



MEASUREMENT & VERIFICATION PLAN ESSENTIALS

ONLINE PROFESSIONAL COURSES LED BY THE WORLD'S TOP SPECIALISTS

ONLINE TRAINING BY KRISHNAJI PAWAR

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MODULE
06

Steps to do M&V Plan

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Steps to do M&V Plan

Developing an M&V Plan is one of the primary learning objectives of the program Measurement and Verification Plan Essentials. This course teaches participants how to use statistical tools to develop M&V plans and culminates in the creation of an M&V Plan. In this course, participants will gain a deeper understanding of the M&V process as well as the preparation and interpretation of plans.



LEARNING OBJECTIVES

- ✓ Steps to do M&V Plan
- ✓ Contents of M&V Plan

Steps to do M&V Plan

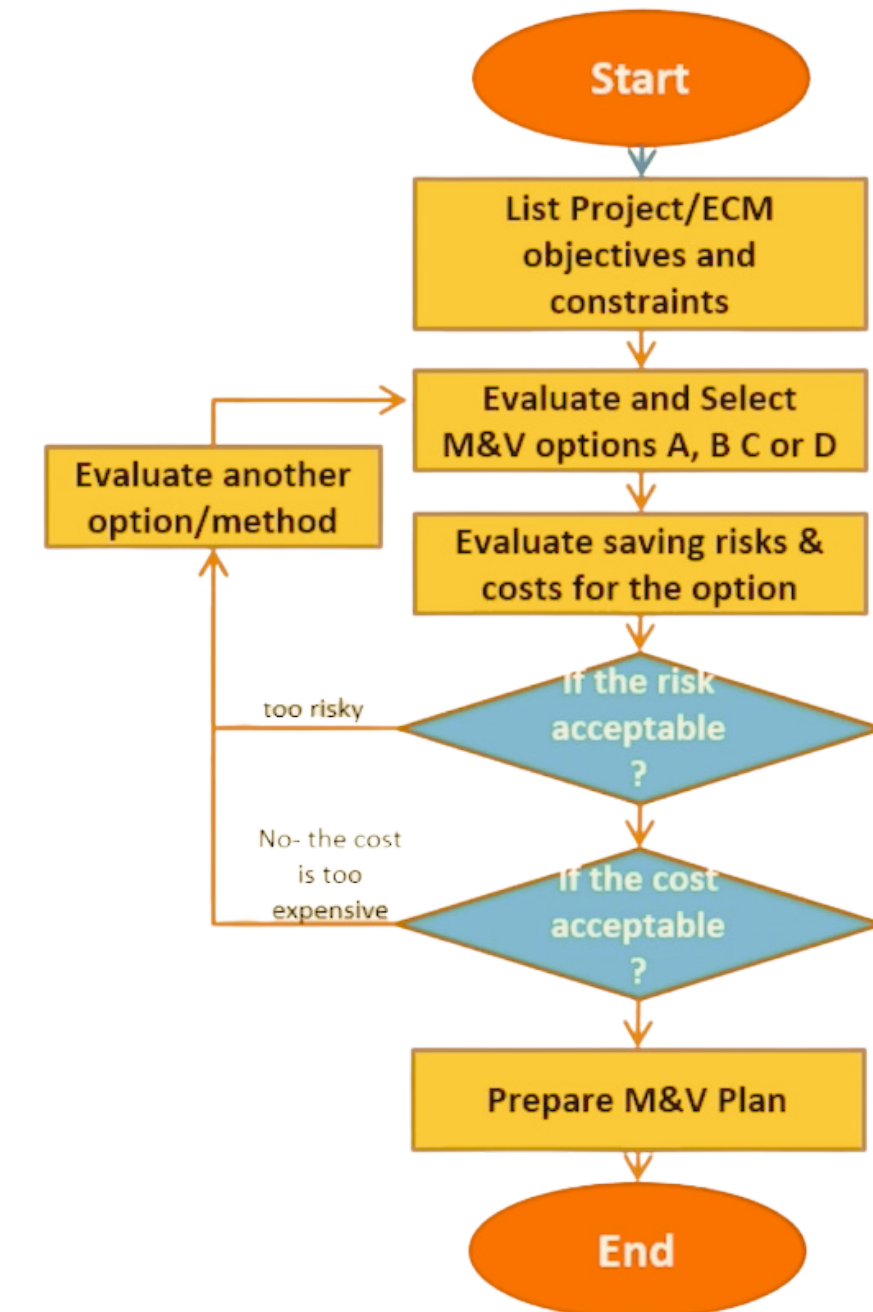
Step 1: List the ECM projects, objectives, and constraints related to M&V.

Objectives:

- To verify energy performance from the ECMs continuously
- To determine energy from the whole building using a utility meter
- To verify energy performance from the ECMs only

Constraints:

- Missing historical data from the utility
- No dedicated utility meters
- high degree of interaction between the ECMs
- ECMs involve a small portion of the whole baseline energy



Steps to do M&V Plan

Step 2: Evaluate and Select the M&V Option

Evaluate the project, the constraints of the project, and identify the most appropriate M&V option that suits the objective and meets the constraints. The M&V must optimize the project's or ECMS's objectives and constraints. methods. If the option does not meet the objective and constraints of the project, Select another M&V option.

Whether to use a single ECM or multiple ECMs depends on the objective of the project.

Step 3: Evaluate the savings risks and cost of the selected M&V option.

Examples of risks:

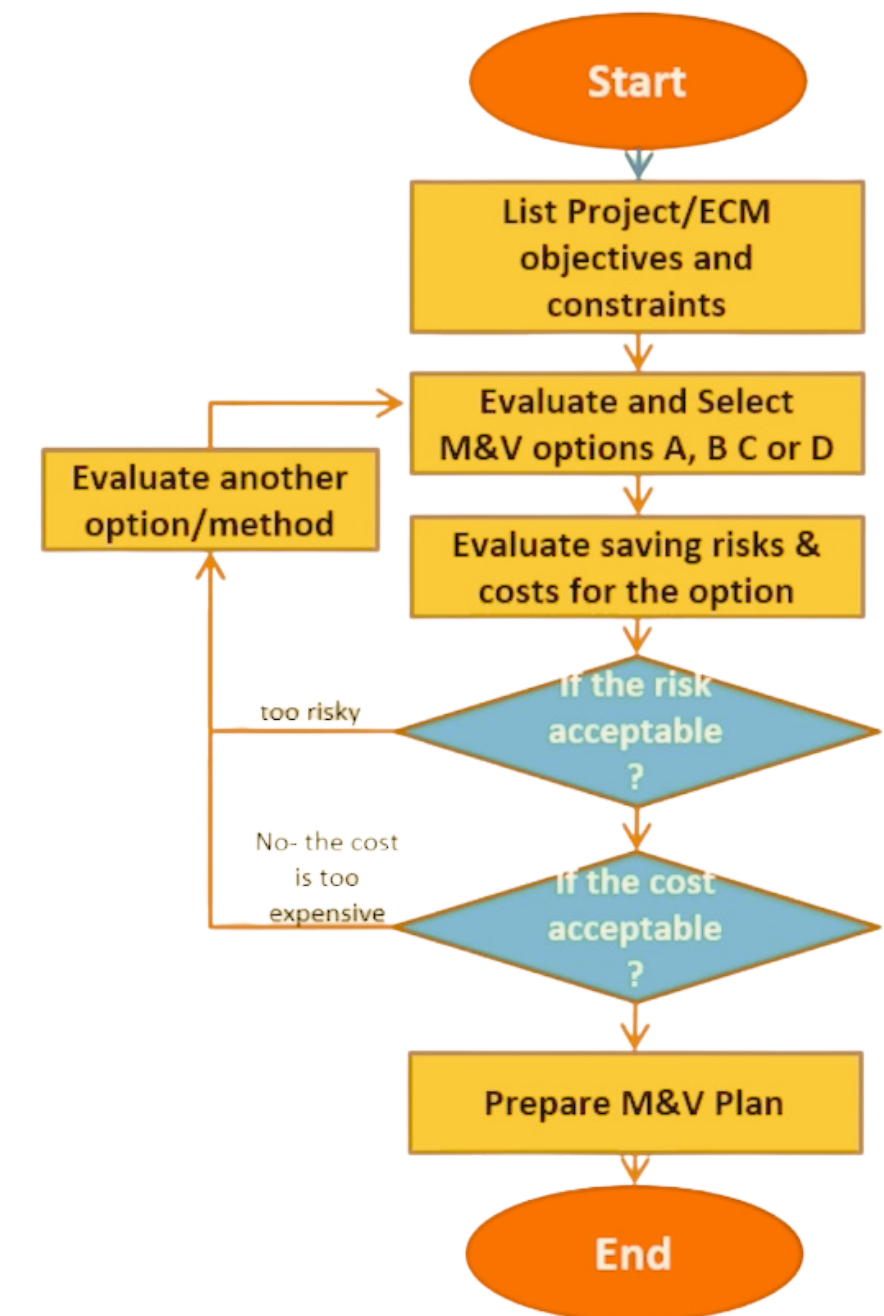
- Missing data or difficulty getting data on independent variables (weather, production, occupancy)
- Missing data or difficult-to-track static factors Non-routine changes in the facilities
- Degradation of the ECMs
- Changing operating hours
- No correlation between variables is needed to get an acceptable regression.model
- Complex design of the building to be calibrated simulation

Example of M&V costs:

- Measurement cost: meter installation, equipment rental,
- competence to do measurement
- Energy software for modeling, consultant
- Mark-ups: M&V design, M&V project management, insurance and tax
- Verifier fee

If the selected option does not meet the required saving risk and cost, a new M&V option should be selected and evaluated. The Savings risks should justify the M&V expenses.

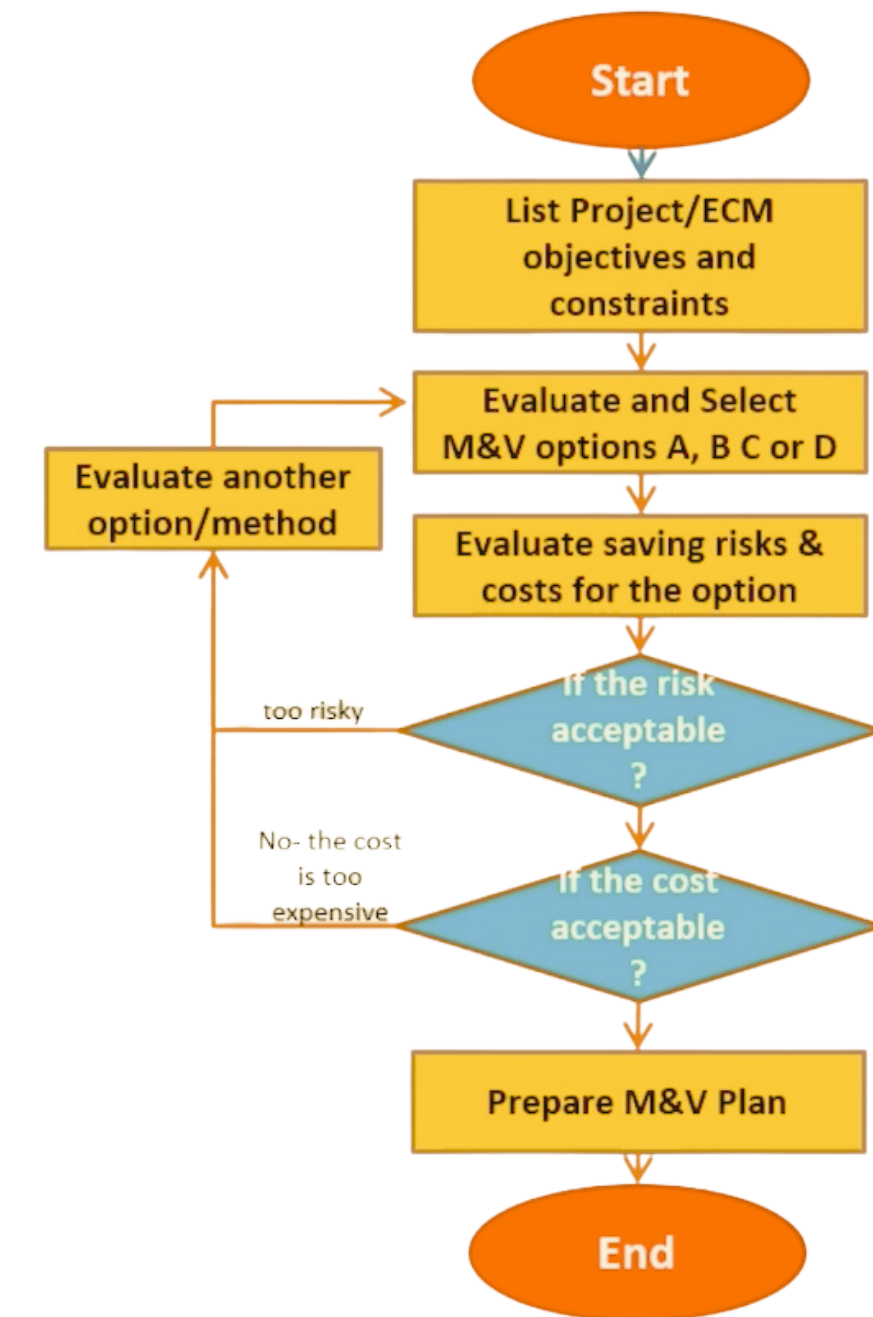
The M&V plan should be iteratively refined to satisfy the M&V requirement and project/ECM budget constraints.



Steps to do M&V Plan

Step 4: Prepare the M&V Plan

- If all the project requirements are met and the savings risks are manageable, to estimate the M&V cost. An M&V plan can start to be developed.



Contents of M&V Plan



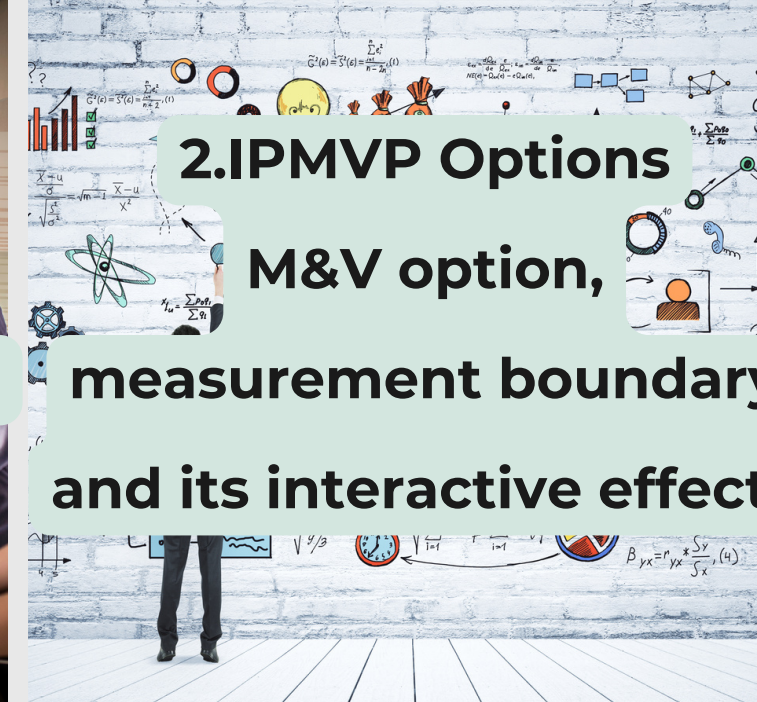
1.ECM Objectives

CM and intended results



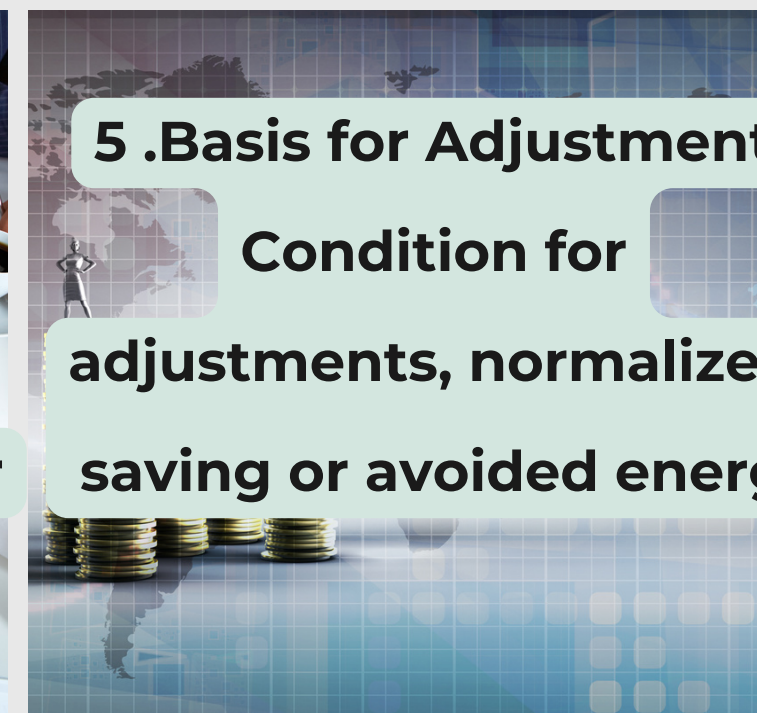
4.Reporting period

Period, consumption data, independent Variables, statistic factor



2.IPMVP Options

M&V option, measurement boundary and its interactive effects

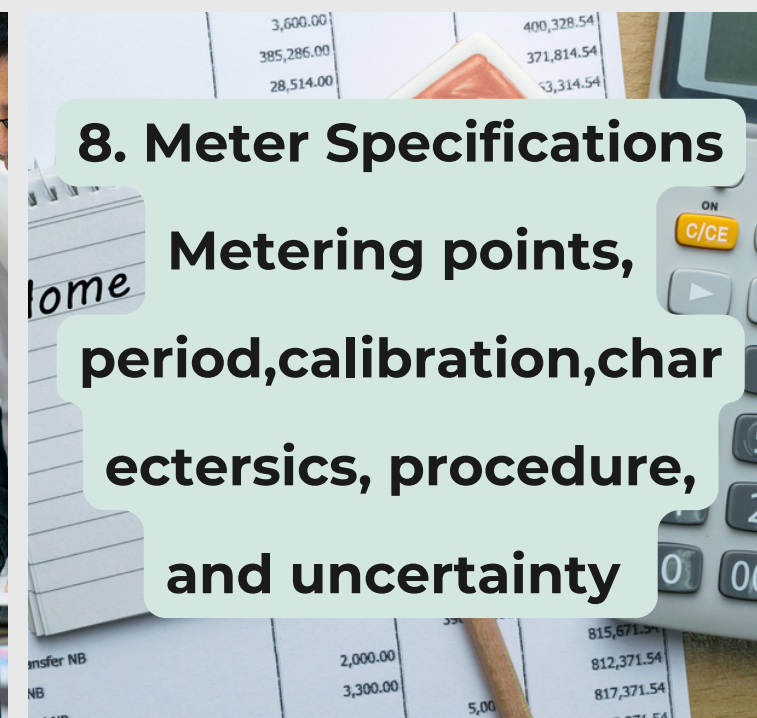


5 .Basis for Adjustment

Condition for adjustments, normalized saving or avoided energy



7.Energy Prices



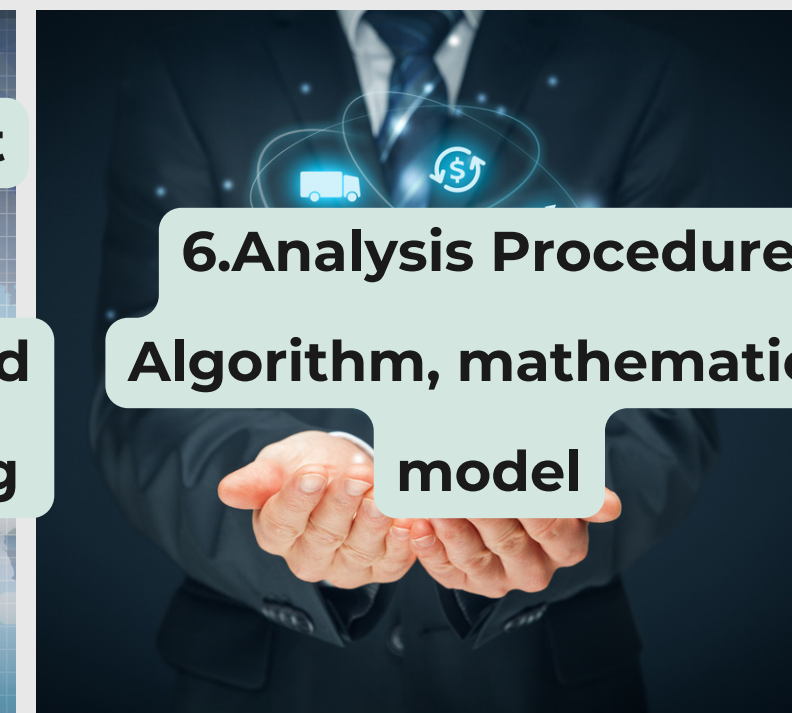
8. Meter Specifications

Metering points, period,calibration,characteristics, procedure, and uncertainty



3. Baseline documents

Period, consumption data, Independent Variables, statistic factor



6.Analysis Procedure

Algorithm, mathematical model



9.Monitoring,

responsibilities, reporting energy data,independent variables, and static tactics



10. Expected Accuracy, Expected Level of Uncertainty (Measurement, Adjustment, Modeling)

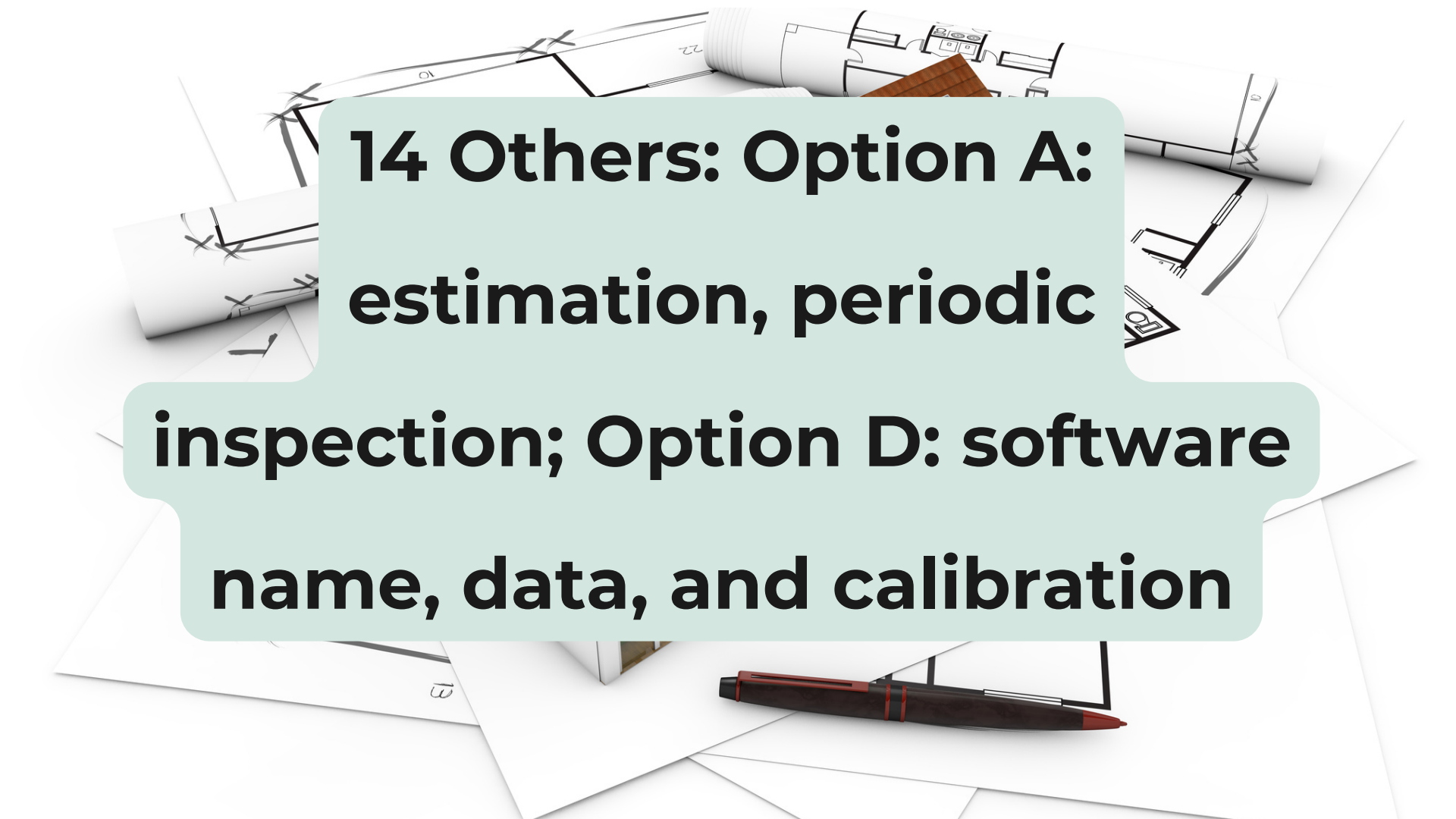


11. budget, initial set-up costs, and running costs

12. Report Format Specify how results will be reported and documented.



13. Quality Assurance, Quality Assurance Procedure



14 Others: Option A: estimation, periodic inspection; Option D: software name, data, and calibration



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THANK YOU

