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

SUBJECT: FY 2018 Energy Conservation Investment Program (ECIP) and Plans for the
Remainder of the Future Years Defense Program Guidance

This memorandum is a data call for Defense Components to submit proposed ECIP projects for
FY 2018 and for the remainder of the Future Years Defense Program (FY 2019 to FY 2022).
Detailed guidance for the FY 2018 ECIP program is included in Attachment A.

Please provide your proposed FY 2018 projects in the “FY 2018 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 17 November 2016.

To support advanced project and program planning, submit proposed projects across the
remainder of the five-year planning period (FY 2019 – FY2022) using the “FY 2019-22 ECIP
Project Submission Template” (Attachment C). In addition to aligning ECIP planning with the
rest of your Military Construction (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 2017.

Please direct all submissions and questions to CDR Walter Ludwig at
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
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 2018 to FY 2022. At this funding level, the program will provide less than 10% of the Department’s projected investment needed to meet the legislative, executive, and agency requirements. The Defense Components (hereinafter Components) will continue to implement strategies in other facility programs and explore third-party financing opportunities to reduce energy consumption, expand renewable energy supplies, increase water conservation, and enhance energy resiliency.

Strategic Vision for the Program
Consistent with the Department’s installation 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, renewable energy, or energy resilience 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 MilCon Program 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, based on DoD’s President’s Budget submission, Congress typically authorizes projects over $3M by listing the location and Program Amount in the annual National Defense Authorization Act (NDAA). Projects with a value less than $3M are aggregated into a lump sum and the lump sum is listed as
“Various Locations”. (It should be noted there is no specific threshold dollar amount for projects to qualify for ECIP funding.) While DoD retains the broad authority established by 10 USC § 2914, every effort should be made to minimize the changes between the projects authorized in the NDAA and DoD Component final execution plans.

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 augmented by 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 obligated for four years following the year of appropriation and 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 2018 program, funding will be available for obligation until 30 September 2022.

**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


Please note: while there is no specified allocation for “Energy Resilience” in table 1, projects that seek to improve energy resilience may be considered if their project attributes compare favorably against other projects submitted for consideration. These projects must align with the strategic vision of the ECIP program and incorporate some measures of Energy Conservation, Water Conservation, or Renewable Energy technologies.

Table 1 below illustrates the target funding allocation by project category, assuming a $150M FY 2018 ECIP Appropriation. This allocation may be adjusted based on the composition of projects submitted in each category.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding Allocation</td>
<td>$37.5M</td>
<td>$97.5M</td>
<td>$15M</td>
<td>*</td>
</tr>
</tbody>
</table>

Table 1 - Target ECIP Funding Allocation by Category
Funding will be allocated to projects which meet the criteria described in this guidance and compare favorably against other submitted projects, but no specified percentage or funding allocations are currently targeted for energy resilience.

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 four 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 a 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 Savings to Investment Ratio (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 (see Appendix III for test bed technology links);

e) The degree to which projects integrate multiple technologies to realize synergistic benefits;

f) The degree to which projects contribute to annual energy efficiency, renewable energy, and water conservation goals; and

g) The degree to which projects improve an installation’s energy resiliency.

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; and

b) The ECIP program manager will ensure that the DoD portfolio closely matches 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 Components are responsible for identifying and executing ECIP projects and providing 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, including Measurement and Verification (M&V); 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, the Office of the Secretary of Defense (OSD) maintains a centralized web-based portal which supports all ECIP project submissions and subsequent updates. The ECIP Portal enables the 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 2018 ECIP funds shall be uploaded as “proposed” projects in the ECIP Portal before the submission deadline of 17 November 2016, along with appropriate supporting documentation, DD Form 1391, and Life-Cycle Cost Analysis (LCCA). Projects not uploaded to the portal by the deadline will not be considered for the FY 2018 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 Form 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.” The DoD ECIP program manager will notify the Components of projects selected to be “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.” The ECIP program manager will notify the Components of projects selected to be “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. Project status change to “awarded” also requires an M&V plan be uploaded to the portal, see Appendix III for M&V Guidance.
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 notifying IE of a project cancellation at any stage of a project life, project status shall be updated to “cancelled.” A template for notification is included as Appendix II.
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 upon written approval from IE. When IE approves changes to a project, upload the email documentation of the change approval to the portal project record.
Responsibility: Service POC or Project POC

k) Actual Performance Data: Components shall provide actual performance data obtained through the identified project M&V plan of their completed projects on an annual basis within the ‘Performance Update’ tab on the left side of the ECIP Portal Menu. 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 during the entire life-cycle of the project. See Appendix III for M&V guidance.
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; and
e) Update ECIP portal to correct any discrepancies. Validation will occur each year on January 31, April 30, July 31 and October 31.

**Project Changes and Cancellations**
As stated above, 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, the Component shall 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 upon written approval from IE.

If for any reason a project must be cancelled, the Component shall notify IE of the cancellation. A template for notification is included as Appendix II. The Component may propose a replacement project. However, as of the FY 2016 ECIP funding year, replacements for cancelled projects will be selected by IE from a prioritized list of previously submitted, but non-selected projects. If necessary, funds associated with the cancelled 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:

- **July/August**: OSD releases ECIP guidance for the upcoming ECIP cycle.
- **31 October**: Quarterly ECIP Portal validation report distributed and annual performance updates due.
- **17 November 2016**: Components submit proposed FY 2018 projects to IE.
- **January**: IE submits selected ECIP program to the Under Secretary of Defense (USD) (Comptroller) for inclusion in the President’s Budget (PB).
- **31 January**: Quarterly ECIP Portal validation report distributed.
- **February/March**: USD (Comptroller) submits PB to the Office of the President.
- **April/May**: IE as well as some Components participate in Congressional Staffer Days which includes a brief on the ECIP program.
- **30 April**: Quarterly 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 waiting period (14 days for electronic submission or 21 days for paper submission) USD (Comptroller) will distribute funds to Components. In the recent past, appropriations have not been distributed until 3rd quarter of a project’s programmed year. Anticipate that during the 3rd quarter of FY 2017, OSD will receive appropriations to fund the FY 2017 ECIP program.
- **31 July**: Quarterly 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 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 a LCCA as well as a DD Form 1391, Military Construction Project Data.

Components shall base the SIR 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 (See Appendix III for M&V Guidance). 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; and
I) Content and format of all M&V reports (post-installation and periodic M&V).

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

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

- Advanced Metering Infrastructure (AMI)
- Building Automation Systems
- Building Management Control Systems
- CO2 Monitoring
- Emergency Management Systems
- Energy Management Systems
- Exterior Lighting Control Systems
- Fire Alarm Systems
- Fire Sprinkler Systems
- Interior Lighting Control Systems
- Public Safety/Land Mobile Radios
- Renewable Energy Geothermal Systems
- Renewable Energy Photovoltaic Systems
- Shade Control Systems
- Smoke and Purge Systems
- Vertical Transport System (Elevators and Escalators)
- Laboratory Instrument Control Systems
- Laboratory Information Management Systems (LIMS)

In order to ensure that PIT-CS systems installed or modified under the ECIP program have the proper NIST developed security controls applied during the design phase, all ECIP projects involving PIT-CS must account for and fund the initial cost of assessing and authorizing (A&A) the PIT-CS under the Risk Management Framework (RMF). ECIP funds may be used to fund A&A, and other funding sources, such as other procurement funding, may also be used for A&A. Regardless of funding source, all DD Form 1391s for ECIP projects shall identify the anticipated cost of A&A and identify the source of the funding if it is 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 2017 and earlier), ECIP funds may be used to pay for PIT-CS A&A ONLY if those costs 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 costs 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 applying the RMF and PIT-CS A&A can be found in Appendix III.
Appendix I
ECIP Portal

The ECIP Portal is found at the following link: [https://dais.osd.mil/ECIP/index.jsp](https://dais.osd.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 Cascading Style Sheet (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 osd.mc-alex.ousd-atl.mbx.dais-help-desk@mail.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: [http://www.dtic.mil/whs/directives/forms/forminfo/forminfopage3211.html](http://www.dtic.mil/whs/directives/forms/forminfo/forminfopage3211.html)

c) Registration Process
   1) Send a signed and encrypted email to the ECIP Helpdesk at osd.mc-alex.ousd-atl.mbx.dais-help-desk@mail.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 hitting CTR-ALT-I (letter I).
         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://dais.osd.mil/ECIP/index.jsp](https://dais.osd.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/Cancellation Notification

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

DETAILS:

a. 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. (If cancellation, N/A)
      ECIP Program Amount: $[new PA]
      SIR: [new SIR]
      Payback: [new payback]
      Energy/Water Savings: [new savings]

b. Reason for Change/Cancellation: A description of the circumstances that necessitate the proposed change.

c. 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.

d. 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 DD Form 1391
2. Revised DD Form 1391
3. Original LCCA
4. Revised LCCA
5. Any other pertinent documents
Appendix III

References

Technical Assistance for Life-Cycle Cost Analysis


b. Economic Analysis for Decision Making, DoD Instruction (DoDI) 7041.03, Sept 9, 2015

c. The Department of Energy (DOE) Federal Energy Management Program (FEMP) maintains a webpage entitled “Building Life Cycle Cost Programs” located here: [http://energy.gov/eere/femp/building-life-cycle-cost-programs](http://energy.gov/eere/femp/building-life-cycle-cost-programs). This page includes links to many life-cycle costing resources including:
   3) Energy Escalation Rate Calculator
   4) NIST Building Life-Cycle Cost (BLCC5) Program Version 5.3-15


Measurement & Verification (M&V) Guidance


Information Technology (IT) and Platform IT (PIT)-Control Systems (CS) Security


j. DoDI 8500.01, Cybersecurity

k. DoDI 8510.01, Risk Management Framework (RMF) for DoD Information Technology (IT)

l. DoDI 8530.01, Cybersecurity Activities Support to DoD Information Network Operations

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://www.us-cert.gov/forms/csetiso

o. Unified Facilities Criteria (UFC) 4-010-06 Cybersecurity of Facility-Related Control Systems (pending signature and distribution)
   https://wbdg.org/

Technology Test Bed Links

p. DoD Environmental Security Technology Certification Program
   http://www.serdp-estcp.org/Program-Areas/Energy-and-Water

q. General Services Administration (GSA) Green Proving Ground
   www.gsa.gov/greenprovingground

r. DOE Commercial Buildings Integration Funding Opportunity Announcement (currently no consolidated website)
   http://energy.gov/eere/buildings/listings/funding-opportunities

s. Navy’s Technology Validation (TechVal) Program

t. National Renewable Energy Lab (NREL) Technology Performance Exchange (TPEX)
   https://performance.nrel.gov

u. DOE Technology Deployment Site
   http://energy.gov/eere/femp/technology-deployment
### Conversion Factors for Calculations of Energy Savings

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchased electricity</td>
<td>3,412 BTU per kWh</td>
</tr>
<tr>
<td>Purchased steam</td>
<td>1,000 BTU per lb</td>
</tr>
<tr>
<td>Distillate fuel oil</td>
<td>138,700 BTU per gal</td>
</tr>
<tr>
<td>Natural gas</td>
<td>1,031 BTU per ft³</td>
</tr>
<tr>
<td>LPG, propane, butane</td>
<td>91,960 BTU per gal</td>
</tr>
<tr>
<td>Butane</td>
<td>102,032 BTU per gal</td>
</tr>
<tr>
<td>Bituminous coal</td>
<td>24,000,000 BTU per short ton</td>
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<tr>
<td>Anthracite coal</td>
<td>25,000,000 BTU per short ton</td>
</tr>
<tr>
<td>Residual fuel oil #1</td>
<td>135,425 BTU per gal</td>
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<tr>
<td>Residual fuel oil #2</td>
<td>138,000 BTU per gal</td>
</tr>
</tbody>
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Table 2
## Estimated Useful Life of Energy Efficiency, Renewable Energy, and Water Conservation Technologies

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

Table 3
Sample Format – Life-Cycle Cost Analysis (LCCA) 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 |

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 85-2739-9 USED FOR DISCOUNT FACTORS: May '10
   - ENERGY FUEL COST CONSUMPTION ANNUAL $ DISCOUNT DISCOUNTED
     | SOURCE | $/MMBTU (1) | MMBTU/YR (2) | SAVINGS (3) | FACTOR (4) | SAVINGS (5) |
     | ELECT. | 49.8000 | 1,253 | $62,399 | 14.58 | $909,783 |
     | WATER (kgal) | 0.0000 | 0 | $0 | 0.00 | $0 |
     | NAT. GAS | 0.0000 | 0 | $0 | 0.00 | $0 |
     | FUEL OIL | 0.0000 | 0 | $0 | 0.00 | $0 |
     | 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 (+/-) OCCURRENCE
     | 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 (+) | YEAR OF OCCURRENCE | DISCOUNT | DISCOUNTED SAVINGS/COST |
     | COST(-) | (1) | (2) | FACTOR (3) | (4) |
     | a. BASELINE EQUIP. REPLACEMENT | $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+3Bf4 / Economic Life) = $156,746

5. **SIMPLE PAYBACK (SPB) IN YEARS**
   - (1G/4) = 9.04

6. **TOTAL NET DISCOUNTED SAVINGS**
   - $2,313,667

7. **DISCOUNTED SAVINGS-TO-INVESTMENT RATIO (SIR)**
   - (6/1G) = 1.63