November 18, 2017

Florida Building Commission
Building Codes and Standards Office
2555 Shumard Oak Blvd
Tallahassee, Florida 32399-2100

RE: Submission of EnergyGauge Summit 6.0 for approval for the 6th edition Florida Energy Code for Commercial Buildings

The Florida Solar Energy Center (FSEC) is pleased to submit EnergyGauge Summit 6.0 for approval for the 6th edition Florida Energy Code for Commercial Buildings.

Certification

To the best of our knowledge, judgement and interpretation, we certify that the software submitted for approval meets the requirements to demonstrate compliance of the 2017 6th Edition Florida Energy Code for commercial buildings and the procedures of the "Energy Simulation Tool Approval Technical Assistance Manual, TAM-2017-1.0".

Disclaimer

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMMITED TO THE WARRANTIES OF MARCHANTABILITY, FITTNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS OR THE UNIVERSITY OF CENTRAL FLORIDA BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OF OR OTHER DEALINGS IN THE SOFTWARE.

Contents of submission:

I. **This letter**

   Fully working install package of the EnergyGauge Summit 6.0 for approval.

II. **Application Checklist:**

   1. **The cover sheet "Request for Approval" shown in Appendix-A**.

      Certified cover sheet that shows the compliance methods has met all the requirements. The cover sheet is appended at the end of this letter.

   2. **Computer Run Report**

      EnergyGauge Summit 6.0 software compliance output report forms per Appendix-C of the 6th Edition 2017 TAM.

   3. **Compliance Supplement and User's Manual**

      The *EnergyGauge Summit 6.0 software user's manua/.*

   4. **Performance Method Test Results Spreadsheet**

1679 CLEARLAKE ROAD, COCOA, FLORIDA 32922-5703 ▪ TEL 321-638-1000 ▪ FAX 321-638-1010 ▪ www.fsec.ucf.edu

STATE UNIVERSITY SYSTEM OF FLORIDA ▪ AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER ▪ A RESEARCH INSTITUTE OF THE UNIVERSITY OF CENTRAL FLORIDA

*Performance methods code compliance calculations software evaluation were performed using the six prototype buildings A1, A3, A20, B1, C1 and D7. The required performance method compliance parameters were populated in the evaluation spreadsheet "CommercialPerformanceMethodsResults.xls". This summary spreadsheet is provide for each prototype building and is placed under the "**Verification/SpreadSheets**" sub-directory.*

5. **ASHRAE Standard 140 Test**

The EnergyGauge Summit 6.0 software test for ASHRAE Standard 140 has been performed and the report is included. File named "SP140Report.pdf" is the SP140-2014 report.

6. **Prescriptive Method Test Results Spreadsheet**

   *The prescriptive code compliance calculation methods software evaluations were conducted for FEC Prescriptive and ASHRAE Prescriptive methods using the two commercial prototype buildings A1 and C1. The commercial prescriptive code compliance parameters were populated in the evaluation spreadsheet "CommercialPrescriptiveMethodsResults.xls". This summary spreadsheets are provided for A1 and C1 prototype buildings and are placed under the "**Verification/Spreadsheets**" sub-directory.*

7. **Component Performance Alternative**

   The Component Performance Alternative methodology software evaluation was conducted and results are in the spreadsheet CommercialComponentPerformanceMethodResults.xlsx *under the "**Verification/Spreadsheets**" sub-directory.*

8. **Envelope Trade-Off Option Results Spreadsheet**

   Not seeking approval of this code compliance method in this submission.

9. **A letter describing any differences between the expected results or any other requirements listed in this document and their software**

   None.

III. **Specifically, the contents are:**
   a. File named "**ApprovalRequestLetter.pdf**": is this letter
   b. The "**Application Checklist**" items described in part II.
   c. Directory named "**EnergyGaugeSummit**": contains the software package for EnergyGauge Summit 6.0 and the *user's manual*.
   d. The directory "SP140" contains the SP140 validation calculation input, output, result and weather files subdirectories:
      1. Directory named "**InputFiles**": contains all the DOE2.1E input files used for the SP140-2014 test sets.
      2. Directory named "**OutputFiles**": contains all the DOE2.1E output files that were obtained by running the input files in the "InputFiles" directory using the EnergyGauge Summit 6.0 Software.
      3. Directory named "**WeatherFiles**": contains all the weather files used for the SP140-2014 test sets.
      4. Directory named "**Results**": contains all the results in the spreadsheet form as described in Section 4 under item 2, including COMNET Acceptance Range Results.
   e. The directory "**Verification**" contains the EnergyGauge Summit 6.0 software evaluation inputs, outputs, and results files. Each verification prototype building has its own folder named: *Protoype-A1*, *Protoype-A3*, *Protoype-A20*, *Protoype-B1*, *Protoype-C1*, and *Protoype-D7*. The DOE2.1E input file names are labeled by concatenating the prototype building names A1, A3, A20, B1, C1, and D7, and "CZ1" and "CZ2" for climate zones 1A and 2A. For example the DOE2.1E input files for prototype building A1, for climate zone 1A and 2A are: "**A1CZ1.EGC**" and "**A1CZ2.EGC**", respectively. The reference input files generated by the software are named by appending "ASHRAEReference" and "IECCReference" to the DOE2.1E input file names for ASHRAE and IECC compliance methods. For example the reference input files generated by the software for prototype building A1 and climate zone 1A are named as "**A1CZ1ASHRAERef.EGC**" and "**A1CZ1IECCRef.EGC**". The compliance report files generated by the Software are named by appending "**ASHRAEPerf**" and "IECC**Perf**" to the input file names for ASHRAE and IECC performance compliance methods, and "**ASHRAEPres**" and "IECC**Pres**" for ASHRAE and IECC Prescriptive compliance methods. For example, the compliance report output files for prototype building A1, for

prescriptive methods and climate zone 1A are named as "**A1CZ1ASHRAEPres.pdf**" and "**A1CZ1IECCPres.pdf**".

f. All verification results are provided in the sub-directory "Verification/Spreadsheets", and named appropriately for the compliance option they designate.

> CommercialComponentPerformanceMethodResults.xlsx
> CommercialPerformanceMethodsResults.xlsm
> CommercialPrescriptiveMethodsResults.xlsm

g. The inputs, outputs and verification results files for the six prototype buildings are summarized in Table 1.

Table 1 Inputs, Outputs and Verification results file names for each test cases

Test Cases	File Names	Description
Protoype-A1	A1CZ1.EGC A1CZ2.EGC	DOE2.1E input files for software verification for climate zones 1A and 2A.
	A1CZ1ASHRAERef.egc A1CZ1ASHRAERef.egc	Reference input files generated for ASHRAE method for climate zones 1A and 2A.
	A1CZ1IECCRef.egc A1CZ2IECCRef.egc	Reference input files generated for IECC method for climate zones 1A and 2A.
	A1CZ1ASHRAEPerf.pdf A1CZ2ASHRAEPerf.pdf	ASHRAE Performance compliance method output files generated for climate zones 1A and 2A.
	A1CZ1IECCPerf.pdf A1CZ2IECCPerf.pdf	IECC Performance compliance method output files generated for climate zones 1A and 2A.
	A1CZ1ASHRAEPres.pdf A1CZ2ASHRAEPres.pdf	ASHRAE Prescriptive compliance method output files generated for climate zones 1A and 2A.
	A1CZ1IECCPres.pdf A1CZ2IECCPres.pdf	IECC Prescriptive compliance method output files generated for climate zones 1A and 2A.
Protoype-A3	A3CZ1.EGC A3CZ2.EGC	DOE2.1E input files for software verification for climate zones 1A and 2A.
	A3CZ1ASHRAERef.egc A3CZ1ASHRAERef.egc	Reference input files generated for ASHRAE method for climate zones 1A and 2A.
	A3CZ1IECCRef.egc A3CZ2IECCRef.egc	Reference input files generated for IECC method for climate zones 1A and 2A.
	A3CZ1ASHRAEPerf.pdf A3CZ2ASHRAEPerf.pdf	ASHRAE Performance compliance method output files generated for climate zones 1A and 2A.
	A3CZ1IECCPerf.pdf A3CZ2IECCPerf.pdf	IECC Performance compliance method output files generated for climate zones 1A and 2A.
Protoype-A20	A20CZ1.EGC A20CZ2.EGC	DOE2.1E input files for software verification for climate zones 1A and 2A.
	A20CZ1ASHRAERef.egc A20CZ1ASHRAERef.egc	Reference input files generated for ASHRAE method for climate zones 1A and 2A.
	A20CZ1IECCRef.egc A20CZ2IECCRef.egc	Reference input files generated for IECC method for climate zones 1A and 2A.
	A20CZ1ASHRAEPerf.pdf A20CZ2ASHRAEPerf.pdf	ASHRAE Performance compliance method output files generated for climate zones 1A and 2A.
	A20CZ1IECCPerf.pdf A20CZ2IECCPerf.pdf	IECC Performance compliance method output files generated for climate zones 1A and 2A.
	A20Performance.xlsm	Verification results summary for performance methods for climate zones 1A and 2A

Table 1 Inputs, Outputs and Verification results file names for each test cases (Continued)

Test Cases	File Names	Description
Protoype-B1 Retail	B1CZ1Ret.EGC B1CZ2Ret.EGC	DOE2.1E input files for software verification for climate zones 1A and 2A.
	B1CZ1RetASHRAERef.egc B1CZ1RetASHRAERef.egc	Reference input files generated for ASHRAE method for climate zones 1A and 2A.
	B1CZ1RetIECCRef.egc B1CZ2RetIECCRef.egc	Reference input files generated for IECC method for climate zones 1A and 2A.
	B1CZ1RetASHRAEPerf.pdf B1CZ2RetASHRAEPerf.pdf	ASHRAE Performance compliance method output file generated for climate zones 1A and 2A.
	B1CZ1RetIECCPerf.pdf B1CZ2RetIECCPerf.pdf	IECC Performance compliance method output file generated for climate zones 1A and 2A.
	B1CZ1RetASHRAEPres.pdf B1CZ2RetASHRAEPres.pdf	ASHRAE Prescriptive compliance method output files generated for climate zones 1A and 2A.
	B1CZ1RetIECCPres.pdf B1CZ2RetIECCPres.pdf	IECC Prescriptive compliance method output files generated for climate zones 1A and 2A.
Protoype-B1 Supermarket	B1CZ1Super.EGC B1CZ2Super.EGC	DOE2.1E input files for software verification for climate zones 1A and 2A.
	B1CZ1SuperASHRAERef.egc B1CZ1SuperASHRAERef.egc	Reference input files generated for ASHRAE method for climate zones 1A and 2A.
	B1CZ1SuperIECCRef.egc B1CZ2SuperIECCRef.egc	Reference input files generated for IECC method for climate zones 1A and 2A.
	B1CZ1SuperASHRAEPerf.pdf B1CZ2SuperASHRAEPerf.pdf	ASHRAE Performance compliance method output files generated for climate zones 1A and 2A.
	B1CZ1SuperIECCPerf.pdf B1CZ2SuperIECCPerf.pdf	IECC Performance compliance method output files generated for climate zones 1A and 2A.
	B1CZ1SuperASHRAEPres.pdf B1CZ2SuperASHRAEPres.pdf	ASHRAE Prescriptive compliance method output files generated for climate zones 1A and 2A.
	B1CZ1SuperIECCPres.pdf B1CZ2SuperIECCPres.pdf	IECC Prescriptive compliance method output files generated for climate zones 1A and 2A.

Table 1 Inputs, Outputs and Verification results file names for each test cases (Continued)

Test Cases	File Names	Description
Protoype-C1 *Manufacturing*	C1CZ1Man.EGC C1CZ2Man.EGC	DOE2.1E input files for software verification for climate zones 1A and 2A.
	C1CZ1ManASHRAERef.egc C1CZ1ManASHRAERef.egc	Reference input files generated for ASHRAE method for climate zones 1A and 2A.
	C1CZ1ManIECCRef.egc C1CZ2ManIECCRef.egc	Reference input files generated for IECC method for climate zones 1A and 2A.
	C1CZ1ManASHRAEPerf.pdf C1CZ2ManASHRAEPerf.pdf	ASHRAE Performance compliance method output file generated for climate zones 1A and 2A.
	C1CZ1ManIECCPerf.pdf C1CZ2ManIECCPerf.pdf	IECC Performance compliance method output file generated for climate zones 1A and 2A.
	C1CZ1ManASHRAEPres.pdf C1CZ2ManASHRAEPres.pdf	ASHRAE Prescriptive compliance method output files generated for climate zones 1A and 2A.
	C1CZ1ManIECCPres.pdf C1CZ2ManIECCPres.pdf	IECC Prescriptive compliance method output files generated for climate zones 1A and 2A.
Protoype-C1 *Warehouse*	C1CZ1Ware.EGC C1CZ2Ware.EGC	DOE2.1E input files for software verification for climate zones 1A and 2A.
	C1CZ1WareASHRAERef.egc C1CZ1WareASHRAERef.egc	Reference input files generated for ASHRAE method for climate zones 1A and 2A.
	C1CZ1WareIECCRef.egc C1CZ2WareIECCRef.egc	Reference input files generated for IECC method for climate zones 1A and 2A.
	C1CZ1WareASHRAEPerf.pdf C1CZ2WareASHRAEPerf.pdf	ASHRAE Performance compliance method output files generated for climate zones 1A and 2A.
	C1CZ1WareIECCPerf.pdf C1CZ2WareIECCPerf.pdf	IECC Performance compliance method output files generated for climate zones 1A and 2A.
	C1CZ1WareASHRAEPres.pdf C1CZ2WareASHRAEPres.pdf	ASHRAE Prescriptive compliance method output files generated for climate zones 1A and 2A.
	C1CZ1WareIECCPres.pdf C1CZ2WareIECCPres.pdf	IECC Prescriptive compliance method output files generated for climate zones 1A and 2A.

Table 1 Inputs, Outputs and Verification results file names for each test cases (Continued)

Test Cases	File Names	Description
Protoype-D7	D7CZ1.EGC D7CZ2.EGC	DOE2.1E input files for software verification for climate zones 1A and 2A.
	D7CZ1ASHRAERef.egc D7CZ1ASHRAERef.egc	Reference input files generated for ASHRAE method for climate zones 1A and 2A.
	D7CZ1IECCRef.egc D7CZ2IECCRef.egc	Reference input files generated for IECC method for climate zones 1A and 2A.
	D7CZ1ASHRAEPerf.pdf D7CZ2ASHRAEPerf.pdf	ASHRAE Performance compliance method output files generated for climate zones 1A and 2A.
	D7CZ1IECCPerf.pdf D7CZ2IECCPerf.pdf	IECC Performance compliance method output files generated for climate zones 1A and 2A.
	D7CZ1ASHRAEPres.pdf D7CZ2ASHRAEPres.pdf	ASHRAE Prescriptive compliance method output files generated for climate zones 1A and 2A.
	D7CZ1IECCPres.pdf D7CZ2IECCPres.pdf	IECC Prescriptive compliance method output files generated for climate zones 1A and 2A.
Results	CommercialComponentPerformanceMethodResults.xlsx	Verification results summary for the component performance alternative method.
	CommmercialPerformanceMethodsResults.xlsm	Verification results summary for performance method.
	CommercialPrescriptiveMethodsResults.xlsm	Verification results summary for prescriptive method.

Appendix A:
Cover sheet for request for approval by the Florida Building Commission as a Compliance Software tool

Date of Submittal: November 18, 2017
Software Company: **Florida Solar Energy Center**
Contact Person: **Muthusamy Swami**
Contact email: **swami@fsec.ucf.edu**
Contact Phone: **321-638-1410**
Name of Product (If marketed under different editions or names list all that apply):
                        EnergyGauge Summit
Version Number: **6.0**

Code Compliance Methods this software calculates:

Commercial Energy Efficiency Code Compliance
- ☑ FEC Prescriptive Method
- ☑ FEC Total Building Performance Method
- ☑ FEC Component Performance Alternative Option
- ☑ ASHRAE Prescriptive Method
- ☐ ASHRAE Envelope Trade-off Option Method (this method is not offered in the software)
- ☑ ASHRAE Energy Cost Budget Method

As an official of the software company named above, I certify the software listed meets the requirements of the Florida Building Code, Energy Conservation 6th Edition (2017) for the methods indicated and that this submittal includes the required documentation as given in the Energy Simulation Tool Approval – Technical Assistance Manual or as requested by the Florida Building Commission:

_____   November 18, 2017
Signature   Date

Muthusamy Swami   Program Director
Printed Name   Title