

Performance-Focused Project Development for Utility Energy Service Contracts

Deb Vasquez, NREL

2019 Energy Exchange, Denver, Colorado, August 19, 2019



Performance-Focused Project Development – Agenda

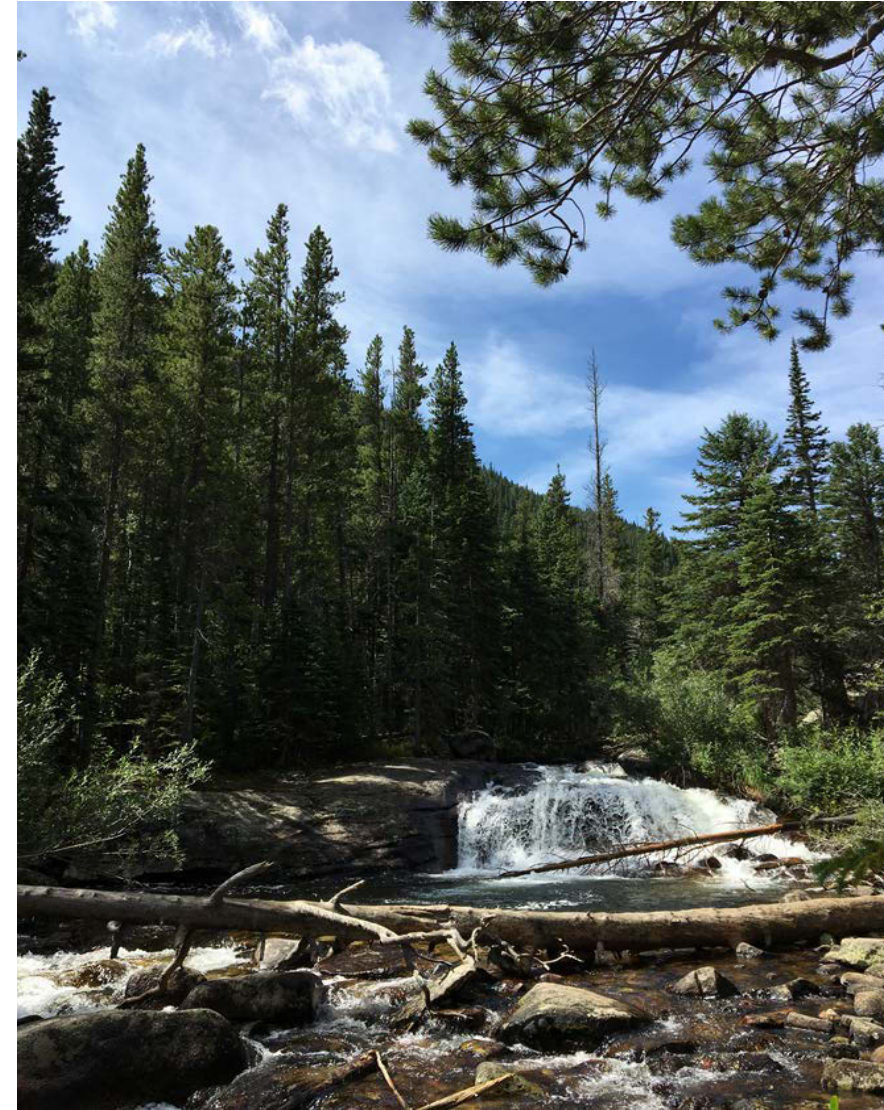
Part 1: Performance-Focused Project Development

Part 2: Performance Planning

Part 3: Project Development

Part 4: eProject Builder

Part 5: Review, Resources, and Links



Introductions

DOE FEMP
Utility Program Manager
Tracy Niro

NREL Utility Team
Karen Thomas
Jeff Gingrich
Deb Vasquez



Please introduce yourselves

- Name
- Organization
- Energy responsibilities

Performance Matters

Imagine great friends, incredible views, perfect weather...
9% grades?!

When our gear is maintained, it's all about our own
performance.

Welcome to
Colorado



What is Performance Assurance?

Simply put, after learning how to ride a bike:

- It's knowing how to operate your gears and your brakes
- It's having safety equipment and using it
- It's testing and tuning before each ride
- And investigating and repairing after each ride ~ that matters.

Now, let's consider performance for energy projects.

Performance-Focused Project Development – Agenda

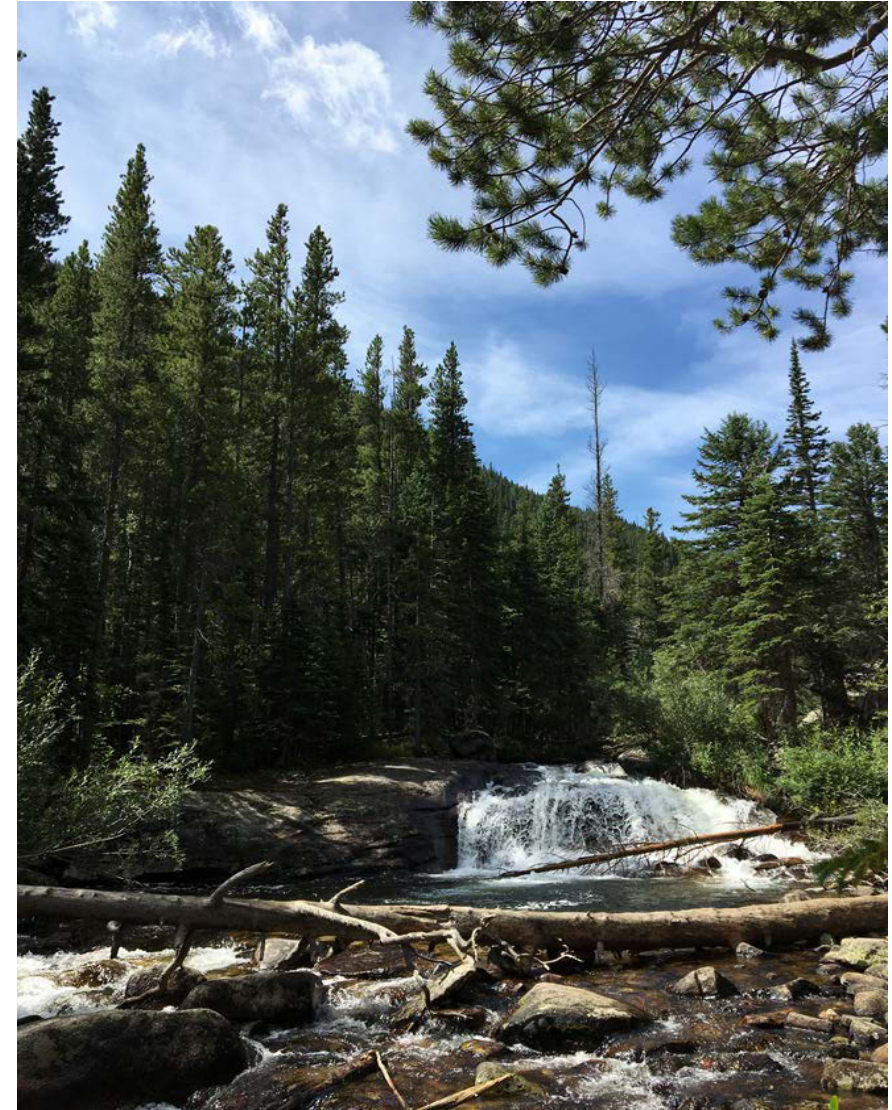
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Utility Energy Contract (UESC)

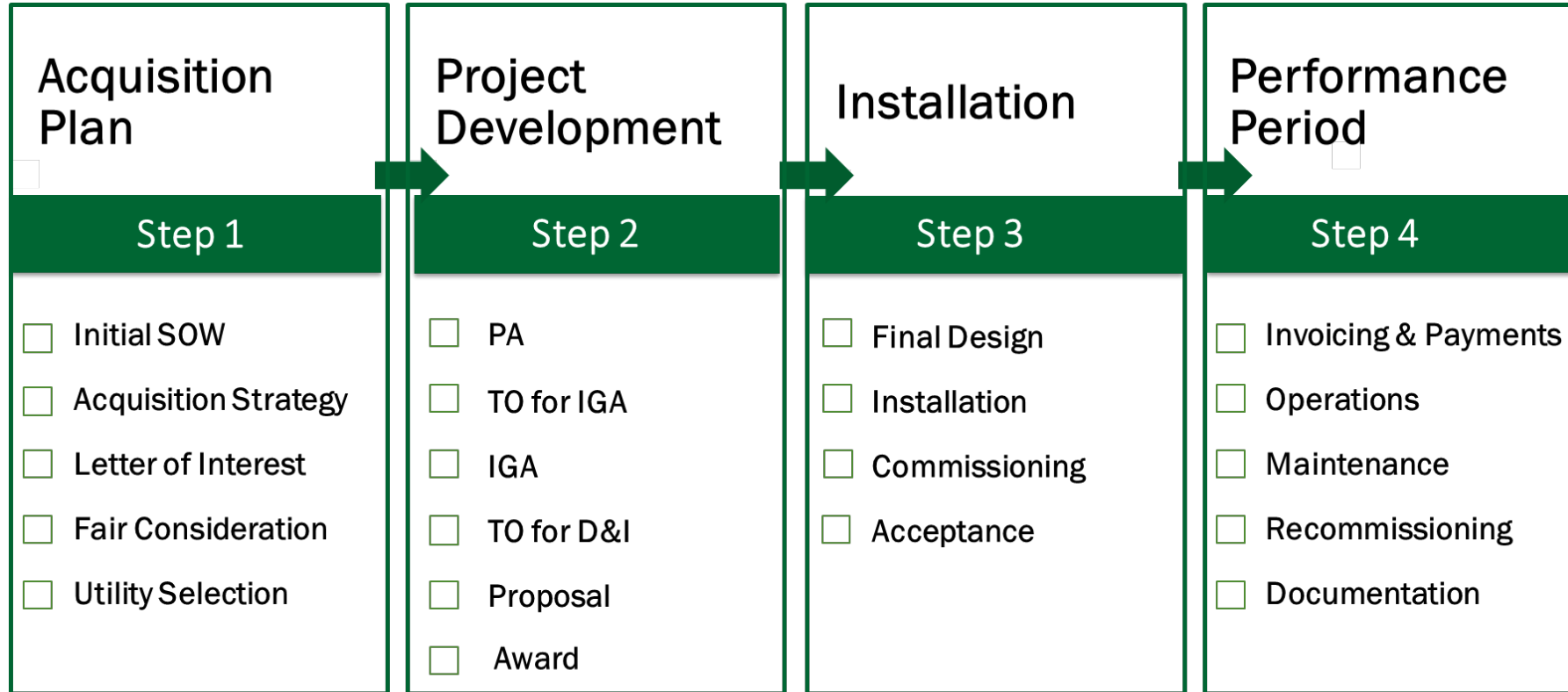
Authorized by 42 U.S.C. § 8256

- A UESC is a contract between a serving utility and the Federal government for energy and water efficiency improvements and demand-reduction services.
- UESC projects must include a plan for sustaining equipment and system performance.

DOD: 10 U.S.C. § 2913 (energy) and 10 U.S.C. § 2866 (water conservation).

Part 1: Performance-focused project development

UESC Project Lifecycle



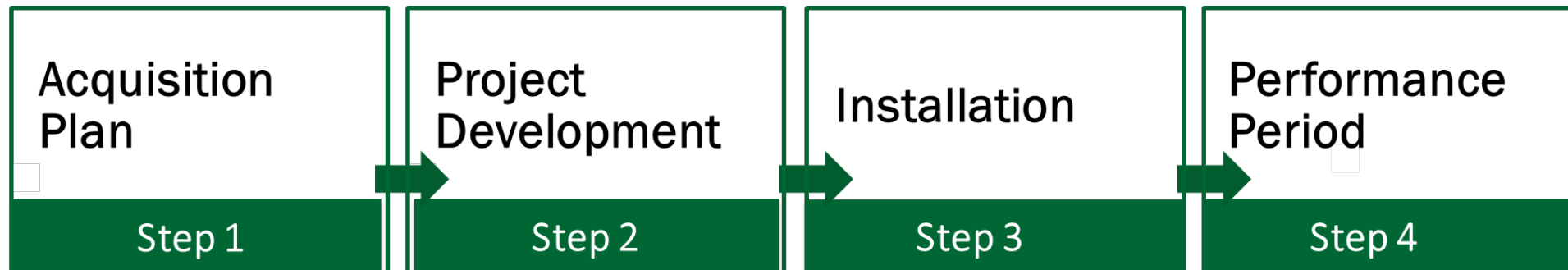
The project lifecycle is the progression of planning, developing, installing, and sustaining project measures.

Part 1: Performance-focused project development

Assuring Performance

Where along the project's lifecycle will we focus our efforts on performance?

Answer: All of them!



Part 1: Performance-focused project development

Performance-Focused Objectives

Develop a project including Task Order (TO) details describing performance requirements and deliverables.

- Meet Federal energy management and agency/site requirements related to assuring performance**
- Acquire post-acceptance services agreed to and described in the TO**
- Prepare agency staff to operate, maintain, and sustain performance of each Energy Conservation Measure (ECM)**

Part 1: Performance-focused project development

Federal Performance Mandates

42 U.S.C. § 8253 Energy Management Requirements

(f) Use of Energy and Water Efficiency Measures in Federal Buildings

(1) Definitions

(5) Follow up on Implemented Measures

Part 1: Performance-focused project development

42 U.S.C. § 8253(f)(1) – Definitions

(f)(1)(A) Commissioning

A process —

- (i) ensuring all systems perform interactively in accordance with—**
 - (I) the design documentation and intent; and
 - (II) the operational needs of the owner of the facility, including preparation of operation personnel; and
- (ii) ensure fully functional systems that can be properly operated and maintained during the useful life of the facility.**

~ synopsis

Part 1: Performance-focused project development

42 U.S.C. § 8253(f)(1) – Definitions, continued

(f)(1)(F) Recommissioning means a process —

- (i) of commissioning (during the performance period)
- (ii) to ensure optimum performance in accordance with design or current operating needs, over its useful life, while meeting building occupancy requirements.

(f)(1)(G) Retrocommissioning means a process —

of commissioning a facility or system that was not commissioned at the time of construction of the facility or system.

~ synopsis

Part 1: Performance-focused project development

42 U.S.C. § 8253(f)(5) – Implemented Measures

42 U.S.C. 8253(f)(5) Follow Up on Implemented Measures

For each measure implemented ensure that —

- (A) Equipment and controls, are fully commissioned at acceptance to be operating at design specifications;
- (B) a plan for appropriate operations, maintenance, and repair of the equipment is in place at acceptance and is followed;
- (C) equipment and system performance is measured during its entire life to ensure proper operations, maintenance, and repair; and
- (D) energy and water savings are measured and verified.

Part 1: Performance-focused project development

Value of Performance-Focused Priorities and Objectives



Uncompahgre National Forest, Trout Lake

- Clarify requirements
- Obtain resource commitments
- Influence decisions
- Justify long-payback priority ECMs

Part 1: Performance-focused project development

Performance-Focused Project Development – Agenda

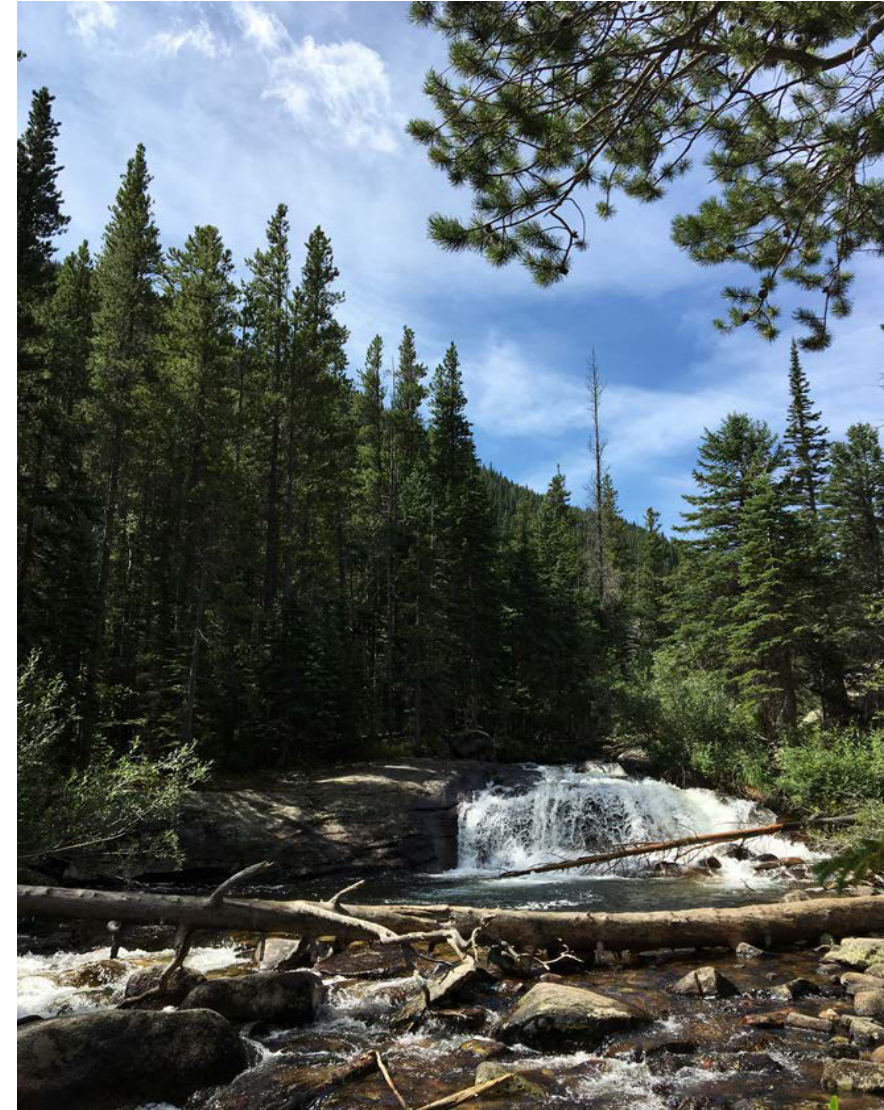
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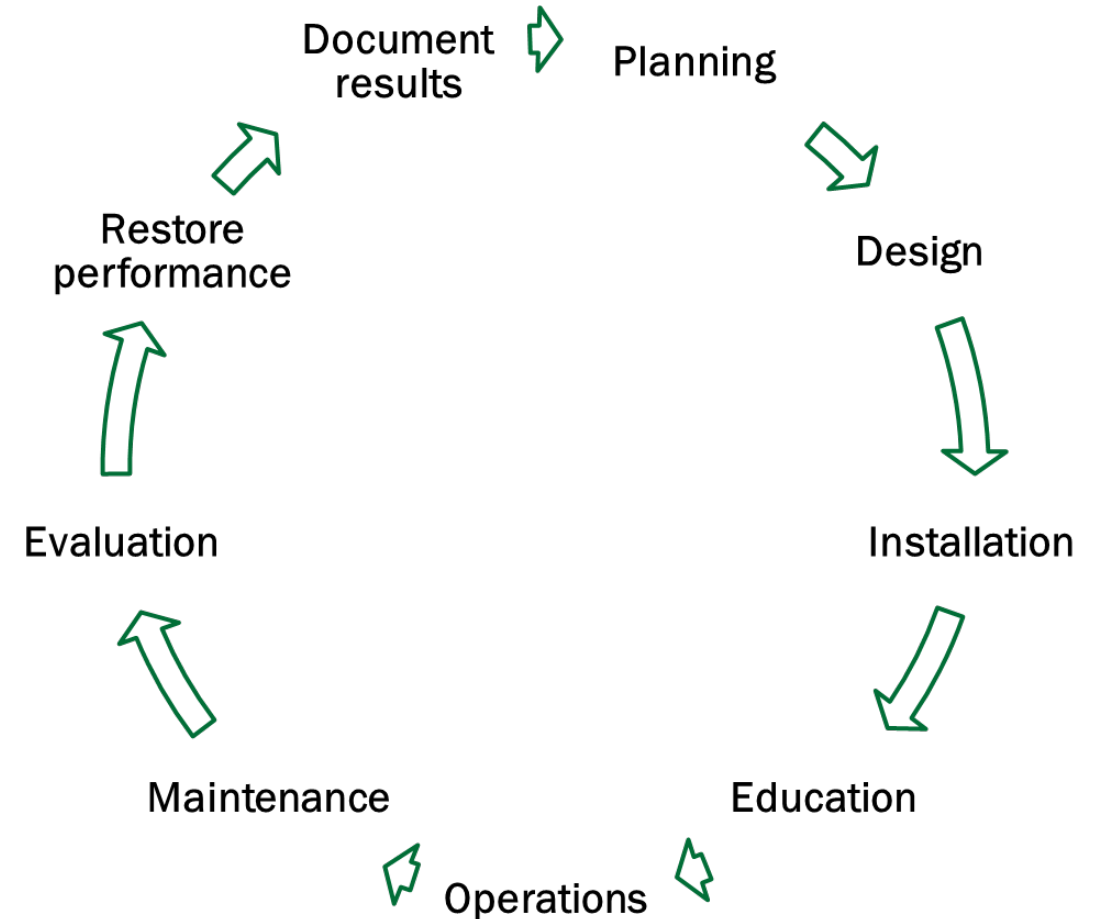
Part 4: eProject Builder

Part 5: Review, Resources, and Links



Performance Planning for Project Lifecycle

- Engineer and design well
- Require a performance plan
- Accept project after performance is demonstrated and documented
- Prepare Agency staff
- Perform operations, maintenance, and recommissioning



Part 2: Performance Planning

Federal Performance Related Mandates – Evaluations

42 U.S.C. § 8253(f) Use of Energy and Water Efficiency Measures in Federal Buildings

- 42 U.S.C. § 8253(f)(3) Energy and Water Evaluations
 - A. Evaluate 25% of facilities per year
 - B. Recommissioning (rCx) and retrocommissioning (RCx) – **identify rCx and RCx measures as part of the evaluation**

Federal Performance Related Mandates – Funding

42 U.S.C. § 8253(f)(10) Funding and Implementation

- A. Authorization of appropriations
- B. Funding options
 - i. Federal agencies may use any combination of
 - I. Appropriations
 - II. Private financing authorized under Federal law, including available through ESPC and UESC
 - ii. Combined funding for same measure – **agencies may use any combination of appropriations and financing to carry out the same measure**

Part 2: Performance Planning

Federal Performance Related Mandates – Implementation

42 U.S.C. § 8253(f)(10) Funding and Implementation

C. Implementation – Federal Agencies may

- Self-implement requirements
- Contract out performance of some or all requirements

Part 2: Performance Planning

What is a Performance Assurance Plan?

A project- and ECM-specific set of deliverables:

- Addressing performance requirements
- Inclusive of operations, maintenance, training, and commissioning plans and protocol

Why Develop and Use a Performance Plan?

- Meet Federal requirements for ECM performance
- Identify and meet agency project performance requirements
- Develop a resource to support implementation of essential activities necessary to acquire a well-performing project and to sustain performance for its life

Performance-Focused Project Development – Agenda

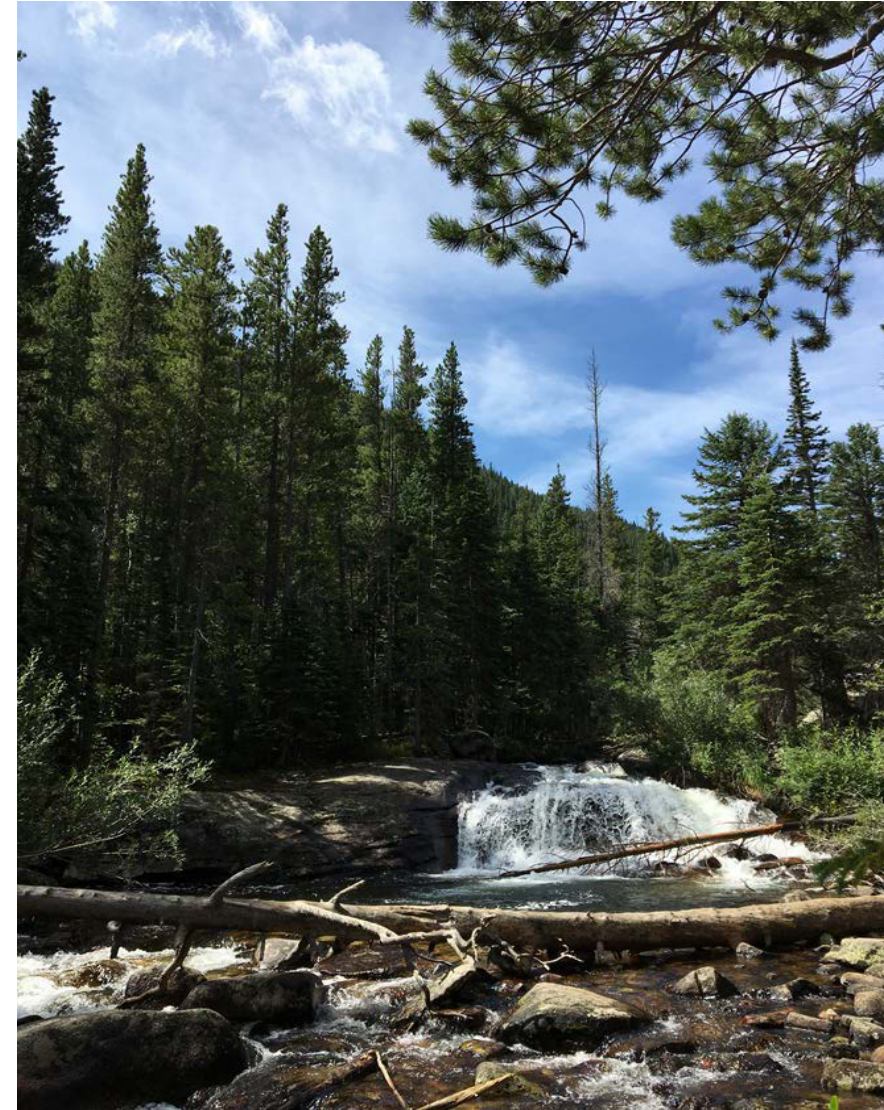
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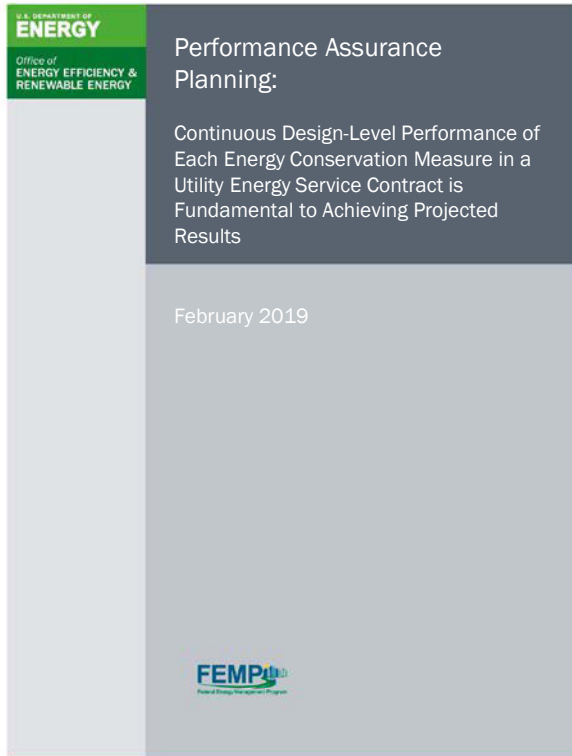
Part 3: Project Development – Subparts



Indian Hills

- a. **Project Development**
- b. **UESC Report Template**
- c. **Acquisition Planning**
- d. **Preliminary Assessment**
- e. **Investment Grade Audit**
- f. **Preparing for Installation and Performance Period**

Part 3a: Project Development



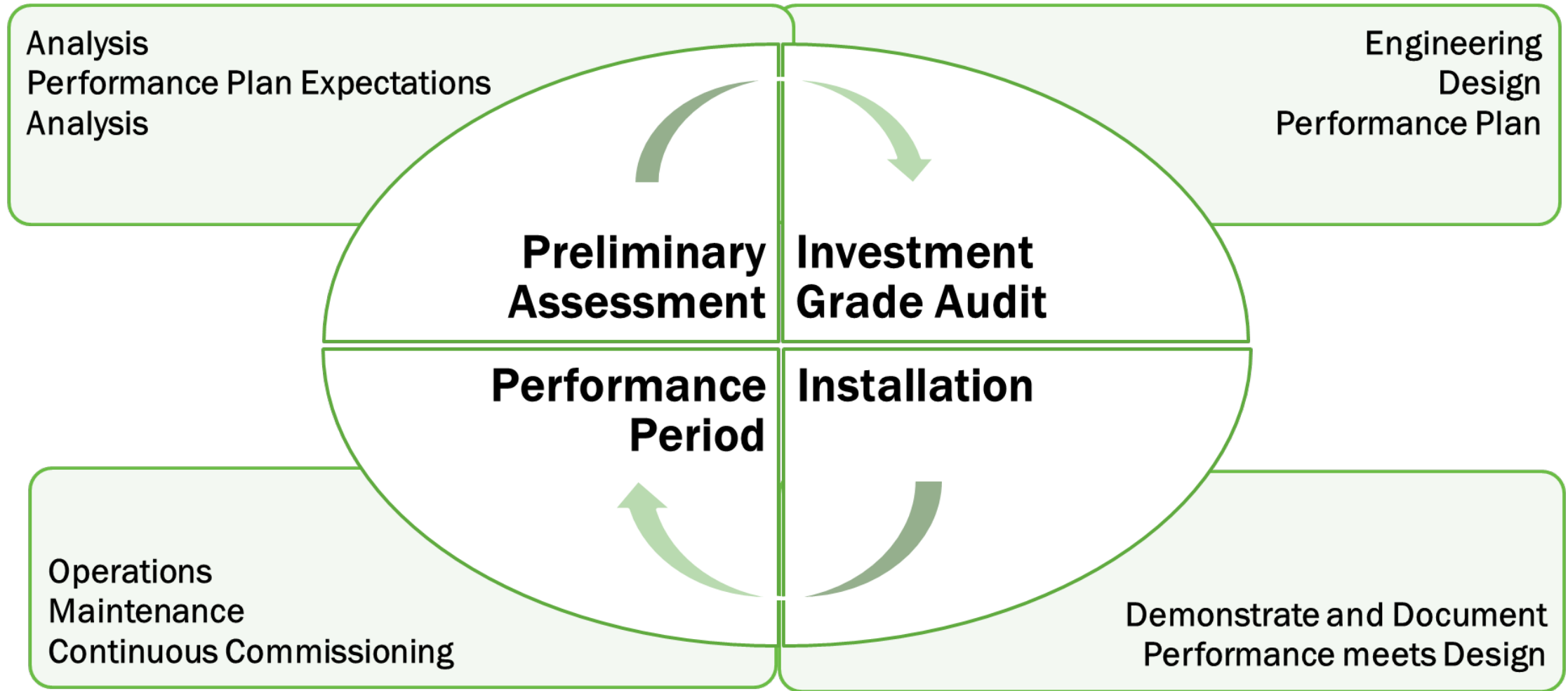
Performance Assurance Planning for UESC

- A framework of recommendations for
 - Discussing and identifying performance related project requirements
 - Establishing and documenting deliverables and services
 - Contemplating contract language

https://www.energy.gov/sites/prod/files/2019/02/f59/uesc_performance_assurance_planning.pdf

Part 3a: Project Development

Performance Influence Opportunities

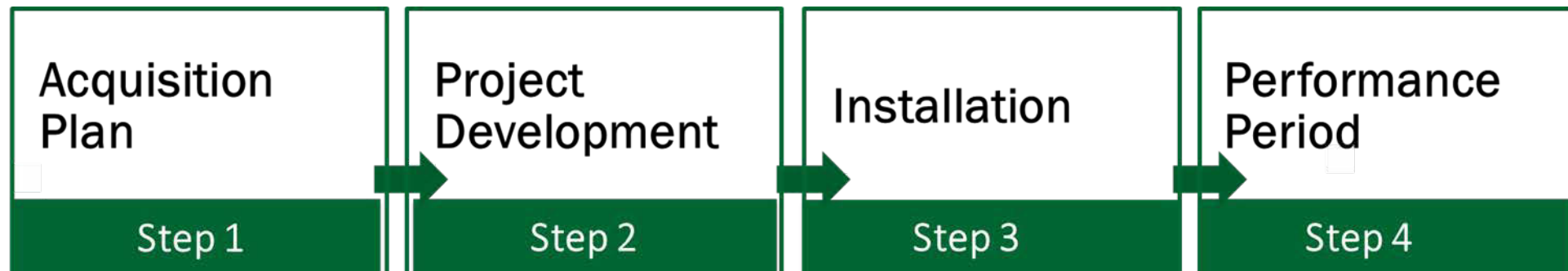


Part 3a: Project Development

Identify Performance Impacts and Gaps

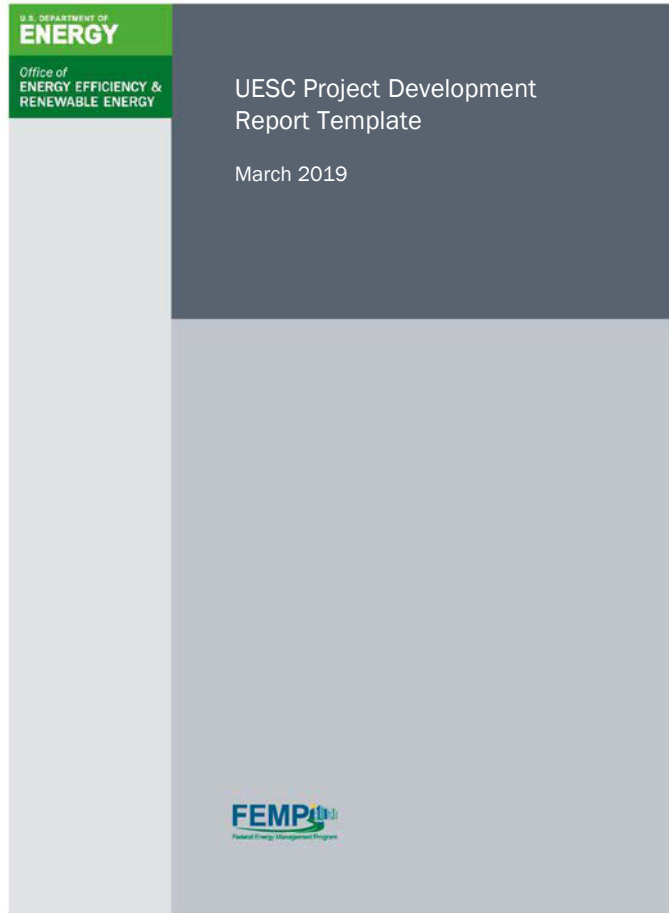
As your project progresses:

- Review performance related impacts to staff and resources while maintaining objectives, priorities, and deliverables to identify gaps
- Review Agency capabilities and resources to respond to gaps
- Discuss options for closing gaps



Part 3a: Project Development

Part 3b: UESC Report Template



UESC Project Development Report Template

- **Discuss, establish, and document**
 - Scope of work and report format for PA, IGA, and firm-fixed-price proposal
 - Discuss/negotiate price for PA and IGA efforts
 - Summary Tables

https://www.energy.gov/sites/prod/files/2019/02/f60/uesc_proj_dev_draft.docx

Part 3b: UESC Report Template

Report Template Objectives

Adapt reporting content, tables, and schedules for project-specific requirements.

- **Establish project requirements and priorities**
- **Manage expectations**
- **Receive essential decision-supporting information**
 - Illustrate fair and reasonable pricing with concise, comprehensive, and consistent formatting
 - Emphasize subcontractor competition
 - Demonstrate project is in the best interest of the government documenting cost and savings details

Template Content – Narrative

Use the narrative to consider and discuss features necessary for your project

- **The body and appendices of the report provide narrative and details to inform reviewers and decision-makers**
- **In developing an audit report, consider the most appropriate approach and level of detail for the size, scope, and complexities of the project**

Template Content – Summary Tables

Summary tables are intended to provide high level insights for Agency decision-makers

- **Agencies’ “ECM priority ratings” support decisions to include top priority measures**
- **The “ECM published life” supports agencies’ decisions to apply appropriations to long payback measures**

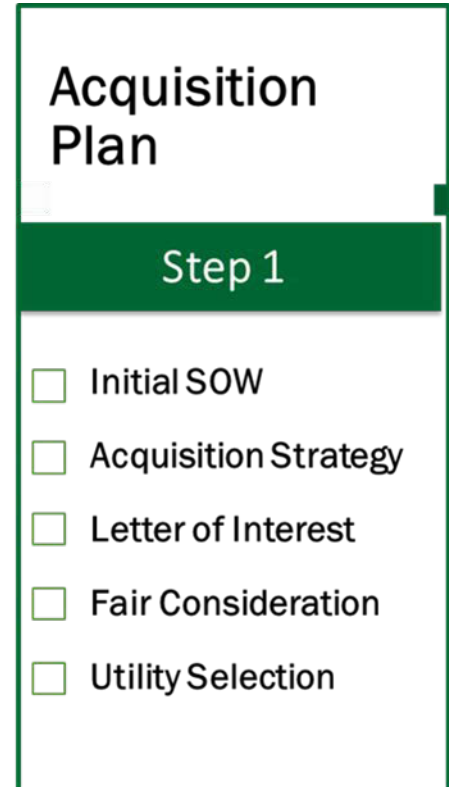
UESC Report – Summary Tables

#	Short Title	Summary
1	Cost and Funding	A summary of savings and costs including simple payback, ECM priority, and published equipment life
2	Electric Energy	A summary of electricity consumption, demand, and O&M savings and Agency identified ECM priorities
3	Natural Gas	A summary of natural gas consumption, O&M and cost savings, and Agency identified ECM priorities
4	Water	A summary of water consumption, O&M and water cost savings, and Agency identified ECM priorities
5	Operations & Maintenance	A summary of operations and maintenance savings
6	Rebates & Incentives	A summary of available monetary rebates and non-monetary incentives

Part 3b: UESC Report Template

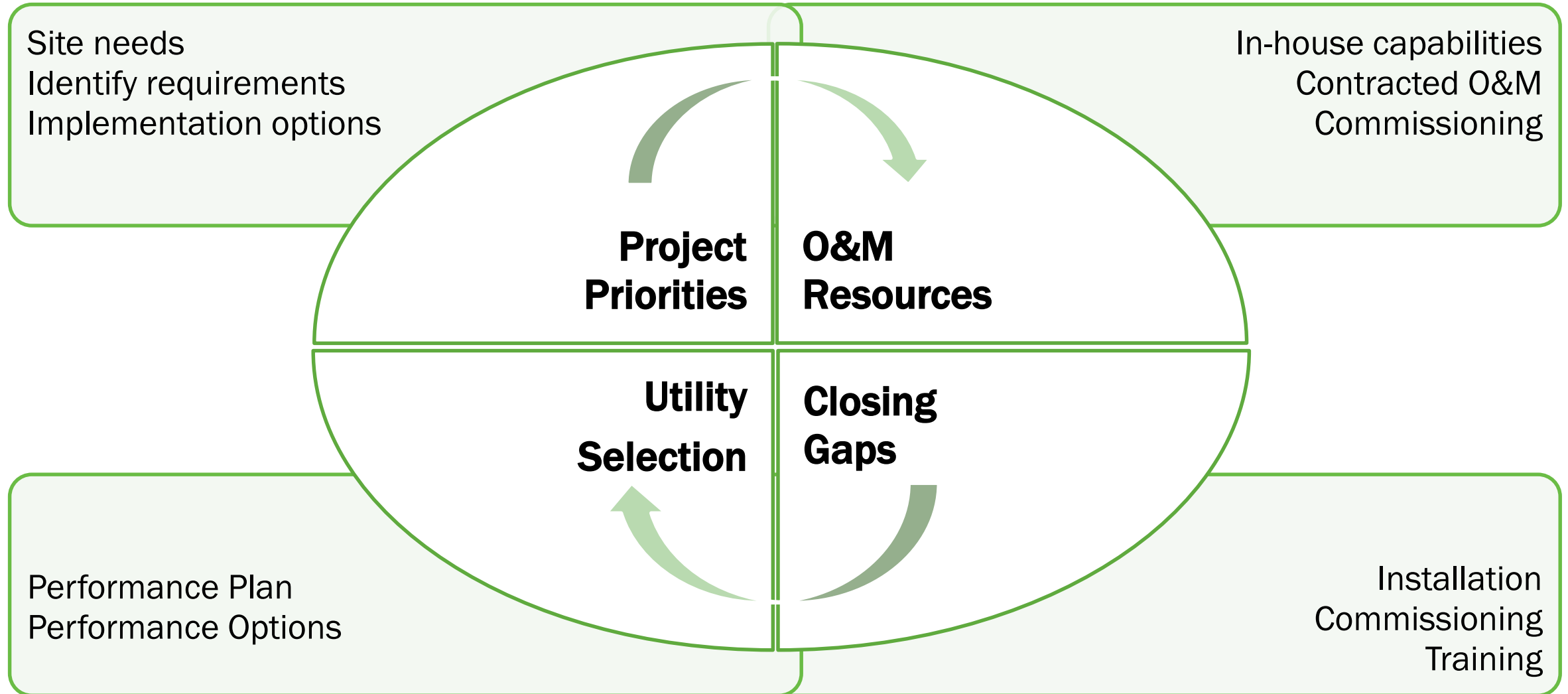
Part 3c: Acquisition Planning

- The activities specific to developing an acquisition plan may not be encumbered
- What added burden might be placed upon Site staff and resources in accomplishing the activities to sustain ECM performance?



Part 3c: Acquisition Planning

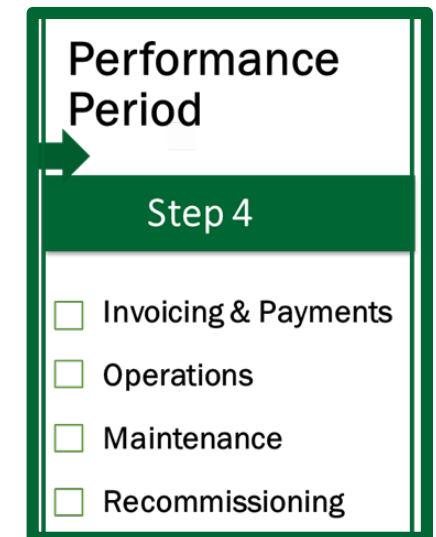
Performance Considerations for Acquisition Planning



Part 3c: Acquisition Planning

Part 3a: Acquisition Planning

- Identify gaps and discuss resources to fill them
- Document as potential deliverables
- For example:
 - Require training for understanding commissioning and reviewing commissioning reports and perhaps commissioning services during the performance period
 - O&M services for specific technologies



Part 3c: Acquisition Planning

Acquisition Decision Support

Federal contract proposals must demonstrate a proposed project is:

- **Technically sound – will meet contract requirements**
- **Financially fair and reasonable**
 - Open book pricing, detailed, with reasonable markups
 - Subcontractor selection based on competition
- **In the best interest of the government – improves facility infrastructure, accomplishes mandates, and creates local jobs**

Use the report template to require essential information.

Part 3d: Preliminary Assessment (PA)

The PA will include a site walkthrough, analysis, and a written report describing potential energy and water saving infrastructure improvements.

Requesting Performance-Focused Evaluation

- The agency contracting officer may request the PA through a written agreement or through a “no cost” TO
- Notify utility that long-term performance of proposed measures will be an important effort should the project move forward to an IGA
- Based on existing energy and water consuming equipment and systems, size and complexity, the PA may be a high-level walk through or an in-depth effort

Preliminary Assessment - Recommissioning

Energy evaluations are to include rCx or RCx

- **Identify issues such as simultaneous heating and cooling**
- **Identify opportunities to optimize performance**
 - Install control system capable of supporting continuous commissioning

Part 3d: Preliminary Assessment

Part 3e: Investment Grade Audit (IGA)

An IGA is an in-depth engineering analysis focused on developing lifecycle cost effective energy and water infrastructure improvements.

- **The performance plan is developed in this phase**
 - Set expectations for focusing on performance
 - Include measures identified through rCx or RCx
 - Accurate calculations are important
 - Designing with operability, maintainability, and performance sustainability are the crux of the project success

Project Expectations

- When negotiating the cost of an investment grade audit (IGA), use the report template to assist discussion; start with the level of design detail required for each ECM
- **100% design completion is not always needed to obtain competitive pricing**

Task	Level of Design Detail
Preliminary Assessment	15%–30%
Investment Grade Audit	60%–85%
Final Proposal	65%–95%

Part 3e: Investment Grade Audit

Design Completeness Influences Price Competition

Competitive pricing is influenced by the level of design and the ECM technology

- LED lighting minimal design to obtain competitive bids
- Control system upgrade is customized, in-depth design
- Combined heat and power plant, significant design detail to reduce risk on potential subcontractors and improve pricing

Design Considerations

Consider requiring a commissioning professional lead the development of the performance plan and review design submissions for quality assurance.

- **Appropriate assumptions**
- **Accurate Baseline consumption and calculated savings**
- **Designs must include ECM-specific operation plans, maintenance plans, and performance metrics**

Commissioning Plan

The commissioning protocol will be developed specifically for the project ECM set and must incorporate actual design specifications including specific performance metrics and operational strategy.

- Include ECM functional testing
- Fully commission each ECM to prove actual performance meets design specifications
- Receive, review, and approve the Cx report prior to acceptance

Performance requirements for O&M

42 U.S.C. § 8253(f)(5) Follow Up on Implemented Measures

For each measure implemented ensure that —

- (A) Equipment and controls, are fully commissioned at acceptance to be operating at design specifications;
- (B) a plan for appropriate operations, maintenance, and repair of the equipment is in place at acceptance and is followed;
- (C) equipment and system performance is measured during its entire life to ensure proper operations, maintenance, and repair; and
- (D) energy and water savings are measured and verified.

Federal Performance Requirements for O&M

- Federal energy projects must include the requirement for ECM-specific operations strategy assuring ECMs perform at design specifications
- An ECM-specific maintenance plan is also required

Prepare Agency to Sustain Performance

- Prepare agency staff to proficiently operate, maintain, evaluate, and document performance of each ECM
- A detailed performance-focused training plan is strongly encouraged
 - Provide an overview of the project
 - Review each ECM design, performance metrics, Cx protocol, operational strategy, and maintenance requirements
 - Present the performance plan in detail and include Cx report review and rCx protocol
 - Include ECM specific and agency specific templates

Task Order Language – Performance Outcomes

Include descriptions of expected outcomes and deliverables.

- **Develop a performance plan inclusive of Design, Baseline, O&M, Cx, Training, etc.**
- **Provide specific requirements such as, “fully commission each ECM”**
- **Project acceptance will be certified after Cx is complete, Cx report has been received, reviewed, and approved**

Part 3e: Investment Grade Audit

Task Order Language – Performance Deliverables

A comprehensive performance plan with detailed, actionable activities and schedules for all ECMs.

1. Final ECM designs with operational strategies, performance metrics, and complete and accurate Baseline
2. Comprehensive training materials and training
3. Commissioning and Cx Report
4. Operations plan
5. Maintenance plan
6. Retrocommissioning plan
7. Post-acceptance services as negotiated in the contract

Performance Period Services

- **When needed, Agencies can select specific performance period services. For example:**
 - Operations, maintenance, and recommissioning for the Combined Heat and Power Plant
 - Recommissioning only for the Chiller Plant
 - Scheduled refresher training on the Chiller Plant every 3rd year

Implementation Options for Performance Period Services

- **Agencies can determine:**
 - Which measures they will self-perform,
 - Which will be contracted separately, and
 - Which the Utility will implement.
- **When including within a UESC project:**
 - The Agency and Utility must negotiate and agree upon the terms and
 - The resulting effort must be described in the TO.

Considerations for Implementing the Performance Plan

- **Utility is typically responsible for developing the plan**
 - Qualified, experienced commissioning professional as “Plan Lead”
 - Actionable plan sufficiently detailed for Agency to implement or contract for services to implement the plan
- **Require Utility to implement all pre-acceptance subplan activities**
 - Implement Cx subplan for each ECM
 - Implement comprehensive training subplan
- **As discussed and agreed upon, document implementation responsibilities in the TO**

Part 3f: Prepare for Installation and Performance Period

- **Installation**

- ECM actual performance must meet design specifications; include this as a requirement in the TO
- Include requirements for quality equipment, materials, and workmanship
- Include requirements for functional testing, commissioning, Cx report,
- Include requirement for comprehensive training

- **Performance Period**

- Discuss and agree upon post-acceptance activities and document them in the TO

Part 3f: Installation and Performance

Performance Period (Post-Acceptance)

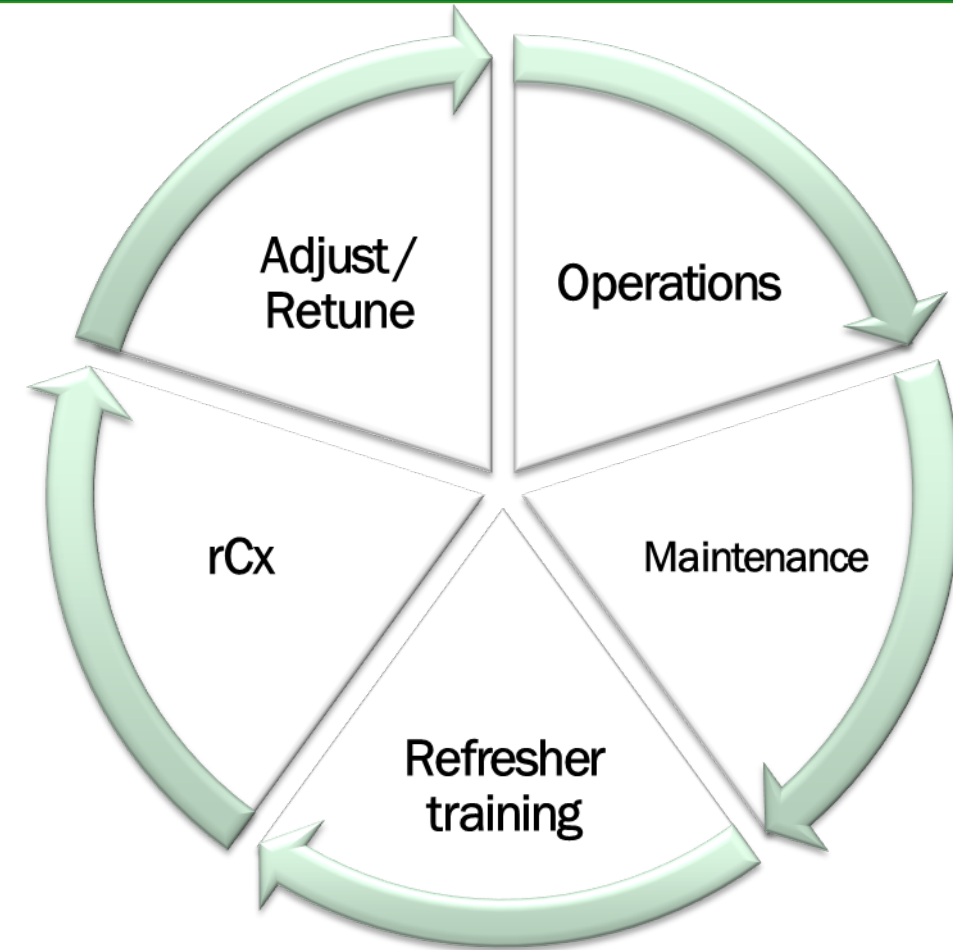
- Warranties and extended warranties
- Implement O&M and rCx
- Agency to implement
- Agency to contract for the services needed
- Utility may provide services as negotiated and stated in the task order e.g. refresher training, rCx consultation, and O&M

Performance Strategy

- **Require a dedicated and experienced Cx agent**
- **Require quality assurance for all project phases**
- **Require comprehensive training**
- **Use existing agency documents e.g. maintenance sheets, acceptance checklist**

Performance Period Activities

- Operate ECM according to operations plan
- Implement ECM-specific maintenance
- Refresher training
- Measure and verify ECM performance through recommissioning or M&V protocol
- Adjust and retune as needed
- Document



Part 3f: Installation and Performance

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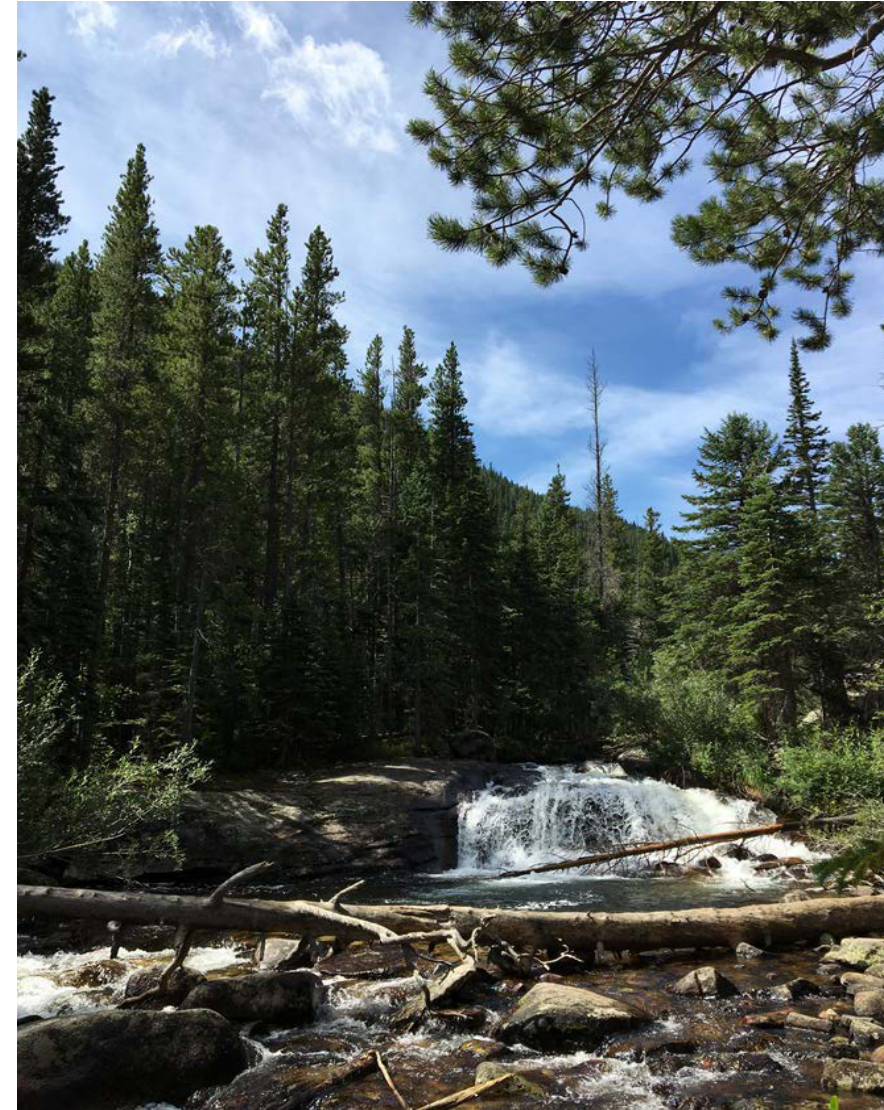
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Part 4: eProject Builder (ePB)

Benefits of using ePB for UESC

- Preserve project data
- Enable analysis and information for a portfolio of projects
- Receive standardized project schedules
- Document and track annual ECM performance outcomes and measurement and verification for the life of the contract



Maintained by Lawrence Berkeley National Laboratory (LBNL), for U.S. DOE

- Offering project financial scenarios using standardized calculations
- Enabling retrieval, examination, revision, analysis, and reporting of projects and portfolios of projects
- Facilitating benchmarking of proposed projects against aggregate statistics of historical ESPC projects
- Providing secure, web-based, project tracking, and reporting

ePB – System Components and Characteristics

- **Secure online system**

- Access is limited
- Data and documents are uploaded, accessed and tracked

- **Data template**

- Common for UESC and ESPC
- Utility or ESCO enters data

SUMMARY SCHEDULE BASIC PROJECT INFORMATION					
Project Contact Information	Role:	Institution:	Name:	Email:	Phone:
	Project Facilitator, if applicable				
	Customer (Project Initiator)				
	ESCO (Project Builder)				
	Finance Specialist				
Primary Financier					
Project Identification & Characteristics	Project Identification:			Project Characteristics:	
	Task Order #, if applicable			List of Sites in Project (separated by commas):	
	Contract #			Number of Buildings in Project:	
	Project Name:			List of Buildings in Project (separated by commas):	
	Primary Project Location-City:			Major Segment:	
	Primary Project Location-State:			Total Floor Area Affected by project (Square Feet):	
	Primary Project Location-Zipcode:			Average Annual Energy Consumption of Affected Buildings (kBtu/yr):	
	Agency Name (combine Name):			Implementation Period (months):	
Project Initiator (Customer)					
ESCO Name (Project Builder)					
Costs & Financials	Financing Terms:			Project Capitalization:	
	Applicable Rional Index:			Total Implementation Price from Schedule-2 Total:	\$0
	Contract Term (years):	0		PLUS Financing Procurement Price-estimated construction period interest (\$):	
	Index Rate:			PLUS Financing Procurement Price-other expenses (\$):	
	Added Premium (adjusted for tax incentives):			LESS Implementation Period Payments (from Schedule-1, (c)):	\$0
	Project Interest Rate:	0.00%		Total Amount Financed (Principal):	\$0
	Financing Issue Date (mm/dd/yyyy):			Performance Bond Amount:	
	Source (financial):			Annual Dollar Savings Retained by Customer:	
	Effective Through (mm/dd/yyyy):				
	Primary Type of Financing (choose from list):				
Project Agreement Type (choose from list):					
Payment Timing (beginning or end of performance year):					
Other Information	Guarantee % of Estimated Savings:				
	Federal Contract Type:				
	Primary Electric Utility:				
	Primary Natural Gas Utility:				
Primary Water Utility:					

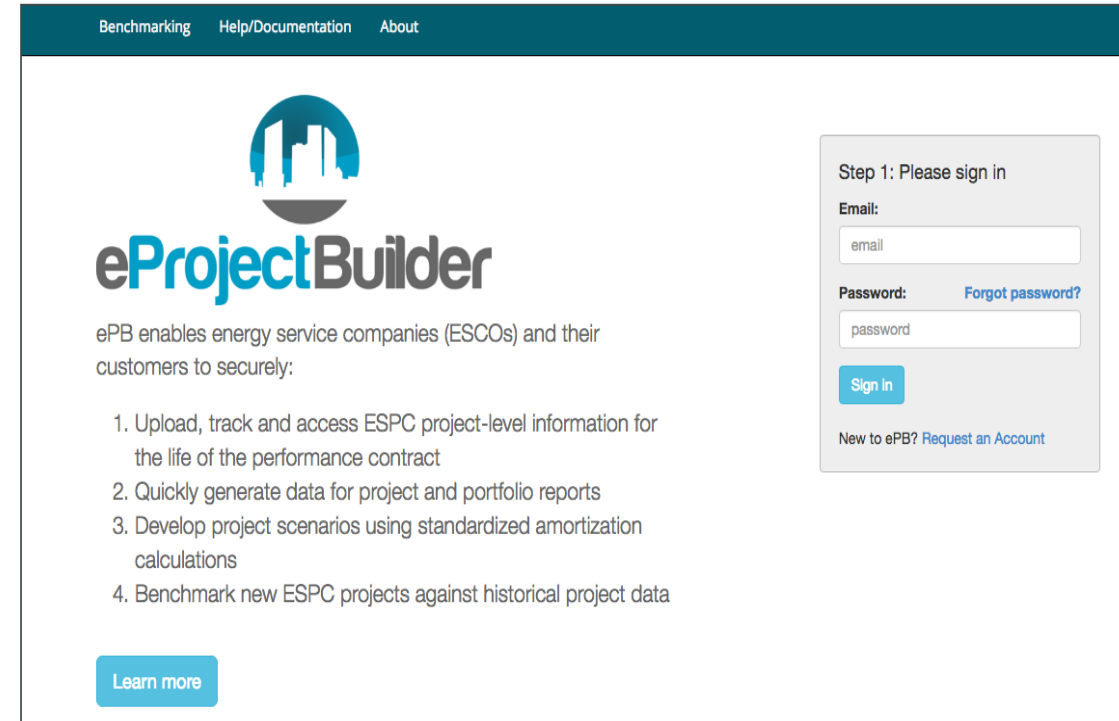
Part 4: eProject Builder

- **Main site**

- Request account
- Enter and retrieve project data
- <https://eprojectbuilder.lbl.gov/home>

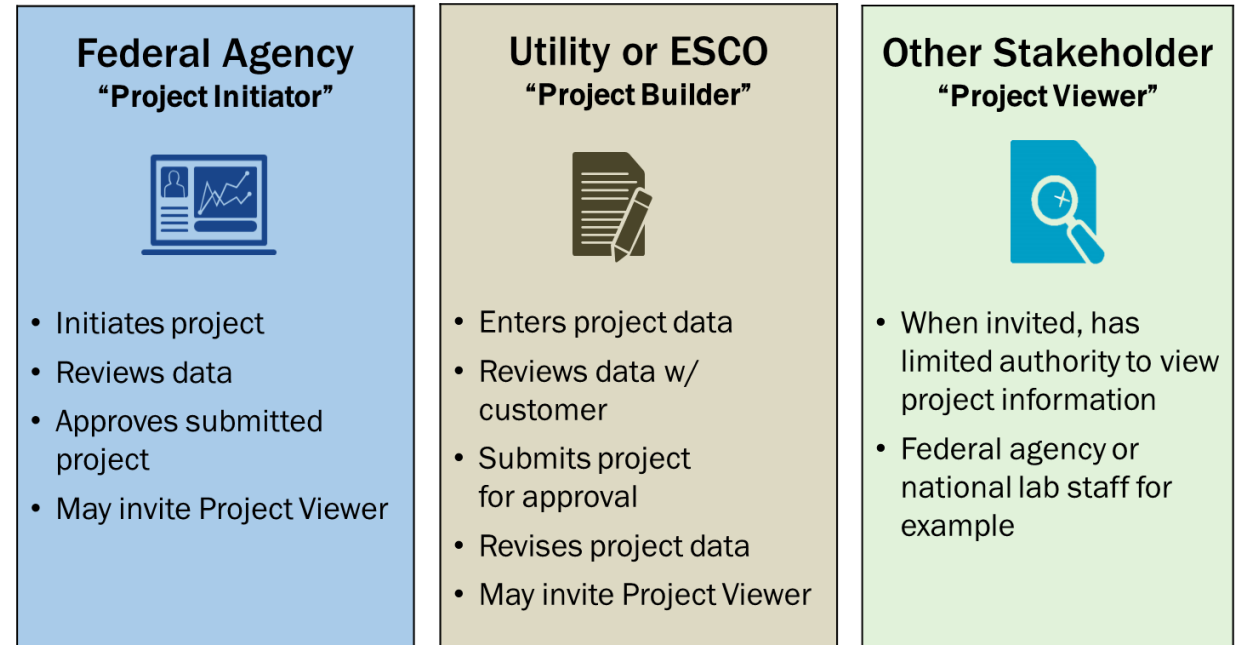
- **Training site**

- Request account
- Enter test data and explore tool from Utility/ESCO and customer perspectives
- <https://epb-test.lbl.gov/home/>



System users: Project initiator, builder, and viewer.

- **Agency point person** – establishes an account, initiates a project file, and reviews and approves project submissions
- **Utility point person** – establishes an account, enters project data, and submits for agency review



The Power of Data Management

Analyze, demonstrate, and report program results

- Value and impacts of completed projects
- Work remaining

Document actual ECM performance

- Prior to project acceptance; measure and verify through commissioning
- Demonstrate persistence over time; operate, maintain, and measure and verify through recommissioning

Performance Project Reporting - “Audit Ready” Reports

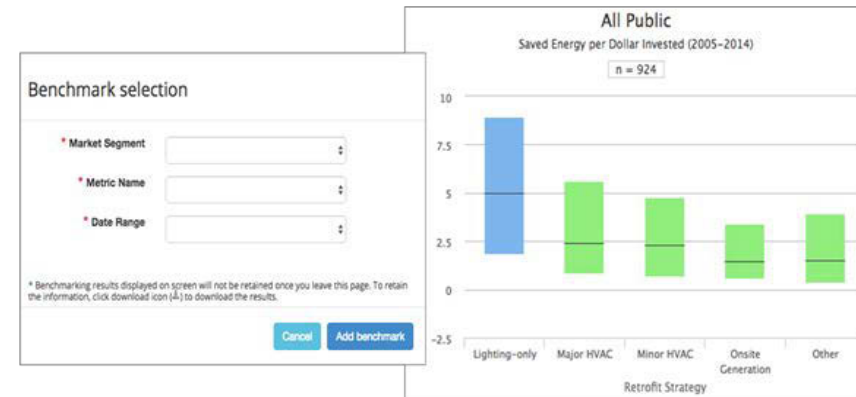
Project Reports

- Standard financial schedules
- Benchmarking resource
- Document annual and cumulative cost savings and performance results

The screenshot shows a detailed report with two main tables. The first table, 'ANNUAL EXPECTED SAVINGS BY ENERGY CONSERVATION MEASURE', lists various measures like 'Lighting', 'HVAC', and 'Water Heating' with their respective savings. The second table, 'ANNUAL PERFORMANCE PERIOD MAY GUARANTEED AND VERIFIED COST SAVINGS', provides a summary of performance metrics over a period, including 'Standard Cost Savings', 'Verified Cost Savings', and 'Value-added Cost Savings'.

Program Reports

- Analyze portfolio of projects
 - Cumulative accomplishments
 - Compare projects
- Illustrate results in tables and graphs



Part 4b: Data Management

Part 4c: ePB Schedules

Schedule	Function	Detail
Summary	Basic project information	Contacts High level costs and financials
Escalation Rate	Annual dollar savings escalation rates	Rate of escalation Savings escalations for electricity, NG, water, O&M, recommissioning
Schedule - 1	Cost savings and payments	Escalated savings and payments for each year of the term
Schedule - 2	Implementation price by ECM	The installed cost of each ECM
Schedule - 3	Performance period cash flow	Debt service = finance payment Performance period expenses Total price = finance payment + expenses
Schedule - 4	1 st year estimated cost savings	This is the Baseline by ECM
Schedule - 5	Cancellation ceilings	Use when required by contract

Part 4c: ePB Schedules

ePB Training and Assistance

- **Advanced eProject Builder Demonstration**
 - September 19, 2019 | 3 p.m. EDT
 - Live online
- **Website:** <https://eprojectbuilder.lbl.gov/home>
 - Check website for dates and times
- **LBNL by request:**
 - Custom training for groups and teams
 - Streamline upload, analyze, and map data



ePB Contact:

Email: epb-support@lbl.gov

Phone: (510) 486-7442

Part 4c: eProject Builder

Performance-Focused Project Development – Agenda

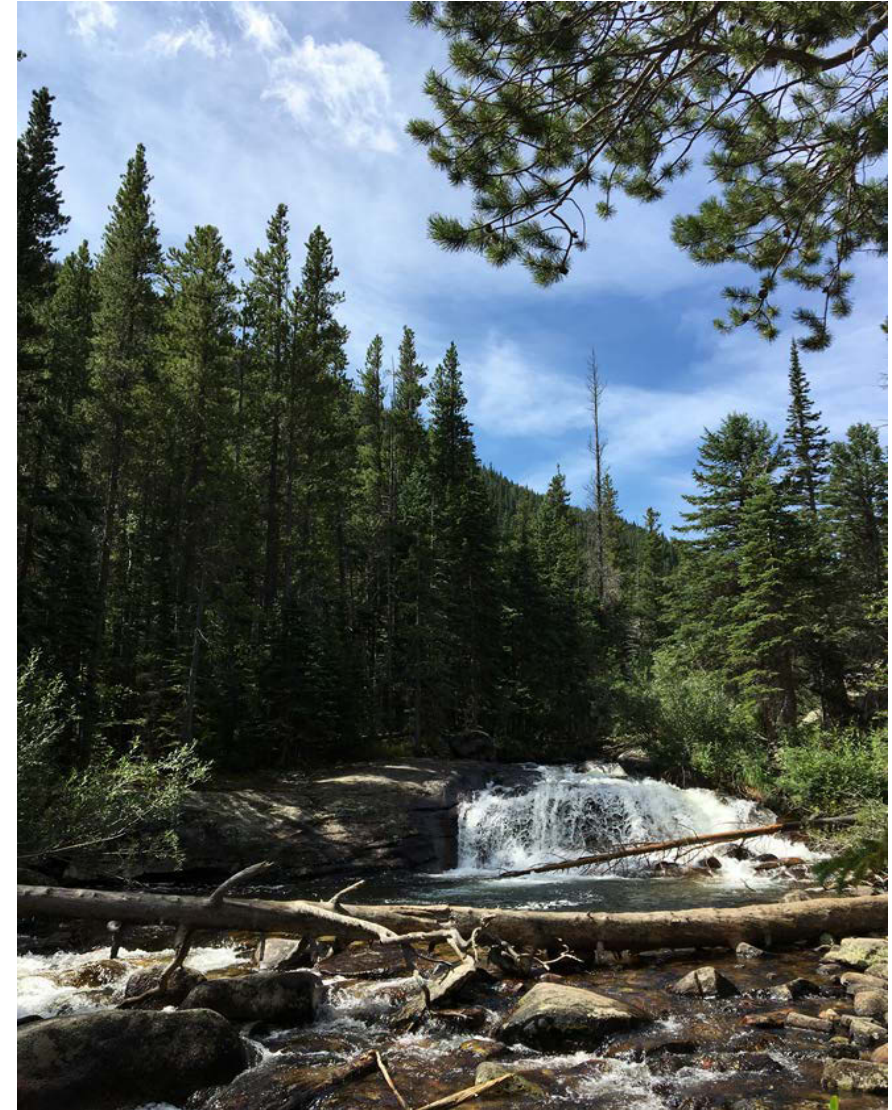
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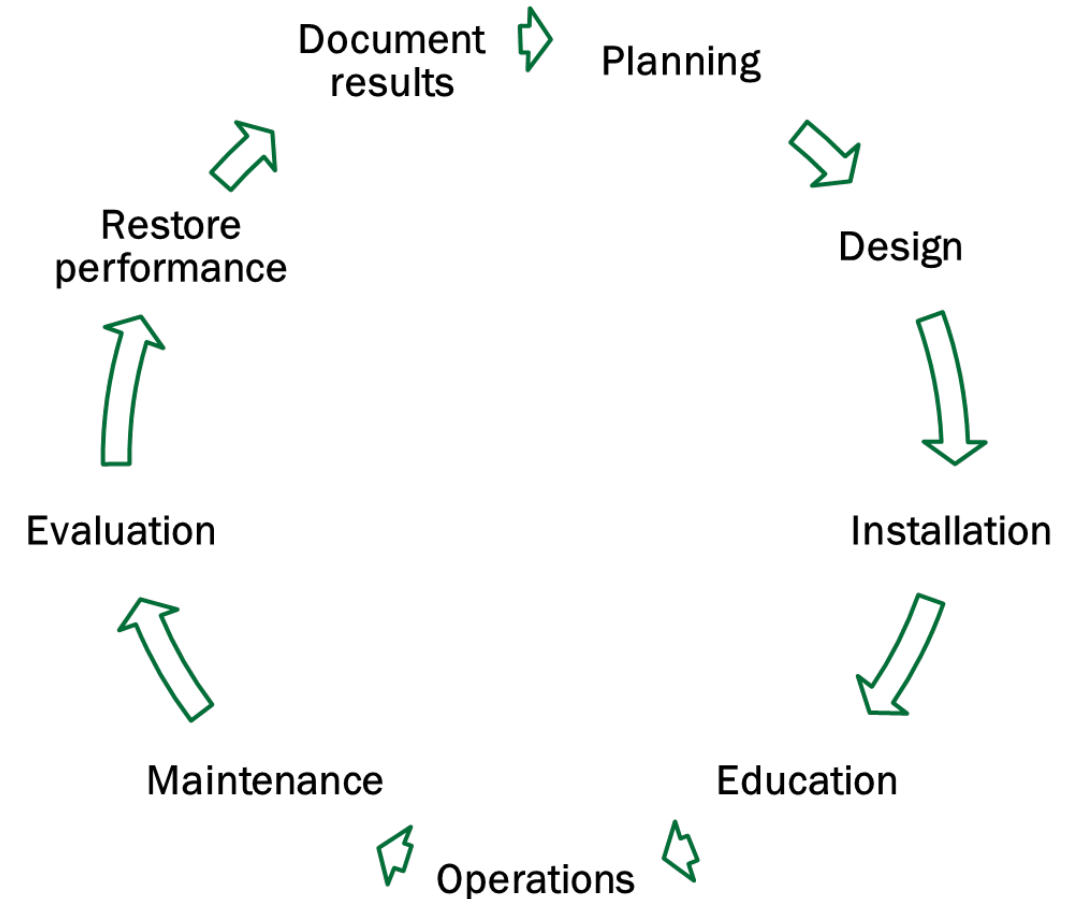
Part 5: Review, Resources, and Links



How Can We Assure Sustained Project Performance?

Progressively build your project focusing on long-term performance

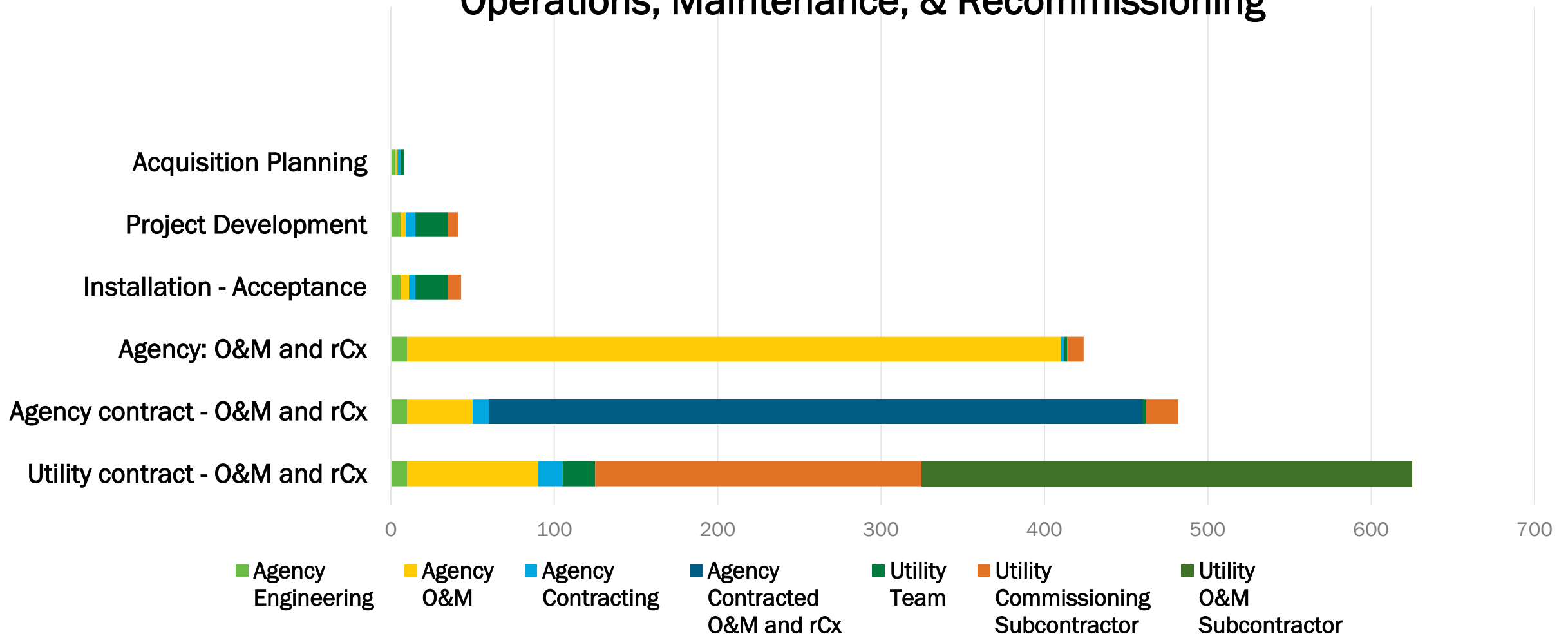
- Plan and design well
- Require a project-specific performance plan
- Project acceptance after all measures are fully commissioned and performance is demonstrated and documented
- Prepare Agency staff with comprehensive training and resources
- Perform essential operations, maintenance, and recommissioning



Part 5: Review, Resources, and Links

Options for Implementing the Performance Plan

Agency implemented or Contractor implemented Operations, Maintenance, & Recommissioning



Detailed and Actionable Plan

- Know what is needed
- Know how and when it should be done
- Prepare agency staff for performance focused O&M

Add value, resolve problems

- **Implement measures that add value and resolve problems**
- **Develop a project-specific performance plan**
- **Measure, verify, adjust, and document performance through Cx and rCx**

Influence Long-Term Performance

- Design and Baseline – complete and accurate
- Prove performance prior to acceptance
- Implement operations and maintenance
- Recommission or continuously commission
- Document consistently

Are M&V and Energy Savings Guarantees Mandatory?

- **42 U.S.C. § 8253(f)(5) requirements apply**
 - Energy consuming equipment and control systems must be commissioned and operating at design specifications prior to acceptance
 - A plan for appropriate operations, maintenance, and repair of the equipment must be developed and in place at acceptance and it must be followed throughout the life of each measure
- **Investment value and payments are linked to energy savings**
 - To ensure savings persist, necessary adjustments and improvements must be made to operate at design performance, and the results must be documented
 - Whether through commissioning or measurement and verification protocol, performance must be analyzed and documented

Part 5: Review, Resources, and Links

Resources to Sharpen Project Requirements



- **Performance Planning**
 - Performance training plan
 - Commissioning plan
 - Operations plan
 - Maintenance plan
 - Recommissioning plan
- **Project Development Report Template**
 - Technical assessment
 - Financial assessment
- **eProject Builder**

Performance planning
Report template

https://www.energy.gov/sites/prod/files/2019/02/f59/uesc_performance_assurance_planning.pdf

https://www.energy.gov/sites/prod/files/2019/02/f60/uesc_proj_dev_draft.docx

Part 5: Review, Resources, and Links

We Want to Know

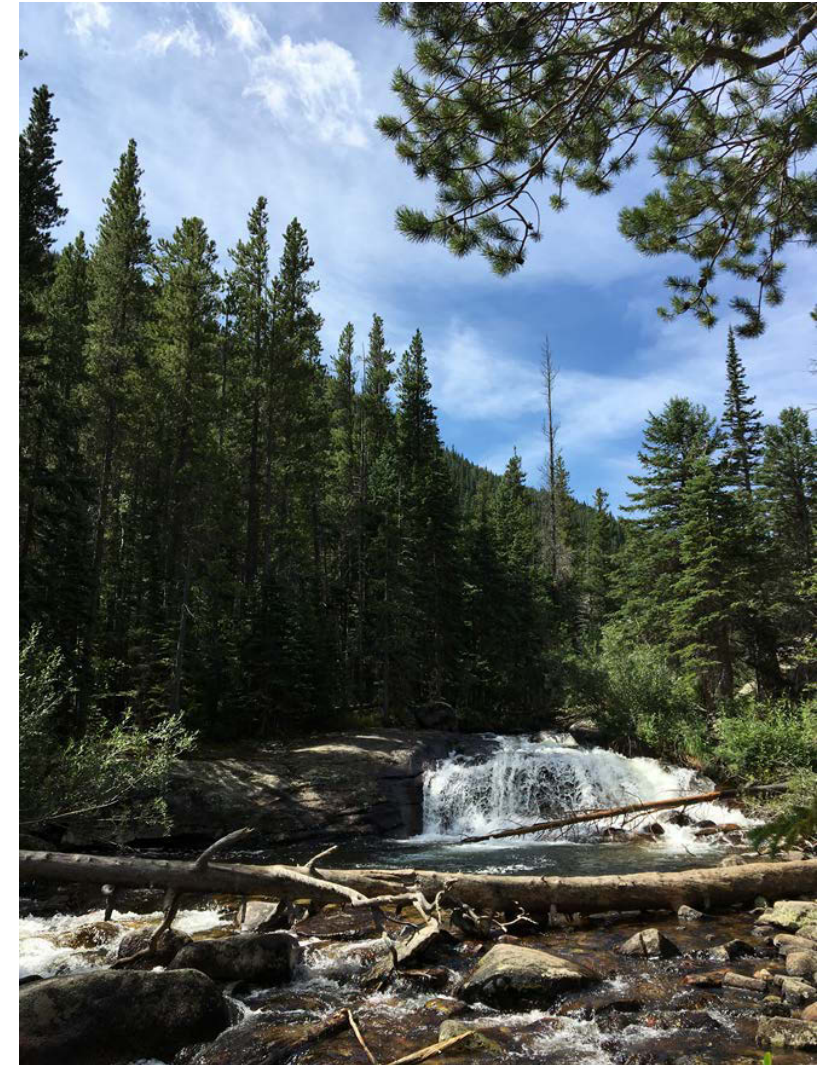
What would you like us to know regarding performance for energy projects?

Write a note to our “FEMP UESC Team”

Please share your thoughts related to your project, experiences, issues, services, or great ideas.

- *Index cards (See Deb or Jeff)*
- *Drop off at the “FEMP Hub” in the Exhibit Hall*

~ please include your name, organization, and energy responsibilities



Indian Hills

Contact Us

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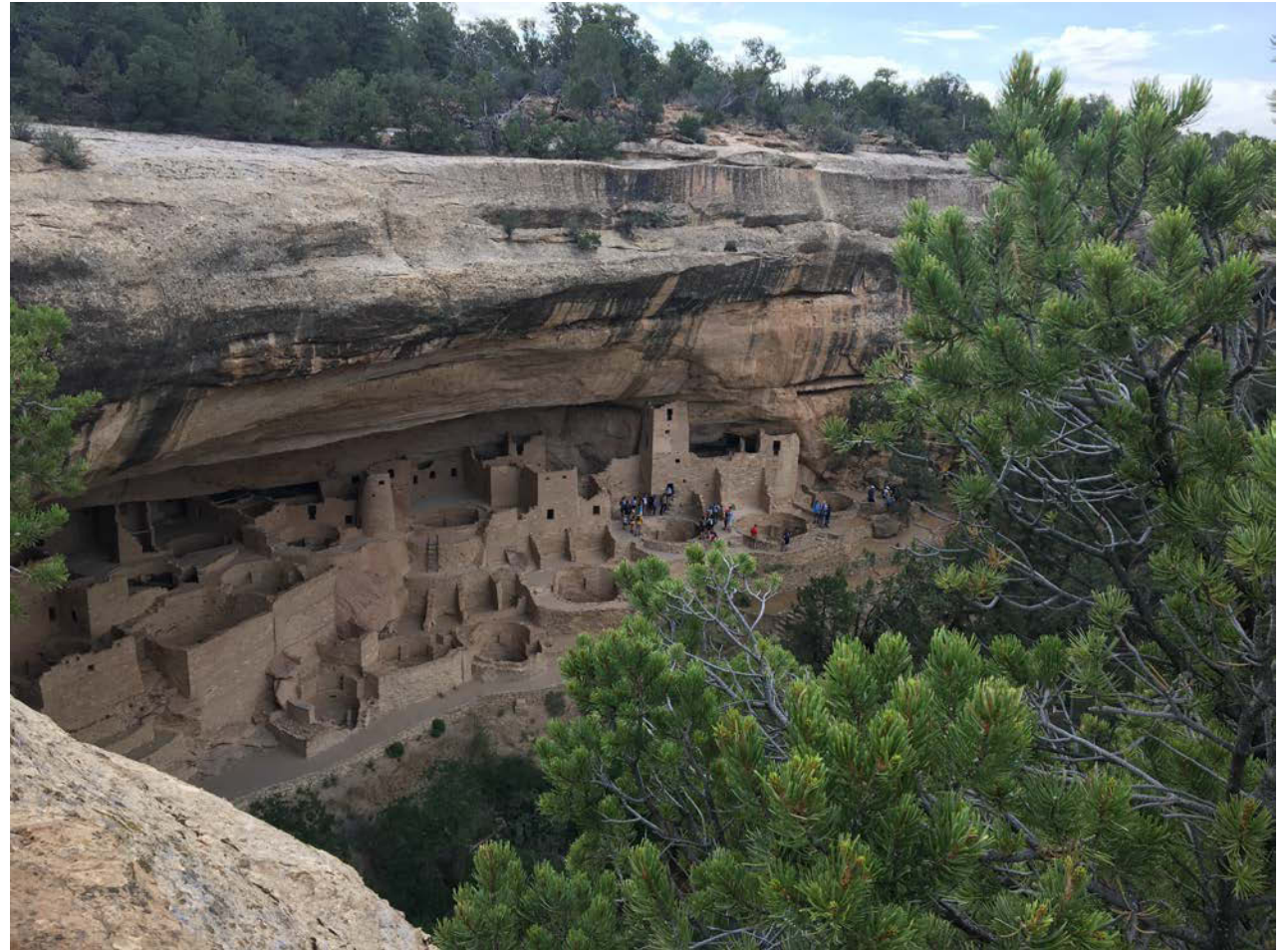
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Thank You for Participating

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Mesa Verde National Park