BUILDING PERFORMANCE VERIFICATION

by the

Sustainable, Energy Efficient Buildings Advisory Committee

in re

N.C.G.S. 143-135.35 thru 143-135.40 (Senate Bills 668 and 1946)

1.0. BUILDING PERFORMANCE VERIFICATION

North Carolina General Statute 143-135.37(e) requires performance verification for major projects, as follows:

> "In order to be able to monitor the initial cost and the continuing costs of the energy and water systems, a separate meter for each electricity, natural gas, fuel oil, and water utility shall be installed at each building undergoing a major facility construction or renovation project. Each meter shall be installed in accordance with the United States Department of Energy guidelines issued under Section 103 of the Energy Policy Act of 2005 (Pub. L. 109-58, 119 Stat. 594 (2005)).
>
> Starting with the first month of facility operation, the public agency shall compare data obtained from each of these meters by month and by year with the applicable energy-efficiency standard under subsection (b) of this section and the applicable water use standard for the project under subsection (c) of this section and report annually no later than August 1 of each year to the Office of State Construction…. If the average energy use or the average water use over the initial 12-month period of facility operation exceeds the applicable energy-efficiency standard under subsection (b) of this section or exceeds the applicable water use standard under subsection (c) of this section by fifteen percent (15%) or more, the public agency shall investigate the actual energy or water use, determine the cause of the discrepancy, and recommend corrections or modifications to meet the applicable standard."

1.1 SCOPE OF BUILDING PERFORMANCE VERIFICATION

Projects that require building performance verification is defined in North Carolina General Statute 143-135.36. This includes new construction projects where the building is larger than 20,000 gsf of occupied or conditioned space, or renovation projects when the project cost is greater than fifty percent of the insurance value of the building prior to renovations, and the renovated area is larger than 20,000 gsf.

1.2 DESIGNER REQUIREMENTS

During the project design, the designers must locate and specify the requirements for energy supply and water meters that meet the requirements of the legislation. For stand-alone buildings, typically this will mean that the designers must coordinate their systems to ensure that metering supplied by serving utility companies is adequate. For buildings that have energy or water services not provided by a utility or have their energy supply or water provided from a centrally-metered distribution system, the designers must ensure that the required metering is incorporated into the design.

For more complex buildings, sub-metering of specific areas or services of the building may be necessary to ensure accurate verification of the building performance. For example, to ensure that the HVAC systems performance meets design requirements, it may be necessary that the electrical power supply to HVAC systems be segregated and separately metered. Likewise, where day lighting is utilized, the lighting power service must be segregated and separately metered so that other electrical energy use does not

"mask" lighting performance. Likewise, major use of water such as for cooling tower make-up and landscape irrigation must be individually measured.

HVAC, plumbing, and electrical design engineers for the project must coordinate the requirements for both master-metering and sub-metering required and develop a Measurement and Verification (M&V) Plan during the Design Development Phase. The M&V Plan will be updated during the Construction Document Phase. The designers and the CxA will review the M&V Plan and ensure all required building parameters are monitored and measured, and that the buildings' direct digital control (DDC) is capable of trending all required parameters.

1.3 OWNER REQUIREMENTS

During the 12-month measurement and verification period following the completion of construction, the owner will be responsible for collecting and validating all utility metering data and ensure that needed building operational DDC data is collected.

At the completion of the first 12 months of building operations, the owner is required to compare the actual energy and water use data with the energy model results and assumptions. If energy and/or water usage exceeds the model projections by 15% or more, the owner will further investigate and resolve any issues found, or recommend further corrections or modifications to meet the efficiency standards. The results of the comparison (and any additional investigation and modifications) will be documented and shall be sent to the State Construction Office and State Energy Office no later than 60 days following the end of the 12-month measurement and verification period.