

Preserving Design Flexibility Through Performance-Based Energy Modeling

This case study highlights how whole-building energy modeling helped a project team achieve energy code compliance while avoiding unnecessary HVAC scope, reducing redesign risk, and preserving project momentum. By leveraging the performance path, Emerald Built Environments helped the team maintain design flexibility while navigating increasingly complex energy code requirements.



BACKGROUND INFORMATION

■ Client Overview

Effler Commercial is a real estate advisory, development, investment, and asset + property management firm that provides tailored and turnkey solutions to customers with complex challenges.

That is precisely why Effler reached out to Emerald for help on its proposed five-story multifamily residential building in Ohio. The project team sought to demonstrate compliance with the ASHRAE 90.1-2019 Appendix G standard using the whole-building performance path, allowing them to confirm overall building performance rather than relying solely on prescriptive requirements, which would add cost to the project.

■ Project Overview

The Rhinebeck engagement is one that Emerald sees more often under more stringent building codes—Effler asked Emerald to develop a whole-building energy model comparing the proposed design against the ASHRAE baseline. The analysis evaluated building envelope performance, HVAC systems, ventilation requirements, and operational assumptions to determine the most effective path to compliance.

As energy codes become increasingly stringent, multifamily developers and design teams are often challenged to balance compliance requirements with project budgets, schedules, and design goals. Through performance-based modeling, Emerald helped the team assess alternatives and identify a compliance strategy that supported both regulatory requirements and project objectives.

CHALLENGES

■ Key Challenges

The project team sought a performance-based pathway to demonstrate compliance with ASHRAE 2019 while avoiding unnecessary HVAC scope and late-stage redesign impacts.

Under a traditional prescriptive compliance approach, the project risked requiring multiple Energy Recovery Ventilators (ERVs), along with associated ductwork and engineering redesign efforts. Implementing these changes would have increased project complexity and potentially impacted the project schedule.

The team needed to determine whether whole-building energy modeling could provide an alternative path to compliance while preserving the original design intent and keeping the project on track.



■ Client Goals

The project teams aimed to:

- 1
- DEMONSTRATE energy code compliance through the performance path
- 2
- PRESERVE architectural and mechanical design flexibility
- 3
- AVOID unnecessary HVAC scope and redesign efforts
- 4
- MAINTAIN the project schedule and permitting timeline
- 5
- PROVIDE clear documentation supporting compliance decisions

STRATEGIES RECOMMENDED

■ Strategies Implemented

Emerald developed a whole-building energy model comparing the proposed multifamily building against the ASHRAE 2019 baseline. The analysis evaluated building envelope performance, HVAC systems, ventilation requirements, and operational assumptions to determine whether the project could achieve compliance through the performance path.

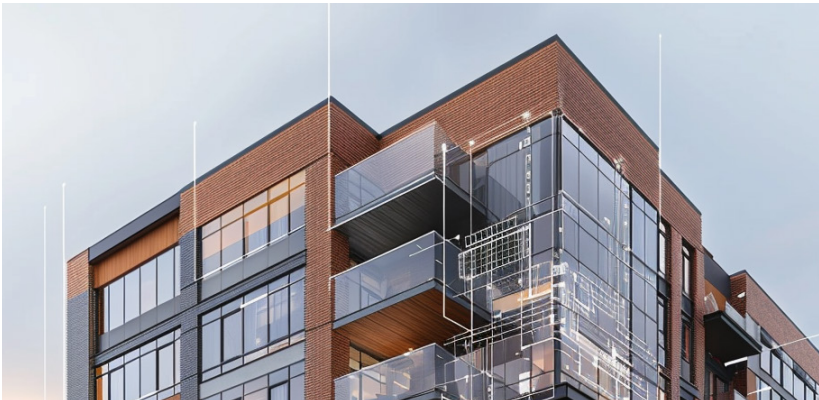
■ Innovative Approaches

Rather than following the prescriptive path, the project team used performance-based modeling to evaluate the building as an integrated system. This approach allowed the team to demonstrate equivalent energy performance while avoiding unnecessary HVAC modifications and preserving the original design intent.

OUTCOMES

■ Results Achieved

The energy modeling analysis successfully supported a performance-based compliance pathway, allowing the project team to move forward with confidence.



Project outcomes included:

- 1
- DEMONSTRATED a defensible path to energy code compliance
- 2
- HELPED avoid additional ventilation equipment requirements and associated ductwork scope
- 3
- REDUCED potential engineering redesign efforts
- 4
- MINIMIZED schedule disruption and permitting risk
- 5
- PRESERVED greater flexibility in architectural and HVAC system design decisions

■ Impact on the Project

By providing a data-driven compliance strategy, Emerald helped the project team make informed decisions while reducing uncertainty and avoiding costly late-stage modifications.

CONCLUSION

This project demonstrates how whole-building energy modeling can provide value far beyond code compliance documentation. Through strategic analysis and performance-based evaluation, Emerald Built Environments, A Crete United Company, helped the project team maintain design flexibility, reduce risk, and confidently navigate increasingly complex energy code requirements.

