FUNCTIONALITY OF THE MEASUREMENT AND VERIFICATION SPECIALIST

Granularity and load shapes are crucial concepts in measurement and verification (M&V) for energy efficiency projects. Granularity refers to the level of detail or resolution at which data is collected and analyzed, affecting both the accuracy and interpretability of M&V results. Time granularity, which can range from annual billing data to high-resolution data collected in one-minute or even one-second intervals, allows for a more precise understanding of system performance and potential savings.

Learning Objectives

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INTRODUCTION

- Granularity refers to the level of detail or resolution at which data is collected and analyzed.

- It can be defined in terms of time intervals, spatial dimensions, or the specificity of data categories.

- Time Granularity: This refers to the coarse measure of energy consumption, ranging from annual billing data to high-resolution data collected in one-minute or even one-second intervals.

- Spatial Granularity: This refers to the level of detail in the locational data of energy consumption, measuring energy use at the level of individual devices, specific rooms, or entire buildings.

- Data Category Granularity: This involves the specificity of the data being collected, such as categorizing energy use by end-use or by the type of energy consumed.

GRANULARITY AND LOAD SHAPES IN METERING AND VOLATILITY (M&V)

- The fundamental data in M&V is the time-series pattern of the baseline, adjusted throughout the reporting period.
- The choice of unit of time for time-series data depends on the specific application, metering available, and the level of accuracy needed.
- The challenge for M&V professionals is to balance the costs of data collection and analysis against the benefits of enhanced understanding of the system.
- The optimal frequency for data analysis may differ from the frequency of the underlying data.
- High frequency data may be required to capture the effects of the Energy Conservation Measurement (ECM), such as hourly demand reduction programs or residential smart thermostat programs.
- Advanced Metering Infrastructure (AMI) and M&V 2.0 are closely related, as AMI provides the necessary data for M&V 2.0.
- M&V 2.0 is still evolving, with ongoing research and development to integrate AMI and other IoT technologies into the M&V process.

LOAD SHAPES IN ENERGY MEASUREMENT

- Load shapes represent the pattern of energy consumption over time, illustrating how demand varies throughout a specific period.
- Characteristics of Load Shapes include Peak Demand, Load Duration Curve, and Time-of-Use Patterns.
- Understanding these patterns can help manage staff levels and inventory, similar to managing energy resources.

Application of Load Shapes

- Analyzing load shapes before and after an energy-efficient lighting upgrade can help assess not only the reduction in total energy consumption but also shifts in peak demand.
- By understanding and applying these concepts, energy professionals can enhance the accuracy of their assessments and optimize energy efficiency measures.

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IMPACT TERMINOLOGY IN M&V PROJECTS

- M&V projects typically report results based on actual reporting period conditions.
- Results are termed "avoided energy" and "avoided/cost."
- Two methods for calculating impacts are "normalized energy/cost" and "backcasting."
- "Avoided energy/cost savings" refers to the estimated impact of the energy efficiency project under the reporting period conditions.
- "Normalized savings: energy/cost" allows consideration of the impact of an energy project under different conditions than in the reporting period.
- "Backcasting" estimates the impacts that would have been achieved if an energy efficiency project had been implemented under baseline conditions.
- The resulting energy usage is compared to what was used in the baseline period.

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