



ENERGY,  
INSTALLATIONS  
AND ENVIRONMENT

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE

3400 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3400

October 14, 2015

MEMORANDUM FOR ASSISTANT SECRETARY OF DEFENSE (HEALTH AFFAIRS)  
ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,  
ENERGY AND THE ENVIRONMENT)  
ASSISTANT SECRETARY OF THE NAVY (ENERGY,  
INSTALLATIONS AND ENVIRONMENT)  
ASSISTANT SECRETARY OF THE AIR FORCE  
(INSTALLATIONS, ENVIRONMENT AND LOGISTICS)  
DIRECTORS OF THE DEFENSE AGENCIES

SUBJECT: Submissions of Projects for the FY 2017 Energy Conservation Investment Program (ECIP) and Plans for the Remainder of the Future Years Defense Program

This memorandum is a data call for Defense Components to submit proposed ECIP projects for FY 2017 and for the remainder of the Future Years Defense Program (FY 2018 to FY 2021). Detailed guidance for the FY 2017 ECIP program is included in Attachment A.

Please provide your proposed FY 2017 projects in the "FY17 ECIP Project Submission Template" (Attachment B) and upload the associated project documentation to the ECIP Portal. In general, your submissions should focus on proposed projects that would not necessarily be candidates for third party financing or Operations and Maintenance (O&M) funds. Please return Attachment B and upload projects by **16 December 2015**.

To support advanced project and program planning, submit proposed projects across the remainder of the five-year planning period (FY 2018 – FY 2021) using the "FY18-21 ECIP Project Submission Template" (Attachment C). In addition to aligning ECIP planning with the rest of your MilCon planning process, this will enable you to communicate funding plans for phased and multi-year ECIP projects. Please return Attachment C by **31 March 2016**.

Please direct all submissions and questions to CDR Wally Ludwig at [walter.s.ludwig.mil@mail.mil](mailto:walter.s.ludwig.mil@mail.mil). Thank you for your continued support of this critical program.

Lisa A. Jung

Deputy Assistant Secretary of Defense  
(Installation Energy)

Attachments:  
As stated

## Attachment A

### ECIP GUIDANCE

#### **Introduction**

ECIP is a critical element of the Department of Defense's strategy to improve the energy performance of its fixed installations. As a Military Construction (MilCon) program, ECIP has traditionally funded small projects that promise a significant payback in reduced energy costs. Although ECIP has enjoyed strong support from Congress and the Office of Management and Budget, it is a relatively small program, expected to remain at \$150M annually for FY 2017 to FY 2021. At this funding level, the program will provide less than 10% of the Department's projected investment needed to meet the energy goals. The Components will continue to budget or seek other sources of funding for the majority of investments needed to reach the energy goals and manage larger programs aimed at reducing energy consumption, expanding renewable energy supply and integrating energy resilience into investment decisions.

#### **Strategic Vision for the Program**

Consistent with the Department's facility energy strategy, ECIP will fund more holistic projects, leveraging the Components' other investments in energy efficiency. The overarching program objectives that guide this concept give preference to projects that:

- a) Dramatically reduce energy consumed at an individual installation or joint base;
- b) Integrate multiple energy savings, monitoring, or renewable energy technologies to realize synergistic benefits;
- c) Implement a documented energy plan for a given installation, region, department or Component. Special consideration will be given to projects that are part of an installation energy master plan; and
- d) Implement a technology validated in a demonstration program (such as the Environmental Security Technology Certification Program (ESTCP), General Services Administration's Green Proving Ground (GPG), Department of Energy's Commercial Buildings Integration Funding Opportunity Announcement (CBI FOA), Navy's TechVal program or other similar test bed programs) or an innovative technology that represents potentially significant improvement over existing technology. Appendix III contains links to websites for the test bed programs referenced here.

#### **Definition**

ECIP is a subset of the Defense-Wide Military Construction Program (MilCon), specifically intended to fund projects that save energy or reduce DoD's energy costs. The Program supports construction of new, high-efficiency energy systems and the improvement and modernization of existing energy systems.

Authority for the ECIP program is established by [10 USC § 2914](#). In addition, Congress typically authorizes projects over \$3M in the annual National Defense Authorization Act (NDAA), based on DoD's President's Budget submission. While DoD retains the broad authority established by

10 USC, every effort should be made to minimize the changes between the projects authorized in the NDAA and your final execution plan.

There are two types of ECIP funds:

- a) Construction funds are intended for executing planned ECIP projects. Construction funds are typically obligated through a Design/Build or Design/Bid/Build contract. ECIP construction funds may be obligated for four years following the year of appropriation. ECIP construction funds may be combined with prior year ECIP construction funds, so long as the prior year funds are still eligible for obligation. ECIP construction funds may not be combined with any other funding source.
- b) Planning and Design (P&D) funds are intended for planning and architectural & engineering services required to prepare ECIP projects for execution. ECIP P&D funds may be combined with prior year ECIP P&D funds, so long as the prior year funds are still eligible for obligation.

For the FY 2017 program, funding will be available for obligation until 30 September 2021.

**Funding Allocation**

Consistent with the strategic vision for the Program, ECIP funding will be allocated using a methodology that:

- a) Allows projects to compete against other submitted projects based on several criteria; and
- b) Identifies target shares of capital across three categories of projects: Renewable Energy, Energy Efficiency and Water Conservation.

Please note: while “Energy Resilience” is not considered as its own project category, projects that seek to improve energy resilience may be considered if their project attributes compare favorably against other projects submitted for consideration.

Table 1 below illustrates the target funding allocation by project category, assuming a \$150M FY 2017 ECIP Appropriation. This allocation may be adjusted based on the composition of projects submitted in each category.

	<b>Renewable Energy</b>	<b>Energy Efficiency</b>	<b>Water Conservation</b>
Percent Allocation	25%	65%	10%
Funding Allocation	\$37.5M	\$97.5M	\$15M

**Table 1 - Target ECIP Funding Allocation by Category**

**Prioritization Criteria and Process**

The Office of the Deputy Assistant Secretary of Defense (Installation Energy) (hereinafter IE) will evaluate and prioritize projects within each of the three categories using a multi-objective optimization tool. This tool will collectively and simultaneously assess all candidate projects across multiple selection criteria. This holistic analysis methodology will maximize the benefit

of the selected portfolio of projects, both in terms of financial benefits and in terms of the “Strategic Vision for the Program” as discussed above.

This approach will elucidate the complex tradeoffs between key financial and energy metrics, enabling exploration and analysis of a broader set of portfolio options, resulting in improved project recommendations relative to the previously-used manual analysis approach.

IE will use the tool to conduct an analysis of the submitted projects to determine the optimal portfolio of projects which maximizes the following criteria:

- a) Net Present Value - based on project provided SIR, economic life, investment value and annual savings values;
- b) Service Priority;
- c) The degree to which projects are part of a documented installation, region, department or component energy plan. Special consideration will be given to projects that are part of an installation energy master plan;
- d) The degree to which projects implement a demonstrated test bed technology or other innovative technology;
- e) The degree to which projects integrate multiple technologies to realize synergistic benefits; and
- f) The degree to which projects contribute to annual energy efficiency, renewable energy and water conservation goals.

The final selected portfolio will be subject to the following additional constraints:

- a) The overall portfolio SIR must achieve a minimum value of 2.0.
- b) The portfolio should closely match the Target Funding Allocation by Category (as shown in Table 1 above).

### **Responsibilities and Program Administration**

IE centrally manages the ECIP Program and is responsible for keeping Congress informed of Program execution and results. In turn, the Defense Components are responsible to identify and execute ECIP projects and provide consistent and regular updates on the progress of their Program’s implementation.

As such, each Defense Component shall:

- a) Execute those projects forwarded to Congress within funds allocated by the Under Secretary of Defense (Comptroller);
- b) Maintain current, auditable documentation and report consistently on the execution of each approved ECIP project; and
- c) Identify a representative to serve as point of contact for matters related to programmatic decisions, administration and communication with IE.

In order to streamline the management and administration of the Program and facilitate the proposal, approval, tracking and monitoring processes of ECIP projects, OSD maintains a centralized web-based portal which supports all ECIP project submissions and subsequent updates. The ECIP Portal enables the Defense Components and IE to track the status and actual

performance of ECIP projects and thus offer better insight into the Program's overall effectiveness. Refer to Appendix I for instructions on how to access and register to use the ECIP Portal.

It's critically important that the ECIP Portal consistently and accurately reflects the current ECIP Program. The Portal is most useful for all users when the data is current and analysis, inquiries and reports can be completed without data calls or concern for the accuracy of the data. To maintain currency, all projects' ECIP Portal records shall be updated at the following milestones at a minimum:

- a) **Project Creation:** All projects submitted for consideration for FY 2017 ECIP funds shall be uploaded as "proposed" projects in the ECIP Portal before the submission deadline of 15 December 2015, along with appropriate supporting documentation, DD 1391 and Life Cycle Cost Analysis (LCCA). Projects not uploaded to the portal by the deadline will not be considered for the FY 2017 program.  
Responsibility: Service Point of Contact (POC) or Project POC (Service POC and Project POC are role-based access types established within the ECIP Portal)
- b) **Project Creation:** For all other projects added to the program using available prior-year funds, project data including DD 1391 and LCCA shall be uploaded immediately upon approval of the project by IE.  
Responsibility: Service POC or Project POC
- c) **Project Selected for Funding:** Upon notification of selection for ECIP funding (i.e. included on the President's Budget submission), project status shall be changed to "budgeted."  
Responsibility: IE
- d) **Project Included in Annual Congressional Notification:** Upon receipt of appropriations for a particular program year, IE submits a notification to Congress which identifies projects that will be funded. Project status for projects identified on the notification shall be changed to "appropriated."  
Responsibility: IE
- e) **Project Awarded:** Upon contract award, the project status shall be changed to "awarded." In addition, ensure project cost is updated with actual award amount and award date is populated.  
Responsibility: Service POC or Project POC
- f) **Project Under Construction:** When construction begins, the project status shall be changed to "under construction."  
Responsibility: Service POC or Project POC
- g) **Construction Completed:** Upon commission and initiation of energy savings, project status shall be updated to "completed/operational."  
Responsibility: Service POC or Project POC
- h) **Project Cancelled:** Upon cancellation of a project at any stage, project status shall be updated to "cancelled."  
Responsibility: Service POC or Project POC
- i) **Project Decommissioned:** When the project has served its useful life and is taken out of operation, project status shall be updated to "decommissioned."  
Responsibility: Service POC or Project POC

- j) **Project Change:** If at any stage during the life of the project there is any significant change in cost, scope or any other aspect of the project, notify IE of the change. Include circumstance of the change, reasons for the change, cost and scope impacts and funding availability. A template for notification is included as Appendix II. Provided no objection exists, contracts or contract modifications may be awarded 14 days after submission or upon written approval from IE.  
Responsibility: Service POC or Project POC
- k) **Actual Performance Data:** Defense Components shall provide actual performance data of their completed projects on an annual basis. Updates shall reflect actual performance data for the previous year. Annual updates shall be made on the Portal no later than 31 October each year.  
Responsibility: Service POC or Project POC

Components are responsible for ensuring their program amount does not exceed a given year's allotment. In other words, project cost escalation must be accompanied by reduction to or elimination of other projects to make room for desired program changes. Full description of program changes shall be included in notification to IE.

Each quarter, Components will validate a report generated from ECIP Portal data. IE will prepare the report and send to Components for validation. Components will be required to:

- a) Verify that projects listed in the report reflect the current program.
- b) Verify that project data, including Program Amount (PA), SIR, Payback, savings and award data (if applicable) is accurate.
- c) Validate balance of ECIP construction and P&D funds for each year of active funding.
- d) Provide feedback on any discrepancies.
- e) Update ECIP portal to correct any discrepancies.

Validation will occur each year on January 31, April 30, July 31 and October 31.

Beginning with the FY 2016 ECIP funding year, replacements for canceled projects will be selected by IE from a prioritized list of previously submitted but non-selected projects. If necessary, funds associated with the canceled project will be returned to OSD Comptroller for redistribution.

For projects canceled from program years prior to FY 2016, the Component canceling the project will propose replacement project(s).

### **ECIP Annual Timeline**

The ECIP process follows a fairly regular cycle with which Components should be familiar. Following is a description of the major milestones in the annual cycle along with specific dates for the current cycle:

- September/October: OSD releases ECIP guidance for the upcoming ECIP cycle.
- 31 October: ECIP Portal validation report distributed and annual performance updates due.

- 15 December 2015: Components submit proposed FY 2017 projects to IE.
- January: IE submits selected ECIP program to USD (Comptroller) for inclusion in the President's Budget (PB).
- 31 January: ECIP Portal validation report distributed.
- February/March: USD (Comptroller) submits PB to the Office of the President.
- 31 March 2016: Components submit proposed projects for FY 2018-2021.
- April/May: IE as well as some Components participate in Congressional Staffer Days which includes a brief on the ECIP program.
- 30 April: ECIP Portal validation report distributed.
- Upon receipt of appropriations: IE sends Congressional Notification for projects intended to be awarded with program funds. Notification also includes changes to previously appropriated projects. Following a 21-day waiting period, USD (Comptroller) will distribute funds to Components. In the recent past, appropriations have not been distributed until 3<sup>rd</sup> quarter. Anticipate that during 3<sup>rd</sup> quarter of FY 2016, OSD will receive appropriations to fund the FY 2016 ECIP program.
- 31 July: ECIP Portal validation report distributed.
- July/August: Working group meetings (if necessary) with representatives from DoD Components are conducted to continuously improve the ECIP process and prepare for the upcoming cycle.

### **Economic Analysis**

The program requires Life-Cycle Cost Analysis (LCCA) to assess the long-term cost-effectiveness of proposed projects. This method applies to any capital investment decision in which the benefit of future cost reductions offsets the initial capital costs. LCCA considers all costs associated with an alternative over its entire useful life. It also considers the cost arising from constructing or procuring, operating, maintaining and ultimately disposing of a project. All projects submitted as part of the initial budget submission or as replacement for a cancelled project require LCCA as well as a DD Form 1391, Military Construction Project Data..

Components shall base the Savings-to-Investment Ratio and the LCCA on the recommended useful life of a retrofit or the remaining life of the basic facility being retrofitted, whichever is less (see Appendix III, Table 3). In addition, Components shall use the actual cost of energy purchased for use at the facility as the basis for energy cost analysis, rather than stock fund prices or Working Capital Fund rates as these rates are often out-of-date and may include storage and other overhead costs.

The National Institute of Standards and Technology (NIST) and DoD publish numerous documents to assist in the development of economic analysis of candidate ECIP projects. (See Appendix III).

### **Measurement & Verification (M&V)**

In general, all ECIP projects require M&V to facilitate tracking of energy/water savings or generation. Components shall develop M&V plans to be uploaded to the ECIP Portal before project award. M&V plans shall propose M&V activities that have the most likelihood of being performed in the current budget and resource constrained environment. Automating data collection and/or data analysis to the maximum extent possible may reduce the amount of

resources necessary to document project performance. In addition, the cost of conducting M&V activities should be commensurate with estimated savings potential of the project. In other words, M&V costs should not significantly impact the savings realized from the project. M&V plans shall address, at a minimum:

- a) How baseline conditions will be measured or calculated;
- b) How post-upgrade energy savings will be measured or calculated;
- c) Equipment necessary for M&V;
- d) Responsibilities and processes to ensure data are captured timely and accurately;
- e) How data will be used to monitor equipment performance;
- f) Opportunities for continuous improvement of data collection;
- g) Overview of proposed energy and cost savings;
- h) Utility rates and the method used to calculate cost savings;
- i) Details of baseline conditions and data collected;
- j) Documentation of all assumptions and sources of data;
- k) Details of post-installation verification activities, including inspections, measurements, and analysis;
- l) Content and format of all M&V reports (post-installation and periodic M&V).

### **Information Technology and Platform IT (PIT) Control Systems (CS)**

Many of the projects funded with ECIP require installation or modification IT, including Platform IT (PIT). PIT consists of hardware and software that are physically part of, dedicated to or essential to the mission performance of special purpose systems. Control Systems (CS) are a type of PIT that encompasses several types of control systems utilized in operating DoD buildings, utilities, and other infrastructure that require similar – yet specialized – actions to ensure they remain cybersecure.

In order to ensure that PIT CS systems installed or modified under the ECIP program have the proper security controls and compatibility, all ECIP projects involving PIT-CS must account for the initial cost of assessing and authorizing (A&A) the PIT-CS under the Risk Management Framework (RMF). ECIP funds may be used to implement requirements of the RMF. In some cases, other entities such as base network or IT organizations may have agreed to pay the costs associated with A&A of these systems. In either case, DD Form 1391s for ECIP projects shall identify the anticipated cost of A&A and identify the source of the funding if it's not ECIP. DD Form 1391s should also identify expected recurring cost for sustainment of PIT-CS as an Operations & Maintenance appropriation expense, and acknowledge that the appropriate public works organization agrees to budget for future sustainment costs. ECIP funds shall not be used for any IT costs beyond initial assessment and authorization.

For prior year ECIP projects (FY 2016 and earlier) ECIP funds may be used to pay for PIT-CS A&A ONLY if those cost are identified and accounted for before contract award. ECIP funds shall not be used to modify existing contracts to include the cost of A&A. No additional ECIP funds will be made available from OSD to account for A&A cost on prior year projects. Funds must come from a Components' available unobligated balance. Components shall notify IE, before contract award, on any previously approved project that intends to add A&A using ECIP funds.

In order to ensure all projects compete on a fair basis for funding decisions, the anticipated cost for A&A shall NOT be included in LCCA calculations to determine SIR and simple payback.

Guidance for RMF and PIT-CS A&A can be found in the references in Appendix III.

## Appendix I

### ECIP Portal

The ECIP Portal is found at the following link: <https://rpuir.maf.ustranscom.mil/ECIP/index.jsp>. The ECIP Portal Guide (uploaded to the “References” section of the ECIP Portal) provides information and instruction on how to navigate through the site, submit, update and track projects in the Portal.

Users are required to register in order to access and use the site:

- a) Minimum System Requirements Browser.
  - 1) Internet Explorer 7+ web browser with CSS and JavaScript support enabled
  - 2) Firefox 3.6.x with CSS and JavaScript support enabled
  
- b) User Requirements
  - 1) Users must have a valid Certificate/Certificate Authority and Common Access Card
  - 2) Foreign nationals must have approval from the Designated Approving Authority (DAA). Contact the ECIP help desk at [AMC.A6II.rpuir@scott.af.mil](mailto:AMC.A6II.rpuir@scott.af.mil) to complete the registration process.
  - 3) Any users who will need to access ECIP from outside of a “.mil” environment (e.g., “.edu,” “.com”) must complete a DD Form 2875 System Authorization Access Request. To access the form, see:
  - 4) <http://www.dtic.mil/whs/directives/infomgt/forms/forminfo/forminfo3211.html>
  
- c) Registration Process
  - 1) Send a signed and encrypted email to the ECIP Helpdesk at [AMC.A6II.rpuir@scott.af.mil](mailto:AMC.A6II.rpuir@scott.af.mil) containing:
    - A. Completed DD Form 2875 (if applicable)
    - B. DAA approval (if applicable)
    - C. Internet Protocol (IP) address
      - i) Users can obtain their IP address by clicking <http://www.ipchicken.com>.
      - ii) For users with non-fixed IP addresses, it may be necessary to request firewall rule changes to account for IP and web proxy changes from their locations. A user may be unable to access the ECIP in the event they are assigned a new IP address.
  - 2) Click on <https://rpuir.scott.af.mil/ECIP/index.jsp> and complete the registration form. Each user must select an account type:
    - A. Standard – Allows users to access project information and reports.
    - B. Project Manager – Allows users to enter and update ECIP projects.

## Appendix II

### Changes Notification Sample/Template

[Date]

#### [Project Number and Title] Change Notification

BLUF: A short description of the reason for the change, the cost impacts, the SIR/Payback impact and recommended action.

#### DETAILS:

##### 1) Scope

- a. Original Scope: A description of the original approved scope.

ECIP Program Amount: \$[**original PA**]

SIR: [**original SIR**]

Payback: [**original payback**]

Energy/Water Savings: [**original savings**]

- b. Revised Scope: A description of the proposed scope.

ECIP Program Amount: \$[**new PA**]

SIR: [**new SIR**]

Payback: [**new payback**]

Energy/Water Savings: [**new savings**]

- 2) Reason for Change: A description of the circumstances that necessitate the proposed change.
- 3) Financial Impacts: A discussion of the financial impacts, including source and year of any additional funds needed or disposition of additional funds created by the proposed change.
- 4) Other Details: A discussion of any other pertinent details or alternative solutions considered.

RECOMMENDATION: Recommended action for which you are seeking IE approval.

#### Attachments:

1. Original DD1391
2. Revised DD1391
3. Original LCCA
4. Revised LCCA
5. Any other pertinent documents

## Appendix III

### References

#### **Technical Assistance for Life- Cycle Cost Analysis**

- a. *Financial Management Regulation*, DoD 7000.14-R, Vol 2b, Chapter 6
- b. *Economic Analysis for Decision Making*, DoDI 7041.03, Sept 9, 2015
- c. The Department of Energy (DOE) Federal Energy Management Program (FEMP) maintains a webpage entitled “Life Cycle Cost Analysis for Sustainable Buildings” located here: <http://www1.eere.energy.gov/femp/program/lifecycle.html>. This page includes links to many life-cycle costing resources including:
  - 1) *Life-Cycle Costing Manual for the Federal Energy Management Program*, NIST Handbook 135 (current version 1995).
  - 2) The Annual Supplement to NIST Handbook 135, *Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis*, NISTIR 85-3273-25
  - 3) *Life Cycle Cost Discount Rates and Energy Price Projections*
  - 4) *NIST “Building Life-Cycle Cost” BLCC Computer Program*
  - 5) Training courses and other resources for conducting LCCAs
- d. *Present Worth Factors for Life-Cycle Cost Studies in the Department of Defense*, NISTIR 4942 (Current version 1996)  
<http://fire.nist.gov/bfrlpubs/build96/PDF/b96077.pdf>
- e. *The Memorandum of Agreement on Criteria/Standards for Economic Analysis/Life-Cycle Costing for MILCON Design (1991)*  
<http://www.wbdg.org/pdfs/moa.pdf>

The Tri-Services memorandum establishes criteria and standards for performing economic analysis for MILCON projects and presents a discounting approach that is different, yet consistent with the LCC rule promulgated in 10 CFR 436.

- f. *The Life-Cycle Cost in Design (LCCID) program*.

LCCID program and application assistance is available from the Building Loads Analysis System Thermodynamics (BLAST) Support Office, Army Construction Engineering Research Laboratory, Champaign, IL, by calling 217-333-3977 or emailing [support@blast.bso.uiuc.edu](mailto:support@blast.bso.uiuc.edu).

#### **Measurement & Verification Guidance**

- g. *FEMP M&V Guidelines: Measurement and Verification for Federal Energy Projects Version 3.0*  
[http://www1.eere.energy.gov/femp/pdfs/mv\\_guidelines.pdf](http://www1.eere.energy.gov/femp/pdfs/mv_guidelines.pdf)

## **Information Technology and Platform IT/Control Systems Security**

- h. NIST Special Publication 800-53, Security and Privacy Controls for Federal Information Systems and Organizations:  
<http://dx.doi.org/10.6028/NIST.SP.800-53r4>
- i. NIST Special Publication 800-82, Guide to Industrial Control Systems Security:  
<http://dx.doi.org/10.6028/NIST.SP.800-82r2>
- j. Federal Information Processing Standards Publication 200: Minimum Security Requirements for Federal Information and Information Systems  
<http://csrc.nist.gov/publications/fips/fips200/FIPS-200-final-march.pdf>
- k. DODI 8500.01, Cybersecurity:  
[www.dtic.mil/whs/directives/corres/pdf/850001\\_2014.pdf](http://www.dtic.mil/whs/directives/corres/pdf/850001_2014.pdf)
- l. DODI 8510.01, Risk Management Framework for DoD Information Technology:  
[www.dtic.mil/whs/directives/corres/pdf/851001\\_2014.pdf](http://www.dtic.mil/whs/directives/corres/pdf/851001_2014.pdf)
- m. Additional information about PIT-CS and associated cybersecurity requirements may be found on the DoD Chief Information Officer's Risk Management Framework Knowledge Service portal, <https://rmfks.osd.mil/login.htm>.

## **Technology Test Bed Links**

- n. OSD Environmental Security Technology Certification Program:  
<http://www.serdp-estcp.org/Program-Areas/Energy-and-Water>
- o. GSA Green Proving Ground:  
[www.gsa.gov/greenprovingground](http://www.gsa.gov/greenprovingground)
- p. DoE Commercial Buildings Integration Funding Opportunity Announcement (currently no consolidated website)
- q. Navy's TechVal  
<https://navyenergy.navfac.navy.mil/projects/techval.html>
- r. National Renewable Energy Lab (NREL) Technology Performance Exchange (TPEX)  
<https://performance.nrel.gov>
- s. DOE Technology Deployment List  
<http://energy.gov/eere/femp/technology-deployment-list>

**Conversion factors for calculations of energy savings**

<b>Commodity</b>	<b>Conversion</b>
Purchased electricity	3,412 BTU per kWh
Purchased steam	1,000 BTU per lb
Distillate fuel oil	138,700 BTU per gal
Natural gas	1,031 BTU per ft <sup>3</sup>
LPG, propane, butane	91,960 BTU per gal
Butane	102,032 BTU per gal
Bituminous coal	24,000,000 BTU per short ton
Anthracite coal	25,000,000 BTU per short ton
Residual fuel oil #1	135,425 BTU per gal
Residual fuel oil #2	138,000 BTU per gal

**Table 2**

## Estimated Useful Life of Energy Efficiency, Renewable Energy and Water Conservation Technologies

Project Category	Technology	Economic Life	Description
Energy Efficiency (EE)	EMCS or HVAC Controls	15 years	Projects that centrally control energy systems with the ability to adjust temperature, shed electrical loads, control motor speeds or adjust lighting intensities.
EE	Steam and Condensate Systems	20 years	Projects to install condensate lines, cross-connect lines, distribution system loops, repair or install insulation, and repair or install steam flow meters and controls.
EE	Boiler Plant Modifications	20 years	Projects that upgrade or replace central boilers or ancillary equipment to improve overall plant efficiency. This includes fuel switching or dual fuel conversions.
EE	Heating, Ventilation, Air Conditioning	20 years	Projects to install more efficient heating, cooling, ventilation or domestic hot water heating equipment. This includes the HVAC distribution system (ducts, pipes, etc.).
EE	Weatherization	15 years	Projects that improve the thermal envelope of a building. This includes building insulation (wall, roof, foundation, doors), windows, vestibules, earth berms, shading, etc.
EE	Lighting Systems	15 years	Projects to install replacement lighting systems and controls. This would include new fixtures, lamps, ballasts, photocells, motion sensors, light wells, highly-reflective painting, etc.
EE	Energy Recovery Systems	20 years	Projects to install heat exchangers, energy wheels, heat reclaim units or other systems to recapture energy lost to the environment.
EE	Electrical Energy Systems	25 years	Projects that increase the energy efficiency of an electrical device or system or reduce the cost by reducing peak demand.
EE	Daylighting	25 years	Projects that optimize natural light for internal lighting.
Water Conservation (WC)	Potable Water Conservation	20 years	Projects that involve devices or processes to reduce potable water loss, waste or use .most of these are in the ground, but liners will be less in ponds but under normal maintenance.
WC	Non-Potable Water Conservation	25 years	Projects that involve the re-use, recycling and eventual reduction of non-potable water such as waste water and irrigation run-off most of these are in the ground, but pumps etc are under normal maintenance.
Renewable Energy (RE)	Geothermal	40years	Projects that generate electrical power or process thermal energy using a high-temperature geothermal source.
RE	Ground Source Heat Pump	40 years	Projects to install a central heating and/or cooling system to store and retrieve heat from the ground. 40 years for in-ground systems, 15 years for controls.
RE	Hydroelectric	30 years	Projects to generate electrical power using water as the potential energy source.
RE	Solar Power	25 years	Projects to generate electrical power with a heat engine using solar energy as the source (solar Stirling engines, heliostats, etc.)
RE	Solar Photovoltaic	25 years	Projects to install solar photovoltaic panels to generate electrical power.
RE	Solar Thermal	25 years	Projects to generate thermal energy using solar energy as the source.
RE	Waste to Energy	30 years	Projects to generate electrical power using waste products as the energy source.
RE	Waste to Fuel	30 years	Projects to generate fuel products from waste products.
RE	Wind	25 years	Projects to generate electrical power using wind energy as the source.
RE	OTEC – Ocean	25 years	Projects to generate electrical power using deep ocean thermal gradients as the source.
RE	Biofuels	25 years	Projects to develop liquid fuel sources (biodiesel, ethanol, etc.) from biomass feedstocks.
RE	Biogas	25 years	Projects to develop gas fuel sources from the breakdown of organic matter.
RE	Hydrokinetic	25 years	Projects to generate electrical power using the energy available in waves or water currents.

Table 3

## Sample Format – Life Cycle Cost Analysis for ECIP Projects

LIFE CYCLE COST ANALYSIS SUMMARY						
LOCATION: USAG Benelux (Chievres)			REGION: EUROPE		PROJECT NO: 78801	
PROJECT TITLE: Install a 187 kWc Solar PV Array					FISCAL YEAR: 2013	
ANALYSIS DATE: 09/06			ECONOMIC LIFE: 20		PREPARED BY:	
1. INVESTMENT:						
A.	CONSTRUCTION COST		=			\$1,271,000
B.	SIOH COST		(6.5% of 1A) =			\$82,615
C.	DESIGN COST		(est 5% of 1A)			\$63,550
D.	TOTAL COST		(1A +1B +1C) =			\$1,417,165
E.	SALVAGE VALUE OF EXISTING EQUIPMENT		=			\$0
F.	PUBLIC UTILITY COMPANY REBATE		=			\$0
G.	TOTAL INVESTMENT		(1D -1E -1F) =		----->	\$1,417,165
2. ENERGY CONSUMPTION:						
DATE OF NISTR 85-3273-9 USED FOR DISCOUNT FACTORS:					May '10	
	ENERGY SOURCE	FUEL COST \$/MMBTU (1)	CONSUMPTION MMBTU/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A.	ELECT.	49.8000	1,253	\$62,399	14.58	\$909,783
B.	WATER (kgal)	0.0000	0	\$0	0.00	\$0
C.	NAT. GAS	0.0000	0	\$0	0.00	\$0
D.	FUEL OIL	0.0000	0	\$0	0.00	\$0
E.	COMPOSITE	0.0000	0	\$0	0.00	\$0
F.	TOTAL		1,253	\$62,399		-----> \$909,783
3. NON-ENERGY SAVINGS (+) OR COST (-)						
A.	ANNUAL RECURRING (+/-)		OCCURANCE			
	1	ANNUAL MAINTENANCE	ANNUAL	(\$6,000)	14.88	(\$89,280)
	2	GREEN CERTIFICATE *	ANNUAL	\$100,347	14.88	\$1,493,163
	* if obtained through procedures					
	6	TOTAL ANNUAL DISC. SAVINGS (+) / COST (-)		\$94,347		\$1,403,883
B.	NON-RECURRING (+/-)					
	ITEM		SAVINGS (+) COST(-) (1)	YEAR OF OCCURRENCE (2)	DISCOUNT FACTOR (3)	DISCOUNTED SAVINGS/COST (4)
	(TABLE A - 2)					
	a.	BASELINE EQUIP. REPLACEMENT	\$0			\$0
	b.					\$0
	c.					\$0
	d.					\$0
	e.					\$0
	f.	TOTAL	\$0			\$0
C.	TOTAL NON-ENERGY DISCOUNTED SAVINGS (+) OR COST (-)				(3A4 + 3Bf4) =	\$1,403,883
4.	FIRST YEAR DOLLAR SAVINGS (+) / COSTS (-)			(2F3+3A4+(3Bf1/ Economic Life))		\$156,746
5.	SIMPLE PAYBACK (SPB) IN YEARS			(1G/ 4) =		9.04
6.	TOTAL NET DISCOUNTED SAVINGS			(2F5 + 3C) =		\$2,313,667
7.	DISCOUNTED SAVINGS-TO-INVESTMENT RATIO (SIR)			(6/ 1G) =		1.63