



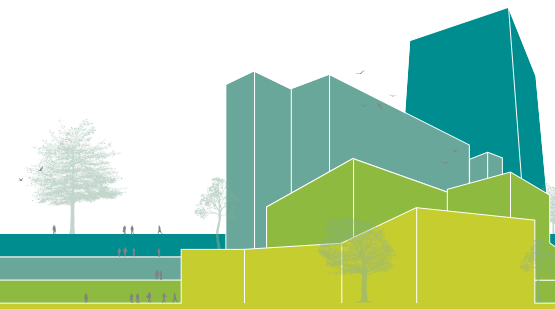
# Integrated Design Advanced Energy Retrofit ROADMAP



Project Team Guide | Lite Retrofits

# Integrated Design Advanced Energy Retrofit Roadmap

*For design, construction, and management of the retrofit process.*



## Project Team Guide for Lite Retrofits

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## Disclaimer

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The Consortium for Building Energy Innovation  
Building Technologies Office, Department of Energy



*The Consortium for Building Energy Innovation is part of the United States Department of Energy's Building Technologies Office. The CBEI aims to transform the energy efficiency market for existing small- and medium-sized commercial buildings. Our vision is to be recognized as the leader in creating vibrant ecosystems to identify and apply integrative technologies and innovative practices in existing buildings.*

*The CBEI performs research to develop and integrate materials, technologies, models, and tools to optimize whole building energy performance. Research results are demonstrated in buildings and effects are measured and cycled back to refine and guide continued research for further optimization of whole building performance. The CBEI scales adoption of proven solutions by addressing business and finance, education and training, and other issues.*

*The headquarters of the CBEI is located at the Navy Yard in Philadelphia, PA. The Navy Yard and the Philadelphia region serve as the test beds from which the CBEI deploys to the nation proven energy-savings, whole building system solutions and integrated retrofit design and delivery methods.*

## Message from Principal Investigator, Franca Trubiano

The energy efficiency market currently lacks effective and scalable project management tools that offer the architecture, engineering, and construction (AEC) industry a comprehensive action process for completing advanced energy retrofits. This is particularly the case for small to medium-sized buildings. Moreover, today's commercial building market can ill afford the renovation of buildings by industry professionals who neglect to account for the building's energy consumption. In response, the ***Integrated Design Advanced Energy Retrofit (ID AER) Roadmap*** project, which our team has authored, is aimed at developing operational guidelines and protocols for ensuring building project teams can successfully complete an ID AER.

Committed to increasing the number of advanced energy retrofits completed in the United States over the next 20 years, this *Integrated Design Roadmap* assists project teams and building owners in achieving deep energy savings in the renovation of existing buildings. The ID process outlined in this *Reference Manual* and its accompanying *Project Team Guide* instructs and empowers owners, project managers, financial investors, architecture, engineering and construction professionals, as well as energy modeling and measurement professionals, with valuable information for completing an advanced energy retrofit.





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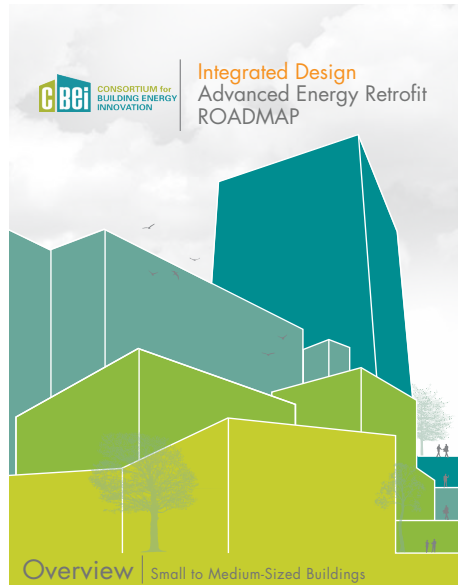
1 INTRODUCTION

- VALUE OF INTEGRATED DESIGN + ID PROTOCOLS
- PROJECT IMPLEMENTATION OF ID PROCESS

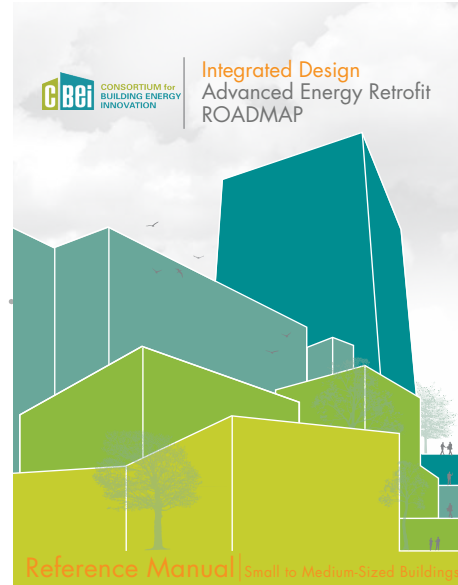
## Integrated Design (ID) Advanced Energy Retrofit (AER) Roadmap Document Suite

The Integrated Design (ID) Advanced Energy Retrofit (AER) Roadmap document suite is organized in a three-tiered structure, with each tier expanding and reinforcing the concepts introduced by the previous. The Roadmap seeks to empower building owners with the knowledge needed in order to make informed decisions leading to the completion of a successful advanced energy retrofit. The Roadmap document suite includes the following documents:

- *ID AER Roadmap Overview*
- *ID AER Roadmap Reference Manual*
- *ID AER Roadmap Project Team Guides*



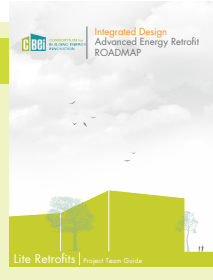
• *ID AER Roadmap Overview*  
The Overview serves as an introduction brochure to the document suite and outlines the basic concepts of Integrated Design (ID) and Advanced Energy Retrofits (AERs). A short quiz helps the reader identify what scale of retrofit may be appropriate for their project. In addition, the Overview provides info on the benefits of Integrated Design (ID) and financial resources and incentives.



• *ID AER Roadmap Reference Manual*  
The Reference Manual focuses on all information related to the execution of an Integrated Design (ID) AER project. This document is geared towards building owners, operations and maintenance teams, and tenants with limited knowledge of Integrated Design (ID), AERs, or buildings. It is also a useful companion to the Project Team Guide for team members with less experience utilizing an Integrated Design (ID) process.

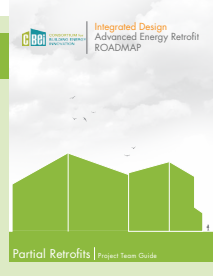
- *ID AER Roadmap Project Team Guides*

Critically important to the implementation of an Integrated Design (ID) process, the Project Team Guide outlines the activities involved in each scale of retrofit. The Project Team Guide includes four separate documents developed for use by all professionals that make up the project team.



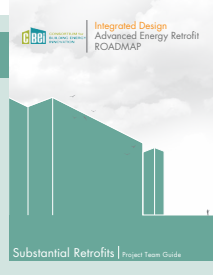
### PROJECT TEAM GUIDE: LITE

The Lite Retrofit Project Team Guide details the implementation of an Integrated Design (ID) process for a project scope that includes the Purchase, Installation and Commissioning of a minimum of one new building system and the existing building commissioning of at least one existing system.



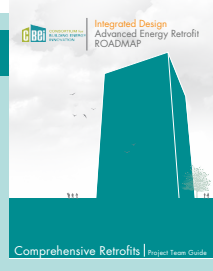
### PROJECT TEAM GUIDE: PARTIAL

The Partial Retrofit Project Team Guide details the implementation of an Integrated Design (ID) process for a project scope that includes the Purchase, Installation and Commissioning of a minimum of two building systems and one building envelope component.



### PROJECT TEAM GUIDE: SUBSTANTIAL

The Substantial Retrofit Project Team Guide details the implementation of an Integrated Design (ID) process for a project scope that includes the Purchase, Installation and Commissioning of most building systems and building envelope components.



### PROJECT TEAM GUIDE: COMPREHENSIVE

The Comprehensive Retrofit Project Team Guide details the implementation of an Integrated Design (ID) process for a project scope that includes the Purchase, Installation and Commissioning of all building systems and building envelope components through the use of customized process protocols and benchmarks.

## What is Integrated Design (ID)?

Integrated Design (ID) is a collaborative process for identifying shared priorities and goals in an effort to build consensus amongst all members on the retrofit team. Building owners are encouraged to demonstrate commitment to the seven Integrated Design (ID) protocols, and to encourage the same level of commitment from the professional team whose members are from Architecture, Engineering, and Construction (AEC) industries.

In Collaborative Meetings (CM) all team members are in attendance to develop:

- Mission Statement + Project Priorities
- Project Budget + Restraints
- Project Values + Goals

Participating in a process such as this offers Owners the chance to have a more efficient, effective building that attains greater energy savings.

## Why is ID better than typical practice?

The use of Integrated Design (ID) in the construction industry often bypasses and mitigates many of the industry's most fragmented and inefficient activities. Regardless of project scope or scale, when professionals from the AEC industry come together and align around a project's goals, results usually include better managed and less costly projects. When using an Integrated Design (ID) approach, in which a single team works for the benefit of a shared goal, the completion of a better performing building usually results. Typical of an Integrated Design (ID) retrofit project is the:

- Team Alignment of goals
- High level collaboration + execution of project activities throughout the entire project
- Use of Predictive Modeling and Measurement + Verification (M+V) to evaluate energy savings

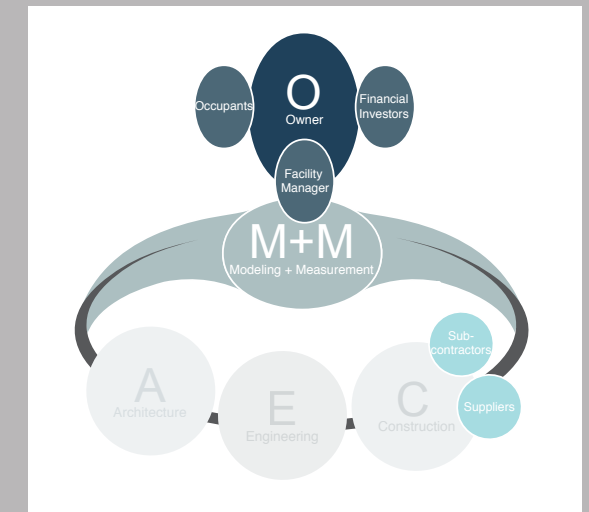
## Participants: Roles + Responsibilities

Successful retrofit projects are the result of open communication and coordination amongst all team members. The careful sequencing of required tasks to be performed by each AEC and Modeling and Measurement professional contributes to this success.

These Integrated Design (ID) protocols have been organized and sequenced to facilitate professional exchange and to increase levels of transparency of benefit to all advanced energy retrofits.

Albeit different project scales will occasion different budgets and different levels of professional engagement, all seven protocols listed here are recommended for implementation.

## PROFESSIONAL ROLES



The diagram above identifies the professionals typically involved in a Lite scale ID AER. Within a Lite scale ID AER, typically a professional from the Architecture and Engineering fields does not participate in this scale of retrofit. Instead, the team includes a Project Manager and a Consultant who is either a Sub-contractor or Supplier.

## ID PROTOCOLS

Seven Integrated Design (ID) protocols guide all advanced energy retrofits, regardless of project size, scope and budget. The protocols include:

### 1 PROJECT MISSION STATEMENTS

- Shared by all members of the team, they create alignment around project goals and expectations.
- Establish values, cost priorities, people-based protocols and performance metrics.
- Organize and guide most decisions and procedures for the entirety of the AER.

### 2 ID REQUESTS FOR PROPOSAL

- Sets performance based standards and financial goals for all team members.
- Ensures all team members, including AEC professionals, Modeling + Measuring consultants, and Product and Service providers have the requisite knowledge and experience for achieving the Owner's energy savings goals.

### 3 COLLABORATIVE TEAM MEETINGS

- Participation in all team gatherings creates engagement among team members.
- Fosters feelings of ownership by all team members.
- Facilitates goal setting and project updating, as well as periodic detailed project reviews.

### 4 ENERGY FREE DESIGN SOLUTIONS

- Promotes and evaluates a range of passive energy solutions that encourage load reduction.
- Contributes to minimizing the size and cost of any new HVAC and lighting systems.
- Encourages the use of renewable energy.

### 5 WHOLE BUILDING SYSTEMS DESIGN

- Promotes the accrual of savings when multiple systems are retrofitted at the same time.
- Ensures the operation of all systems (new or existing) are efficient.
- Identifies the value of bundling retrofit measures.

### 6 PREDICTIVE MODELING

- Offers baseline model benchmarking for building energy consumption, pre- and post-retrofit.
- Forecasts where other energy savings or benefits may exist.
- Validates and tests potential design solutions for effectiveness in achieving energy target goals.

### 7 MEASUREMENT + VERIFICATION

- Enables the calibration of building systems post-retrofit to ensure they are operating as expected.
- Offers measurable data to substantiate energy savings claims.
- Demonstrates energy savings to tenants (existing and future) as well as to financing bodies.

## Project Phases in a Lite ID AER

A Lite ID AER project can be organized into five phases over the course of the project including:

- Conceptualization
- Design Development
- Implementation Documentation
- Construction & M+V
- Commissioning & Post-Occupancy

Each phase requires the collaboration of all professionals on the team.

### • Conceptualization

The Conceptualization phase includes the Pre-Project Resource Gathering (RG) stage and the first process oriented Collaborative Meeting (CM) stage. During the Pre-Project RG stage, the preliminary project details are identified. The first CM is intended to give the team an opportunity to understand the ID process and its protocols, develop project goals, and work towards alignment.

### • Design Development

The Design Development phase includes a RG stage and the second CM stage. During the RG stage, design solutions are developed and the team participates in Sub-Team Meetings to review options. During the CM stage, all team members participate to review the final design options and ensure continued alignment with the project's Mission Statement.

### • Implementation Documentation

The Implementation Documentation phase includes a RG stage and the third process oriented CM stage. During the RG stage, implementation/installation documents are developed and reviewed, as well as the purchase orders and the construction/installation schedule. During the CM stage, the Mission Statement is reviewed to ensure team members remain aligned.

### • Construction & M+V

The Construction & M+V phase includes only a RG stage. This RG stage includes the construction of the project using Lean Project Delivery methods and the identification of the project's M+V goals (if applicable). In addition, a plan for operations and maintenance (O+M) is identified and reviewed.

### • Commissioning & Post-Occupancy

The Commissioning & Post-Occupancy phase includes the final CM, and the final RG stage, called On-going Performance Evaluation. At the CM, the O+M plan is confirmed and approved. During On-going Performance Evaluation, if applicable, limited monitoring of building systems occurs.

## Resource Gathering (RG)

The ID process includes two types of activities defined as Resource Gathering (RG) stages and Collaborative Meeting (CM) stages. RG stages include information gathering activities assigned to each professional team member based on their competencies. Typically, team members work independently in gathering the required information. During RG stages, the Owner and/or Project Manager may have Sub-Team meetings with various team members to review the development of these activities and ensure alignment of the project with the Mission Statement.

During a Lite scale retrofit, there are typically five RG stages. The first is defined as the Pre-Project RG stage during the Conceptualization phase. This and all of the other RG stages involve the participation of the Owner and/or Project Manager and the Consultant team member.

## Collaborative Meetings (CM)

As part of a Lite scale ID AER, four Collaborative Meeting (CM) stages take place. CM stages include all team members in order to achieve project alignment and provide for the integrated development of the project. The following outlines the CM stages within a Lite scale ID AER:

### • Alignment and Goal Setting Meeting:

The first CM occurs during the Conceptualization phase and focuses on introducing and developing an understanding of all ID process protocols by team members.

### • Final Design Decisions Meeting:

The second CM occurs during the Design Development phase and focuses on the review and approval of the final design solutions by the project team.

### • Installation Initiation Meeting:

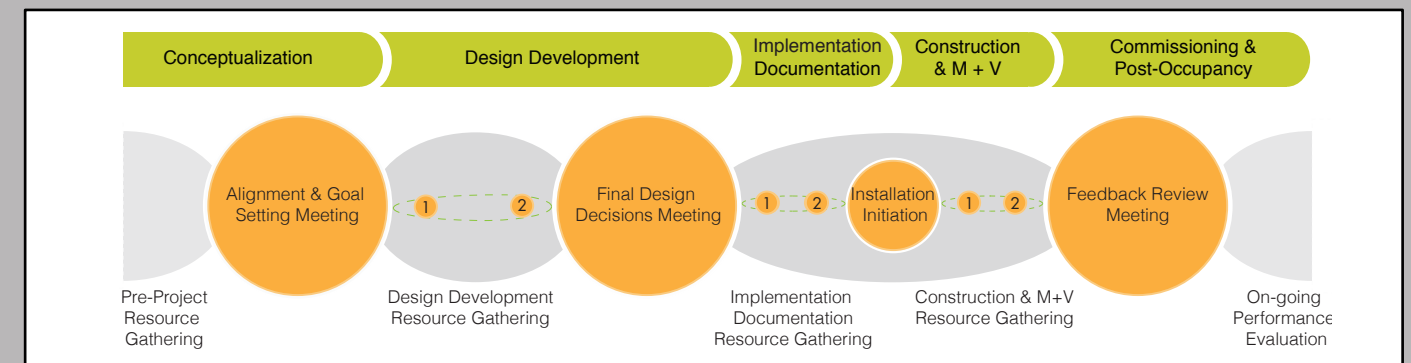
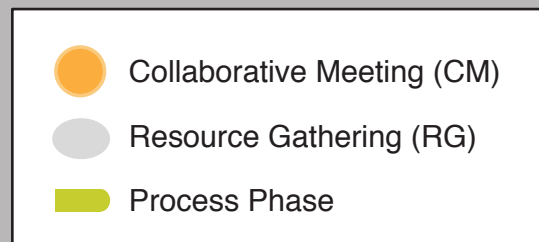
The third CM occurs during the Implementation Documentation phase and focuses on the review and approval of the construction schedule, budget, and implementation documents.

### • Feedback Review Meeting:

The fourth CM occurs during the Commissioning & Post-Occupancy phase and focuses on approval of plans for on-going performance evaluation.

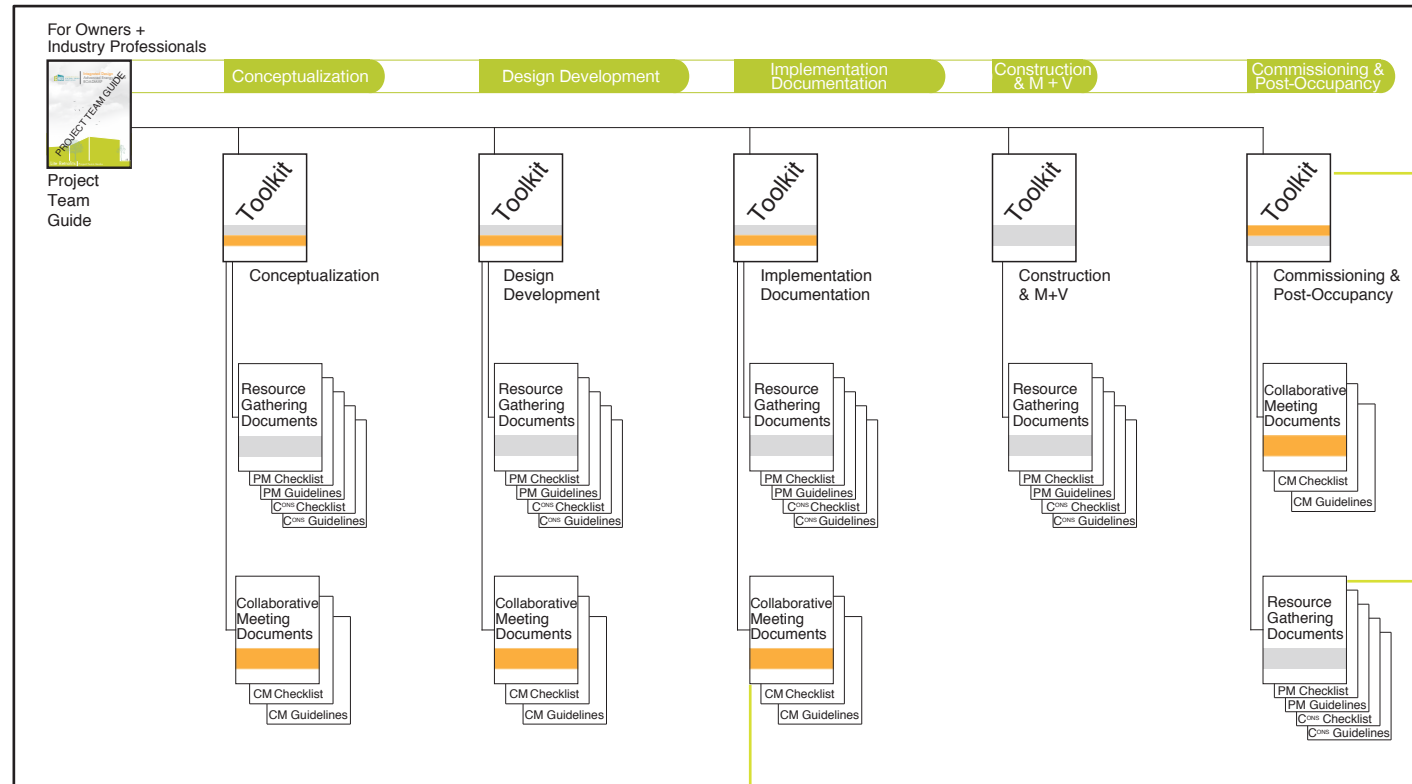
## INTEGRATED DESIGN PROCESS DIAGRAM

This Integrated Design (ID) Process Diagram identifies the phases of a typical Lite scale ID AER project. The diagram identifies the components involved within each phase including Resource Gathering (RG) and Collaborative Meeting (CM) stages. Detailed activity Checklists and Guidelines for all of the RG and CM stages can be found within this document. Throughout this process, team members collaborate for maximum alignment around project goals and intended outcomes.





## Project Team Guide Documents Map



### Project Phase Toolkits

The Project Team Guide is organized into toolkits used during each phase of an integrated design (ID) AER project. Each toolkit includes the documents that are necessary for that particular phase, which typically involves Resource Gathering documents and Collaborative Meeting documents.

### Resource Gathering Documents

The Collaborative Meeting (CM) documents include shared Checklist and Guidelines documents that outline activities to be completed by all team members within each of the CM stages.

### Collaborative Meeting Documents

The Collaborative Meeting (CM) documents include shared Checklist and Guidelines documents that outline the activities that will be completed by all team members within each of the CM stages.

## Using the Project Team Guide to Complete a Lite ID AER

The Project Team Guide outlines all activities involved in each phase of a Lite ID AER project. This comprehensive toolkit has been developed for use by all professionals on a project team. Since a typical Lite scale ID AER project will have a limited number of professionals on the team, the documents within the guide are organized according to the professional competencies required on a particular team, which include the following:

- Project Management
- Consultant Team Member (which may include Architectural, Engineering, Construction, Modeling + Measurement, and/or Product Suppliers)

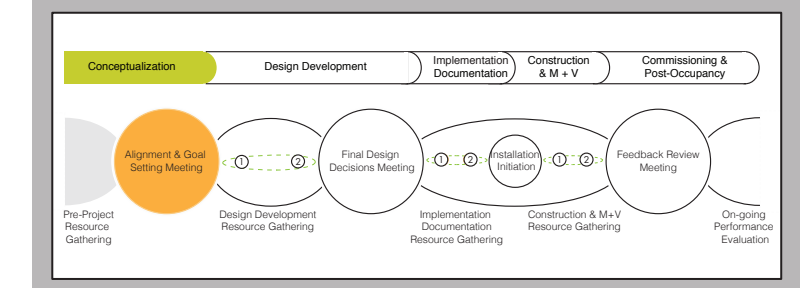
During a Lite scale retrofit, team members will be required to explore tasks that are not typically offered as part of their services but for which they are qualified. Designated project team roles are explored according to the specifics of a project, and assigned by the Owner and/or Project Manager at the start of the project.

## CONCEPTUALIZATION PHASE CONTENTS

DESIGN DEVELOPMENT (DD) PHASE	
CONTENTS	
RESOURCE GATHERING (RG) DOCUMENTS	
DD.PM	PROJECT MANAGEMENT (PM) xx
DD.PM.1	PM CHECKLIST
DD.PM.GUIDELINES	PM GUIDELINES
DD.CM	CONSULTANT (C <sup>MS</sup> ) xx
DD.CM.1	CONSULTANT CHECKLIST
DD.CM.GUIDELINES	CONSULTANT GUIDELINES
ID COLLABORATIVE MEETING (CM) DOCUMENTS xx	
DD.CM.1	FINAL DESIGN DECISIONS MEETING CHECKLIST
DD.CM.GUIDELINES	FINAL DESIGN DECISIONS MEETING GUIDELINES

*Design Development Phase Table of Contents*

## CONCEPTUALIZATION PHASE LEGEND



## EXAMPLE CHECKLIST DOCUMENT

Conceptualization Phase Resource Gathering Document

## Project Team Checklists

Within the Project Team Guide, each Resource Gathering (RG) and Collaborative Meeting (CM) stage includes Checklists that outline the integrated design (ID) and advanced energy retrofit (AER) activities required during a Lite scale retrofit.

### • Resource Gathering (RG) Checklists:

During RG stages, Checklists are used to outline the professional competencies needed on the project to complete all required activities.

### • Collaborative Meeting (CM) Checklists:

During CM stages, one shared Checklist outlines the activities to be completed by all team members at each process oriented Collaborative Meeting.

## Project Team Guidelines

Within the Project Team Guide, each Resource Gathering (RG) and Collaborative Meeting (CM) stage includes a Guidelines section for every Checklist. These Guidelines provide resources and additional information to assist the project team in completing the activities that are outlined in the corresponding Checklist.

### • Resource Gathering (RG) Guidelines:

During RG stages, the Guidelines are organized according to the professional competencies required for designated activities.

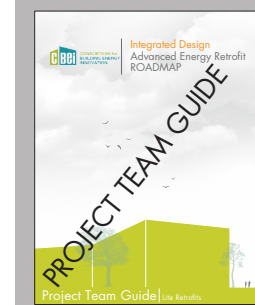
### • Collaborative Meeting (CM) Guidelines:

Of use during CM stages, there is one Guidelines section used by the project team. These Guidelines help direct Integrated Design activities and contribute to team alignment around a project's goals and outcomes.

## EXAMPLE GUIDELINES DOCUMENT

Conceptualization Phase Resource Gathering Document

## NEXT STEPS: USING THE LITE ID AER PROJECT TEAM GUIDE



The documents within this guide outline all of the activities involved in a Lite ID AER project. Initially, the Owner and/or Project Manager will begin the project by launching the Conceptualization phase. Initial steps include some of the following activities during the Pre-Project Resource Gathering stage:

### FINANCIAL RESOURCES REVIEW

The Owner and/or Project Manager will review the financial resources available for the project, and any associated constraints. This will include a review of all available incentives in order to develop a preliminary project budget.

### ID REQUEST FOR PROPOSALS

The Owner and/or the Project Manager will identify the required consulting competencies. Integrated Design (ID) Request for Proposals (RFPs) help identify professionals who are familiar with ID and who share the goals of advanced energy retrofits.

### CONTRACTING THE TEAM

The Owner and/or the Project Manager will review and respond to the ID RFPs for professionals. Once completed, professionals are contracted and invited to the first Collaborative Meeting (CM). All team members need to be contracted prior to the CM.

### COLLABORATIVE MEETING

At the Alignment & Goal Setting Meeting, the team will review the ID process and protocols. The intent of this first meeting is to understand the ID process and develop goals for the project relating to the ID protocols, in order to align team members towards achieving the intended outcomes.

# CONCEPTUALIZATION (CONC.) PHASE

## CONTENTS

### RESOURCE GATHERING (RG) DOCUMENTS

#### CONC.PM PROJECT MANAGEMENT (PM) 18

CONC.PM.1 PM CHECKLIST

CONC.PM.2 PM CHECKLIST

CONC.PM.GUIDELINES PM GUIDELINES

#### CONC.CONS CONSULTANT (CONS) 28

CONC.CONS.1 CONSULTANT CHECKLIST

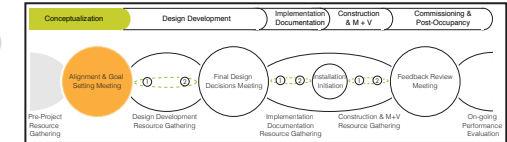
CONC.CONS.GUIDELINES CONSULTANT GUIDELINES

#### ID COLLABORATIVE MEETING (CM) DOCUMENTS 34

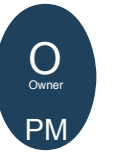
CONC.CM.1 ALIGNMENT & GOAL SETTING CHECKLIST

CONC.CM.GUIDELINES ALIGNMENT & GOAL SETTING GUIDELINES

### PHASE LEGEND







CHECKLIST

- 1a Identify who will FACILITATE the Integrated Design (ID) process
  - Team Member Name: \_\_\_\_\_
  - Contact Information: \_\_\_\_\_
- 1b Identify building performance and utility DATA for Consultant
  - DELIVERABLE: Submit Utility Bills for the most recent 1-2 years on record (Electric, Gas, Water)
  - DELIVERABLE: Submit Energy Audits, if available
  - DELIVERABLE: Submit Building Automation System report(s), if available
- 1c Identify and review retrofit SCALE using the ID AER Roadmap evaluation tools
  - DELIVERABLE: Submit completed Retrofit Scale Quiz
- 1d Identify and review preliminary project SCOPE and SCHEDULE
  - DELIVERABLE: Submit summary outlining preliminary project scope
  - DELIVERABLE: Submit preliminary project schedule
- 1e Identify and review project CONSTRAINTS
  - DELIVERABLE: Submit summary outlining project constraints
- 1f Identify and review preliminary project PERFORMANCE TARGETS and Metrics with Consultant
  - DELIVERABLE: Submit summary outlining the preliminary project performance targets and metrics
- 1g Identify and review an Owner's TEAM ORGANIZATION MAP for communication
  - DELIVERABLE: Submit Owner's team Organization Map
- 1h SCHEDULE first Collaborative Meeting, Alignment and Goal Setting, and draft list of owner's project priorities
  - DELIVERABLE: Submit draft list of owner's project priorities
  - DELIVERABLE: Schedule the Alignment and Goal Setting Meeting and notify all project team members

ASSIGNED TO: \_\_\_\_\_ CONTACT INFO: \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_



## PRE-PROJECT RESOURCE GATHERING (RG) DOCUMENT

### PROJECT MANAGEMENT (PM) FINANCIAL ACTIVITIES

- 2a) Identify and review FINANCIAL RESOURCES for project
  - DELIVERABLE: Submit summary of financial resources for the project
- 2b) Identify and review INCENTIVES for project:
  - Identify and review possible UTILITY company agreements (ESCO, ESA, On-Bill)
  - Identify and review possible product equipment REBATES
  - Identify and review possible ENERGY INCENTIVES
  - Identify and review possible energy upgrade TAX INCENTIVES
    - DELIVERABLE: Submit summary of selected incentives for the project
- 2c) Identify and review preliminary BUDGET for project
  - DELIVERABLE: Submit preliminary budget for project
- 2d) Identify and review possible GREEN LEASES and negotiate leases, if applicable
  - DELIVERABLE: Submit negotiated leases, if applicable
- 2e) Identify and review RISK CAPACITY and intended return on investment (ROI)
  - DELIVERABLE: Submit summary outlining the review of risk capacity and the intended ROI

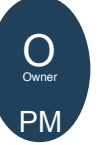
### PROJECT MANAGEMENT (PM) ID RFPs ACTIVITIES

- 2f) Identify required project TEAM COMPETENCIES (Architecture, Engineering, Construction) and proficiencies
  - DELIVERABLE: Submit list of required team competencies and proficiencies
- 2g) Identify a list of CONSULTANTS based on required project team competencies with shared goals and priorities
  - DELIVERABLE: Submit list of consultants
- 2h) Issue Integrated Design Request for Proposals (RFPs) to list of consultants
  - DELIVERABLE: Submit copy of issued ID RFPs
- 2i) CONTRACT project team members and invite to Alignment & Goals Setting Meeting
  - DELIVERABLE: Submit copy of project team contracts

ASSIGNED TO:

CONTACT INFO:

DATE COMPLETED:



### 1a) Identifying an Integrated Design Facilitator

The Project Manager identifies the team member who will facilitate the Integrated Design (ID) process. This ID facilitator can be the Project Manager, and/or any other member of the project team who is skilled and committed to the goals of integrated design. This facilitator will ensure that the team is on track to complete the Checklists required for each phase. At the beginning of each phase, the facilitator will be responsible for assigning the Checklists within that particular phase to a team member. A completion date for each Checklist is also assigned by the facilitator. In addition, it is important that the facilitator keeps the project and the team members aligned throughout the ID process. See the *Roadmap Reference Manual* for additional information (pages 15-18).

### 1b) Identifying Performance & Utility Data

The Project Manager gathers all building performance and utility data. Building performance data includes utility bills, recent energy audits and building automation system reports, if applicable. Utility bills should include historic electric, water, and gas bills from the past one to two years showing monthly usage for the building. The Project Manager shares this information with the project's Consultant (A,E, C and/or M+M) for their use and review. See the *Roadmap Reference Manual* for additional information (page 29).

### 1c) Identifying Retrofit Scale

The Project Manager reviews the retrofit scale evaluation tools to ensure the project is correctly classified as a Lite retrofit. See the *Roadmap Reference Manual* (pages 70-78) for additional information and the scale of retrofit evaluation tools.

### 1d) Identifying Project Scope & Schedule

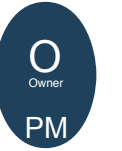
The Project Manager identifies and reviews the preliminary project scope and planned energy efficient measures, as well as the schedule. This includes identifying the ID process timeline for Resource Gathering and Collaborative Meetings stages.

### 1e) PROJECT CONSTRAINTS

The Project Manager reviews possible project constraints associated with the existing building conditions, occupant and tenant requirements, as well as the scope, budget, and schedule. Identifying these issues early in the project will help to eliminate problems later on in the ID AER.

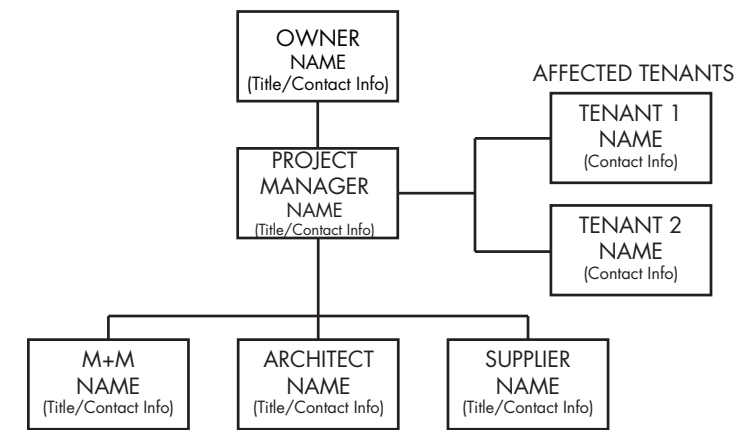
### 1f) PERFORMANCE TARGETS

The Project Manager identifies preliminary performance targets and metrics, relating to pre- and post-retrofit benchmarks and energy use intensity (EUI), for the ID AER. This can include identifying the percentage of energy savings targeted for the advanced energy retrofit project. This will ensure the project achieves a greater amount of energy savings. Additional information about benchmarking can be found in the *Roadmap Reference Manual* (pages 29-30).



### 1g) Identifying an Owner's Team Organization Map for Team Communication

The Project Manager creates the Team Organization Map which will be used during the retrofit project and shared with all team members. The Map outlines the decision making process for facilitating communication amongst all project team members. All team members involved in the ID AER project are identified with contact information. This Team Organization Map encourages project transparency. The diagram below provides a basic example of an Owner's **Team Organization Map**.



### 1h) COLLABORATIVE MEETING PREP

The first Collaborative Meeting which is the Alignment and Goal Setting Meeting is scheduled during the Pre-project Resource Gathering (RG) stage, and all team members are present at this meeting. All Pre-project RG activities need to be completed prior to the meeting, including the issuing of ID RFPs in order to contract the professional team members. In addition, in preparation for the meeting the Project Manager develops an agenda for the meeting and drafts a preliminary Mission Statement for the project. The Mission Statement will include project values, project cost priorities, people based priorities, and performance targets for the project.

**2b) STATE INCENTIVES RESOURCES**

State based energy saving incentives are found in the Database of State Incentives for Renewables and Efficiency:

<http://www.dsireusa.org>

With its interactive map, property owners and their representatives have access to a full list of financial programs designed to facilitate the completion of advanced energy retrofits.

**2b) CBEI RESOURCES**

Local utilities often provide incentives for commercial building energy efficiency and retrofit projects; it is worth determining if there are applicable incentives as part of the process of planning a building retrofit.

The CBEI's *Incentive Program Guide* is a tool for identifying incentive programs for energy efficient retrofits offered by state agencies and utility companies in the ten-county CBEI region. For additional information on market incentives, consult our *Incentive Program Guide* online at:

[http://cbei.psu.edu/portals/cbei/Resources/RegionIncentiveProgramGuide/EEB\\_Hub\\_Region\\_Incentive\\_Program\\_Guide.pdf](http://cbei.psu.edu/portals/cbei/Resources/RegionIncentiveProgramGuide/EEB_Hub_Region_Incentive_Program_Guide.pdf)

**2a) Identifying Financial Resources**

The Owner and/or Project Manager reviews the financial resources available for the project. Financial resources have an impact on project scope and possible design solutions. A full financial review will determine the amount of financing needed for the project, and if additional incentives need to be pursued.

**2b) Identifying Financial Incentives**

The Project Manager identifies and reviews all possible financial incentives including the following:

- **Utility Company Agreements:**
  - *On-Bill Financing (OBF)*  
OBF "refers to a financial product that is serviced by, or in partnership with, a utility company for energy efficiency improvements in a building, and repaid by the building owner on his or her monthly utility bill". \*ACEEE: [http://www.puc.state.pa.us/Electric/pdf/Act129/OBF-ACEEE\\_OBF\\_EE\\_Improvements.pdf#sthash.whH4wh0e.dpuf](http://www.puc.state.pa.us/Electric/pdf/Act129/OBF-ACEEE_OBF_EE_Improvements.pdf#sthash.whH4wh0e.dpuf)
  - *Energy Service Companies (ESCOs)*  
ESCOs are businesses that provide a range of services including consulting, designing and implementing building efficiency projects for guaranteed energy and financial savings. \*Pacific Northwest National Laboratory, PEI, Department of Energy, 2011: *Advanced Energy Retrofit Guide for Office Buildings*
- **Product Rebates:**  
Product rebates for qualified energy efficient products that may be applicable to your project.
- **Energy Incentives**
- **Tax Incentives:**  
Local, state, and federal tax incentives for energy efficient upgrades such as the *179D Federal Tax Deduction*.  
\*Department of Energy, 2012: *179D DOE Calculator*

**2c) Identifying a Preliminary Project Budget**

The Project Manager identifies a preliminary project budget, taking into account the financial resources available, potential incentives, as well as the preliminary project scope.

**2d) Identifying & Negotiating Green Leases**

The Project Manager reviews resources associated with available green leases. Green leases are tools that help address possible financial asymmetries between building owners and tenants who wish to go 'green'. The *Green Lease Library* is a centralized resource that provides guidance for building owners and tenants on the signing commercial green leases. For additional information on identifying and negotiating green leases, consult the website: <http://www.greenleaselibrary.com/>.  
\*EEB Hub, 2013: <http://www.eebhub.org/research-digest/>

**2e) Identifying Risk Capacity & ROI**

The Owner and/or Project Manager identifies the project's intended return on investment (ROI) and the project's risk capacity. These both will have an impact on the project scope, and it is important to identify both at the beginning of the project.

**2f) Identifying Team Competencies**

Since a typical Lite scale ID AER project may have a limited number of professionals on the team, the Owner and/or Project Manager identifies the necessary project team competencies based and who will complete them (see *Reference Manual*, pages 21-24 for additional info). Within a Lite scale retrofit, team members will be required to explore tasks that are within their abilities, but not typically offered as part of their services. The professional competencies that the team may be required to have include the following:

- Project Management
- Consultant (which may include Architectural, Engineering, Construction, Modeling + Measurement, Sub-contractor and/or Product Suppliers)

**2g) Identifying Team Consultants**

Once the required team competencies have been identified, the Project Manager identifies consultants who will meet these requirements. Professional consultants with past experience in integrated design should be sought. Once team consultants are identified, Integrated Design (ID) Request for Proposals (RFPs) are issued for bids (see *Reference Manual* for additional info, page 17).

**2h) ISSUING INTEGRATED DESIGN RFPs**

A Request for Proposal (RFP) is a solicited opportunity for professionals in the industry to submit bids for completing defined project needs. Often, an RFP will include a description of the project, products and/or services needed, business requirements, the submitter's experience and background, an RFP due date, standards for selection, and a time frame. Integrated Design (ID) RFPs can also set performance based standards, including energy use intensity (EUI) and financial goals, for consultants with shared energy goals. An ID RFP outlines clear ID methods that the project plans to undertake, as well as the intended ID goals.

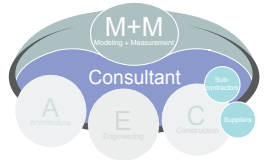
**2i) CONTRACTING TEAM MEMBERS**

Selecting the professionals for the project is one of the most important steps leading to an exceptional project. When all bids are in, the Owner and/or Project Manager evaluates all project bids and identifies the best choice for the project. Project goals and priorities are taken into consideration, and the candidate(s) who best supports these goals should be selected. In addition, it is important to select professionals who are committed to participating in the ID process and to establish expectations and responsibilities at both the individual and group level. Once contracts are finalized, all team members are invited to the first Collaborative Meeting.



## PRE-PROJECT RESOURCE GATHERING (RG) DOCUMENT

### CONSULTANT ACTIVITIES



CHECKLIST

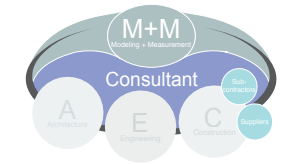
CONCEPTUALIZATION

RESOURCE GATHERING

- 1a) Review building performance and utility DATA (from PM/Owner)
  - Consider the completion of a UTILITY CONSUMPTION ANALYSIS
    - YES, a utility consumption analysis has been completed (submit documentation)
    - A utility consumption analysis has NOT been completed (explain below):  
\_\_\_\_\_  
\_\_\_\_\_
  - DELIVERABLE: Submit a Site Assessment summary report that outlines building centered information, performance data, and any issues that have been identified
- 1b) Identify and review preliminary project PERFORMANCE TARGETS and Metrics with PM/Owner
  - DELIVERABLE: Submit summary outlining preliminary project Performance Targets and Metrics
- 1c) Identify a preliminary PREDICTIVE MODEL strategy for the project; if possible, create the model
  - DELIVERABLE: Submit a summary outlining the preliminary Predictive Model strategy
  - DELIVERABLE: Submit results of the preliminary Predictive Model (if applicable)
- 1d) Consider identifying a preliminary MEASUREMENT + VERIFICATION (M+V) PLAN for the project pre- and post-retrofit
  - YES, a preliminary M+V Plan has been identified (submit documentation)
  - A preliminary M+V Plan has NOT been identified (explain below):  
\_\_\_\_\_  
\_\_\_\_\_
- 1e) Consider the completion of an ASHRAE Level I AUDIT
  - YES, an ASHRAE Level I Audit was completed (submit documentation)
  - An ASHRAE Level I Audit was NOT completed (explain below):  
\_\_\_\_\_  
\_\_\_\_\_
- 1f) Consider establishing pre-retrofit BENCHMARKS using Portfolio Manager (or similar)
  - YES, pre-retrofit benchmarks have been established (submit documentation)
  - Pre-retrofit benchmarks have NOT been established (explain below):  
\_\_\_\_\_  
\_\_\_\_\_

**ASSIGNED TO:** \_\_\_\_\_ **CONTACT INFO:** \_\_\_\_\_ **DATE COMPLETED:** \_\_\_\_\_





### 1a) Reviewing Performance & Utility Data

The Consultant reviews the existing building's performance and utility data. This includes a full review of historic electrical, gas, and water usage, and any available energy audits, if applicable. Using this data, the building's energy use can be determined and any energy use related issues can be identified.

### 1a) Completing a Utility Consumption Analysis

Utility Consumption Analysis investigates present energy consumption against a building's past usage, examining where, when, and how much energy is being consumed. As an important component of this analysis, monthly energy use data along with utility interval data offers an assessment of trends in energy usage, offering clues as well as identifying which systems are poorly performing. It can also help to establish pre-retrofit benchmarks. See the *Roadmap Reference Manual* for additional information (page 29).

### 1b) Identifying Performance Targets

The Consultant helps the Project Manager to identify performance targets for the AER project. This includes setting target energy use reduction goals.

### 1c) Identifying a Predictive Model Strategy

The Consultant identifies the preliminary Predictive Energy Model strategy and goals for the project. For a Lite scale ID AER, this may include inverse modeling of some form. Goals relating to benchmarking and forecasts of potential energy savings or benefits, are also reviewed. See the *Roadmap Reference Manual* for additional information (pages 45-46). If possible, the Consultant also begins to build the model for the project using the collected building data.

#### M+M TOOLS

There are a variety of tools available for benchmarking data before an ID AER including:

- Energy Audits
- Energy Modeling
- Utility Consumption Analysis
- Climate Analysis
- Installation of M+V Instrumentation

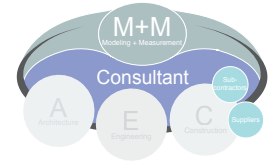
Additional details on M+M can be found in the *Roadmap Reference Manual* (pages 45-46).

#### BENEFITS OF USING M+M

Using M+M can provide several benefits including the following:

- More efficient and comprehensive energy management.
- Increased energy savings both monthly, and through the monitoring and adjustment of systems over time.
- Encourages a comprehensive integration of engineering systems within the development of the project and its specific targets to be met.
- Potential to change occupant behavior by making post-monitoring results available, resulting in lower user-driven energy demand.

Additional details can be found in the *Reference Manual* (pages 45-46 and 31-32).



### 1d) Identifying an M+V Plan

The Consultant proposes the identification of a preliminary Measurement + Verification (M+V) Plan for the project pre- and post-retrofit. Goals are related to the level of pre- and post-retrofit M+V in order to verify energy savings, which at the Lite scale typically will include some amount of existing building commissioning (EBCx) of systems in order to ensure systems are operating efficiently. Additional scope M+V activities can include commissioning of new systems, the installation of M+V instrumentation, third party annual energy usage reporting, the issuing of post-occupancy surveys to occupants and tenants, and the training of Operation and Maintenance personnel. See the *Roadmap Reference Manual* for additional information on M+V (pages 31-32) and existing building commissioning (pages 43-44).

### 1e) Completing an ASHRAE Level 1 Audit

The Consultant proposes the completion of an ASHRAE Level 1 Audit. A *“Level 1 Audit includes a brief walk-through of the building and a survey of the building’s energy consuming equipment.”*<sup>1</sup> In conclusion the Audit can identify *“no-cost and low-cost measures and recommending further investigation into measures that would require more significant investment.”*<sup>1</sup>

A larger scope audit may also be considered such as an ASHRAE Level II Audit which *“includes a full review of all building systems’ energy use to develop pre-retrofit benchmarks as well as to inspect and recommend improvements for a building’s energy usage.”*<sup>2</sup> See the *Roadmap Reference Manual* (pages 29-30) for additional information.

<sup>1,2</sup>Pacific Northwest National Laboratory, PECL, Department of Energy, 2011: *Advanced Energy Retrofit Guide for Office Buildings*

### 1f) PRE-RETROFIT BENCHMARKS

The first step in the commitment to M+V is to identify pre-retrofit benchmarks for the building. Benchmarking is the act of comparing energy consumption of a building to either its previous years consumption or other buildings of a similar profile (its peer group). To accurately evaluate the efficiency or inefficiency of a building, it is crucial to benchmark consistently over time using the same unit of measure. This process helps identify potential areas of savings. See the *Roadmap Reference Manual* (pages 29-30) for additional information.



## CONCEPTUALIZATION (CONC.) PHASE

CONC.CM.1

### ID COLLABORATIVE MEETING (CM) DOCUMENT

#### ALIGNMENT & GOAL SETTING MEETING ACTIVITIES

- ① Identify who will FACILITATE the Alignment & Goal Setting Meeting  
 Team Member Name: \_\_\_\_\_  
 Contact Information: \_\_\_\_\_
- ② Review Integrated Design PROTOCOLS and PROCESS
- ③ Identify and align around project VALUES
- ④ Identify and align around project COST PRIORITIES
- ⑤ Identify and align around PEOPLE BASED PRIORITIES
- ⑥ Review and align around project PERFORMANCE TARGETS
- ⑦ Identify project MISSION STATEMENT
- ⑧ Identify goals for ENERGY FREE DESIGN
- ⑨ Identify goals for WHOLE BUILDING SYSTEMS
- ⑩ Identify goals for PREDICTIVE MODELING
- ⑪ Identify goals for MEASUREMENT + VERIFICATION (M+V)
- ⑫ Review and align around preliminary project SCOPE
- ⑬ Review and align around preliminary project BUDGET
- ⑭ Review and align around preliminary project SCHEDULE
- ⑮ Identify team roles and assign Design Development ACTIVITIES to team members
- ⑯ Identify the number of collaborative SUB-TEAM MEETINGS during the Design Development Resource Gathering stage

#### REPORTING:

PROJECT MGMT.
PROJECT MGMT.
PROJECT MGMT.
PROJECT MGMT.
CONSULTANT
PROJECT MGMT.
CONSULTANT
CONSULTANT
CONSULTANT
CONSULTANT
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PROJECT MGMT.

#### REPORTING GUIDELINES:

##### ACTIVITY REPORTER:

Based on the Reporting Chart, the assigned Activity Reporter serves as the point person to create an Activity Report of decisions and outcomes made at the Collaborative Meeting for each identified activity. Once the Activity Report is completed, the final document should be given to the Summary Reporter on an agreed to date after the Collaborative Meeting.

##### SUMMARY REPORTER:

The Summary Reporter serves as the point person to collate the Activity Reports from the Collaborative Meeting for the creation of a Summary Report. Once the Summary Report is completed, the final document should be distributed to the entire team on an agreed to date after the Collaborative Meeting.



## ID COLLABORATIVE MEETING (CM) DOCUMENT

## ALIGNMENT &amp; GOAL SETTING MEETING ACTIVITIES

**1** Identifying a Meeting Facilitator

The Project Manager identifies the team member who will facilitate the process oriented Collaborative Meeting (CM) and coordinate the project team. At the CM, coordinating the project team involves the alignment of all team members towards the same goals and performance targets. In addition, the CM facilitator will be responsible for ensuring the team will complete the Checklist activities required for the CM. In order to complete the agenda, the CM facilitator manages the time in order to keep the team on schedule.

**2** Reviewing Integrated Design Protocols

During the CM, ID protocols and the ID process are reviewed to ensure understanding by all team members. The aim, goals, outcomes, and value of ID are outlined and clarified. This will contribute to the alignment of team members, key for the success of an ID AER.

At the first CM, goals for each of the ID protocols, regardless of project size, scope and budget, are identified. The following list outlines the seven ID protocols:

1. Project Mission Statement
2. Participation in Integrated Design RFPs
3. Participation in Process Oriented Collaborative Meetings
4. Commitment to "Energy Free" Design Solutions
5. Commitment to Whole Building Systems Design
6. Commitment to Predictive Modeling
7. Commitment to Measurement + Verification

The success of ID protocols is predicated on the project's capacity to identify shared beliefs before it engages in Design, Engineering (implementation) and Instrumentation. See the *Roadmap Reference Manual* for additional information (pages 15-20).

**2** PROCESS FOR TEAM ALIGNMENT

Commitment to the seven ID protocols includes the process for team alignment at CM meetings, where all team members are in attendance to discuss priorities, budget restraints, goals, and intended outcomes for the ID AER project. Attendance is a key factor for ensuring team alignment and a spirit of cooperation when working on a construction project. This gives all team members an equal opportunity to voice opinions while encouraging a sense of ownership and camaraderie amongst the team. Communication and coordination amongst the project team members is essential within the ID process, and working towards team alignment at the first CM will set a good foundation for the entire project.

**2** VALUE OF ID PROTOCOLS

Integrated design is greatly facilitated when team members demonstrate commitment to the seven ID protocols. Participating in a process such as this has the potential to result in a more efficient building that achieves greater energy savings, and increases occupancy rates, tenant satisfaction, and overall value. In addition, by allowing equal participation of professionals from the AEC industry, it affords opportunities for innovate design that otherwise may not occur.

## CONCEPTUALIZATION (CONC.) PHASE

CONC. CM. GUIDELINES

## ID COLLABORATIVE MEETING (CM) DOCUMENT

## ALIGNMENT &amp; GOAL SETTING MEETING ACTIVITIES

## 7 VALUE OF MISSION STATEMENT

The writing of a project Mission Statement is the first collaborative activity completed by all members of the team. It allows for alignment around project goals and shared expectations which elevates project objectives and potential outcomes. In addition, the project Mission Statement organizes and guides most decisions and procedures for the entirety of the AER. See the *Reference Manual* for additional information (page 17).

## 7 IDENTIFYING MISSION STATEMENT

Everyone on the project team works on the production of a project Mission Statement, offering input and feedback to reach a level of refinement satisfactory to all. Doing so ensures that each professional is in agreement with its goals and in so doing offers each member of the team a sense of ownership. In order to complete this, the following will be identified:

- Project Values
- Project Cost Priorities
- People Based Priorities
- Performance Targets & Metrics

During the Alignment and Goal Setting Meeting, team members align around the Mission Statement in order to achieve the intended project outcomes. See *Identifying a Project Mission Statement* on page 44 for additional information and a template.

## 3 Identifying Project Values

The project team identifies and aligns around project values for the ID AER. These core values are integral to the ID process, and have an impact on all aspects of the project including the project scope and design. The project values will identify the aims, goals, and intended outcomes for the project.

## 4 Identifying Project Cost Priorities

The project team identifies and aligns around project cost priorities for the ID AER. The cost priorities will be related to the financial resources that the owner has available, as well as the preliminary project budget. The project's cost priorities will influence the project scope, and it is important for this to be identified at the beginning of the project before energy efficient measures and design solutions are selected and developed.

## 5 Identifying People Based Priorities

The project team identifies and aligns around people based priorities for the project. This includes the identification of tenant and occupant requirements within the building. In addition, the team reviews project specific roles within the ID AER to set clear expectations.

## 6 Reviewing Performance Targets

The project team identifies and reviews performance targets and metrics, relating to pre- and post-retrofit benchmarking, as well as goals relating to the energy use intensity (EUI). This often ensures the project achieves a greater amount of energy savings. Additionally, in larger scope projects, certification programs can provide a number of benefits including attracting more tenants than buildings that are not certified, as well as increasing the building's value. See the *Reference Manual* for additional info on performance targets and benchmarking (pages 29-30), as well as available certification programs (pages 35-36).

## 8 Identifying Energy Free Design Goals

The project team identifies and aligns around Energy Free Design goals for the ID AER. These goals are related to passive design strategies, such as daylighting, solar shading, natural ventilation, and increased tree coverage, as well as possible renewable energy strategies in order to reduce immediate and long term energy demands. See the *Reference Manual* for additional info (page 18).

## 9 Identifying Whole Building Systems Goals

The project team identifies and aligns around Whole Building Systems goals for the ID AER. These goals consider the contingent energy savings associated with the retrofit of two or more building systems, and encourage the project to review additional scope scenarios, such as bundling energy efficient measures, to achieve greater energy savings. See the *Reference Manual* for additional info (pages 19, 47-50).

## 10 Identifying Predictive Modeling Goals

The project team identifies and aligns around Predictive Energy Modeling goals for the ID AER. This may include identifying the project's strategy for predictive modeling. For a Lite scale ID AER, this might include inverse modeling of some form. Additional scope Predictive Modeling may include the possible use of a building information model (i.e. OpenStudio) or Design Builder. Goals relating to benchmarking and forecasts of potential energy savings or benefits, are also reviewed. See the *Roadmap Reference Manual* for additional information (pages 29-30 and 45-46).

## 11 Identifying M + V Goals

The project team identifies and aligns around Measurement + Verification (M+V) goals for the ID AER. In a Lite scale retrofit, goals are related to the level of existing building commissioning (EBCx) on the project. Additional scope activities may include the installation of M+V instrumentation such as sensors, post-retrofit M+V in order to verify energy savings, third party annual energy usage reporting, the issuing of post-occupancy surveys to occupants and tenants, as well as the training of Operation and Maintenance personnel. See the *Roadmap Reference Manual* for additional information (pages 31-32 and 43-44).

## 12 13 14 BUDGET, SCOPE &amp; SCHEDULE

As a result of the Pre-Project Resource Gathering stage, the Project Manager and Owner have developed a preliminary scope, budget, and schedule for the project. At the CM, the project team identifies and aligns around the preliminary scope, budget, and schedule for the ID AER. This includes a full review of each item in order for the project team to understand any constraints within the project.

## 15 IDENTIFYING TEAM ACTIVITIES

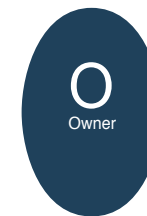
At the end of the CM, the meeting facilitator and/or the Project Manager identifies the needed team roles (see page 40) and assigns Design Development Resource Gathering (RG) activities to team members. All Design Development RG Checklists will be assigned to the appropriate team member.

Required team members will schedule the Design Development RG stage Sub-Team Meetings in advance, and if possible at the end of this CM. Additionally, the next CM will be scheduled in advance and all project team members will be available to attend this meeting. For additional information, see *Identifying Design Development Collaborative Sub-Team Meetings* (page 42).

### 15 Identifying Team Roles

During a Lite scale ID AER, there will be a limited number of professionals on the team. This will require team members to take on additional tasks, which are not typically offered as part of their services but for which they are fully competent. Roles are assigned accordingly during the Collaborative Meeting.

PROJECT MANAGER \_\_\_\_\_

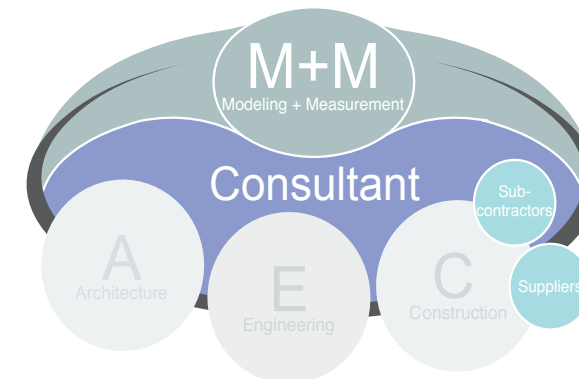


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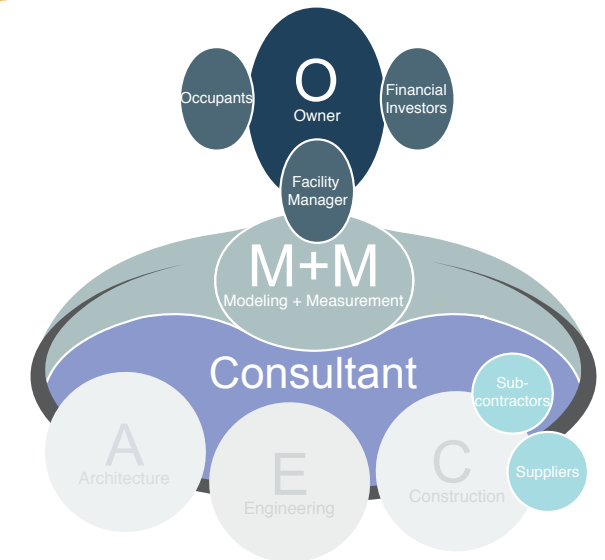


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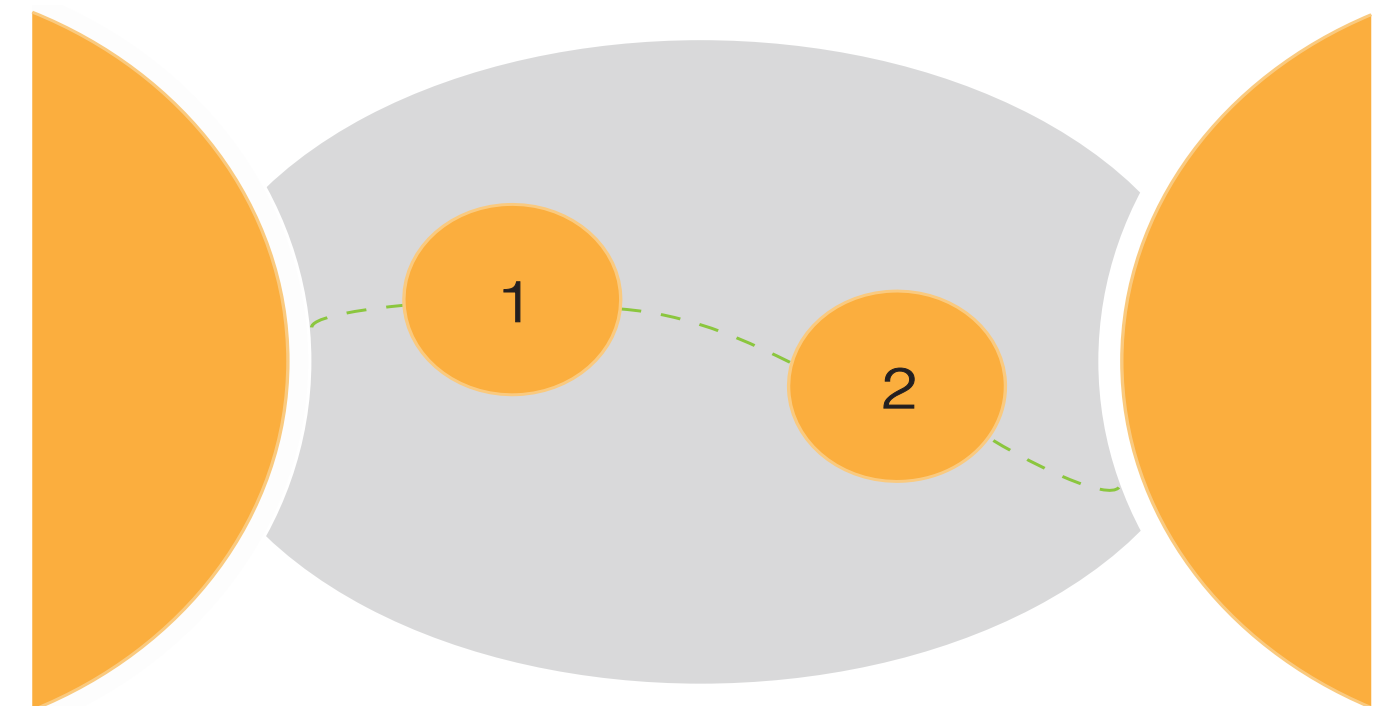
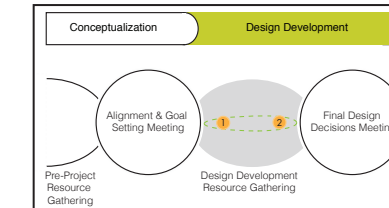
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CONCEPTUALIZATION  
COLLABORATIVE MEETING

## 16 Identifying Design Development Collaborative Sub-Team Meetings

### PHASE LEGEND



**1. SUB-TEAM MEETING 1** to review **Energy Free Design** solutions, **Whole Building Systems**, and **M+V Plan** (if applicable) in order to select energy efficient measures (EEMs) relative to the project budget

- Determine which EEMs are appropriate for your AER with respect to project constraints

**2. SUB-TEAM MEETING 2** to review **Predictive Modeling** (if applicable) and **Cost Feedback** information in order to select final **Energy Efficient Measures (EEMs)** relative to the project budget

- Rigorously analyze model's results (if applicable) and Cost Feedback information
- Review Conceptualization progress and adjust project scope accordingly
- Finalize list of EEMs and project scope

### 7 Identifying a Project Mission Statement

The following template can be used by the team members to create a project Mission Statement during the Collaborative Meeting. The Mission Statement includes the Purpose (Why) outlining the reasons for completing an ID AER project, intended Outcomes which includes project goals, and Outputs (How) which explains the process used in achieving project goals. See page 37 in this document and the *Reference Manual* (pages 16-20) for additional information about Mission Statements.

#### PROJECT MISSION STATEMENT:

Purpose - WHY - Reasons for acting:

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Outcomes - WHAT - Goals for the project:

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Outputs - HOW - Process (by doing what and how):

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# DESIGN DEVELOPMENT (DD) PHASE

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DD.CONS.1 CONSULTANT CHECKLIST

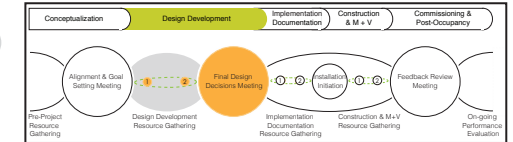
DD.CONS.GUIDELINES CONSULTANT GUIDELINES

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DD.CM.1 FINAL DESIGN DECISIONS MEETING CHECKLIST

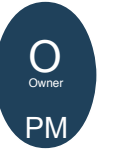
DD.CM.GUIDELINES FINAL DESIGN DECISIONS MEETING GUIDELINES

### PHASE LEGEND



DESIGN DEVELOPMENT





# CHECKLIST

- ① SCHEDULE the required number of collaborative Sub-Team Meetings to review Design Development progress and ensure the project is aligned with the Mission Statement
  - DELIVERABLE: Schedule the Sub-Team Meetings and notify required team members
- ② Develop and review project BUDGET
  - DELIVERABLE: Submit project budget to project team members
- ③ Develop and review project SCHEDULE
  - DELIVERABLE: Submit project schedule to project team members
- ④ Identify and review applicable PERMITS
  - DELIVERABLE: Submit list of applicable permits to project team members
- ⑤ Lead collaborative SUB-TEAM MEETING 1 to review Energy Free Design solutions, Whole Building Systems Design solutions, and M+V Plan (if applicable) in order to select energy efficient measures (EEMs) relative to the project budget
  - DELIVERABLE: Submit report outlining the results of Sub-Team Meeting 1
- ⑥ Lead collaborative SUB-TEAM MEETING 2 to review Predictive Modeling analysis of potential energy savings (if applicable) of EEMs and to determine the final EEMs relative to the project budget
  - DELIVERABLE: Submit report outlining the results of Sub-Team Meeting 2
- ⑦ SCHEDULE the next Collaborative Meeting, Final Design Decisions, and invite project team members
  - DELIVERABLE: Schedule Final Design Decisions Meeting and notify all project team members

ASSIGNED TO:

CONTACT INFO:

DATE COMPLETED:





### ① Scheduling Sub-Team Meetings

The Project Manager schedules collaborative sub-team meetings to review the progress made by the team members throughout the Design Development phase. During this stage of the project, the Project Manager meets with the Consultant to encourage the selection of Energy Free Design and Whole Building Systems Design solutions, as well as to consider the use of Predictive Modeling and an M+V Plan. The Project Manager ensures design and scope are aligned with the project's Mission Statement and budget. In addition, the Project Manager also shares with the team members the updated project schedule, budget, applicable permits, and any other findings that will impact the project's design. For additional information, see *Identifying Design Development Collaborative Sub-Team Meetings* on page 42.

### ④ Identifying Applicable Permits

The Project Manager identifies and reviews permits and gathers the information necessary to submit all permits. Possible permits include city and regional building permits including zoning, demolition, and construction. Additional resources can typically be found by visiting your local municipality or town office in-person or online. Once the necessary permits have been identified, a list of these requirements is generated and circulated to the project team. In addition, the Project Manager assigns any required permit tasks to the appropriate team member(s), if applicable.

### ② DEVELOPING PROJECT BUDGET

The Project Manager develops a detailed project budget based on the project scope. The Project Manager shares the budget with all team members to ensure design solutions are aligned with available financial resources.

### ③ DEVELOPING PROJECT SCHEDULE

The Project Manager further develops the project schedule based on the project scope. This schedule highlights key deadlines and identifies when Collaborative Meetings will take place during the course of the project. The Project Manager distributes the Project Schedule to all team members.

### ⑤ Commitment to Energy Free Design

The Project Manager demonstrates commitment to the Integrated Design Protocol 4 – Energy Free Design. Energy Free Design focuses on the use of passive design and possible renewable energy strategies for the reduction of immediate and long term energy demand within the building. The Project Manager encourages the selection of Energy Free Design solutions within the AER project. See the *Reference Manual* for additional info (page 18).

### ⑤ Commitment to Whole Building Systems

The Project Manager demonstrates commitment to the Integrated Design Protocol 5 – Whole Building Systems Design. Whole Building Systems Design focuses on the integration of building systems to maximize efficiency. The Project Manager encourages the selection of Whole Building Systems Design solutions within the project. See the *Reference Manual* for additional info (page 19).

### ⑤ Commitment to M+V

The Project Manager demonstrates commitment to the Integrated Design Protocol 7 – Measurement + Verification (M+V). M+V may include the commissioning and existing building commissioning (EBCx) of systems in order to ensure systems are operating efficiently, the evaluation of building data to substantiate energy savings claims, and the verification of indoor environmental quality. M+V includes the instrumentation of the building with controls and sensors such as sub-metering and a building automation system (BAS) to optimize the building systems. The Project Manager encourages the use of M+V within the AER project both pre- and post-retrofit. See the *Reference Manual* for additional info (pages 19, 31-32).

### ⑥ PREDICTIVE MODELING

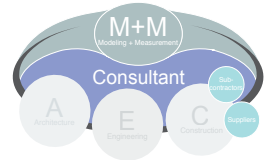
The Project Manager demonstrates commitment to the Integrated Design Protocol 6 – Predictive Modeling. Predictive Modeling focuses on developing a simulation model for the project. Once the model is created, potential design solutions and various energy efficient measures (EEMs) can be tested to determine the potential energy savings of each solution. This will help the team select EEMs that will achieve greater energy savings for the project. The Project Manager encourages the use of Predictive Modeling throughout the AER project. See the *Reference Manual* for additional info (page 19).

### ⑦ COLLABORATIVE MEETING PREP

In preparation for the second Collaborative Meeting (CM), Final Design Decisions, the Project Manager schedules a date and notifies all team members. It is essential that all team members are in attendance at this CM to ensure an integrated process, as well as the alignment of the project team members and the AER project. All Design Development Resource Gathering (RG) activities need to be completed prior to the meeting. In preparation for the Final Design Decisions CM, the Project Manager creates an agenda for the meeting and distributes it to all team members.

## RESOURCE GATHERING (RG) DOCUMENT

### CONSULTANT ACTIVITIES



CHECKLIST

- ① Develop and review typical OCCUPANCY hours and use (including all tenants, if applicable), and its effect on design solutions
  - DELIVERABLE: Submit summary outlining occupant info and possible design implications
- ② Develop and review possible ENERGY FREE DESIGN solutions relative to the project budget
  - DELIVERABLE: Submit summary outlining recommended Energy Free Design solutions
- ③ Develop and review building wide PLUG LOAD strategies and limits
  - DELIVERABLE: Submit summary outlining recommended plug load strategies and limits
- ④ Develop and review WHOLE BUILDING SYSTEMS DESIGN solutions relative to the budget:
  - Develop and review potential ENERGY SAVINGS based on original scope of work
    - DELIVERABLE: Submit summary of potential energy savings for original scope of work
  - Develop and review ADDITIONAL SCOPE scenarios that would ensure higher energy savings:
    - Develop and review opportunities for BUNDLED measures & associated energy savings
      - DELIVERABLE: Submit summary outlining Whole Building Systems Design solutions, potential energy savings, and recommended additional scope scenarios
- ⑤ Develop and review the PREDICTIVE MODEL for the project
  - Consider reviewing Energy Free Design and Whole Building Systems Design solutions, additional scope scenarios, and the potential energy savings using a PREDICTIVE MODELING analysis
    - YES, a predictive modeling analysis has been completed (submit documentation)
    - A predictive modeling analysis has NOT been completed (explain below):  

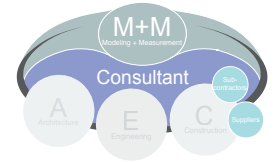

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- ⑥ If applicable, develop and review the MEASUREMENT + VERIFICATION (M+V) Plan
  - DELIVERABLE: Submit summary outlining any updates to the M+V Plan
- ⑦ Participate in collaborative SUB-TEAM MEETINGS to review Design Development progress and ensure the project is aligned with the Mission Statement and budget
  - Participate in Sub-Team Meeting 1 to review Energy Free Design solutions, Whole Building Systems Design solutions, and the M+V Plan (if applicable) in order to select energy efficient measures (EEMs)
  - Participate in Sub-Team Meeting 2 to present and review Predictive Modeling analysis of potential energy savings of EEMs (if applicable) and to determine the final EEMs relative to the project budget

**ASSIGNED TO:** \_\_\_\_\_ **CONTACT INFO:** \_\_\_\_\_ **DATE COMPLETED:** \_\_\_\_\_





### ① Reviewing Occupancy Information

The Consultant team member develops and reviews the typical occupancy hours and use, and any potential effect on the design solutions. The typical occupancy hours are reviewed in order to develop schedules for conditioning and lighting the building in order to reduce energy use. The Consultant team member prepares a summary of these findings and distributes it to all other team members. See the *Reference Manual* for additional info (page 33).

### ② Developing Energy Free Design Solutions

The Consultant team member develops and reviews Energy Free Design solutions for the project, tests possible design solutions using Predictive Modeling (if applicable), and identifies preliminary cost estimates for these solutions. Energy Free Design focuses on the use of passive design and possible renewable energy strategies for the reduction of immediate and long term energy demand within the building. Examples of Energy Free Design solutions include the reduction of the demand of plug loads, increased insulation, and daylighting, and solar shading. See the *Reference Manual* for additional info (page 18).

### ② Developing Solar Shading Solutions

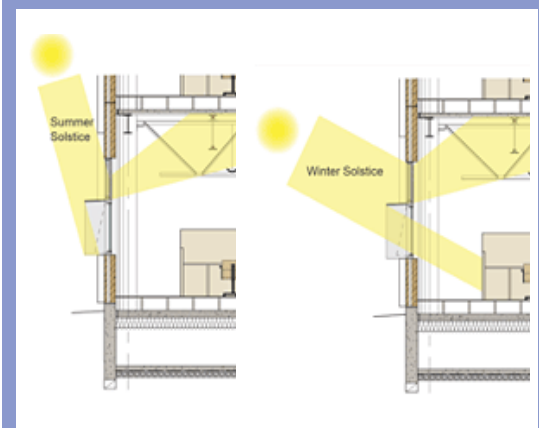
The Consultant team member develops and reviews solar shading solutions, if applicable to the project. Solar shading solutions include the use of light shelves, overhangs, and landscaping to control the amount of sunlight entering the building. The Consultant team member reviews the building's climate zone to determine if there is a high cooling load or a high heating load in order to determine the type of solutions that should be used.

### ② ENERGY FREE DESIGN

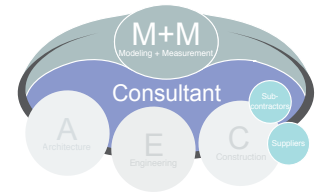
Additional resources on Energy Free Design include:

- 50 to 50, American Institute of Architects,  
<http://www.aia.org/practicing/akr/AIAB089185>

### ② SOLAR SHADING & DAYLIGHTING



Example of Daylighting & Solar Shading Devices  
\*<http://www.wbdg.org/resources/daylighting.php>



### ② DAYLIGHTING SOLUTIONS

Example of Optimizing Multi-system Performance Using Bundled Daylighting Solutions

### ② Developing Daylighting Solutions

The Consultant team member develops and reviews daylighting solutions, if applicable to the project. Daylighting is the use of natural daytime light to illuminate the interior of the building (typically through the use of top lighting and side lighting), which helps increase occupant comfort and contributes to improved productivity. By increasing the amount of daylighting used in the building, the use of artificial electric lighting can be reduced, thereby reducing energy demand of the building. The Consultant also considers the installation of daylighting sensors to automatically detect when electric lighting can be turned off. See the *Reference Manual* for additional info (page 49).

### ② ENVELOPE SOLUTIONS

Example of Building Envelope Solutions - Combining Systems to Reduce Load

### ② Developing Envelope Solutions

The Consultant team member develops and reviews envelope enhancement design solutions for the project. The envelope includes the roof, exterior walls, and windows, all of which contribute to indoor environmental quality. Possible envelope enhancement design solutions include increasing the **insulation** of the building (either the exterior walls and/or the roof), enhancing the R-value of the windows (double or triple glazing), and **decreasing air infiltration**. By making enhancements to the envelope, the building's energy load can be reduced and significant energy savings can be achieved.

### ③ Developing Plug Load Strategies

The Consultant team member develops plug load strategies and establishes limits for the building post-retrofit. Plug loads are any and all equipment that are plugged in to an electrical outlet on a regular basis, which can account for 30% of energy use in office buildings. Plug load strategies help identify ways of reducing loads in order to save energy. Strategies can include switching off inactive equipment, eliminating unnecessary equipment, and behavioral strategies such as turning off the lights, which can add up to substantial savings. See the *Reference Manual* for additional info (page 48). Additional resources on reducing plug loads can be found in the National Renewable Energy Laboratory's (NREL) Assessing and Reducing Plug and Process Loads in Office Buildings: <http://www.nrel.gov/docs/fy13osti/54175.pdf>

### ④ Whole Building Systems Design Solutions

The Consultant team member develops Whole Building Systems Design solutions for the project, tests possible design solutions using Predictive Modeling (if applicable), and identifies preliminary cost estimates. Whole Building Systems Design focuses on the integration of building systems to maximize efficiency. Building systems can be defined more broadly as heating, air conditioning, ventilation, plumbing, water, artificial lighting, plug loads, insulation, windows and glazing, and exterior skins including the roof. The Consultant team member reviews opportunities to increase the project scope by one or two systems and/or components to achieve greater energy savings within the AER project. See the *Reference Manual* for additional info (pages 41-42, 47-50).

### ④ Developing Potential Energy Savings

The Consultant team member develops and reviews the potential energy savings for the original project scope. If applicable, the Predictive Model for the project is used to evaluate the potential energy savings for each energy efficient measure (EEM). Once completed, the Consultant team member prepares a summary of the potential energy savings.

### ④ Developing Additional Scope Scenarios

The Consultant team member develops possible additional scope scenarios for achieving greater energy savings within the AER project. This includes reviewing opportunities for increasing the project scope such as bundling of energy efficient measures (EEMs). Increasing the project scope promotes the accrual of savings when multiple systems are retrofitted at the same time. The Consultant team member reviews potential energy savings associated with bundled EEMs and prepares a summary of their recommendations for presentation to the Building Owner and project team members. See the *Reference Manual* for additional info (pages 41-42, 47-50).

### ② ENVELOPE SOLUTIONS

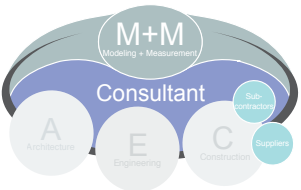
Example of Reducing the Load by Bundling Envelope Solutions

### ④ WHOLE BUILDING SYSTEMS DESIGN

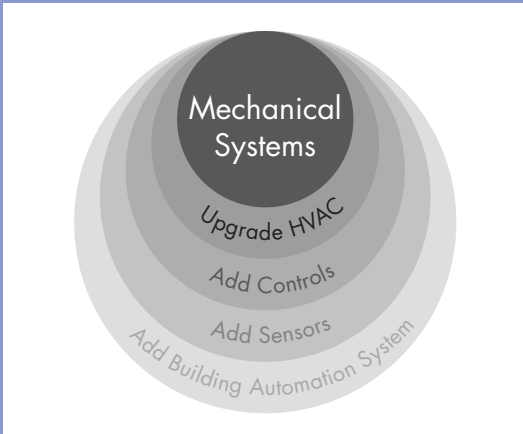
Additional resources on Whole Building Systems Design include:

- Advanced Energy Retrofit Guide for Office Buildings, Pacific Northwest National Laboratory: <https://buildingdata.energy.gov/cbrd/download/19>





#### ④ INCREASING SYSTEMS SCOPE



Example of Increasing Systems Scope - Mechanical Systems

#### ④ Developing Opportunities for Bundled EEMs

The Consultant team member develops opportunities for bundled energy efficient measures (EEMs). Bundling offers building owners an opportunity to upgrade systems and/or system components that are under-performing, which when combined with the necessary planned upgrades, yield deeper energy savings. Two methods exist for bundling building systems and their components:

- Increasing System Scope:
 

Increasing Project Scope involves the addition of one or more system components within any one system type in order to achieve a higher level of operating efficiency. For example, if the light fixtures are being replaced, the building would also benefit from the installation of occupancy sensors. Bundling these components, albeit increasing the scope of the lighting system work, would allow a building owner to monitor the frequency at which space is being used and the ability to adjust lighting as needed.

#### ⑤ Developing a Predictive Model

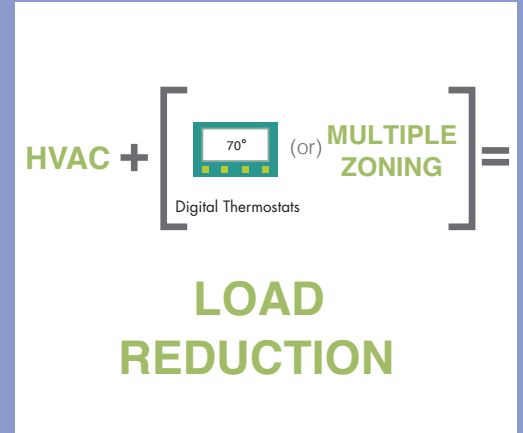
The Consultant develops and reviews the Predictive Energy Model for the project. If applicable, the model is calibrated using the building's baseline data. Once the model is calibrated, potential design solutions and various energy efficient measures (EEMs) can be tested using the model to determine their effectiveness in achieving the intended performance targets. See the *Reference Manual* for additional info (pages 45-46).

#### ⑤ WHOLE BUILDING MODELING

Additional scope Predictive Modeling may include whole building energy modeling for the retrofit project. Tools such as OpenStudio can be used to create a whole building energy model for the AER project.

OpenStudio is a collection of open source software tools that can be used for whole building energy modeling. OpenStudio can be downloaded at no cost from the National Renewable Energy Laboratory here: <https://openstudio.nrel.gov>.

#### ④ COMBINING SYSTEMS



Example of Combining Systems - Mechanical Systems & Building Envelope

- Combining Systems:
 

Combining Systems involves retrofitting at least two building systems, with at least one component of the building envelope, addressed. For example, in upgrading the mechanical systems, a building would stand to benefit from upgraded windows and wall insulation. Bundling mechanical systems and the building envelope affords an opportunity to reduce the energy load, thus reducing the size of HVAC equipment needed to heat and cool the building.

See the *Reference Manual* for additional info about energy efficient measures (pages 39-42) and bundling of measures (pages 47-50).

#### ⑥ Developing an M+V Plan

The Consultant team member reviews the M+V Plan for the project and considers any necessary revisions or enhancements to the design based on the recommended scope of energy efficient measures (EEMs). M+V includes the commissioning and existing building commissioning (EBCx) of systems in order to ensure systems are operating efficiently, the evaluation of building data to substantiate energy savings claims, and the verification of indoor environmental quality.

In addition, M+V can include the instrumentation of the building with controls and sensors such as sub-metering and in larger scope projects, a building automation system (BAS) to optimize the building systems. M+V instrumentation is typically applied to the building envelope and mechanical systems, and can automate all systems together, separately, or on a building system component level.

The Consultant team member encourages the use of M+V within the AER and if applicable, prepares a summary outlining any updates to the M+V Plan and distributes this report to all other team members. See the *Roadmap Reference Manual* for additional info (pages 31-32).

#### ⑥ SUB-TEAM MEETINGS

Throughout this Design Development Resource Gathering (RG) stage the Consultant team member participates in collaborative Sub-Team Meetings to review the selection of Energy Free Design and Whole Building System Design solutions with the Project Manager and Owner. These meetings verify that the design and project scope are aligned with the project's goals and Mission Statement. For additional information, see *Identifying Design Development Collaborative Sub-Team Meetings* on page 42.



## DESIGN DEVELOPMENT PHASE

DD.CM.1

### ID COLLABORATIVE MEETING (CM) DOCUMENT

#### FINAL DESIGN DECISIONS MEETING ACTIVITIES

- ① Identify who will FACILITATE the Final Design Decisions Meeting  
 Team Member Name: \_\_\_\_\_  
 Contact Information: \_\_\_\_\_
- ② Review Integrated Design Mission Statement for team and project ALIGNMENT
- ③ Review ENERGY SAVINGS ANALYSIS of EEMs
- ④ Confirm and approve M + V PLAN (if applicable)
- ⑤ Confirm and approve final project SCOPE of EEMs
- ⑥ Confirm and approve project BUDGET
- ⑦ Confirm and approve project SCHEDULE
- ⑧ Identify and review preliminary project PHASING (if applicable)
- ⑨ Identify and assign Implementation Documentation ACTIVITIES to project team members
- ⑩ Identify the number of collaborative SUB-TEAM MEETINGS during the Implementation Documentation Resource Gathering stage

REPORTING:

PROJECT MGMT.
PROJECT MGMT.
CONSULTANT
CONSULTANT
PROJECT MGMT.
PROJECT MGMT.
PROJECT MGMT.
PROJECT MGMT.
PROJECT MGMT.
PROJECT MGMT.

REPORTING GUIDELINES:

ACTIVITY REPORTER:

Based on the Reporting Chart, the assigned Activity Reporter serves as the point person to create an Activity Report of decisions and outcomes made at the Collaborative Meeting for each identified activity. Once the Activity Report is completed, the final document should be given to the Summary Reporter on an agreed to date after the Collaborative Meeting.

SUMMARY REPORTER:

The Summary Reporter serves as the point person to collate the Activity Reports from the Collaborative Meeting for the creation of a Summary Report. Once the Summary Report is completed, the final document should be distributed to the entire team on an agreed to date after the Collaborative Meeting.



### 3 Energy Savings Analysis of EEMs

All team members review the energy savings analysis of potential energy efficient measures (EEMs) to confirm the final list of measures. If available, the predictive model analysis (such as the financial and verification results) is also reviewed. This includes an overview of the outcomes from the Resource Gathering stage Sub-Team Meetings, which focused on reviewing and finalizing the list of EEMs. Using this information, project team members make informed decisions that will contribute to increased energy savings during the retrofit project.

### 4 Confirming an M+V Plan

If applicable, the Measurement + Verification (M+V) Plan for the project is confirmed and approved during the CM. The M+V Plan may include the commissioning and existing building commissioning (EBCx) of systems in order to ensure systems are operating efficiently, the evaluation of building data to substantiate energy savings claims, and the verification of indoor environmental quality. Additionally, M+V may include the installation of controls and sensors such as sub-metering and in larger scope projects, a building automation system (BAS). Once confirmed, the team encourages the implementation of the M+V Plan within the project.

### 5 6 7 Confirming Project Scope, Budget, and Schedule

The team works together to confirm the final project scope, budget, and schedule based on the progress made during the Design Development Resource Gathering stage. During the CM, team members ensure that the final project scope, budget, and schedule are in alignment with the project's Mission Statement. If adjustments to any of these items are needed, these are reviewed by the project team during the CM.

### 1 IDENTIFYING A CM FACILITATOR

Similar to other stages, the Project Manager identifies the team member who will facilitate the process oriented Collaborative Meeting (CM) and coordinate the project team. The CM facilitator is responsible for ensuring the team will complete the required Checklist activities. In order to complete the agenda, the CM facilitator manages time and keeps the team on schedule.

### 2 TEAM AND PROJECT ALIGNMENT

Once a Mission Statement has been established for the ID AER project, the team and project aligns around intended outcomes. During this CM, the Mission Statement is reviewed by the entire team to remind all of project's goals, values, cost priorities, and performance metrics. Any necessary adjustments to the project's development, and/or team member roles are made in order to ensure the project goals are met. Throughout the duration of the project, team members' decisions are guided by and aligned with the Mission Statement.



### 8 Identifying Preliminary Project Phasing

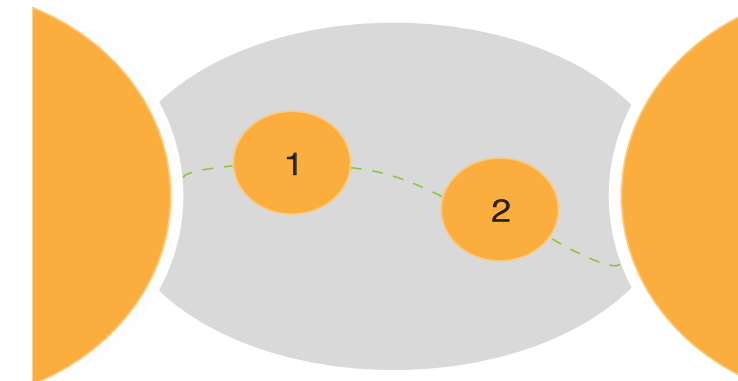
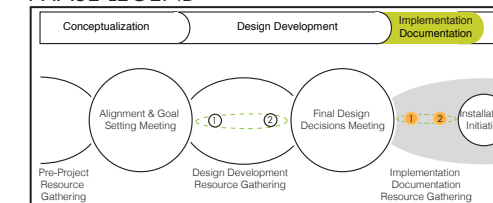
Project Phasing is the act of coordinating particular building activities in an appropriate sequence relative to a project's needs. Constraints may exist that keep a project from completing all retrofitting activities at one time, thus requiring phases. The scheduling of planned and/or additional scope energy efficient measures (EEMs) are reviewed during this CM to ensure optimum phasing based on tenants, scope of work, and available budget. Team members identify and review opportunities for phasing within the project. When phasing a project, loads should be reduced first and envelope improvements effected thereafter. See *Reference Manual* for additional information (pages 51-52).

### 9 ASSIGNING ACTIVITIES

At the end of the Final Design Decisions CM, the meeting facilitator and/or Project Manager assigns Implementation Documentation Resource Gathering (RG) activities to team members. All Implementation Documentation RG Checklists are assigned to the appropriate team member. In addition, the required Implementation Documentation Sub-Team Meetings are reviewed by all of the team members.

### 10 Identifying Implementation Documentation Collaborative Sub-Team Meetings

#### PHASE LEGEND



**1. SUB-TEAM MEETING 1 to review *Installation/Implementation Drawings* and recommendations for a project *Phasing Plan* (if applicable)**

- Ensure project development is aligned with the Mission Statement

**2. SUB-TEAM MEETING 2 to review and coordinate the *Construction Schedule and Purchase Orders***

- Coordinate Final Construction Schedule
- Complete Final Purchase Orders in preparation for Construction & M+V Phase

# IMPLEMENTATION DOCUMENTATION (IMPDOC) PHASE

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IMPDOC.CONS.1 CONSULTANT CHECKLIST

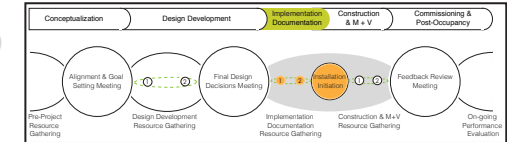
IMPDOC.CONS.GUIDELINES CONSULTANT GUIDELINES

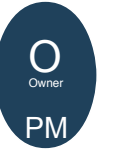
ID COLLABORATIVE MEETING (CM) DOCUMENTS 82

IMPDOC.CM.1 INSTALLATION INITIATION MEETING CHECKLIST

IMPDOC.CM.GUIDELINES INSTALLATION INITIATION MEETING GUIDELINES

### PHASE LEGEND





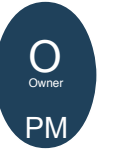
- ① SCHEDULE the required number of collaborative Sub-Team Meetings to review Implementation Documentation progress and ensure the project is aligned with the Mission Statement
  - DELIVERABLE: Schedule the Sub-Team Meetings and notify required team members
- ② Develop and review a project PHASING plan (if applicable)
  - DELIVERABLE: Submit a project PHASING plan (if applicable)
- ③ Develop and review a project CONSTRUCTION SCHEDULE coordinated with Consultant)
  - DELIVERABLE: Submit a project CONSTRUCTION SCHEDULE (coordinated with Consultant)
- ④ Develop and review project PURCHASE ORDERS with Consultant
  - DELIVERABLE: Submit outline of required project PURCHASE ORDERS
- ⑤ Assist Consultant to administer INTEGRATED DESIGN REQUESTS FOR PROPOSALS (ID RFPs) for sub-contractors/suppliers with shared energy savings goals (if applicable)
- ⑥ Lead collaborative Implementation Documentation Phase SUB-TEAM MEETING 1 to review and coordinate Installation/Implementation Drawings, and recommendations for a project Phasing Plan (if applicable), to ensure the project is aligned with the Mission Statement
  - DELIVERABLE: Submit report outlining the results of Sub-Team Meeting 1
- ⑦ Lead collaborative Implementation Documentation Phase SUB-TEAM MEETING 2 to review and coordinate the Construction Schedule and Purchase Orders
  - DELIVERABLE: Submit report outlining the results of Sub-Team Meeting 2
- ⑧ SCHEDULE the next Collaborative Meeting, Construction Planning, and invite project team members
  - DELIVERABLE: Schedule Construction Planning Meeting and notify all project team members

ASSIGNED TO:

CONTACT INFO:

DATE COMPLETED:





### ① Scheduling Sub-Team Meetings

The Project Manager schedules collaborative Sub-Team Meetings to review the progress made by the team members throughout the Implementation Documentation phase. During this stage of the project, these meetings review the implementation drawings, project phasing (if applicable), construction schedule, and purchase orders with team members. The Project Manager ensures the design and scope are aligned with the project's Mission Statement. For additional information, see *Identifying Implementation Documentation Collaborative Sub-Team Meetings* on page 66.

### ② Developing a Phasing Plan

The Project Manager develops and reviews recommendations for a Project Phasing Plan. These recommendations are based on issues unique to this AER project, the available budget, schedule, and/or occupant needs. As previously outlined, when phasing a project loads should be reduced first and envelope improvements effected thereafter. In order to create a final Project Phasing Plan, recommendations are reviewed with other team members during a Sub-Team Meeting. Once reviewed, the Project Manager prepares the final Project Phasing Plan and distributes it to the team. See the *Reference Manual* for additional info (pages 51-52).

### ③ CONSTRUCTION SCHEDULE

The Project Manager coordinates with the Consultant team member to develop a Construction Schedule based on the project scope. This schedule highlights key deadlines and identifies when Collaborative Meetings will take place during the project. The Project Manager distributes the Construction Schedule to all team members.

### ④ REVIEWING PURCHASE ORDERS

Based on the final project scope, the Project Manager coordinates with the Consultant team member to develop and review project purchase orders in preparation for the Construction phase of the ID AER. Once purchase orders have been prepared, the Project Manager collaborates with the Consultant team member to prepare an outline of requirements and manage the procurement process.

### ⑤ Administering Integrated Design RFPs

In preparation for the Construction phase, the Project Manager assists the Consultant team member in administering and issuing Integrated Design (ID) Requests for Proposals (RFPs) (if necessary). The ID RFPs ensure that the sub-contractors and suppliers share the project's energy savings goals, and are willing to work collaboratively towards the project's Mission Statement. In general, the lowest bidder is not always the best choice. The project's goals and priorities should be taken into consideration and the candidate who will best support the project's needs should be selected. Additional information about ID RFPs can be found in the *Reference Manual* on pages 17, 21, and 22.

### ⑥⑦ Leading Sub-Team Meetings

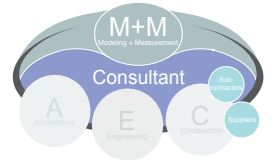
The Project Manager leads the Implementation Documentation phase Sub-Team Meetings with applicable team members. During this phase, the Project Manager demonstrates commitment to the seven Integrated Design (ID) protocols and encourages the implementation of the project goals and Mission Statement. During these meetings, the Project Manager ensures the team and project remain aligned and is fully integrated to maximize energy savings within the AER. The goal of these meetings is to ensure the project is progressing on track and is ready for the next Collaborative Meeting (CM). In order for this to occur, throughout the Implementation Documentation RG stage, team members make progress on their assigned Checklist activities, which need to be completed prior to the next CM. For additional information, see *Identifying Implementation Documentation Collaborative Sub-Team Meetings* on page 66.

### ⑧ COLLABORATIVE MEETING PREP

In preparation for the third Collaborative Meeting (CM), Installation Initiation, the Project Manager schedules a date and notifies all team members. It is key that all team members are in attendance at CMs to ensure an integrated process, as well as the alignment of the whole project team. All Implementation Documentation Resource Gathering (RG) activities need to be completed prior to this meeting. In preparation for the Installation Initiation CM, the Project Manager creates an agenda for the meeting and distributes it to all team members.

## RESOURCE GATHERING (RG) DOCUMENT

### CONSULTANT ACTIVITIES



- ① Develop and review INSTALLATION/IMPLEMENTATION DOCUMENTS for selected EEMs that are aligned with the project Mission Statement
  - DELIVERABLE: Submit Installation/Implementation Documents
- ② Develop and calibrate the PREDICTIVE ENERGY MODEL (if applicable) and encourage the implementation of Predictive Energy Model goals
  - DELIVERABLE: Submit calibrated Predictive Energy Model (if applicable)
- ③ Encourage the implementation of M+V PLAN/GOALS (if applicable)
- ④ Develop and review recommendations for a project PHASING plan (if applicable)
  - DELIVERABLE: Submit recommendations for a project Phasing Plan (if applicable)
- ⑤ Develop and review a project CONSTRUCTION SCHEDULE
  - DELIVERABLE: Submit a project Construction Schedule (coordinated with Project Manager)
- ⑥ Develop and review project PURCHASE ORDERS with Project Manager (PM)
  - DELIVERABLE: Submit outline of required project Purchase Orders (coordinated with PM)
- ⑦ Administer, issue, and respond to INTEGRATED DESIGN REQUESTS FOR PROPOSALS (ID RFPs) for sub-contractors/suppliers with shared energy savings goals (if applicable)
  - DELIVERABLE: Submit outline of ID RFP documentation (if applicable)
- ⑧ Participate in collaborative Implementation Documentation SUB-TEAM MEETINGS to review project development and ensure the project is aligned with the Mission Statement
  - Participate in Sub-Team Meeting 1 to review and coordinate Installation/Implementation Drawings, and recommendations for a project Phasing Plan (if applicable)
  - Participate in Sub-Team Meeting 2 to review the Construction Schedule and Purchase Orders

CHECKLIST

IMPLEMENTATION DOCUMENTATION

RESOURCE GATHERING

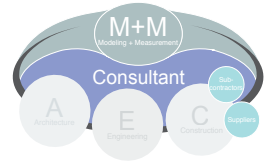
ASSIGNED TO:

CONTACT INFO:

DATE COMPLETED:







### ① Developing Implementation Documents

The Consultant team member develops and reviews Installation/Implementation Documents outlining the selected energy efficient measures (EEMs). This task is undertaken in coordination with the Project Manager. As the drawings are developed, Sub-Team Meetings to review and approve the documents may be needed to fully integrate design solutions and ensure that the project remains aligned with the Mission Statement.

### ② Predictive Energy Model Goals

If applicable, the Consultant team member develops and calibrates the Predictive Model using the building's baseline data and encourages the implementation of the project's predictive modeling goals. The predictive model may be used to test energy efficient measures (EEMs) and design solutions as the Installation/Implementation Documents and possible project Phasing Plans are developed. This will help ensure performance targets and project goals are met.

### ④ Developing a Project Phasing Plan

The Consultant team member develops and reviews recommendations for a Project Phasing Plan (if applicable). These recommendations are based result from the available budget, schedule, and/or occupant needs. As previously outlined, when phasing projects loads should be reduced first and envelope improvements effected thereafter. In order to create a final Project Phasing Plan, recommendations are reviewed with other team members during a Sub-Team Meeting. See the *Reference Manual* for additional info (pages 51-52).

### ③ ENCOURAGING M+V GOALS

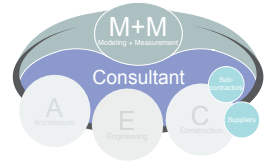
If applicable, the Consultant team member encourages the implementation of the M+V Plan and goals. The Consultant team member coordinates the planning and implementation of M+V related activities throughout the project, which may include additional coordination with the Project Manager and/or other team members.

### ⑤ CONSTRUCTION SCHEDULE

The Consultant team member works alongside the Project Manager to develop a Construction Schedule based on the project scope. This schedule highlights key deadlines and identifies when Collaborative Meetings will take place during the project. Once this is finalized, the Project Manager distributes the Construction Schedule to all team members.

## RESOURCE GATHERING (RG) DOCUMENT

## CONSULTANT GUIDELINES



## ⑥ Reviewing Purchase Orders

Given the final project scope, the Consultant team member coordinates with the Project Manager to develop and review project purchase orders in preparation for the Construction phase of the ID AER (if applicable). Once purchase orders are prepared, the Consultant team member coordinates with the Project Manager to prepare an outline of requirements and manage this procurement process.

## ⑦ Administering Integrated Design RFPs

In preparation for the Construction phase, the Consultant team member administers and issues Integrated Design (ID) Requests for Proposals (RFPs) (if necessary). The ID RFPs ensure that the sub-contractors and suppliers share the project's energy savings goals, and are willing to work collaboratively towards the project's Mission Statement. This is essential to being able to achieve the targeted energy savings and goals within the ID AER. In general, the lowest bidder is not always the best choice. The project's goals and priorities should be taken into consideration and the candidate who will best support the project's needs should be selected. Additional information about ID RFPs can be found in the *Reference Manual* on pages 17, 21, and 22.

## ⑧ SUB-TEAM MEETINGS

Throughout this Resource Gathering Stage, the Consultant team member participates in collaborative Sub-Team Meetings to review Installation/Implementation Drawings, project phasing (if applicable), and the construction schedule with the Project Manager and Owner. These meetings verify that the design and project scope are aligned with the project's goals and Mission Statement. For additional information, see *Identifying Implementation Documentation Collaborative Sub-Team Meetings* on page 66 of this *Project Team Guide*.

## IMPLEMENTATION DOCUMENTATION PHASE

IMPDOC.CM.1

### ID COLLABORATIVE MEETING (CM) DOCUMENT

#### INSTALLATION INITIATION MEETING ACTIVITIES

- ① Identify who will FACILITATE the Installation Initiation Meeting  
 Team Member Name: \_\_\_\_\_  
 Contact Information: \_\_\_\_\_
- ② Review Integrated Design Mission Statement for team and project ALIGNMENT
- ③ Confirm and approve IMPLEMENTATION DRAWINGS
- ④ Confirm and approve PROJECT PHASING (if applicable)
- ⑤ Confirm and approve CONSTRUCTION SCHEDULE
- ⑥ Confirm and approve PURCHASE ORDERS
- ⑦ Confirm and approve sub-contractors/suppliers from ID RFPs
- ⑧ Review M+V PLAN/GOALS (if applicable)
- ⑨ Identify and assign Construction & M+V ACTIVITIES to project team members
- ⑩ Identify the number of collaborative SUB-TEAM MEETINGS during the  
 Construction & M+V Resource Gathering stage

REPORTING:

PROJECT MGMT.
PROJECT MGMT.
PROJECT MGMT.
PROJECT MGMT.
PROJECT MGMT.
PROJECT MGMT.
CONSULTANT
PROJECT MGMT.
PROJECT MGMT.

REPORTING GUIDELINES:

ACTIVITY REPORTER:

Based on the Reporting Chart, the assigned Activity Reporter serves as the point person to create an Activity Report of decisions and outcomes made at the Collaborative Meeting for each identified activity. Once the Activity Report is completed, the final document should be given to the Summary Reporter on an agreed to date after the Collaborative Meeting.

SUMMARY REPORTER:

The Summary Reporter serves as the point person to collate the Activity Reports from the Collaborative Meeting for the creation of a Summary Report. Once the Summary Report is completed, the final document should be distributed to the entire team on an agreed to date after the Collaborative Meeting.



## ID COLLABORATIVE MEETING (CM) DOCUMENT

## INSTALLATION INITIATION MEETING GUIDELINES

**1** Identifying a Meeting Facilitator

The Project Manager identifies the team member who will facilitate the process oriented Collaborative Meeting (CM) and coordinate the project team. The CM facilitator is responsible for ensuring the team will complete the required Checklist activities. In order to complete the agenda, the CM facilitator manages time and keeps the team on schedule.

**3** Approving Implementation Documents

At the Installation Initiation Meeting, the final drawings are reviewed, confirmed, and approved in preparation for construction/installation. The project team confirms that the documentation and project scope are aligned with the Mission Statement to ensure the goals and performance targets will be met.

**4** Approving the Project Phasing Plan

The team reviews, approves, and confirms the Project Phasing Plan. The goal of the Phasing Plan is to accommodate the project's unique issues, available budget, schedule, and/or occupant needs, while achieving the intended goals, performance targets, and Mission Statement for ID AER. See the *Reference Manual* for additional info (pages 51-52).

**5** Approving the Construction Schedule

All team members review, confirm, and approve the Construction Schedule for the AER. Team members ensure the schedule takes into account the project scope, key deadlines, and when Collaborative Meetings will take place throughout the remainder of the project.

**6** Approving Purchase Orders

The project team reviews the outlined purchase orders to ensure that the purchase orders are accurate and aligned with the Mission Statement. Once purchase orders have been confirmed and approved, the Consultant team member coordinates with the Project Manager manage the procurement process (if applicable).

**2** TEAM AND PROJECT ALIGNMENT

During this CM, the Mission Statement is reviewed by the entire team to remind all of project's goals, values, cost priorities, and performance metrics. Any necessary adjustments to the project's development, and/or team member roles are made in order to ensure the project goals will be met. Throughout the duration of the project, team members' decisions are guided by and aligned with the Mission Statement.

**7** APPROVING ID RFPs

If applicable, the project team reviews, confirms, and approves the Integrated Design (ID) Requests for Proposals (RFPs). The ID RFPs ensure that the sub-contractors and suppliers share the project's energy savings goals, and are willing to work collaboratively towards the project's Mission Statement. See the *Reference Manual* for additional info (pages 17, 21-22).

### 8 Reviewing the M+V Plan & Goals

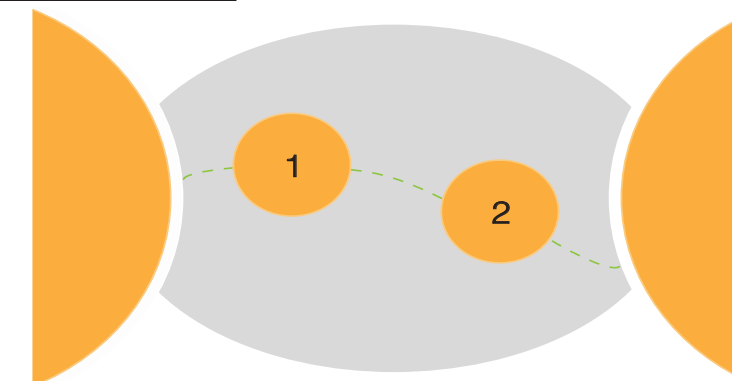
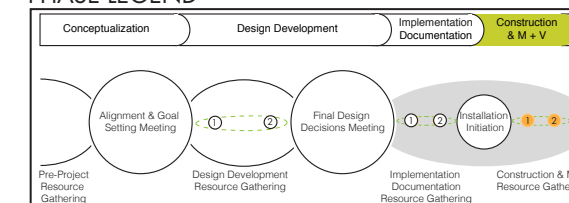
To ensure that the project is on track to meet the intended goals, the team members review the Measurement + Verification (M+V) Plan and goals (if applicable). This includes a review of activities that will occur during the Construction & M+V phase, and any necessary team member coordination is discussed during the Installation Initiation Meeting.

### 9 ASSIGNING ACTIVITIES

At the end of the Construction Planning CM, the meeting facilitator and/or Project Manager assign Construction & M+V Resource Gathering (RG) activities to team members. All Construction & M+V RG Checklists are assigned to the appropriate team member. In addition, the required Construction & M+V Sub-Team Meetings are reviewed by the team members at the CM.

### 10 Identifying Construction & M+V Phase Collaborative Sub-Team Meetings

#### PHASE LEGEND



#### 1. SUB-TEAM MEETING 1 to review **Installation/Construction Progress and Project Budget**

- Ensure Installation/Construction Progress is aligned with the Mission Statement

#### 2. SUB-TEAM MEETING 2 to review the **M+V Plan (if applicable) and On-Going Performance Evaluation Plan**

- Coordinate Implementation of the M+V Plan (if applicable)
- Coordinate and review the On-Going Performance Evaluation Plan

# CONSTRUCTION & M+V (C/MV) PHASE

## CONTENTS

### RESOURCE GATHERING (RG) DOCUMENTS

#### C/MV.PM PROJECT MANAGEMENT (PM) 90

C/MV.PM.1 PM CHECKLIST

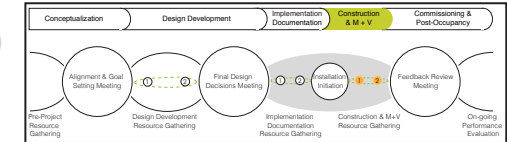
C/MV.PM.GUIDELINES PM GUIDELINES

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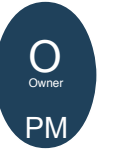
C/MV.CONS.1 CONSULTANT CHECKLIST

C/MV.CONS.GUIDELINES CONSULTANT GUIDELINES

### PHASE LEGEND







- ① SCHEDULE the required number of Construction & M+V collaborative Sub-Team Meetings to ensure the project is aligned with the Mission Statement
  - DELIVERABLE: Schedule the Sub-Team Meetings and notify required team members
- ② Develop and review a plan for OPERATIONS + MANAGEMENT with project team
  - DELIVERABLE: Submit an Operations + Management plan (coordinated with team)
- ③ Coordinate with the Consultant to implement M+V PLAN/GOALS for the project (if applicable)
- ④ Lead collaborative Construction & M+V Phase SUB-TEAM MEETING 1 to review Construction Progress and Project Budget
  - DELIVERABLE: Submit report outlining the results of Sub-Team Meeting 1
- ⑤ If applicable, lead collaborative Construction & M+V Phase SUB-TEAM MEETING 2 to review M+V Plan and/or Operations and Management Plan
  - DELIVERABLE: Submit report outlining the results of Sub-Team Meeting 2 (if applicable)
- ⑥ SCHEDULE the next Collaborative Meeting, Feedback Review, and invite required team members
  - DELIVERABLE: Schedule Construction Planning Meeting and notify required team members

ASSIGNED TO:

CONTACT INFO:

DATE COMPLETED:



### ① Scheduling Sub-Team Meetings

The Project Manager schedules the collaborative Sub-Team Meetings to review progress made by the team members throughout the Construction & M+V phase. During this stage, these meetings review construction progress, project budget, M+V Plan and installation of sensors (if applicable), as well as the Operations and Management Plan with team members. Since not all team members may be needed during these Sub-Team Meetings, the Project Manager and Owner determine who is necessary and notify the required team members. For additional information, see *Identifying Construction & M+V Collaborative Sub-Team Meetings* on page 86.

### ② Operations and Management Plan

Another component of longer-term M+V is the creation of an Operations + Management (O+M) plan that outlines the day to day functions of the building. In addition, whenever possible, it is important to have a facilities manager on staff that is trained to implement this plan.

The O+M Plan includes guidelines for proper operations of the building and recommendations for maintaining systems and equipment, which are guided by the project's Mission Statement and integrated decisions that have been made during the ID AER project. The purpose of this plan is ensure that in daily operations and times of repair, decisions that reflect the building's energy goals and performance targets are made to ensure the highest performance possible.

### ③ Implementing the M+V Plan

The Project Manager coordinates with the Consultant team member to implement the M+V Plan (if applicable). During the Construction and M+V phase, this may include the installation of M+V Instrumentation, which is typically applied to the building envelope and mechanical systems. Additional info about M+V can be found in the *Reference Manual* on pages 31-32.

### ④ ⑤ LEADING SUB-TEAM MEETINGS

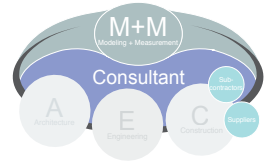
The Project Manager leads the Construction & M+V phase Sub-Team Meetings with applicable team members. During this phase, meetings review construction progress, budget, M+V Plan and installation of sensors (if applicable), as well as the completion of construction and the Operations and Management Plan. These meetings verify that the project construction is aligned with the Mission Statement and all Checklist activities are being completed by the assigned team members. For additional information, see *Identifying Construction & M+V Collaborative Sub-Team Meetings* on page 86 of this *Project Team Guide*.

### ⑥ COLLABORATIVE MEETING PREP

In preparation for the final Collaborative Meeting (CM) dedicated to feedback review, the Project Manager schedules a date and notifies the required team members. For this final meeting, all team members may not be required to attend. The Project Manager and Owner determine which team members are required. All Construction & M+V Resource Gathering (RG) activities need to be completed prior to this meeting. In preparation for the Construction Planning CM, the Project Manager creates an agenda for the meeting and distributes it to the required team members.

## RESOURCE GATHERING (RG) DOCUMENT

### CONSULTANT ACTIVITIES



- ① Develop and review recommendations for an OPERATIONS + MANAGEMENT plan
  - DELIVERABLE: Submit recommendations for an OPERATIONS + MANAGEMENT plan
- ② If applicable, oversee the implementation of the M+V PLAN/GOALS for the project
  - Consider the installation of BUILDING SENSORS (such as lighting, CO2, occupancy)
    - YES, building sensors have been installed (submit documentation)
    - Building sensors have NOT been installed (explain below):  
\_\_\_\_\_  
\_\_\_\_\_
  - If applicable, consider creating a COMMISSIONING PLAN
    - YES, a Commissioning Plan has been created (submit documentation)
    - A Commissioning Plan has NOT been created (explain below):  
\_\_\_\_\_  
\_\_\_\_\_
- ③ Participate in collaborative Construction & M+V Phase SUB-TEAM MEETINGS to review project development and ensure the project is aligned with the Mission Statement
  - Participate in Sub-Team Meeting 1 to review Construction Progress and Project Budget
  - If applicable, participate in Sub-Team Meeting 2 to review M+V Plan and/or Operations and Management Plan

CHECKLIST

CONSTRUCTION & M+V

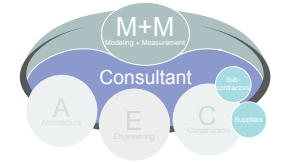
RESOURCE GATHERING

ASSIGNED TO: \_\_\_\_\_ CONTACT INFO: \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_



## RESOURCE GATHERING (RG) DOCUMENT

## CONSULTANT GUIDELINES



### ① Developing Recommendations for an Operations + Management Plan

The Operations + Management (O+M) plan outlines the day to day functions of the building. The plan includes guidelines for proper operations of the building and recommendations for maintaining systems and equipment, which are guided by the project's Mission Statement and integrated design decisions made during the ID AER project. The purpose of this plan is to ensure that in daily operations and times of repair, decisions that reflect the building's energy goals and performance targets will be made to ensure the highest performance possible. The Consultant team member develops recommendations for the O+M Plan. These are outlined in a summary report and submitted to the Project Manager, who is responsible for creating the final O+M Plan.

### ② Implementing the M+V Plan

If applicable, the Consultant team member ensures that the M+V Plan and its goals are implemented during the retrofit project. The Construction and M+V phase may include the installation of M+V Instrumentation, which will require coordination with the Project Manager. To optimize building systems, various forms of M+V Instrumentation can be introduced into a building including sensors, controls, and in larger scope projects a building automation system (BAS). Typically applied to the building envelope and mechanical systems, M+V Instrumentation takes place by automating all systems together, separately, or on a building system component. Additional info about M+V can be found in the *Reference Manual* on pages 31-32.

### ③ Participating in Sub-Team Meetings

Throughout this Resource Gathering Stage, the Consultant team member participates in collaborative Sub-Team Meetings to review construction progress, budget, M+V Plan and installation of sensors (if applicable), as well as the completion of construction and the Operations and Management Plan with the other team members. These meetings verify that the design and project scope are aligned with the project's goals and Mission Statement. For additional information, see *Identifying Construction & M+V Collaborative Sub-Team Meetings* on page 86 of this *Project Team Guide*.

### ② COMMISSIONING OF SYSTEMS

The Consultant team member reviews and considers the commissioning of newly installed and existing systems within the retrofit project. Commissioning ensures that new and existing equipment and/or systems are installed correctly and functioning properly in order for them to run as energy efficiently as possible. Commissioning occurs after the installation of new equipment and/or systems to test they are running properly, and if not, allow for changes that would make them more efficient. Commissioning may seem unnecessary, but the process of verifying that all components of the building are working well individually and together is imperative in order to accurately identify the energy savings that have been achieved.

### ② BUILDING SENSORS

The Consultant team member reviews and considers the installation of building sensors. Deeper energy savings can be achieved by optimizing the performance of building systems through the use of sensors. Examples include the use of lighting sensors to detect when occupants leave a room or when there is enough daylighting available to power-off electric lighting. Building sensors can also help to monitor systems within the building. Bundling the installation of sensors with controls and a building automation system (BAS) can contribute to increased long-term energy savings.

# COMMISSIONING & POST-OCCUPANCY PHASE

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BC<sup>x</sup>/PO.PM.1 PM CHECKLIST

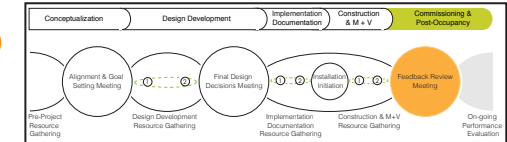
BC<sup>x</sup>/PO.PM.1 PM GUIDELINES

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BC<sup>x</sup>/PO.CONS.1 CONSULTANT CHECKLIST

BC<sup>x</sup>/PO.CONS.1 CONSULTANT GUIDELINES

### PHASE LEGEND



## COMMISSIONING & POST-OCCUPANCY PHASE BCX/PO.CM.1

### ID COLLABORATIVE MEETING (CM) DOCUMENT

#### FEEDBACK REVIEW MEETING ACTIVITIES

- ① Identify who will FACILITATE the Feedback Review Meeting  
 Team Member Name: \_\_\_\_\_  
 Contact Information: \_\_\_\_\_
- ② Confirm and approve OPERATIONS + MANAGEMENT plan
- ③ Confirm, approve, and review M+V PLAN for commissioning (if applicable)
- ④ Identify and review post-occupancy M+V results (if applicable)
- ⑤ Identify and review FEEDBACK from project team regarding the ID process
- ⑥ Identify and assign Commissioning & Post-Occupancy ACTIVITIES to team members

REPORTING: PROJECT MGMT.
PROJECT MGMT.
CONSULTANT
CONSULTANT
PROJECT MGMT.
PROJECT MGMT.

#### REPORTING GUIDELINES:

##### ACTIVITY REPORTER:

Based on the Reporting Chart, the assigned Activity Reporter serves as the point person to create an Activity Report of decisions and outcomes made at the Collaborative Meeting for each identified activity. Once the Activity Report is completed, the final document should be given to the Summary Reporter on an agreed to date after the Collaborative Meeting.

##### SUMMARY REPORTER:

The Summary Reporter serves as the point person to collate the Activity Reports from the Collaborative Meeting for the creation of a Summary Report. Once the Summary Report is completed, the final document should be distributed to the entire team on an agreed to date after the Collaborative Meeting.



### 1 Identifying a Meeting Facilitator

For the final Collaborative Meeting (CM), the Project Manager identifies the team member who will facilitate the meeting and coordinate the project team. The CM facilitator is responsible for ensuring the team will complete the required Checklist activities. In order to complete the agenda, the CM facilitator manages time and keeps the team on schedule.

### 2 Operations + Management Plan Approval

The team reviews, confirms, and approves the final Operations + Management (O+M) Plan. It is important for the plan to outline the day to day functions of the building and include guidelines for proper operations of the building and recommendations for maintaining systems and equipment. The Plan is guided by the project's Mission Statement and integrated design decisions made during the ID AER project. In addition, whenever possible, it is important to have a facilities manager on staff that is trained to implement this plan. The purpose of this plan is to ensure that in daily operations and times of repair, decisions that reflect the building's energy goals and performance targets are made to ensure the highest performance possible. Any additional recommendations or changes are discussed by the team during this CM and incorporated into the final plan.

### 5 Reviewing Team Feedback

During the Collaborative Meeting, the team reviews feedback regarding the Integrated Design (ID) process. The team reviews what worked well within the process, what can be improved, and any implications for this particular building that need to be taken into consideration in possible future project phases. This activity is aimed at helping the Building Owner and other team members improve the ID process and team alignment on future projects.

### 6 Assigning Activities

At the end of the Feedback Review Meeting, the facilitator and/or Project Manager assigns Commissioning & Post-Occupancy Resource Gathering (RG) activities to team members. All Commissioning & Post-Occupancy RG Checklists are assigned to the appropriate team member.

### 3 REVIEWING THE M+V PLAN

During this CM, to ensure that the project is on track to meet the intended goals, the team members review the Measurement + Verification (M+V) Plan and goals (if applicable), especially those relating to commissioning. This includes a review of activities that will occur during the Commissioning and Post-Occupancy phase as well as after the project is completed. In addition, any necessary team member coordination is discussed during the Feedback Review Meeting.

### 4 REVIEWING M+V RESULTS

During the Feedback Review Meeting, the team reviews the post-occupancy measurement and verification (M+V) results (if applicable). The actual energy savings is measured and compared to the estimated energy savings developed during the retrofit project. These results can indicate if any adjustments need to be made within the Commissioning and Post-Occupancy phase of the project.

### RESOURCE GATHERING (RG) DOCUMENT

### PROJECT MANAGEMENT CHECKLIST



- ① Coordinate the implementation of the OPERATIONS + MANAGEMENT plan
  - DELIVERABLE: Submit documentation of Operations + Management implementation
- ② Coordinate the implementation of the long-term M+V PLAN with Consultant (if applicable)
  - DELIVERABLE: Submit documentation of M+V results (coordinated with Consultant) (if applicable)

### PROJECT MANAGEMENT GUIDELINES

#### ① Implementing the Operations + Management Plan

The Project Manager implements the Operations + Management Plan throughout the Commissioning & Post-Occupancy phase. This plan includes guidelines for proper operations of the building and recommendations for maintaining systems and equipment. In addition, if possible, it is important that a facilities manager is on staff and trained to implement this plan.

#### ③ LONG-TERM M+V PLAN

If applicable, the Project Manager implements the long-term M+V Plan throughout the Commissioning & Post-Occupancy phase in coordination with the Consultant team member. This may include the coordination of commissioning of newly installed building systems. Additional info about M+V can be found in the *Reference Manual* on pages 31-32.

ASSIGNED TO:

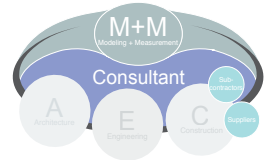
CONTACT INFO:

DATE COMPLETED:



### RESOURCE GATHERING (RG) DOCUMENT

#### CONSULTANT CHECKLIST



- ① Coordinate the implementation of the long-term M+V PLAN with Project Manager (if applicable)
  - If applicable, implement the COMMISSIONING PLAN
    - YES, a Commissioning Plan has been implemented (submit documentation)
    - A Commissioning Plan has NOT been implemented (explain below):  
\_\_\_\_\_  
\_\_\_\_\_
  - DELIVERABLE: Submit documentation of M+V results (coordinated with PM)

#### CONSULTANT GUIDELINES

##### ① Implementing the Long-Term M+V Plan

The Consultant team member implements the long-term M+V Plan and goals in coordination with the Project Manager (if applicable). This may include the coordination of commissioning of existing and/or newly installed building systems. Additional info about M+V can be found in the *Reference Manual* on pages 31-32.

##### ① COMMISSIONING PLAN

The Consultant team member considers implementing a Commissioning Plan (if applicable) to ensure that equipment and/or systems are installed correctly and/or functioning properly in order for them to run as energy efficiently as possible. The process of verifying that all components of the building are working well individually and together is imperative in order to accurately identify the energy savings that have been achieved.

ASSIGNED TO:

CONTACT INFO:

DATE COMPLETED:



1 GLOSSARY



## GLOSSARY: GENERAL TERMS

Integrated Design.....collaborative process oriented set of decision making activities for identifying shared priorities and goals in an effort to build consensus amongst all members on the retrofit team.

Advanced Energy Retrofit.....a building and systems based renovation of an existing structure focused on the energy savings potential of proposed retrofit activities.

Resource Gathering.....stages of analysis, information gathering, and project development with particular activities assigned to each professional team member based on their professional competencies.

Collaborative Meeting.....coordinated in person meetings of the entire project team aimed at generating key all-team decisions necessary for advancing the project in order to achieve project alignment and provide for the integrated development of the project.

Mission Statement.....a set of clearly defined and shared goals detailing vision, performance targets, budget constraints, and general principles for guiding and measuring the project's progress and success.

Integrated Design (ID) Requests for Proposals (RFPs)...solicitation of services from industry professionals and suppliers that sets performance based standards and financial goals for all team members; and ensures all team members have the requisite knowledge and experience for participating in an Integrated Design (ID) process.

Energy Free Design Solutions...strategies that are focused on attaining minimal energy usage by using passive energy solutions, load reduction, and renewable energy.

Whole Building Solutions.....solutions that focus on evaluating the impact of retrofitting two or more building systems and the orchestration of the building's systems as a whole.

## ACRONYMS

ID	Integrated Design
AER	Advanced Energy Retrofit
OOO	Owner, Operator, Occupant
RFP	Request for Proposal
AEC	Architecture, Engineering, Construction
A	Architecture
E	Engineering
C	Construction
M+M	Modeling + Measurement
M+V	Modeling + Verification
EEM(s)	Energy Efficient Measure(s)
EBCx	Existing Building Commissioning
DOE	Department of Energy
BTO	Building Technologies Office
CBEI	Consortium for Building Energy Innovation
SELS	Saving Energy in Leased Space
USGBC	United States Green Building Council
LEED	Leadership in Energy & Environmental Design
HVAC	Heating, Ventilation, Air Conditioning
BAS	Building Automation System
RG	Resource Gathering
CM	Collaborative Meeting





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