

Quantitative and Economic Analysis of the 7th Edition Florida Building Energy Code

Bereket Nigusse and Muthusamy Swami
Florida Solar Energy Center
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Background

The State of Florida desires to compare the 7th Edition Florida Energy Conservation Code (FEC) with ASHRAE Standard 90.1-2016 quantitatively and perform cost-benefit analysis of updating the 7th edition FEC to the newer codes of those code changes that impact energy use.

Task A: Quantitative Comparison of Commercial Energy Code FEC 7th Ed. vs ASHRAE 90.1-2016

Scope: This subtask will quantify the energy use differences between the 7th edition Florida Energy Code, and the 2016-ASHRAE 90.1 code. The 7th edition FEC prototype building models is based on the 6th edition FEC energy code and includes code change items that have been identified to have energy impacts from IECC-2018 code change. Activities under *Subtask A* include:

- Determine how to incorporate the code changes in to EnergyPlus energy models for the quantitative analysis.
- Develops prototype building energy models for 7th edition Florida Energy Code.
- Modifies the ASHRAE 90.1-2016 FEC prototype building models to Florida Energy Code, climate and location.
- Perform simulations of the 7th Edition Florida Energy Code and the ASHRAE 90.1-2016 Code using selected prototype building energy models representative Florida climates. Determines annual area-weighted energy savings by buildings type.

Budget: The estimated budget for *Subtask A* is \$25,400. If the 7th edition commercial FEC quantitative analysis does not meet ASHRAE 90.1-2016 code requirement and further analysis requires substantial effort, then FSEC may seek additional funding.

Note: The schedule proposed for this task assumes that DOE will release the 2016 ASHRAE 90.1 building energy models sometime in July 2018, which PNNL have indicated by email correspondence to FSEC.

Task B: Economic Analysis of moving Commercial Energy Code from FEC 6th Ed to 7th Ed. FEC for those items that impact Energy Use.

Scope: Perform cost effectiveness analysis by building type, aggregated for the State of Florida for quantifiable code differences between FEC 7th edition and FEC 6th edition for the commercial buildings. The cost-benefit analysis will use the annual energy savings determined in Task A, or re-run the models as needed to get the energy savings for each code change items, the state's average energy rates for electricity and natural gas, and

incremental first cost and other costs between alternatives. For the purposes of this study ‘cost effective’ is to be defined as the case in which the present value of the life-cycle energy cost reductions (the savings) exceeds the present value of the life-cycle improvement costs (the investment). The ratio of these two present values (Savings / Investment) is the savings-to-investment ratio or SIR. If the SIR is greater than unity, there is a net financial benefit derived from the investment.

Budget: The estimated budget for Task B is \$13,100.

Note: The cost-benefit analysis will be performed within a subset of the reference commercial prototype buildings from previous task. If a change does not impact energy use, then no cost benefit analysis will be performed for that change. Code change incremental cost estimate will be based on DOE/PNNL latest report found in this link (https://www.energycodes.gov/sites/default/files/software/Commercial_State_Savings_Calculator_V1.0Rev1.zip) and other sources such as RS Means cost data. This subtask is contingent upon receipt of ASHRAE 2016 analysis PNNL report, which is expected to be released by the end of 2018.

Task C: FEC 7th Ed. FEC Necessary Code Change Submission

FSEC will identify and determines the necessary code changes for submission based on the quantitative and economic analysis results. FSEC will also submit the code changes, provide justification, and attend the necessary meetings to respond to questions.

Budget: The estimated budget for Task C is \$11,000.

DELIVERABLES

Task D: Interim Report

Scope: FSEC will deliver an interim report of *Subtask A* comprised of preliminary results of the quantitative analysis of the 7th Edition Florida Energy Code and ASHRAE 90.1-2016 Code to the Florida Energy Technical Advisory Committee (TAC) no later than November 30, 2018. The interim report will consist of summary of approved code changes that has energy impacts and can be analyzed quantitatively using simulation. The interim report will also include preliminary results and presented to the Florida Building Commission’s TAC at a time agreed upon by the Contractor and Department’s Contract Manager.

Budget: Budget for interim report preparation is included in the final report task D.

Task D: Final Report

Scope: FSEC will deliver a final report no later than June 15, 2019 that will include the lists of code changes that have potential energy impacts, energy use savings by building type, cost-benefit analysis results, discussion and conclusions. The final report will be presented to the Florida Building Commission’s Energy Technical Advisory Committee at a time agreed upon by the Contractor and the Department’s Contract Manager.

Budget: The estimated budget for the interim and final report preparation is \$4,000.

SCHEDULE AND BUDGET

Schedule: 9 months. Note that according to PNNL some supporting materials that are needed for Task B of this project are expected to be available by the end of the year 2018.

Total Budget:

The total approximate budget breakdown by tasks is summarized below.

Task	Budget
Task A	\$25,400
Task B	\$13,100
Task C	\$11,000
Task D	\$4,000
Total	\$53,500