

## **Comments on TAM: Muthusamy Swami & Rob Vieira; Florida Solar Energy Center**

The proposed 2014 residential and commercial energy codes are principally based on IECC 2012 with the commercial code, in addition, having the option of using ASHRAE 90.1 2010.

The current TAM for most part deals with the following aspects of software verification

1. Validation & consistency checks, missing inputs
2. Minimum capabilities, including building heat and moisture flows
3. Simulation criteria
4. Minimum outputs and end use reporting
5. Required equipment modeling capabilities
6. Certain test and standard that verifies accuracy of the underlying simulation engines

In general, both residential and commercial codes specify rules and procedures to determine compliance of a building. Implementation of these rules are the key to ensuring that the inputs from a user are being correctly translated per established rules and compliance determined accurately. A major verification aspect that is completely overlooked and ignored by the current TAM as well as the marked up 2014 version are test cases that verify if the rules of compliance are being accurately applied by the software to produce correct results.

For example, the 2014 code allows commercial buildings to comply with any one of the following five options:

1. IECC 2012, Chapter 4 -- Prescriptive compliance
2. IECC 2012, Chapter 4 -- Total Building performance compliance
3. ASHRAE 90.1, 2010 -- Prescriptive compliance
4. ASHRAE 90.1, 2010 -- Envelope trade-off option
5. ASHRAE 90.1, 2010 -- Energy Cost Budget method

While the current TAM specifies test suites that are intended to verify the underlying simulation engine, it does not have any provision whatsoever to verify whether the software tool correctly applies the rules and criteria for each of the method outlined above. Clearly, tests, protocols, baseline prototypes are needed to demonstrate what kind of results will be expected of the compliance software tool submitted for approval. The methodology and requirements that software tools must meet at a minimum need development. No such tests are known to exist in the literature at this time.

The proposed 2014 Florida Building Code includes four methods of residential compliance. The original manual is written for just the performance method yet for the 2010 code the Commission found themselves also reviewing software for the prescriptive trade-off method. The manual needs to be updated to handle test cases for the developer to run to verify

compliance using this method as well as reports to be submitted to show compliance. It also should be updated with test cases for generating the 2014 Florida code baseline home.

While cost considerations may prohibit developing an exhaustive set of tests, a limited number of tests are certainly needed to keep software submitted for approval within a certain range of predictability.