

This document responds to the general comments and specific comments that were presented on the Meeting Agenda for the Florida Building Commission, Energy Technical Advisory Committee meeting, dated September 27th 2018. Responses are prepared by Integrated Environmental Solutions Ltd.

Comment from **Hilton T. Meadows** of **Diversified Environmental Planning**:

www.floridabuilding.org/fbc/commission/FBC_1018/Energy_Tac/Comment-from-Hilton-Meadows.pdf

<p>Issue/Comment: Mr. Meadows has made reference to the FBC accepting a “commercialized calculation methodology” and accepting “Proprietary Methods”.</p>	<p>IES Response: It appears that this comment is a general comment toward the TAC or FBC. However, to clarify from the perspective of Integrated Environmental Solutions Limited, the IESVE Software is implementing the “Energy Cost Budget Method” with its ASHRAE-140 validated engine. The Energy Cost Budget Method, while is documented in ASHRAE Standards, does not belong to any proprietary organization and it is ASHRAE’s intention to have this ECB method be implemented in software tools and be adopted by various AHJ. Thus, all detailed of the ECB Method are all publically available, including performance requirements of HVAC systems, schedules, constructions, etc.</p>
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Comment from **Michael Sheerin**, CEO of **TLC Engineering for Architecture**:

www.floridabuilding.org/fbc/commission/FBC_1018/Energy_Tac/IESVE-for-Energy-Compliance.pdf

<p>Issue/Comment: Mr. Sheerin, on behalf of nearly 400 engineers (90+ licensed engineers) at TLC Engineering for Architecture has strongly encouraged the approval of IESVE version 2018 as an acceptable Energy Compliance Software as an alternative tool from the FLACOM program.</p>	<p>IES Response: Integrated Environmental Solutions Limited agrees with this comment and would like to thank the experienced perspective of nearly 400 engineers (90+ licensed engineers) at TLC Engineering for Architecture.</p>
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Comments from **Muthusamy Swami**, Director, **Simulation Software Development** at **Florida Solar Energy Center (FSEC)**: www.floridabuilding.org/fbc/commission/FBC_1018/Energy_Tac/IES_SoftwareReview_Findings.pdf

<p>Introductory Statement by Dr. Swami</p>	
<p>Issue/Comment: Dr. Swami has stated that “IES seems to report only the Annual Energy Cost for the proposed and budget building and components in a generic fashion.”</p>	<p>IES Response: Integrated Environmental Solutions Limited would like to thanks Dr. Swami and others at the EnergyGauge FlaCom software development team for their comments. IESVE Software does <u>not</u> “report only the Annual Energy Cost for the proposed and budget building and components in a generic fashion”. IESVE Software reports various inputs and outputs of a building model from the perspectives of building design, building energy consumption, building energy cost, building utility costs & building code compliance.</p>

The ASHRAE 90.1 ECB reports in IESVE Software are not “generic” and are based on the requirements and layouts prescribed by ASHRAE. These ASHRAE 90.1 ECB Report Templates are posted at <https://xp20.ashrae.org/UM90.1-2013/ECB-Method-Compliance-Form-2013.pdf>. See Figure 01 for a representative comparison.

Compliance Forms | Energy Cost Budget Method

Energy Cost Budget (ECB) Compliance Report Page 1 of 2

Project Name: _____
 Project Address: _____ Date: _____
 Designer of Record: _____ Email: _____ Telephone: _____
 Contact Person: _____ Email: _____ Telephone: _____
 City: _____ Principal heating source:
 Weather Data: _____
 Fossil fuel
 Electricity
 Solar/site recovered
 Other

Space Summary

Building Use	Conditioned Area (ft ² or m ²)	Unconditioned Area (ft ² or m ²)	Total
Total			

Advisory Messages

	Proposed Building Design	Budget Building	Difference Proposed/Budget
Number of hours heating loads not met (system/plant)			
Number of hours cooling loads not met (system/plant)			
Number of warnings			
Number of errors			
Number of defaults overridden			

Compliance Result

The design detailed in the above-referenced plans complies with the mandatory provisions of ANSI/ASHRAE/IES Standard 90.1-2013 and the design energy cost does not exceed the energy cost budget. Therefore, this design **DOES COMPLY** with the ANSI/ASHRAE/IES Standard 90.1-2013 ECB compliance methodology.
 Individual certifying authenticity of the data provided in this analysis:

Signature _____ Title _____

90.1-2013 User's Manual

Compliance Forms | Energy Cost Budget Method

Energy Cost Budget (ECB) Compliance Report Page 2 of 2

Project Name: _____
 Contact Person: _____ Email: _____ Telephone: _____

Energy and Cost Summary by Fuel Type*

End Use	Energy Type	Proposed Building		Budget Building		Proposed / Budget Energy (%)
		Energy 10 ⁶ Btu/yr (GJ/yr)	Peak 10 ³ Btu/h (kW)	Energy 10 ⁶ Btu/yr (GJ/yr)	Peak 10 ³ Btu/h (kW)	
Lighting—conditioned						
Lighting—unconditioned						
Space heating (1)						
Space heating (2)						
Space cooling						
Pumps						
Heat rejection						
Fans—interior ventilation						
Fans—interior exhaust						
Fans—parking garage						
Service water heating						
Office equipment						
Elevators and escalators						
Refrigeration (food, etc.)						
Cooking (commercial)						
Total building consumption						

Energy Summary by End Use*

End Use	Proposed Building		Budget Building		Proposed / Budget	
	Energy (10 ⁶ Btu/yr or GJ/yr)	Cost (\$/yr)	Energy (10 ⁶ Btu/yr or GJ/yr)	Cost (\$/yr)	Energy (%)	Cost (%)
Electricity						
Natural gas						
Other fossil fuel						
District steam						
Total nonsolar						
Solar or site recovered						
Total including solar						

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

90.1-2013 User's Manual

Compliance Forms | Energy Cost Budget Method

IES INTEGRATED ENVIRONMENTAL SOLUTIONS

Energy Cost Budget (ECB) 2013 Compliance Report Page 1 of 2

Project Name: Florida Solar Energy Center
 Project Address: 1679 Clearlake Road, (18 Stories), Cocoa, Florida, 32922-5703
 Date: 20-Sep-2018
 Designer of Record: Joe Bloggs Email: Joe.Bloggs@IBC.com Telephone: (321) 638-1410
 Contact Person: Joe Bloggs Email: Joe.Bloggs@IBC.com Telephone: (321) 638-1410
 City: Cocoa
 Weather Data: USA_FL_Orlando.Executive.AP.722653_TMY3.epw
 Principal Heating Source:
 Fossil Fuel
 Electricity
 Solar/site recovered
 Other

Space Summary

Building Use	Conditioned Area (ft ²)	Unconditioned Area (ft ²)	Total (ft ²)
SPACE: Office - Open plan	46005.9	0	46005.9
SPACE: Storage - All Other	38400.5	0	38400.5
Total	49206.3	0	49206.3

Advisory Messages

	Proposed Building Design	Budget Building	Difference Proposed/Budget
Number of hours heating loads not met (system/plant)	0.0	0.0	0.0
Number of hours cooling loads not met (system/plant)	0.0	0.0	0.0
Number of warnings	-	-	-
Number of errors	-	-	-
Number of defaults overridden	-	-	-

Compliance Result

The design detailed in the above-referenced plans complies with the mandatory provisions of ANSI/ASHRAE/IES Standard 90.1-2013 and the design energy cost does not exceed the energy cost budget. Therefore, this design **DOES COMPLY** with the ANSI/ASHRAE/IES Standard 90.1-2013 ECB compliance methodology.
 Individual certifying authenticity of the data provided in this analysis:

Signature _____ Title _____

Integrated Environmental Solutions

Compliance Forms | Energy Cost Budget Method

IES INTEGRATED ENVIRONMENTAL SOLUTIONS

Energy Cost Budget (ECB) 2013 Compliance Report Page 2 of 2

Project Name: Florida Solar Energy Center
 Contact Person: Joe Bloggs Email: Joe.Bloggs@IBC.com Telephone: (321) 638-1410

Energy Results

End Use	Energy Type	Proposed Building		Budget Building		Proposed Budget Energy (%)
		Energy (kBtu/yr)	Peak (kBtu/h)	Energy (kBtu/yr)	Peak (kBtu/h)	
Lighting - conditioned	Electricity	2,505,895.4	891.0	3,023,653.2	943.4	17.1%
Lighting - unconditioned	Electricity	4,173.4	0.9	8,183.2	1.7	49.0%
Space Heating	Gas	996,090.5	1,065.5	985,221.0	3,018.2	29.0%
Space Cooling	Electricity	2,775,427.7	1,515.5	4,450,286.7	2,637.1	37.6%
Heat Rejection	Electricity	197,603.7	176.6	947,164.7	397.3	79.1%
Pumps	Electricity	49,096.7	32.1	347,046.0	282.0	85.9%
Fans Interior	Electricity	868,597.2	294.8	1,824,962.0	996.2	54.9%
Receptacle Equipment	Electricity	65,961.4	23.6	95,961.5	23.6	0.0%
Office Equipment	Electricity	6,892,521.8	2,122.7	6,554,428.8	2,122.7	-8.2%
Elevators Escalators	Electricity	105,763.3	34.1	105,763.3	34.1	0.0%
Total building consumption		14,164,851.2		18,408,410.3		23.1%

Energy and Cost Summary by Fuel Type

End Use	Proposed Building		Budget Building		Proposed/Budget	
	Energy (kBtu/yr)	Cost (\$/yr)	Energy (kBtu/yr)	Cost (\$/yr)	Energy (%)	Cost (%)
Electricity	13,468,760.8	2,025,314.1	17,428,189.3	2,814,228.4	22.7%	22.7%
Gas	696,090.5	34,804.5	980,221.0	49,011.0	29.0%	30.0%
Total ex Onsite Generation	14,164,851.2	2,055,118.6	18,408,410.3	2,863,239.4	23.1%	22.9%
Elec Gen PV	-760,537.9	-114,080.7	0	0	0%	0%
Total inc Onsite Generation	13,404,313.2	1,941,037.9	18,408,410.3	2,863,239.4	27.2%	27.1%

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

Notes
 The results are based on 8760 simulated hours
 60 Rooms included in the unmet load hours check

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Figure 1: ASHRAE Prescribed ECB Reports (above) and ASHRAE ECB Reports in IESVE Software (below)

Section C-1 (continued) by Dr. Swami	
Issue/Comment: The report form does not include input fields and results for the following categories	Response: The ASHRAE 90.1 ECB reports are as per the ASHRAE templates. However, there are additional input & output reports available in IESVE Software. In addition, a variety of ASHRAE 90.1 ECB value fields are carried over to the report.
<ol style="list-style-type: none"> 1. Number of Stories: Doesn't appear in the report and missing entry field 2. Builder Name: Doesn't appear in the report and missing entry field 3. Permit Office/Jurisdiction: no or missing entry field 4. FL jurisdiction field and data does not appear to be included as the weather indicator. User has to know which weather file applies to a particular jurisdiction. 	<ol style="list-style-type: none"> 1. The number of stories can appear on the ECB report. Note that a building's number of stories can be interpreted differently, which is why a 3-D model image is presented on some IES input reports. Example of varying interpretation include: <ul style="list-style-type: none"> • Mezzanine-levels at varying heights in tall spaces. • A 3 ½ story atrium adjacent to 2 floors and 3 floors on opposite sites. • Partially above-grade and below-grade floors. 2. The builder name is another value field in the project details where the user has the option to enter designer and/or contractor information. 3. The permit office/jurisdiction is another value whereby the user has the option to enter. 4. The address, city, zip-code and weather file information is provided in the report.

Section C-2 (continued) by Dr. Swami	
Issue/Comment: The following compliance test results are missing or cannot be generated: <ul style="list-style-type: none"> • External lighting Compliance • Lighting controls Compliance • System report Compliance • Water Heating System Compliance • Plant Compliance • Piping System Compliance • Other Required Compliance Compliance Summary for each major category are missing or cannot be generated: <ul style="list-style-type: none"> • Exterior Lighting • Lighting controls • HVAC System • Plant • Water Heating System • Piping System 	Response: The ASHRAE 90.1-2013 Energy Cost Budget Method allows "Trade-Offs", it does not utilize the prescriptive method and does not require compliance reports for individual components. The compliance reports in IESVE software conforms to the requirements of ASHRAE 90.1-2013 Section 11.5.1. Comparison between the proposed design and ECB for peak demand, energy consumption and energy costs are included for various individual energy end-uses: <ul style="list-style-type: none"> • External Lighting • Internal Lighting • Heating • Cooling • Heat Rejection • Pumps • Fans • Receptacle Equipment • Office Equipment • Elevators & Escalators The ECB Checklist report also includes additional information, including MEP & lighting controls, etc.

C-3 (continued) by Dr. Swami	
Issue/Comment: Compliance Certification Box. Check box and signature box for Owner, Builder, registered design professional, and Building Commission Code Official are missing from the compliance report form. Version Number of the software is also missing in the compliance report.	Response: Signature box is included for the Owner, Builder, registered design professional, or Building Commission Code Official on the compliance report form. There is ample space in the report for any additional signatures, stamp, and other officials' information. The software version number is included on multiple input reports and can be added to the ECB compliance report. Examples are shown in Figure 02.

C-4 (continued) by Dr. Swami	
Issue/Comment: Building Input Summary Report No minimum building input summary report is included in the sample compliance report.	Response: IESVE software does provide various building input summary reports for the building, plant, HVAC systems, thermal zones, rooms, building envelop comparison, internal gains comparison, schedules, etc. Some examples are shown in Figure 02.

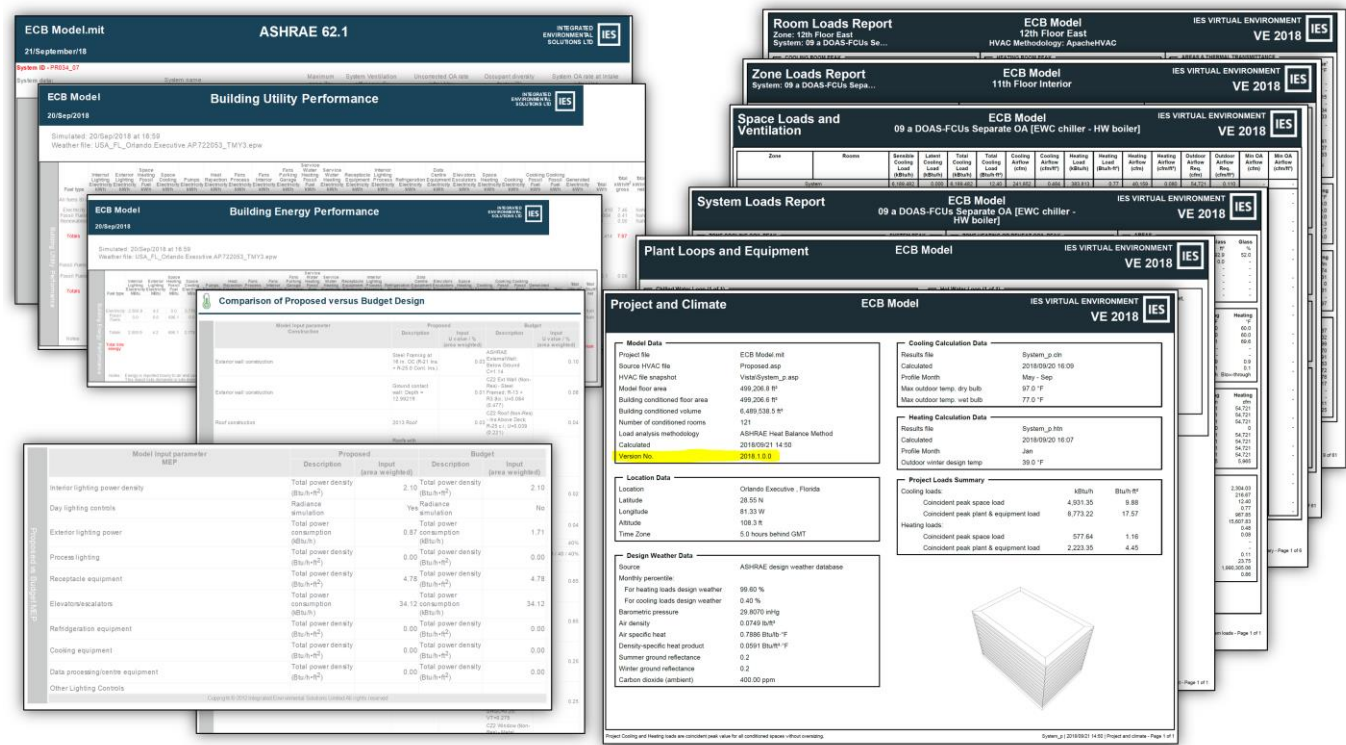


Figure 2: Example Reports from IESVE Software

C-5 (continued) by Dr. Swami	
Issue/Comment: Energy Code Compliance Checklist	Response:
No Energy code compliance checklist is included in the sample compliance report.	<p>IESVE software includes an ECB Compliance Checklist report.</p> <p>IESVE also utilizes an integrated Navigator as a compliance checklist for the ASHRAE 90.1-2013 ECB Method.</p>

C-6 (continued) by Dr. Swami	
Issue/Comment: Baseline Model Creation	Response:
<p>“The program does create the baseline model automatically; however, it also allows users to import the baseline model for editing. Some of the baseline HVAC system input characteristics such as cooling and heating coils capacity, heat recovery Heat Exchanger efficiency and auxiliary power, and fan power and efficiency can be modified by users. One is able to modify the budget building model input assumption and reverse the compliance whole building compliance.”</p>	<p>In IESVE Software, the ASHRAE 90.1 ECB model is indeed created automatically, but this ECB model cannot be ‘imported for editing’. The proposed model and ECB model reside in the same project and they are intrinsically tied to one another.</p> <p>In IESVE Software, the ASHRAE 90.1 ECB model utilizes automated sizing routines for its HVAC systems in accordance with ASHRAE 90.1-2013 ECB Method. Coils, fans and equipment are auto-sized and cannot be edited by users. An example fan dialog from an autosized ECB model is shown in Figure 03. As shown, fan power, efficiency and other autosized data cannot be edited by the user.</p> <p>In rare scenarios, edits may be warranted, but will be flagged as edited. Examples:</p> <ul style="list-style-type: none"> • A large amount of unmet load hours often requires airflow rates and coil capacities to be increased manually. This can only result in <i>increased</i> ECB model energy, which nobody would try to ‘game the system’ by doing so. The Unmet Load Hour check keeps this in check. • New construction project adjoined to an existing/protected structure should be modeled as the existing construction on the ECB model. Note, this will be reported/flagged in the output reports.

Settings

Design flow rate: Autosize cfm **A**

Oversizing factor:

Design total pressure: in water

Fan efficiency at design flow rate: %

Motor efficiency at design flow rate: % **A**

Motor airstream heat pickup factor: %

Design fan power: kW **A**

Electricity meter: Electricity: Meter 1 ▾

Fan category: Interior central ▾

Figure 3: ECB Model Fan Dialog

C-7 (continued) by Dr. Swami	
Issue/Comment: Help Documentation	Response:
Help document is incomplete (sometimes referring to ASHRAE standard 90.1-2010 instead of 2013).	The Help document discovered by Dr. Swami was erroneously forwarding to an outdated document. The same link has since been updated and now reflects the current ASHRAE 90.1 Navigator tools in IESVE Software. There are no references to editing any baseline/budget model. help.iesve.com/ve2018/ecb_guidance_2013.htm