PROJECT PLAN: BUILDING DATA FOR BUILDING PERFORMANCE STANDARDS

ABSTRACT

This project aims to develop a comprehensive building performance database that will support both benchmarking initiatives and building performance standards implementation. By enhancing the existing database with additional data points, automated assumption generation, and robust analysis capabilities, we will create a powerful tool for understanding building energy performance across different building types and vintages. The enhanced database will serve as a foundation for evidence-based policy decisions and help identify targeted improvement opportunities in the building sector for both City-Owned and Non-City buildings.

1 INTRODUCTION

Project Description

The current building benchmarking database, while functional, has significant data gaps that limit its utility for comprehensive building performance analysis and standards development. This project will transform the existing database into a more robust analytical tool through data enhancement, development of standardized assumptions, and creation of visualization capabilities. The focus of this assessment will be on non-city owned buildings, but City-Owned buildings can also be considered.

Relevance

Buildings account for a large portion of energy consumption and carbon emissions in most jurisdictions. As Kansas City explores implementation of building performance standards, having access to comprehensive building data becomes crucial for:

- Setting realistic performance targets
- Understanding building stock characteristics
- Identifying high-impact improvement opportunities
- Supporting evidence-based policy development
- Enabling effective program implementation

Final Goals

1. Create a comprehensive building performance database that supports both benchmarking and building performance standards
2. Develop reliable methodologies for filling data gaps
3. Establish a robust analytical framework for building performance assessment

2 BASELINE OR INITIAL ANALYSIS

Data Assessment

1. Audit existing database:
    - Identify complete vs. incomplete records
    - Calculate data availability percentages for each field
    - Assess data quality and consistency
    - Map data gaps by building type and vintage

Data Structure Analysis

1. Data Fields:
    - Building Characteristics:
        - Gross floor area*
        - Year built*
        - Primary use type*
        - Number of floors
        - Building envelope characteristics
        - HVAC system types
        - Major renovation history
    - Operational Data:

        - Operating hours*
        - Occupancy patterns
        - Energy consumption by fuel type
        - Water consumption
        - Waste generation
        - Owner
        - Owner Contact Information
    - Performance Metrics:
        - Energy use intensity (EUI)
        - Greenhouse gas emissions
        - Energy Star scores
        - Water use intensity
        - Carbon intensity

**required*

3 Final Analysis

Enhanced Database Structure

1. Data Organization:
    - Temporal organization for tracking changes
    - Relationship mapping between different data points
    - Data validation systems
2. Assumption Generation Framework:
    - Models for missing data estimation
    - Vintage-based characteristic assumptions
    - Energy Star scores extrapolated to incomplete benchmarking submissions

Visualization and Analysis Capabilities

1. Interactive Dashboards:
    - Building stock characteristics overview
    - Performance metrics distribution
    - Temporal trend analysis
    - Peer group comparisons
2. Analysis Tools:
    - Performance benchmark generators
    - Improvement potential calculators
    - Policy impact assessment tools
    - Custom report generators

4 Final Goals & Evaluation

Database Completeness

- Achieve 95% data completeness for critical fields
- Develop validated assumptions for remaining gaps
- Establish data quality verification protocols

Analytical Capabilities

- Develop reliable prediction models for missing data

Functionality

- User-friendly interface for data access and analysis

Documentation

- Detailed methodology documentation
- User guides
- Final project report with findings and recommendations

The enhanced database will serve as a crucial tool for:

1. Informing building performance standards development
2. Supporting policy decisions with data-driven insights
3. Enabling effective program implementation
4. Facilitating targeted intervention strategies
5. Advancing building sector decarbonization efforts

5 Related Work

Building Performance Standards (BPS) overview: https://www.energycodes.gov/BPS

BPS research library: https://www.energycodes.gov/BPS/Resources

Institute for Market Transformation: https://imt.org/public-policy/building-performance-standards/

Metropolitan Energy Center: https://metroenergy.org/programs/energy-solutions-hub/benchmarking/

6 Data & Technical Requirements

Datasets can be provided upon request. Some publicly available data includes previously published benchmarking data: https://data.kcmo.org/browse?q=benchmarking&sortBy=relevance