Project Overview and Roadmap

# 1. Project Description

This project is organized into four primary development tracks: EM Core Tools, Reference Documents, EnergyPlus, and LCCA. Each track delivers unique functionality, and all are integrated through a modular development approach. The purpose is to enable efficient energy modeling, lifecycle cost analysis, and standards compliance using CBECC, EnergyPlus, and IESVE.

# 2. Track Overview and Key Deliverables

## 2.1 EM Core Tools Track

Provides foundational tools used across all other tracks, including model viewers, data parsers, converters, and shared visualization and comparison engines.

- Model Viewer/Inspector  
- Model Conversion Engine (CBECC ↔ IESVE)  
- Data Processing Modules (XML Parser, IDF Generator)  
- Comparison Engine  
- Report Generation Modules  
- Interactive Dashboards

## 2.2 Reference Documents Track

Provides structured documentation and modeling guidance for users and developers.

- CBECC Modeling Guide (input descriptions, use cases)  
- IESVE Modeling Guide  
- CBECC vs. IES Modeling Comparison (with examples)

## 2.3 EnergyPlus Track

Focuses on developing tools for EnergyPlus-based modeling workflows, especially for ASHRAE 90.1 baseline generation and performance validation.

- EnergyPlus Baseline Modeling Tool  
- Compliance Validator  
- EnergyPlus IDF Generator  
- Performance Analysis Tool

## 2.4 LCCA Track

Focused on lifecycle cost analysis and integration of cost data with energy modeling results. This track includes the LCCA Tool and Construction Cost Database.

- LCCA Tool (Scenario Comparison, Cost Projections)  
- Construction Cost Database  
- System Cost Estimator (HVAC, PV, Battery)  
- Integration with EnergyPlus & EM Core Tools

# 3. Backend Integration Plan

All tracks are built on top of shared EM Core modules. Parsed data, converted models, and energy simulation outputs will feed directly into the cost analysis and reporting layers.   
 - Shared libraries: XML Parsers, IDF Generators, Comparison Modules  
  
 - Data Standardization: Normalized inputs across all tracks  
  
 - Reporting: ECON-1 and ASHRAE 90.1 outputs shared across LCCA and EnergyPlus tracks

# 4. Naming Convention and File Structure

All files and deliverables follow GitHub-compatible naming conventions and progressive version control:

- Format: [Track]\_[Module]\_[Deliverable]\_vX.Y  
- Example: EM\_Core\_Tools\_Model\_Viewer\_v0.01.docx

Folder Structure:  
/EM\_Core\_Tools/Model\_Viewer\_Inspector/...  
/Reference\_Documents/CBECC\_Modeling\_Guide/...  
/EnergyPlus/EnergyPlus\_Baseline\_Modeling\_Tool/...  
/LCCA/LCCA\_Tool/...

Versioning: v0.X for in-development, v1.0+ for production-ready files.

# 5. Adopted Development Best Practices

- Modular Development: Small, reusable components developed in parallel  
- Incremental Deliverables: Each module delivers subcomponents progressively  
- Version Control: Clear GitHub-style versioning (v0.01, v0.02, …)  
- Agile Workflow: Sprints with testable milestones every 2–4 weeks  
- Automated Testing & Integration: As needed for backend reliability  
- Professional Documentation: Structured, searchable, and tracked by version

# 6. Development Timeline and Roadmap

The following roadmap outlines the timing for each module's incremental deliverables and milestone reviews. The approach is based on the fast-tracking strategy adopted on July 3, 2025.

- July–August 2025: Core tool foundation (viewer, parser, conversion, baseline generator)  
- August–September 2025: System comparison engine, LCCA scenario calculator, IDF export  
- September–October 2025: Report generator, escalation models, EnergyPlus compliance checker  
- October–December 2025: Final dashboards, visualizations, integration, and documentation