures, lamps, ballasts, photocells, motion sensors, light wells, etc.
7.	Energy Recovery Systems	20	Projects to install heat exchangers, regenerators, heat reclaim units or recapture energy lost to the environment.
8.	Electrical Energy Systems	20	Projects that will 1) increase the energy efficiency of an electrical device or system 2) reduce costs by reducing the peak demand
9.	Renewable Energy Systems	20	Any project utilizing renewable energy. This includes active solar heating, cooling, hot water, industrial process heat, photovoltaic, wind, biomass, geothermic and passive solar applications.
10.	Facility Energy Improvements	20	Multiple category projects or those that do not fall into any other category.
20.	Water Conservation Projects	20	Any project that reduces water consumption.

Uniform Present Value (UPV*) Discount Factors

Table Ba-1. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Census Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont)

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	7.37	7.57	7.16	6.73	8.28	7.48
15	10.7	10.72	10.14	9.51	11.53	10.5
20	13.74	13.51	12.87	12.08	14.38	13.19

Table Ba-2. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Census Region 2 (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin)

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	8.00	7.60	7.11	6.72	8.44	7.11
15	11.51	10.76	10.07	9.51	11.82	9.99
20	14.68	13.56	12.80	12.11	14.78	12.59

Table Ba-3. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Census Region 3 (Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia)

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	7.75	7.62	7.29	6.40	8.39	7.41
15	10.98	10.77	10.24	9.16	11.71	10.40
20	13.87	13.57	12.96	11.73	14.59	13.08

Table Ba-4. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel.

Census Region 4 (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming)

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	7.80	8.13	7.14	7.31	8.20	6.78
15	10.82	11.51	10.07	10.18	11.50	9.47
20	13.49	14.52	12.75	12.91	14.52	11.94

Table Ba-5. UPV* discount factors adjusted for average fuel price escalation by end-use sector and major fuel. United States Average

N	Industrial					Residential
	ELEC	DIST	RESID	NTGAS	COAL	LPG
10	7.78	7.75	7.21	6.64	8.40	7.23
15	11.05	10.97	10.16	9.42	11.74	10.15
20	13.99	13.83	12.88	12.02	14.67	12.79

Uniform Present Value Discount Factors

Table A-2. UPV N	DOE Discount Rate	Table A3-a UPV* @ 2% Water Non Fuel
10	8.53	9.48
15	11.94	13.89
20	14.88	18.08

Table A-1. Single Present Value (SPV) DOE Discount Factors

N	SPV	Entered Savings
0	1	0
1	0.971	0
2	0.943	0
3	0.915	0
4	0.888	0
5	0.863	0
6	0.837	0
7	0.813	0
8	0.789	0
9	0.766	0
10	0.744	0
11	0.722	0
12	0.701	0
13	0.681	0
14	0.661	0
15	0.642	0
16	0.623	0
17	0.605	0
18	0.587	0
19	0.570	0
20	0.554	0

Payback Calculation

Investment Cost	Investment Less Savings	Investment Left	Logical Column	Payback Calc.
275,000	249,978.60	249,979	0	FALSE
	224,957.20	224,957	0	FALSE
	199,935.80	199,936	0	FALSE
	174,914.40	174,914	0	FALSE
	149,893.00	149,893	0	FALSE
	124,871.60	124,872	0	FALSE
	99,850.20	99,850	0	FALSE
	74,828.80	74,829	0	FALSE
	49,807.40	49,807	0	FALSE
	24,786.00	24,786	0	FALSE
	-235.40	0	1	10.99
	-25,021.40	0	2	11.00
	-25,021.40	0	3	12.00
	-25,021.40	0	4	13.00
	-25,021.40	0	5	14.00
	-25,021.40	0	6	15.00
	-25,021.40	0	7	16.00
	-25,021.40	0	8	17.00
	-25,021.40	0	9	18.00
	-25,021.40	0	10	19.00
	-25,021.40	0	11	20.00

Tables

5	State	Two Letter Abbreviation	Region	9	Energy Category	Energy Project Title	Economic Life
1	Alabama	AL	3	1	1	EMCS or HVAC Controls	10
2	Alaska	AK	4	2	2	Steam and Condensate Systems	15
3	Arizona	AZ	4	3	3	Boiler Plant Modifications	20
4	Arkansas	AR	3	4	4	HVAC	20
5	California	CA	4	5	5	Weatherization	20
6	Colorado	CO	4	6	6	Lighting Systems	15
7	Connecticut	CT	1	7	7	Energy Recovery Systems	20
8	Delaware	DE	3	8	8	Electrical Energy Systems	20
9	Dist of Columbia	DC	3	9	9	Renewable Energy Systems	20
10	Florida	FL	3	10	10	Facility Energy Improvements	20
11	Foreign Base	FB	5	11	20	Water Projects	20
12	Georgia	GA	3				
13	Hawaii	HI	4				
14	Idaho	ID	4				
15	Illinois	IL	2				
16	Indiana	IN	2				
17	Iowa	IA	2				
18	Kansas	KS	2				
19	Kentucky	KY	3				
20	Louisiana	LA	3				
21	Maine	ME	1				
22	Maryland	MD	3				
23	Massachusetts	MA	1				
24	Michigan	MI	2				
25	Minnesota	MN	2				
26	Mississippi	MS	3				
27	Missouri	MO	2				
28	Montana	MT	4				
29	Nebraska	NE	2				
30	Nevada	NV	4				
31	New Hampshire	NH	1				
32	New Jersey	NJ	1				
33	New Mexico	NM	4				
34	New York	NY	1				
35	North Carolina	NC	3				
36	North Dakota	ND	2				
37	Ohio	OH	2				
38	Oklahoma	OK	3				
39	Oregon	OR	4				
40	Pennsylvania	PA	1				
41	Rhode Island	RI	1				
42	South Carolina	SC	3				
43	South Dakota	SD	2				
44	Tennessee	TN	3				
45	Texas	TX	3				
46	Utah	UT	4				
47	Vermont	VT	1				
48	Virginia	VA	3				
49	Washington	WA	4				
50	West Virginia	WV	3				
51	Wisconsin	WI	2				
52	Wyoming	WY	4				

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