

APPENDIX D: WHOLE BUILDING PROJECT TECHNICAL REQUIREMENTS

I. Application Submission

Whole-building projects include significant renovation or new construction projects that deliver significant air quality benefits to Ohio through the design, construction, commissioning and operation of a high performing building that encompasses highly energy-efficient equipment and measures, onsite clean energy generation and/or improvement to occupant's health through reduction of harmful air contaminants. ***These projects should achieve a combined 50% energy savings above the current energy efficiency standards*** adopted by the Ohio Board of Building Standards in rules 4101:1-13-01 and 4101:1-35-01 of the Ohio Administrative Code.

In addition, and if applicable, projects should provide information in their application on the interest or pursuit of certifications for building rating standards, such as Leadership in Energy and Environmental Design (LEED), Green Globes, Net Zero Energy Building (NZEB), RESET air quality standard or other industry standard program.

Applications must include:

- A. a whole-building simulation of the base-case project that complies with the current Energy Code for the state;
- B. a separate simulation for each ECDM in isolation such that for each isolation simulation, all building systems and components are kept constant except for the ECDM equipment or component being analyzed;
- C. a comprehensive whole building energy simulation which represents the final as-built project including all ECDMs; and
- D. a Monitoring and Verification (M&V) plan that describes how the project will be inspected and commissioned, and how the energy savings from the project will be measured and reported once the project is built.

The application must identify and justify the equipment, materials, and other applicable components of the facility, along with the proposed costs, that contribute to the functionality and performance of the project to serve as an Air Quality Facility. Aesthetic, beautification, tenant allowances, marketing, parking and driveway areas for vehicles, and other non-functioning elements of the property may not be considered in the definition of the Air Quality Facility. The final determination of any and all components comprised in the definition of the Air Quality Facility is made by OAQDA, pursuant to its statutory discretion.

II. Project Review

The project review process for whole-building projects begins with a code-compliance review of the proposed project to ensure that the project meets the minimum threshold standards in **Section V, C**. Once a project successfully completes this stage of the review there is a review and verification of the measurement and verification plan for whole-building projects to comply with ASHRAE Guideline 14-2014 (ASHRAE 2014, including July 2019 errata) and/or the Uniform Methods Project (UMP 2020) to ensure that the measurement and verification of the project complies with industry standards. In addition, there will be a review of the construction plan and commissioning plan. Successful completion of all these plans is then followed by the project construction and project commissioning report. Satisfactory review of the construction and commissioning reports is then followed by an occupancy permit. Once the occupancy permit is issued, then the monitoring or metered data collection begins.

III. Measurement & Verification (M&V)

In general, the measurement and verification process for projects consists of three stages: (1) the Application Submittal and Review stage as described in Section I, A; (2) the M&V Plan Submittal and Review stage as described in Section I, B; and (3) the Project M&V Process stage as described below.

All projects need to comply with each stage in sequence to qualify as an Air Quality Facility and OAQDA will work with the applicant to ascertain if and where meters are to be placed in the building (or project), or if whole-building gas and/or electric meters are appropriate for measuring savings, and what end-use energy use quantities are to be measured before construction begins. OAQDA may also request the use of ENERGY STAR Portfolio Manager as a free industry-standard tool to assist in benchmarking the project's impact on the building's performance.

Project M&V Process. Data collection efforts and required information is submitted by the applicant annually and must comply with the M&V Plan initially submitted and reviewed by OAQDA. The review begins before the retrofit or after the new construction is complete and proceeds throughout the project period. After a sufficient period of data is collected, a calibrated whole-building model is developed by the applicant and shared with a third-party reviewer selected by OAQDA to compare with the measured data from the project. The calibrated whole-building model is then used to determine whether the measure savings agree with the estimated savings predictions.

In addition, adherence to the recommendations in ASHRAE Guideline 14 (ASHRAE 2015) and/or the Uniform Performance Measurement (UMP) guidelines (UMP 2020) is important to ensure accurate measurement and reporting.