GSA's Green Proving Ground

Project Plan Guidance

August, 2013

Overview

The Green Proving Ground program (GPG) leverages GSA's real estate portfolio to evaluate innovative sustainable building technologies. Evaluations, performed in association with independent researchers, are used to support the development of GSA performance specifications and inform decision making within GSA, other federal agencies, and the real estate industry. The program aims to drive innovation in environmental performance in federal buildings and help lead market transformation through deployment of new technologies.

All GPG project Principal Investigators must create a Project Plan and submit the plan to the GPG Project Manager for approval. The Project Plan includes a statement of what the demonstration will attempt to prove, a description of the performance objectives, an explanation of how the demonstration will unfold, and descriptions of measurements and analyses involved in the project. The Project Plan creates the conditions to create valid findings that will provide insights and guidance for the General Services Administration (GSA) policy and resource management decisions.

This document provides guidance for writing Project Plans. Principal Investigators should submit a Project Plan at least six weeks prior to the initiation of significant field work activities to allow time for review, comment and revisions Minor changes to the Project Plan may occur in the field during the demonstration. In the event of substantial changes to the Project Plan that occur after approval, Principal Investigators must notify the GPG Program Manager, briefly explain the circumstances and request concurrence with the proposed changes.

The guidance provided here is general and all elements may not apply to all GPG projects. It will be the responsibility of each Principal Investigator, with the concurrence of GPG, to decide what is most appropriate, and to what degree, for his or her demonstration site(s) and technology.

Format
Project Plans are working documents and not intended for publication. However, they form the basis of and create the data for the final Report and Findings documents. A Project Plan contains the following elements:

- Technology Assessment (updated from materials provided)
- Technical Objectives
- Project scope and methods
- Project Charter, Project Milestone Schedule/Budget and Monthly Reporting

1. Project Statement

This section should state which technology is being evaluated, at what site(s) and what the study will evaluate. Also include any outside relevant information about the project team, site or technology.

2. Technology Assessment

This section should build upon the assessment that led to the technology's selection by the GPG program, validating its technical accuracy and assumptions. It should describe (1) what the technology is, including technology maturity and advances / innovation compared to the technology it proposes to replace, (2) its state in the marketplace (in development, available in market and in use, in use at other GSA locations etc.), and (3) why GSA is interested in it, focusing on mandated targets it can help meet, cost savings it promises to deliver, improvements in tenant satisfaction it may deliver and/ or enhanced operability it may deliver.

3. Technology Measurement and Verification (M&V) Objectives

Based upon the Preliminary Technology Assessment (PTAs),the GSA Request for Information (RFI) , independent market research, prior studies of the technology and GSA objectives described in SOW provide a succinct statement of the specific, tangible objectives of the project evaluation. Include:
• Specific parameters to be evaluated, including environmental performance, costs and benefits, occupant acceptance, operability
• Factors that will be considered for recommended GSA deployment (broad, targeted or no deployment at this time), such as building type, climate, occupancy, baseline conditions, technology maturity and/or other considerations and criteria
• Intended outcomes, including how study results may influence GSA policy, practices, guidelines, regulations and/or standards
• Coordination (if any) with other previous or parallel demonstration activities.

Description of metrics used in assessment of technical performance

(this is an example, please modify and include in final report)

Analysis	Metric	Definition	Target Value of Metric	Why is it Important to Measure?
Energy and GHG Savings	Lighting Power Density (LPD)	A metric for characterizing the lighting power in a space at a given time, defined as the lighting power divided by the corresponding floor area. LPD is usually calculated in watts per square foot.		
	Lighting Energy Use Intensity (EUI)	A metric for characterizing energy use, defined as the		

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		amount of energy used in a space over a given time period divided by the area of the space and the time interval studied. In lighting, EUI is usually calculated in watt-hours per square foot per day or kilowatt-hours per square foot per year.		
	Global Warming Effect (GWE)	A metric for characterizing greenhouse gas emissions by summing the product of instantaneous greenhouse gas emissions and their specific time-dependent global warming potential. In this study, GWE was calculated for each utility provider (g CO_2,eq /kWh electricity generated) and also normalized by floor area and calculated based off of annual energy savings (kg CO_2,eq/ft2/year).		
Cost-effectiveness	Simple Payback Period (SPP)	A metric for characterizing the length of time required to recover the cost of an investment, defined as the cost of project over the energy savings at the site per year. SPP is usually calculated in years.		
	Net Present Value (NPV)	The net present value is the sum of the present values of any present or future cash flows, both incoming and outgoing. These values will be		

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		normalized by the floor area and will be presented as $/ft^2.		
	Life Cycle Cost (LCC)	A metric that characterizes the costs over the lifetime of the tested technology. LCC results from performing a life cycle cost analysis (LCCA) that takes into account costs from the initial investment, energy savings, operation & management, and salvage. The costs will be converted to their present value (PV) and will be presented in $/ft^2 and $/fixture.		
	Savings to Investment Ratio (SIR)	A metric for characterizing cost-effectiveness by determining the ratio of life cycle savings from an energy improvement to the initial investment cost. If SIR is greater than 1, the investment is cost-effective over the investment's lifetime. This metric is unitless.		
Photometric Performance	Illuminance	The density of incident luminous flux on a surface. In less technical terms, a measure of the amount of incoming light reaching a surface. This metric will be presented using the units footcandles and lux.		
	Color Rendering Index (CRI)	Quantitative measure of the ability of a light source to reproduce colors accurately.		

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		Useful in comparing the quality of light emitted by fluorescent lamps and LEDs. This measure is unitless.		

   i.   Analysis Methodology

4. Project scope and methods

In this section, describe the approach to delivering the technology evaluation that will satisfy the reporting requirements of the Green Proving Ground Deliverables (Attachment 1) Recommended components are:

    a. *Description of Demonstration Site(s).* Describe the location and relevant physical characteristics of the location where the technology will be installed and evaluated:
        i.   Location map
        ii.   Building photo
        iii. Relevant site and/or climatic characteristics
        iv. Description of subspace (if appropriate)
        v.   Technical attributes of relevant building systems
        vi. Other relevant physical attributes (positive or negative)
    b. *Required GSA support:*
        i.   Baseline and building data, such as square footage, energy and or water use
        ii.   Required tenant/GSA interaction (e.g. occupant surveys interviews of facility staff, maintenance records)
        iii. IT coordination if there are any data loggers or other equipment that will be monitored remotely
        iv. Manual data downloads if there are any data loggers or other equipment that will require on-site download leaders at the selected site to endorse and support the demonstration.
    c. *Metrics and methods.* This section should summarize proposed metrics that will be used and how data will be collected and analyzed to validate the technical objectives described above:
        i.   GSA and / or industry metrics and baselines that will be used
        ii.   Ability to utilize available baseline data from GSA facilities.
        iii. Performance, operational, cost and survey data that that will be collected
        iv. Additional metering requirements to quantify the operational performance of the baseline and new technology at the selected GSA locations.
        v.   Data acquisition, data management, data synthesis and modeling tools that will be used
        vi. Methodology for comparing post-installation performance to baseline data.
        vii. Periods of collection and monitoring of data to determine normalized annual performance characteristics
        viii. Cost data, including Simple Payback, Savings to Investment Ratio (SIR) and Life-Cycle Cost Analysis (LCCA) (see Attachment 2)

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5. **Project Charter, Project Milestone Schedule/Budget and Monthly Reporting**
   The Principal Investigator shall complete the Project Charter in Attachment 3. The Principal Investigator shall provide the schedule on the accompanying spreadsheet (Attachment 6: GSA – GPG Project Plan Schedule and BudgetTemplate.xls) as part of this project plan. Monthly reports shall be submitted using Monthly Report Template (Attachment 4) no later than the 20th of each month. GSA NPT will schedule calls with the PI following receipt to accept report and ensure the project budget, scope and schedule are on track.

   a. GPG Project Plan Schedule and Budget Template

   The Project Plan Schedule and Budget Template contains 5 Major Milestones

   1. Planning/Kick-off Work,
   2. Technology Background Research,
   3. Measurement and Verification,
   4. Lab Deliverables, and
   5. Findings

   Within the lab's budget proposal, a line item total for each of these 5 Major Milestones should be included. Additional detail is also recommended when necessary. Table 4 below contains milestone 3-5 in more detail.

<p align="center">**Table 1: Data collection periods (this is an example, please modify)**</p>

Task Description	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-13	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14
Document existing conditions	■	■												
Baseline energy monitoring				■	■									
Baseline photometric characterization		■												
Baseline occupant survey				■										
Installation						■								
Post-installation energy monitoring							■		■	■	■			
Post-installation photometric characterization								■						
Post-installation occupant survey									■					
Analyze data		■	■	■	■	■	■	■	■	■	■	■	■	
Technical assistance and	■	■	■	■	■	■	■	■	■	■	■	■	■	■

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reports														
Milestone (M)/ Deliverables (D)			M1	M2	M3	M4	M5			M6, D1	M7		D2	D3

6. **Attachments**
   a. Green Proving Ground Deliverables (Attachment 1)
   b. Cost Assessment (Attachment 2)
   c. Project Charter in (Attachment 3)
   d. Section 508 of the Americans with Disabilities Act Guidance (Attachment 4)

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Attachment 1: Green Proving Ground Deliverables

Below is an annotated description of deliverables required in the approved Statement of Work and reflected within the GSA-GPG Project Plan Schedule Template. Where there is a discrepancy, the Project Team will convene and amend this list, as appropriate. All intermediate milestones are intended to facilitate successful delivery of the final Technical Report, as described in GSA's Green Proving Ground Report Guidance and Style Guide, August, 2013.

a. **Technical Kick Off Meeting**   Presentation and meeting led by GSA to achieve consensus understanding of demonstration project objectives - what we are testing, why we are testing it, what we need to learn.

b. **Draft Project Plan, Schedule and Meeting Preparation.** Provide project plan and schedule using templates in this document; provide agenda for Project Plan Review meeting.

c. **WebEx Meeting: Project Plan Review**
    i. *Meeting lead*: Principal Investigator.
    ii. *Purpose*: achieve consensus understanding of the Project Plan and the Project Plan Schedule - what we will be measuring, how we will be measuring it, what it will tell us..
    iii. *Attendees*: GPG Program Manager, GPG Project Manager, GSA Regional Project Manage, Installation Contractor, Vendor, Evaluation Team.
    iv. *Reporting*: evaluation team is responsible for taking notes during the project plan review meeting, and submitting final notes to NPT lead after the meeting

d. **WebEx Meeting: Initial Data Analysis Presentation** *(GSA to define further)*
    i. *Meeting Lead*: Principal Investigator
    ii. Purpose: review preliminary findings - ensure that project plan is giving us needed info, preview initial findings, make any needed corrections to project plan.
    iii. *Attendees*: GPG Program Manager, GPG Project Manager, GSA Regional Project Manager, Installation Contractor, Vendor, GSA Report Review Team, PI Evaluation Team.
    iv. *Reporting*: evaluation team is responsible for taking notes during the project plan review meeting, and submitting final notes to NPT lead after the meeting
    .

e. **WebEx Meeting: Final Data Analysis Presentation**
    i. *Meeting Lead*: Principal Investigator
    ii. Purpose: Present results of completed field work, describe key project findings. Achieve consensus understanding of 'what we have learned', and that we are on track to address the project objectives set out in the TKO

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      iii.   *Attendees*: GPG Program Manager, GPG Project Manager, GSA Regional Project Manager, Installation Contractor, GSA Report Review Team, PI Evaluation Team.

      iv.   *Reporting*: evaluation team is responsible for taking notes during the project plan review meeting, and submitting final notes to NPT lead after the meeting

f. First Draft Report – 70%

Review will focus on content, not on formatting or grammar, and ensure that at \70% the report is on track to legibly translate what we have learned according to five key questions:

      i.   What is the technology?

      ii.   Why is GSA interested in it?

      iii.   What were the methods and metrics used to evaluate the technology?

      iv.   What did we find - how did the technology perform (environmentally financially, operability/maintainability, customer acceptance)?

      v.   What are the recommendations for GSA deployment: broad deployment, targeted deployment, no deployment at this time?

GSA will compile and consolidate comments from NPT project manager, GPG TC, and GSA SME.

g. WebEx Meeting: Final Draft Report Presentation – 70%

      i.   *Meeting Lead*: Principal Investigator

      ii.   Purpose: Present final results of completed field work, and recommendations for deployment to project team, collect feedback on presentation and draft report to finalize report.

      iii.   *Attendees*: GPG Program Manager, GPG Project Manager, GSA Regional Project Manager, Installation Contractor, GSA Report Review Team, PI Evaluation Team.

      iv.   *Reporting*: evaluation team is responsible for taking notes during the project plan review meeting, and submitting final notes to NPT lead after the meeting

h. Final Draft Report - 95%

This report should incorporate all oral and written feedback from the final draft report and WebEx presentation. The document should reflect peer review and have been reviewed by an internal technical writer/ communications editor and be grammatically polished. The final draft should comply with the Report and Style Guidance provided by GSA. Upon acceptance by the GPG National Program Team (NPT), the final draft will be circulated to GSA legal counsel for any issues of bias/endorsement, and the vendor for any issues of disclosed intellectual property or errors of fact.

i. Final Report – 100%

The final report will be delivered as a .pdf, compliant with section 508 of the Americans with Disabilities Act (see Attachment 5)

Attachment 2: Cost Assessment

Develop and validate the expected life-cycle operational costs for the demonstrated technology as follows.

Refer to NIST Handbook 135: *Life-Cycle Costing Manual for the Federal Energy Management Program* as a guide to evaluate energy and water conservation projects. The handbook and its annual supplement are available online at:
http://www1.eere.energy.gov/femp/information/download_blcc.html#handbook

- Life-Cycle Cost Analysis (LCCA) – look at the total cost of a design choice, including first cost, operation, maintenance and repair costs, financing costs, and the serviceable life of the design. Include
    - Life-Cycle Cost (LCC) – the total discounted dollar costs of owning, operating, maintaining, and disposing of a building or building system.
    - Life-Cycle Cost Elements: Briefly describe each cost element, the associated data collection process and relevant data interpretation to determine life-cycle costs for the demonstrated technology.
    - Life-Cycle Cost Timeframe: Define the timeframe for the life-cycle cost estimate.

- Net Present Value – the net result of an investment, expressed in today's dollars; the present value of future cash flows minus the present value of the investment minus any associated future cash outflows.

- Savings-to-investment ratio (SIR) – this is the percent of money recovered from the system generation compared to the initial investment cost and ongoing O&M costs, with reference to a specific desired payback period. Within the specified time frame: values of 1 indicate that the investment cost was completely recouped; values greater than 1 indicate savings greater than the investment, values less than 1 indicate the investment cost is more than the potential savings from the system. For example, a value of 0.2 indicates that within the desired payback period, only 20% of the investment cost was recovered; a value of 1.4 indicates that the savings exceeded the investment cost by 40%.

- Simple Payback – the length of time needed to pay back the initial capital investment, usually expressed in years. This is the simplest form of cost-benefit analysis, and is suitable for small projects and general discussion. Simple payback does not take into account costs or savings beyond the first cost, so is limited in use for more intensive capital investment projects.

Attachment 3: Project Charter

Project Name	Technology Category	
FY	Budget	

Directory			
Principal Investigator	Name	Phone	Email
TC Sponsor			
NPT Project Manager			
Project Manager			
Building Manager			
Vendor			
Consultant			
Consultants Needed			

Project Start Date:*	mm/dd/yyyy	Project Plan Approved	mm/dd/yyyy
Targeted End Date:*	mm/dd/yyyy	Single Site/Multisite	

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Key Milestones/Phases

#	Milestone/Phase	Target Completion Date
1		
2		
3		
4		
5		
6		
7		
8		
19		
20		
21		
22		

*Denotes Deliverable.

High-Level Issues/Risks, Mitigation Strategies, and Synergies

#	Issue/Risk/Synergy	Mitigation Strategy
1		
2		
3		

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Attachment 4:   Section 508 Compliance Guidance

The final technical report must be delivered as a document that complies with Section 508 of the Americans with Disabilities Act. The following guidance provides background for developing a 508 compliant document.

Color: Design Web pages so that all information conveyed with color is also available without color, for example from context or markup. If color is used to convey important information, an alternative indicator should be used, such as an asterisk (*) or other symbol.

Data tables: Make data tables compliant by identifying row and column headers. Use markup to associate data cells and header cells for data tables so that the significance of the content in each cell is clear and can be read by assistive technology.

Forms: Provide short field help for all editable fields on a form so that people using assistive technology can access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.

Graphics: Provide alternate text for graphics or any non-text element (e.g., via "alt," "longdesc," or in element content).

Links: The best way to lead a reader to another Web page is to make the link a complete phrase instead of just "Click Here." For example, make a link to a training schedule the complete phrase "View the training schedule." It is not 508-compliant to have a link consisting of "click here" because that does not give someone using an assistive reader enough information about the link to which you are leading them.

Multimedia: Provide an equivalent alternative for any multimedia presentation synchronized with the presentation.

Navigation: Provide a method that permits users to skip repetitive navigation links. This is handled by code in the http://www.gsa.gov/ templates, but is also required on any linked offsite pages. All GSA WebPages are required to be 508-compliant.

Plug-in: When a Web page requires that an applet, plug-in, or other application be present on the client's system to interpret page content, the page must provide a link to a plug-in or applet that is compliant. Provide a link to a disability-accessible page where the plug-in can be downloaded. All Java applets, scripts, and plug-ins (including Acrobat PDF files and PowerPoint files, etc.) and the content within them must be accessible to assistive technologies, or else an alternative means of accessing the equivalent content must be provided.

Screen Flicker: Screens that flicker can cause seizures in susceptible individuals.

Note 1:
"Text-only" and "accessible" are NOT synonymous. Text-only sites may help people with certain types of visual disabilities, but are not always helpful to those with cognitive, motor, or hearing disabilities.
Note 2:
At this time, many elements of Dynamic HTML (client-side scripted HTML, which is usually accomplished with JavaScript) cannot be made directly accessible to assistive technologies and

keyboards, especially when the onMouseover command is used. If an onMouseover (or similar) element does not contain any important information (e.g. the script causes a button to "glow"), then there is no consequence for accessibility. If this scripted event reveals important information, then a keyboard-accessible alternative is required.

Note 3:
When embedded into Web pages, few plug-ins are currently directly accessible. Some of them (e.g. RealPlayer) are more accessible as stand-alone products. It may be better to invoke the whole program rather than embed movies into pages at this point, although this may change in the future.

Note 4:
Acrobat Reader 5.0 allows screen readers to access PDF documents. However, not all users have this version installed, and not all PDF documents are text-based (some are scanned in as graphics), which renders them useless to many assistive technologies. Make an alternate HTML version, text version, or Word version available for the user.

Note 5:
PowerPoint files are currently not directly accessible unless the user has a full version of the PowerPoint program on the client computer (and not just the PowerPoint viewer). It is recommended that an accessible HTML version be provided, as well.

Additional information is available on the GSA website [Accessibility Page](#).