



U.S. Department of Energy
Energy Efficiency and Renewable Energy

SYSTEM COMMISSIONING

STERLING MILLER
ENERGY SYSTEMS GROUP



System Commissioning

A process for achieving, verifying and documenting the performance of buildings to meet the operational needs of the building within the capabilities of the design, and to meet the design documentation and the owner's functional criteria, including preparation of operator personnel - IPMVP



System Commissioning

The process of ensuring that systems are designed, installed, functionally tested and capable of being operated and maintained to perform in conformity with the design intent - **ASHRAE**





System Commissioning

In short –
commissioning is a
process that ensures
you get exactly what
you purchased.





Benefits

Why Do We Need This?

- Fewer project delays
- Shorter building turnover and transition period
- Lower energy and operation costs
- Reduce occupant complaints
- Improve indoor environmental quality
- Reduce premature equipment failures
- Improve facility operation and maintenance procedures
- Reduce staff time spent on emergency or complaint calls



Who: System Commissioning Team

- Commissioning team leader
- Customer team
- Design team
- Implementation team
- M&V team





Who: Commissioning Agent

- Owner
- Independent CA reporting to the Owner
- Engineer of Record
- General Contractor
- Subcontractor





System Commissioning Objectives

- Varies Depending on Project but.....
 - Objectives must be determined before project start
 - Must be communicated clearly and continuously
 - Must be SMART
 - Specific, Measurable, Attainable, Relevant, Timely



System Commissioning Steps

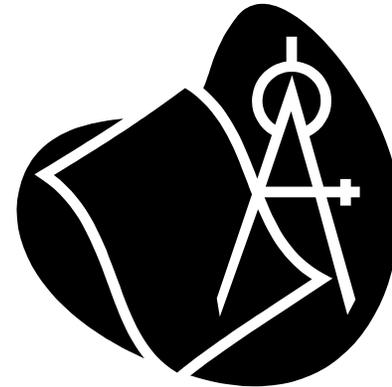
- Design
- Implementation
- M&V
- Training





Design

- Ensure that the design intent is clearly communicated
- Ensure that performance criteria, O&M documentation, and operator training are in the scope of the project
- Direct design document development





Implementation

- Verify that equipment and systems are installed according to the manufacturer's specifications and industry standards
- Verify that operational checkouts by the contractors have been completed
- Verify and document the performance of equipment and systems
- Deliver O&M documentation to the customer
- Verify that the system operating personnel are trained



Monitoring and Verification

- Ensure that system meets the design intent
- Ensure the system performs during peak operational conditions
- Discuss and rectify performance issues





Training

- Ensure that operators and maintainers are fully trained
- Ensure that documentation is complete
- Ensure that several subject matter experts are available on a continuous basis





System Commissioning Procedures

- Planning
- Design
- Implementation
- Close Out





Planning

- Select the commissioning team leader
- Identify and assign responsibilities
- Preliminarily document the design intent
- Start development of commissioning and M&V plans



Design

- Develop documents with clear design intent
- Review commissioning plan and specifications
- Ensure contract documents clearly identify, describe, and fulfill the design intent
- Sign off on contract documents after they meet the design intent



Implementation

- Ensure submittals meet all performance criteria
- Restate the commissioning plan
- Establish installation, start-up, and test procedures to verify compliance
- Carry out field observations and inspections
- Document all tests and observations including balancing reports
- Report deficiencies found immediately to all team members
- Schedule operations and maintenance personnel training and record



Close Out

- Verify and document that all systems are performing to the design intent
- Document performance testing of all systems involved
- Complete and deliver all as-built records
- Schedule system turn over training for operations and maintenance personnel
- Finalize the commissioning report
- Deliver all O&M systems manual



Conclusion

- Commissioning is a process – plan your work and work your plan
- Communicate – set an expectation for continuous communication
- Set Targets and Measure – set expectations and ensure measurement of results





Thank You

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