ACEC New York

American Council of Engineering Companies of New York

RECOMMENDATIONS FOR THE REFERENCE GUIDE REQUIRED BY LOCAL LAW 97 OF 2019

Local Law 97 of 2019 establishes an Advisory Board. The law requires the Advisory Board to recommend "A reference guide to delineate the responsibilities of the building designer and owners to comply with emissions limits." To support the implementation of this requirement, ACEC New York has developed the below recommended reference guide for consideration by the Advisory Board and stakeholders.

The Reference Guide for building design will:

- Establish a standard for building energy system design as it relates to building emissions that can be referenced in conjunction with building code and standards.
- Make stakeholders' responsibilities and necessary coordination clear.
- Identify accountability in the case of noncompliance, such that corrective measures may be identified.

Introduction

The process of designing, building and operating a building to meet the challenging building emissions requirements as identified by Local Law 97 of 2019 is very complex. Additionally, implementing major alterations to existing building stock to meet these requirements or for other purposes can be similarly complex. The actions of each stakeholder can have an impact on the outcome of the building's energy performance and thus its building emissions. Because this outcome is a result of the interactions of so many individuals and groups, rectifying building performance that does not meet pre-implementation expectations and does not comply with requirements of the law, could be difficult. Documentation of the assumptions leading to the initial performance estimates for the building after construction or major alteration greatly facilitates establishing the cause for deviation from the expected performance.

Energy Consumption Design Targets

At the start of each design process, the design team and owner shall establish and agree to reasonable and, with current technology, achievable energy consumption and building emission targets for the project. The target shall be set and measured based on the specific scope of the project, and only include energy consumption which is influenced by and able to be tracked within the scope of the project. The target shall be measurable and trackable and metered annually over the course of actual operations. This target may be used to inform lease language as it relates to tenant/landlord scope in buildings with more than a single occupant. The energy consumption targets shall be translated into building emissions as they may relate to current Local Law 97 building emission limits.

Design Team Design Phase Responsibilities

The design team, depending on the scope of the project, will include some combination of the following entities: architects, curtain wall and building envelope consultants, mechanical, electrical, plumbing, fire protection, information technology, vertical transportation, civil, structural and geotechnical engineers, lighting designers, interior designers, energy modelers and building analytics consultants along with other professionals necessary to complete the design of or alterations to the building. Assumptions made during design may have bearing on estimating and approximating building energy consumption and thus building emissions. These assumptions must be developed and agreed to by all relevant

members of the design and ownership/operator team but are not guarantees of actual building performance.

- Develop and document all data from the appropriate disciplines, that is within the scope of the project, about the detailed building design or alteration that is relevant or influential to the energy consumption and building emissions.
- Request and document data that is outside the scope of the project, but which may be relevant or influential to the building energy consumption and building emissions for the scope of the project.
- Define all space occupancy schedules and operational schedules of all systems for every hour of the year and submit to owner for verification.
- Confer with owner and/or operator and confirm anticipated parameters about how the buildings will be used and operated including such values as:
    - Assumptions concerning building population, usage schedule, personnel activities (MET rate).
    - Assumptions for unit power densities for all internal energy consumption loads (e.g. Plug and Lighting) for every hour of the year and submit to owner for verification.
    - All space temperature and humidity set points for every hour of the year.
    - All assumptions for energy consumption parameters of non-regulated loads and submit to owner for verification.
    - Assumptions about any energy consuming misc. equipment and submit to owner for verification.
    - Assumptions about Domestic Hot Water use, including peak usage and schedule.
- In the case of a major alteration, the energy modeler shall model all parameters to match owner and/or operational information above and shall calibrate the model to match actual benchmarked holistic building performance. Where available, energy modeler shall benchmark specific usage to existing sub-metered data.
- In the case of a major alteration, where modeled data differs significantly from actual consumption, and the source of the variance cannot be discerned, discrepancies shall be clarified to the building owner and/or operator for further review as necessary.
- Define explicitly the model weather data used for purposes of hourly energy simulation.
- Identify and define buildings orientation and position on the site.
- Define the shading effects from nearby buildings and other external factors. This may include shading from existing buildings or from future structures that may shade the building. Provisions for future development should be established and agreed upon with the owner.
- Define system types for all building functions and spaces.
- Define elevator energy consumption parameters, based upon projected building population and schedule (e.g. per American Society of Heating and Air-Conditioning Engineers (ASHRAE) User Manuals).
- In conjunction with owner, establish reasonable and appropriate energy modeling safety factors, based upon confidence levels for specific inputs.
- Energy modeling software must be compliant and certified against applicable ASHRAE Standards.
- The responsible energy modeler should have appropriate professional qualifications and experience including:
    - Building Energy Modeling Professional (BEMP, by ASHRAE)
    - Building Energy Simulation Analyst (BESA by AEE)
    - Or demonstrated experience and professional registration.
- Implement a Quality Assurance process by the energy modeler that includes identifying and documenting: Preparer of Models, Reviewer of Models, and Approver of Models.

- If required, develop customized control and equipment performance curves to accommodate specific systems configurations and control sequences. This effort may require post processing or other analytical tools not available in "off the shelf" software packages.
- Specify that the design incorporates adequate sub-metering, monitoring and trend-logging capabilities to facilitate diagnostic activities should building performance vary from expected.
- In the case of an alteration, require that measurement and verification methodologies are capable of isolating impacted loads, and that measurement is completed both before and after implementation so that the effect of the alteration can be reasonably identified.
- Document relevant assumptions and identify known uncertainties about parameters influential to building energy consumption, e.g. weather or operating schedules, that were made because of lack of definitive information about the values of those parameters in the project.
- Evaluate the need for peer review for design documents and energy model.
- Assist owner in reasonably attempting to translate estimated energy consumption into reasonably estimated, based on readily available methods and technology, building emissions and report about status of compliance with LL97.
- Prepare documentation of all energy modeling information; submit to owner for owner's approval.

Owner Design Phase Responsibilities

- Configure the design contracts to include milestones for Energy Modeling, which shall include Schematic Design (SD) Phase, Design Development (DD) phase, Final Design Model at end of Construction Documents (CD's).
- Ensure that the project design schedule includes adequate time to complete energy modeling of the project for all major milestones.
- Provide input, review and verify assumptions and all information requested by the design team as outlined above in 'Design Team Design Phase Responsibilities'.
- Procure peer review of design documents and energy model.
- Provide data and information to the design team, as requested and as required.

Commissioning Agent Responsibilities

- During Schematic Design (SD) Phase, verify that the LL97 requirements are stated in the owner's project requirements (OPR) and basis of design (BOD) documents.
- Conduct a comprehensive review of the design, drawings and specifications at various stages of development (during DD and CD), and provide comments and additional language, as needed, to verify energy efficiency measures are incorporated into design.
- Engage in a series of consultations with the design team to revise or further develop the initial design to incorporate energy-efficient design, practices, and equipment in order to achieve the LL97 performance goals.
- In the case of alterations, in advance of the construction phase, verify that a baseline is established to enable full measurement and verification after project completion so that the effect of the alterations can be identified.
- During the construction phase, verify that equipment and systems affecting building emissions, as related to LL97, are incorporated into the overall commissioning process and are installed properly and per the contract documents.
- During functional testing, verify that the equipment and building operations conform to the performance criteria stated in the construction documents. Bring to the attention of building owner immediately any deviations and assist the building owner in determining the reason for and effect of the deviations.

- During the building operations review (usually 10 months after substantial completion), review building metering, monitoring and trend-logging to verify that the equipment and building operations conform to the design performance requirements. Inform building owner of any deviations and assist the building owner to determine the reason for and effect of the deviations. Verify that the Owner's operating personnel are adequately trained in monitoring procedures and analysis for energy efficiency.

Design Team Construction Phase Responsibilities

- Review, analyze and report estimates of impact of construction variations on the building's energy and emissions performance.
- Monitor commissioning effort to identify potential impacts of commissioning on building energy performance.
- Prepare documentation of all energy modeling information following construction and submit to owner.

Owner Construction Phase Responsibilities

- Engage a commissioning agent(s) to commission all energy consuming systems in the project, commensurate with industry best practices.
- Require installing contractors to submit all final sequences of operation for review by design team and commissioning agent, upon completion of construction.
- Ensure that the construction contract requires the contractor to document all variations from the work as described in the construction documents, including value engineering modifications during bid and award and substitutions approved during the construction phase.

Design Team Occupancy Phase Responsibilities

- Assist the owner in investigating identified discrepancies in the building operation.

Owner Occupancy Phase Responsibilities

- Commission a post occupancy evaluation to identify factors that may result in building performance that differs from expectations.
- Ensure that building metering, monitoring and trend-logging capabilities are utilized to keep a complete record of building operation and performance.
- Ensure that any additional facilities or capabilities and tenant modifications that are added to the building subsequent to the initial construction are covered by appropriate additions to the building sub-metering and monitoring system and that information on the operation and energy consumption of these new facilities is documented.
- Notify the design team upon recognizing that the building operation has changed substantially from the assumptions utilized in the as-built energy model, or that the building energy consumption is deviating significantly from the results of the as-built energy model, and initiate an investigative effort to determine the reason for and effect of the deviations from the energy-modeling assumptions or identify the cause of the variation from the predicted energy consumption.