Automation of Performance-based Compliance Quality Control and Reporting

A proposal for funding submitted to DOE. Principal Institution Karpman inc.

Background

The performance path of compliance with energy code is viewed by industry stakeholders as the best opportunity for achieving low energy and net zero buildings.[1] While this path is favored by states and municipalities with ambitious energy goals, they are unable to spend the time to cross-check fully. It is not supported by COMcheck, which is widely used for projects complying prescriptively. Also, it requires building intrinsically complex energy modeling.

Most commercial new construction projects in Florida use the performance path of compliance with the energy code. To be approved, BEM tool vendors must self-certify that their tool has a compliance shell that generates models as the standard prescribes. The proposed project will utilize the ASHRAE Standard 229P (Std 229) framework to streamline documentation and automate the submittal review of performance-based projects. The work builds on several past and ongoing DOE-funded efforts:

a) Development of the ASHRAE Standard 229P (Std 229P) that has the following key components:
   - Ruleset Model Description (RMD) schema that includes elements of the building models pertinent to code compliance.
   - Testing protocol for a Ruleset Checking Tool (RCT) software that can parse energy models in the RMD format and automatically verify their compliance with the ruleset.

b) Implementing a Ruleset Checking Tool for 90.1 2019 Appendix G by PNNL.

c) Implementation of RMD file generation for EnergyPlus (E+) models.

d) Updates to COMcheck informed by extensive user feedback by PNNL. Data import from third-party tools into COMcheck was one of the top priorities identified by stakeholders.

Proposed Technical Scope

The proposed work has the following key focus areas:

1. **Implement the RMD generation functionality for EnergyGauge, eQUEST, OS, and TRACE** (BEM Tools) and perform testing following Standard 229P.
2. **Develop requirements and perform testing for the new COMcheck Performance-Based Compliance module** with the following features:
   - ✓ Support reporting requirements of 90.1 Section 11 and Appendix G.
   - ✓ Allow importing project information from compliance models via the RMD files.
   - ✓ Generating model review reports using the RCT as an internal quality control engine.
   - ✓ PNNL will complete the implementation of the new module.
3. **Facilitate adoption of the developed tools by jurisdictions** by assembling a national working group of industry stakeholders to raise awareness and get input on the developed tools; pilot the tools in several jurisdictions and update them based on feedback.

Karpman Inc respectfully requests the FBC Energy Technical Advisory committee for its support in bringing the project to fruition.

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[1] Rosenberg MI, R Hart, J Zhang, and RA Athalye. 2015. Roadmap for the Future of Commercial Energy Codes.