

**APPLYING THE ELCAP EXPERIENCE TO MONITORING OF  
COMMERCIAL BUILDINGS IN HOT AND HUMID CLIMATES**

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**ABSTRACT**

Energy use monitoring projects for commercial buildings must be carefully configured and managed to assure useful data products are produced in a timely and cost-effective manner. Many challenges associated with site selection, data definition, hardware installation, and quality assurance should be addressed before monitoring is attempted. This presentation describes our experience with these challenges and offers advice for those considering the monitoring of buildings in hot and humid climates.

Over one hundred commercial buildings have been instrumented by Pacific Northwest Laboratory to provide an empirical basis for utility end-use load forecasting and conservation assessment. For the largest project, The End-Use Load and Consumer Assessment Program (ELCAP), specific protocols were developed for management, initial site inspection, measurement plan development, characteristics data collection, equipment installation, and data collection and verification. The purpose and general structure of these protocols will be described, and our experiences with their application will be shared in the hope that others undertaking commercial building energy use monitoring projects can benefit.

**SYNOPSIS**

Recent advances in microprocessor based data acquisition system technology are now being applied to the study of energy use in commercial buildings. The new capability to collect very detailed time-series data at affordable costs allows the development an empirical understanding of commercial building energy consumption according to end-use, building type, and a myriad of other classifications. This capability presents a challenge to the research community to balance the costs and benefits of data collection for particular projects.

To facilitate comparisons of building performance and the effectiveness of energy conservation measures, the U.S. Department of Energy is sponsoring the development of a commercial building monitoring protocol. The intent of the protocol is to provide a set of consistent data definitions and data collection guidelines so that the results of energy use monitoring exercises can be readily exchanged and compared. With such commonality, various analysis techniques can be applied routinely to provide a more comprehensive understanding of commercial building energy use than would otherwise be affordable.

This presentation will summarize the procedures employed for the configuration and management of the largest commercial building monitoring exercise conducted to date. This project was initiated in 1983 at Pacific Northwest Laboratory for the Bonneville Power Administration, the federal power marketing authority for the Pacific Northwest. Entitled the End-Use Load and Consumer Assessment Program (ELCAP), the project now involves the collection of over 20,000 channels of energy consumption and determinant data from approximately 500 residences, and 125 commercial buildings located in the states of Washington, Oregon, Idaho, Montana, and Wyoming.

For this project, a significant investment was made to develop and test procedures for sample selection, initial site inspection, measurement plan development, characteristics data collection, equipment installation, and data collection and verification. The presentation will include various depictions of the data collected by this project as a testimony to the value of systematic data collection methods. The intent of this presentation is to briefly describe these procedures and reflect upon our experience with them over the past five years in the hope that others planning similar exercises in hot & humid climates can benefit from this experience.

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