

CBECC-Com

California Building Energy
Code Compliance for
Commercial Buildings

CABEC
2014 Conference

October 10, 2014

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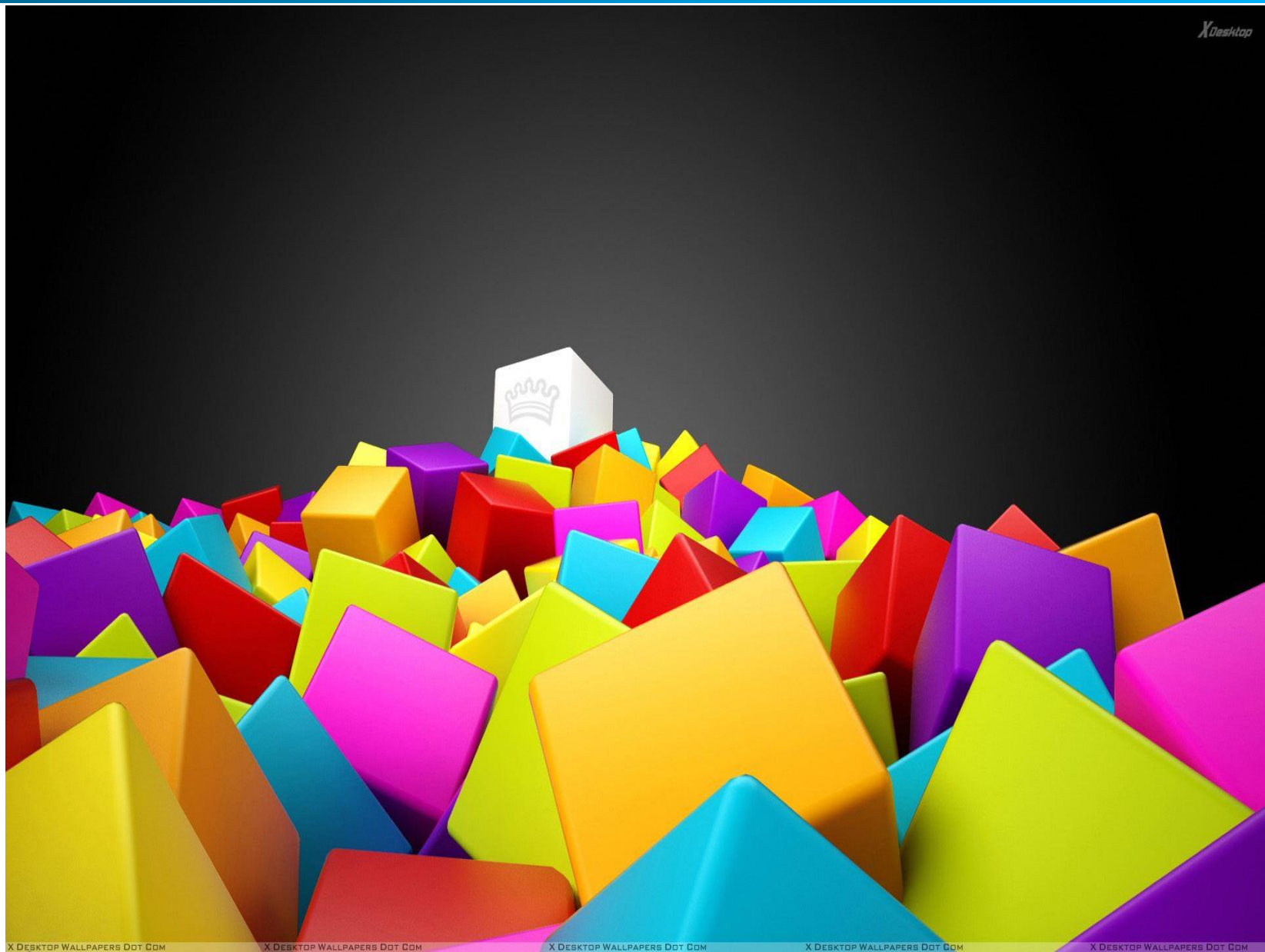
Standards Development Office
Energy Efficiency Division

Presentation Outline

- Background
- Compliance Modeling Workflow
- Under the Hood
- Issues & Opportunities



Background



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Requirements for Public Domain Software

- Software is available to the public for its intended use at no or low cost
- Access to source code for development of derivative works
- Access to all data, logic and code to understand, review and critique the implementation of the performance compliance approach



Constraint of Public Domain Software

Software functionality will always be limited to what can be accomplished with available public resources and other donations



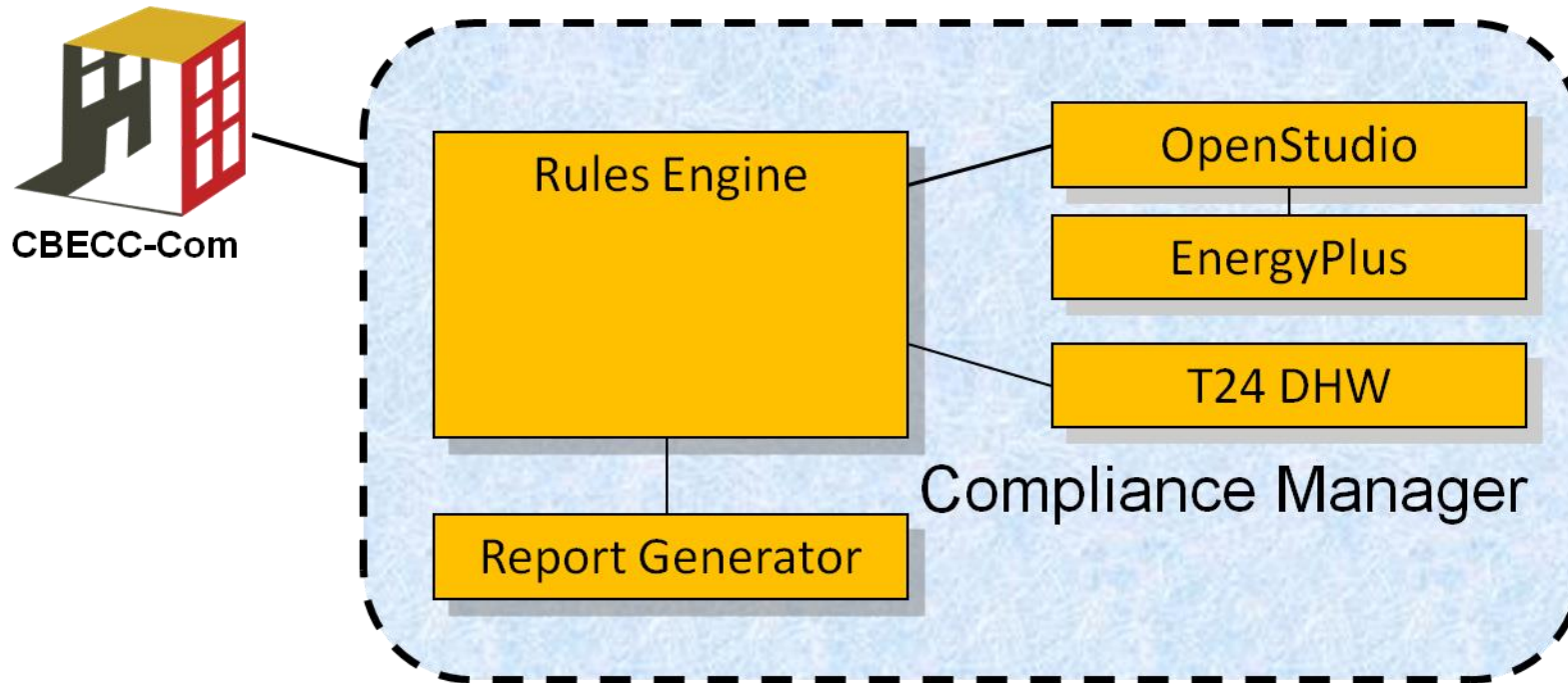
Background

CEC Issues (pre CBECC-Com)

- Limited licenses to distribute proprietary software
- No ability to fix bugs or update software
- Non-competitive contracting
- Few vendor options
- Multiple interpretations of the rules
- Dormancy in building energy simulation software advances
- Zero Net Energy



Background



Compliance Manager software tool library

Nonresidential Compliance Software

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Background

EnergyPlus – energy analysis engine focused on commercial buildings

- Supported by U.S. DOE over last 15 years
- Prioritization of work to facilitate CEC adoption for 2013 Standards
- Includes low energy system modeling:
 - Natural ventilation
 - Displacement ventilation
 - Under floor air distribution systems
 - Evaporative cooling
- Distributed under an open source license

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Background

OpenStudio – building energy analysis software platform using EnergyPlus

- Supported by U.S. DOE via National Renewable Energy Laboratory
- Building energy model translations
- EnergyPlus simulations
- Retrieves results
- Distributed under an open source license



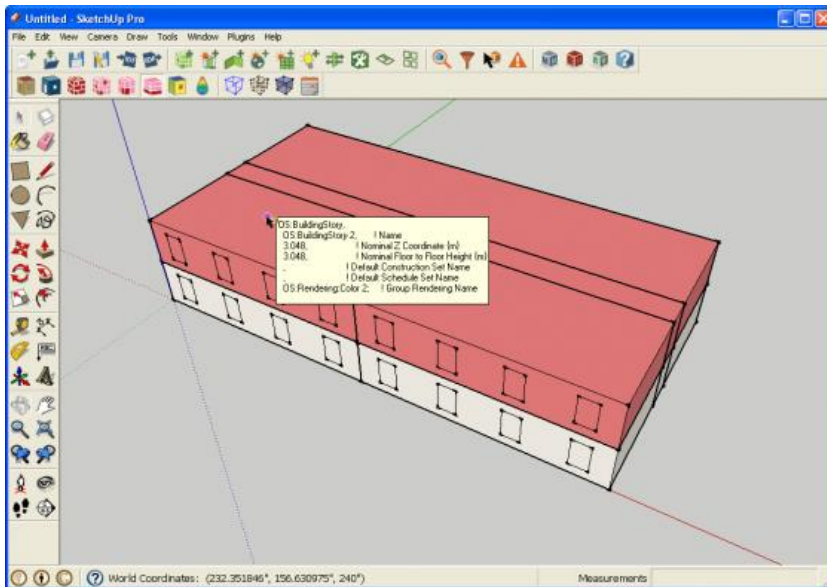
Background

Makes use of Building Information Modeling (BIM) industry standards for electronic data exchange of building geometry

green building XML - “gbXML”

Workflow to describe building:

1. Define Geometry in gbXML compliant tool (e.g. SketchUp)



2. Import building geometry

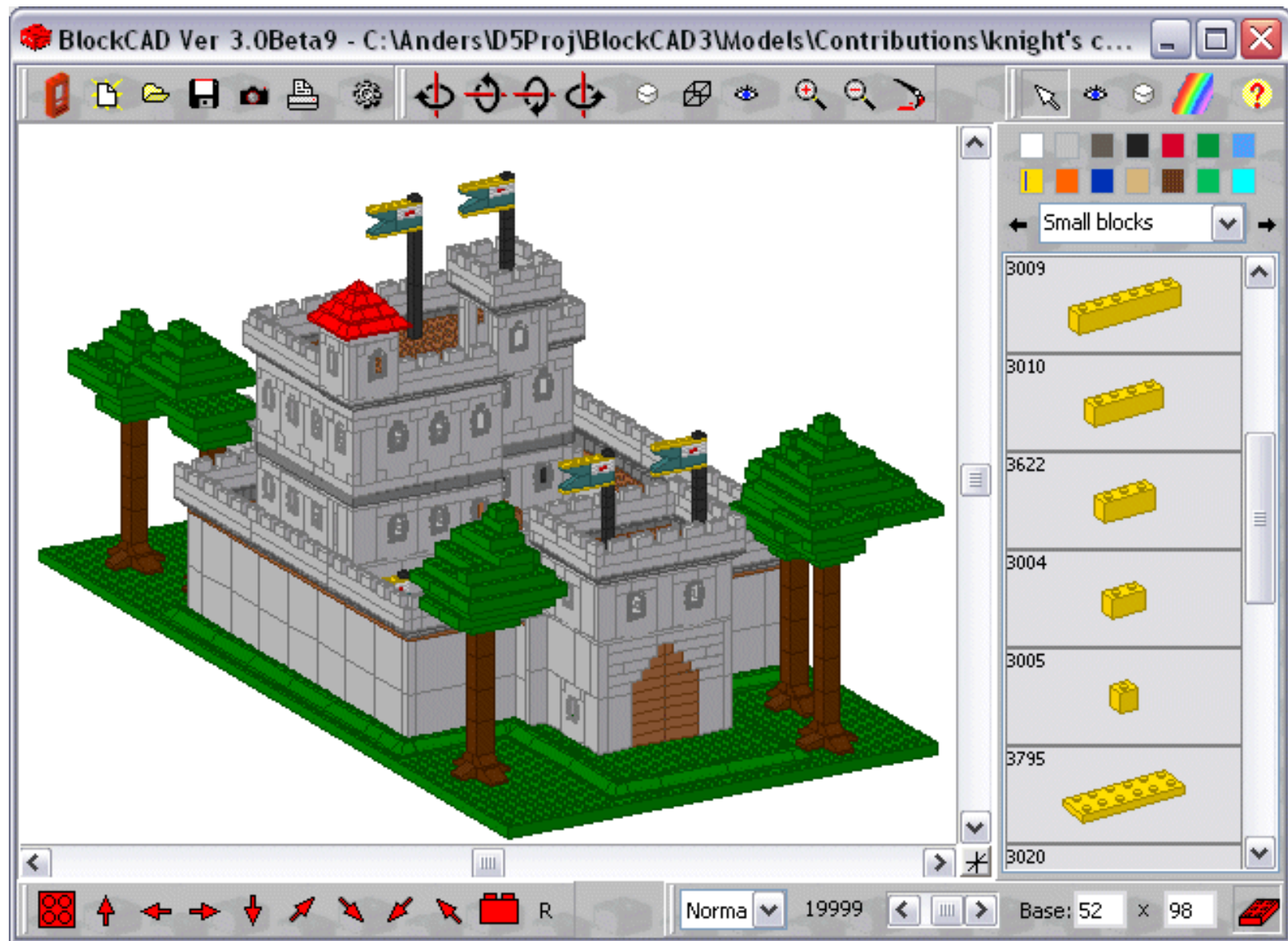


3. Define remaining properties in CBECC-Com (e.g. Lighting, HVAC, DHW)

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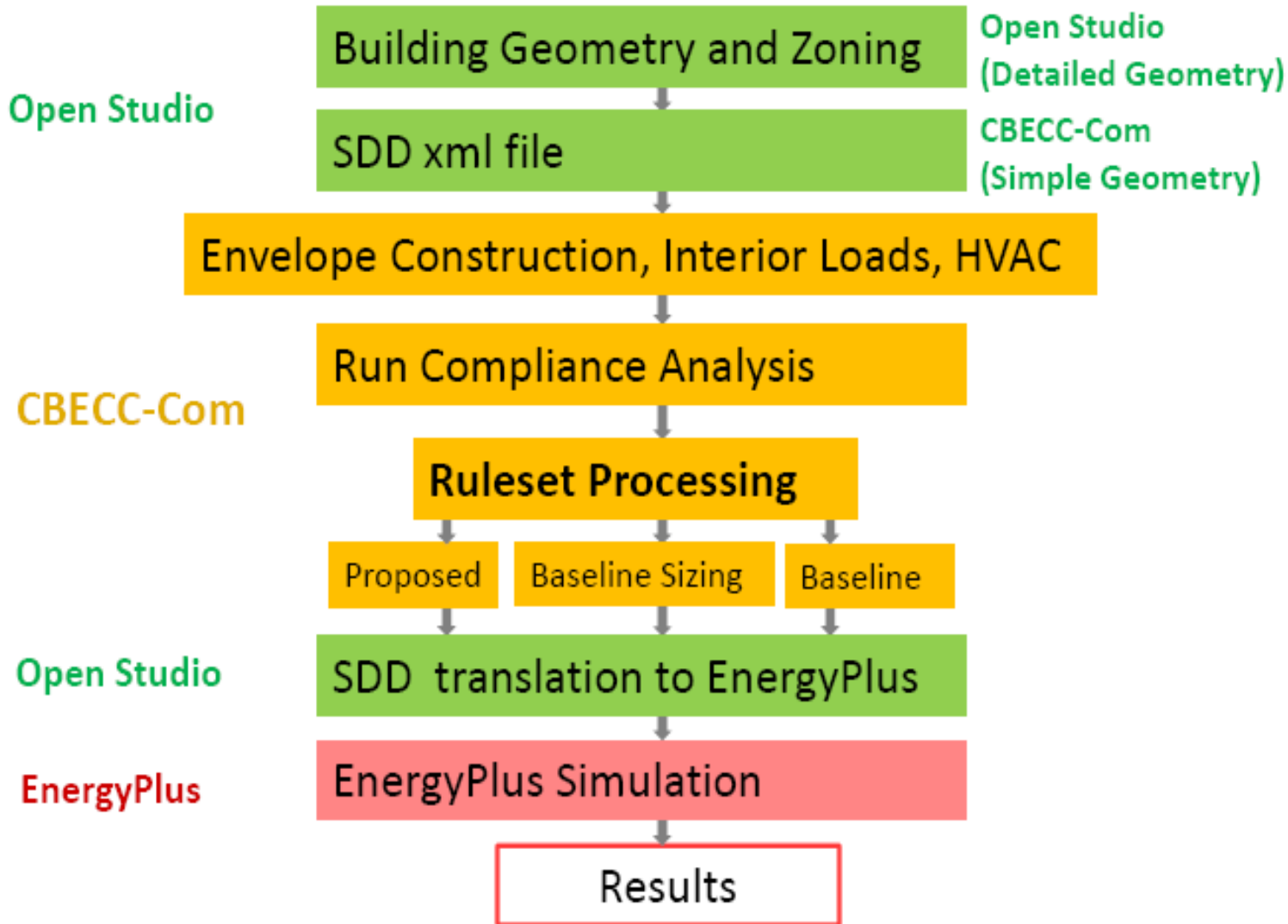
Modeling Workflow



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Modeling Workflow



Modeling Workflow – 3D Geometry

Title 24 2013 Compliance Software: CBECC-Com

**“California Building Energy Code Compliance
for Commercial Buildings”**

**Creating Model Geometry
using the Detailed Geometry Approach**

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Modeling Workflow – 2D Geometry

Title 24 2013 Compliance Software:

CBECC-Com

“California Building Energy Code Compliance
for Commercial Buildings”

**Creating Building Geometry
using the Simplified Geometry Approach**

Required Software: CBECC-Com v3



Modeling Workflow – Constructions

Title 24 2013 Compliance Software: CBECC-Com

“California Building Energy Code Compliance
for Commercial Buildings”

Defining and Assigning Constructions

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Modeling Workflow – Lighting & Loads

Title 24 2013 Compliance Software: CBECC-Com

“California Building Energy Code Compliance
for Commercial Buildings”

Defining Lighting and Internal Loads

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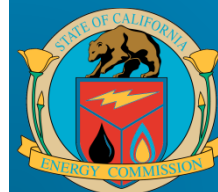


Modeling Workflow – HVAC

Title 24 2013 Compliance Software: CBECC-Com

“California Building Energy Code Compliance
for Commercial Buildings”

Defining Packaged HVAC Systems



Modeling Workflow – Central Plants

Title 24 2013 Compliance Software:

CBECC-Com

“California Building Energy Code Compliance
for Commercial Buildings”

Defining Central Plant Systems

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Modeling Workflow – DHW

Title 24 2013 Compliance Software:

CBECC-Com

“California Building Energy Code Compliance
for Commercial Buildings”

Defining Domestic Hot Water Systems



Modeling Workflow – Analysis

Title 24 2013 Compliance Software:

CBECC-Com

“California Building Energy Code Compliance
for Commercial Buildings”

Perform Analysis – Review Results

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Under the Hood



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Under the Hood: web site

2013 Nonresidential Compliance x

bees.archenergy.com/software.html

CBECC-Com NONRESIDENTIAL COMPLIANCE SOFTWARE

- HOME
- SOFTWARE
- FAQ / TRAINING
- SUBMIT AN ISSUE
- REFERENCE METHOD
- WEATHER & TDV DATA
- ADVISORY COMMITTEE
- ABOUT

CBECC-COM USES ENERGYPLUS v8.0/8.1 TO PERFORM SIMULATIONS AND SKETCHUP (v8.0/Pro) WITH OPENSTUDIO SKETCHUP PLUGIN FOR GEOMETRY INPUT. INSTRUCTIONS AND LINKS FOR DOWNLOADING THE COMPLIANCE SOFTWARE AND THE ASSOCIATED SUPPORTING SOFTWARE ARE LISTED BELOW.

1. DOWNLOAD/INSTALL CBECC-COM

CBECC-Com v3: [Click here to download and install CBECC-Com 2013 v3 \(Build 653\) - Certified by California Energy Commission](#)

New in this version:

- Simulations use EnergyPlus 8.1
- Indirect, direct, and indirect-direct evaporative cooling for use with air systems
- Exhaust fans
- Dedicated outdoor air systems (DOAS) for use with zone systems in nonresidential applications
- Water-source condensers as an option with new 'WSHP' zone system, as well as related dual setpoint control of condenser water loop supply temperature
- Instantaneous water heaters
- Plenum supply and return air flow paths for air systems
- Lighting heat gain factors adjusted for plenum returns
- Lighting heat gain factors adjusted for plenum return vs. non-plenum return configurations Inputs for daylighting modified to include:
 - Installed lighting power in the daylight zone
 - Controlled lighting power in the daylight zone
- Daylighting control minimum dimming light and power fractions prescribed as a function of luminaire type (not user input)
- Daylighting controls are no longer specified by default where they are mandatory. A project level flag enables this functionality, however projects for which daylighting controls have been installed by default cannot be used for compliance
- VAV boxes without reheat coils
- Series fan-powered VAV boxes
- CRAC and CRAH systems for computer rooms
- Solar fraction input added to service hot water systems and recirculating DHW systems
- Special requirements enabled for process spaces (computer rooms, kitchens, laboratories)
- Network drive paths allowed for data and project files (though simultaneous execution using shared network drives not yet supported)
- New Tools menu bar options to view project folder and most recent compliance report
- Ability to change building component parent/child order via new options on the right-mouse button menus in the UI's component tree
- Options to store hourly simulation results and TDV multipliers to CSV file for each analysis model

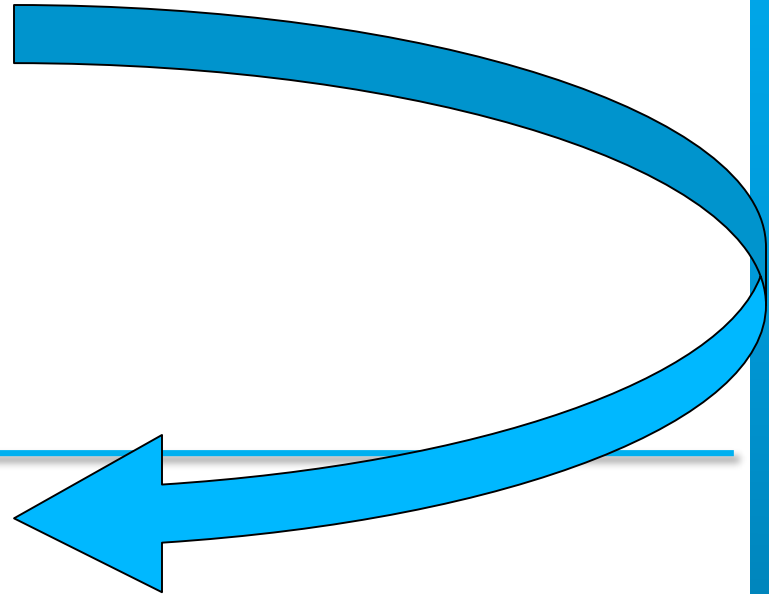
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Under the Hood: reference documents

- CBECC-Com 2013 Data
 - ComplianceForms
 - Documents
 - EPW
 - Rulesets
- CBECC-Com 2013 Projects

 - Documents
 - ACM
 - RulesetSource



Under the Hood: data model files

■ CBECC-Com 2013 Data

■ Documents

■ RulesetSource

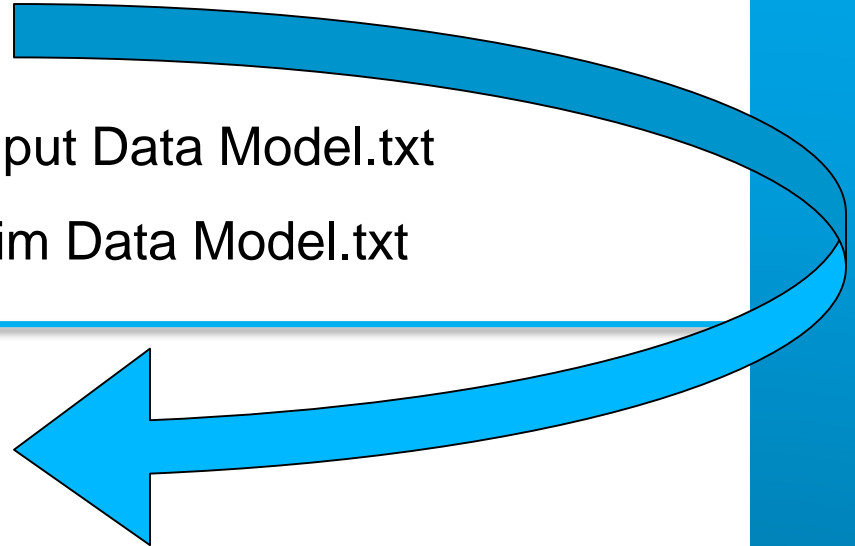
■ CA 2013 Nonres

- CEC 2013 NonRes - Input Data Model.txt
- CEC 2013 NonRes - Sim Data Model.txt

■ CA 2013 Nonres

■ Rules

- CEC 2013 NonRes BEMEnums.txt
- CEC 2013 NonRes BEMBase.txt
- CEC 2013 NonRes Screens.txt



Under the Hood: data model

```

118 ;
119
120
121 ;-----
122 ;           LName           Template      MD  MR  AC  Parent1  P2  P3  P4  P5  P6  P
123 ;-----
124 0,  "Proj",    "Project",      "Project <i>",  1,  0,  0,  "",      "", "", "", "", "", ""
125 ;
126 ;
127 ;           VType      NV  WA  SP      US      UL
128 ;-----
128 ; do not remove these first three entries, as they are referenced by BEMBase source code
129 1,      "Ruleset",      BEMP_Sym,  1,  0,  0,  Pres,  "",
130 1,      "RuleFile",     BEMP_Str,  1,  0,  0,  Pres,  "",
131 1,      "BldgEngyModelVersion", BEMP_Int,  1,  0,  0,  Opt,  "",
132
133 1,      "CreateDate",   BEMP_Int,  1,  0,  0,  Pres,  "",
134 1,      "ModDate",      BEMP_Int,  1,  0,  0,  Pres,  "",
135 1,      "RunDate",      BEMP_Int,  1,  0,  0,  Pres,  "",
136 1,      "RunDateFormatted", BEMP_Str,  1,  0,  0,  Pres,  "",
137
138 1,      "GeometryInpType", BEMP_Sym,  1,  0,  0,  Opt,  "",
139 1,      "SolDistribution", BEMP_Sym,  1,  0,  1,  NInp,  "",
140 1,      "NumTimeStepsPerHr", BEMP_Int,  1,  0,  1,  Opt,  "",
141
142 1,      "PermitScope",   BEMP_Sym,  1,  0,  0,  Req,  "",
143 1,      "PermitMonth",   BEMP_Int,  1,  0,  0,  Req,  "",
144 1,      "PermitDay",     BEMP_Int,  1,  0,  0,  Req,  "",
145 1,      "PermitYear",    BEMP_Int,  1,  0,  0,  Req,  "",
146 ; 1,      "RunYear",     BEMP_Int,  1,  0,  1,  Req,  "",
147 ; 1,      "BldgClassMthd", BEMP_Sym,  1,  0,  0,  Opt,  "",
148 ; 1,      "WhlBldgOcc",   BEMP_Sym,  1,  0,  0,  Opt,  "",
149 1,      "MaxClgUnmetLdHrs", BEMP_Flt,  1,  0,  0,  NInp,  "hrs",
150 1,      "MaxHtgUnmetLdHrs", BEMP_Flt,  1,  0,  0,  NInp,  "hrs",
151
152 ; 1,      "ZipCode",      BEMP_Int,  1,  0,  0,  Req,  "",

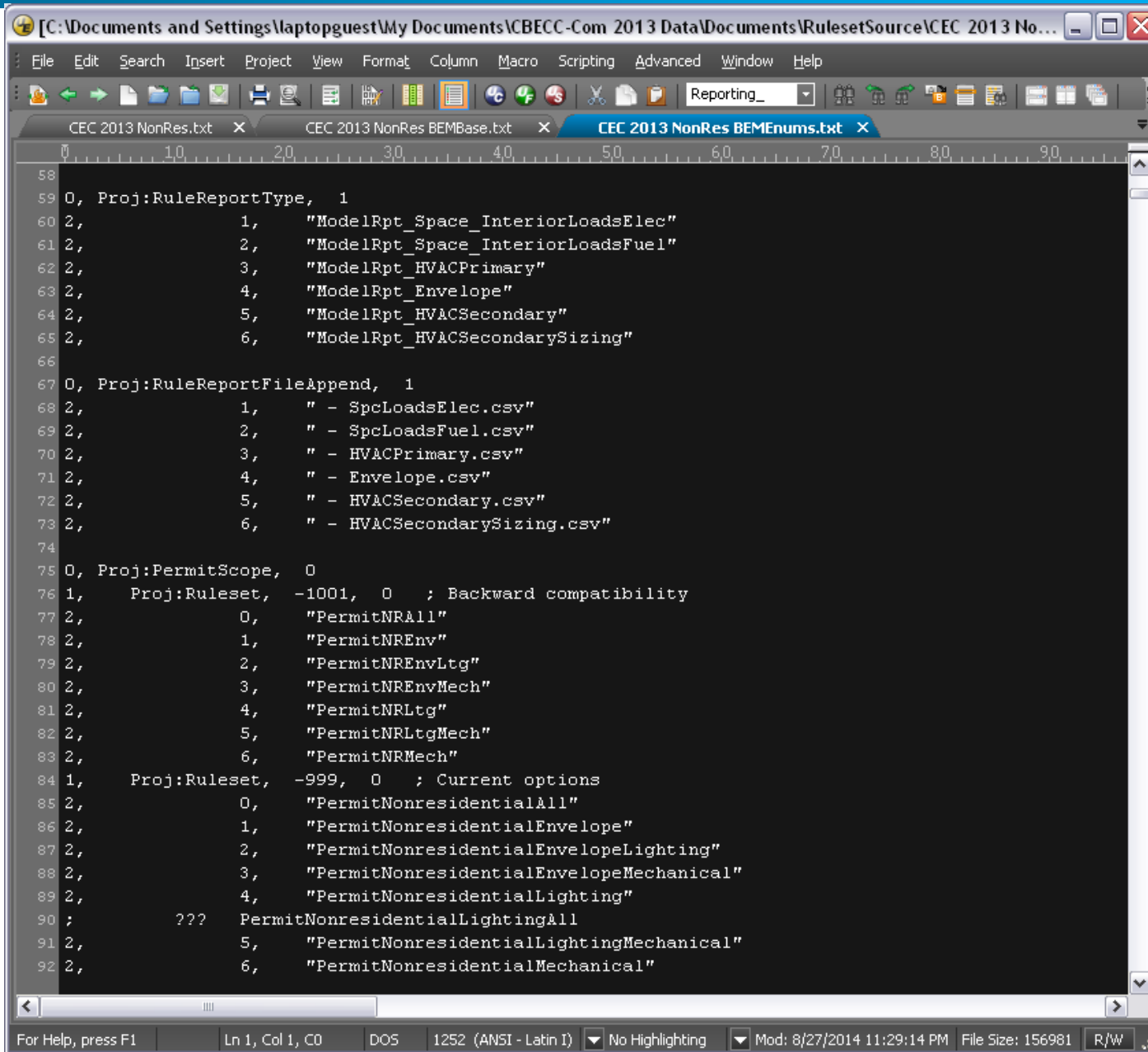
```

For Help, press F1 Ln 1, Col 1, C0 DOS 1252 (ANSI - Latin I) No Highlighting Mod: 9/5/2014 1:45:18 PM File Size: 326802 R/W

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Standards



Under the Hood: enumerations



```
58
59 0, Proj:RuleReportType, 1
60 2, 1, "ModelRpt_Space_InteriorLoadsElec"
61 2, 2, "ModelRpt_Space_InteriorLoadsFuel"
62 2, 3, "ModelRpt_HVACPrimary"
63 2, 4, "ModelRpt_Envelope"
64 2, 5, "ModelRpt_HVACSecondary"
65 2, 6, "ModelRpt_HVACSecondarySizing"
66
67 0, Proj:RuleReportFileAppend, 1
68 2, 1, " - SpcLoadsElec.csv"
69 2, 2, " - SpcLoadsFuel.csv"
70 2, 3, " - HVACPrimary.csv"
71 2, 4, " - Envelope.csv"
72 2, 5, " - HVACSecondary.csv"
73 2, 6, " - HVACSecondarySizing.csv"
74
75 0, Proj:PermitScope, 0
76 1, Proj:Ruleset, -1001, 0 ; Backward compatibility
77 2, 0, "PermitNRAll"
78 2, 1, "PermitNREnv"
79 2, 2, "PermitNREnvLtgt"
80 2, 3, "PermitNREnvMech"
81 2, 4, "PermitNRLtgt"
82 2, 5, "PermitNRLtgtMech"
83 2, 6, "PermitNRMech"
84 1, Proj:Ruleset, -999, 0 ; Current options
85 2, 0, "PermitNonresidentialAll"
86 2, 1, "PermitNonresidentialEnvelope"
87 2, 2, "PermitNonresidentialEnvelopeLighting"
88 2, 3, "PermitNonresidentialEnvelopeMechanical"
89 2, 4, "PermitNonresidentialLighting"
90 ; ??? PermitNonresidentialLightingAll
91 2, 5, "PermitNonresidentialLightingMechanical"
92 2, 6, "PermitNonresidentialMechanical"
```

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Under the Hood: ruleset source files

■ CBECC-Com 2013 Data

■ Documents

■ RulesetSource

■ CA 2013 Nonres

■ Rules

Topic rule lists,
e.g.
Lighting;
Daylighting;
HVAC;
Water Heating

All
referenced
in .txt file

• **CEC 2013 Nonres.txt**

• *.rule

■ Library

• Library_*.rule

e.g.
Schedules;
Constructions;
Baseline HVAC;
Performance
Curves

■ Tables

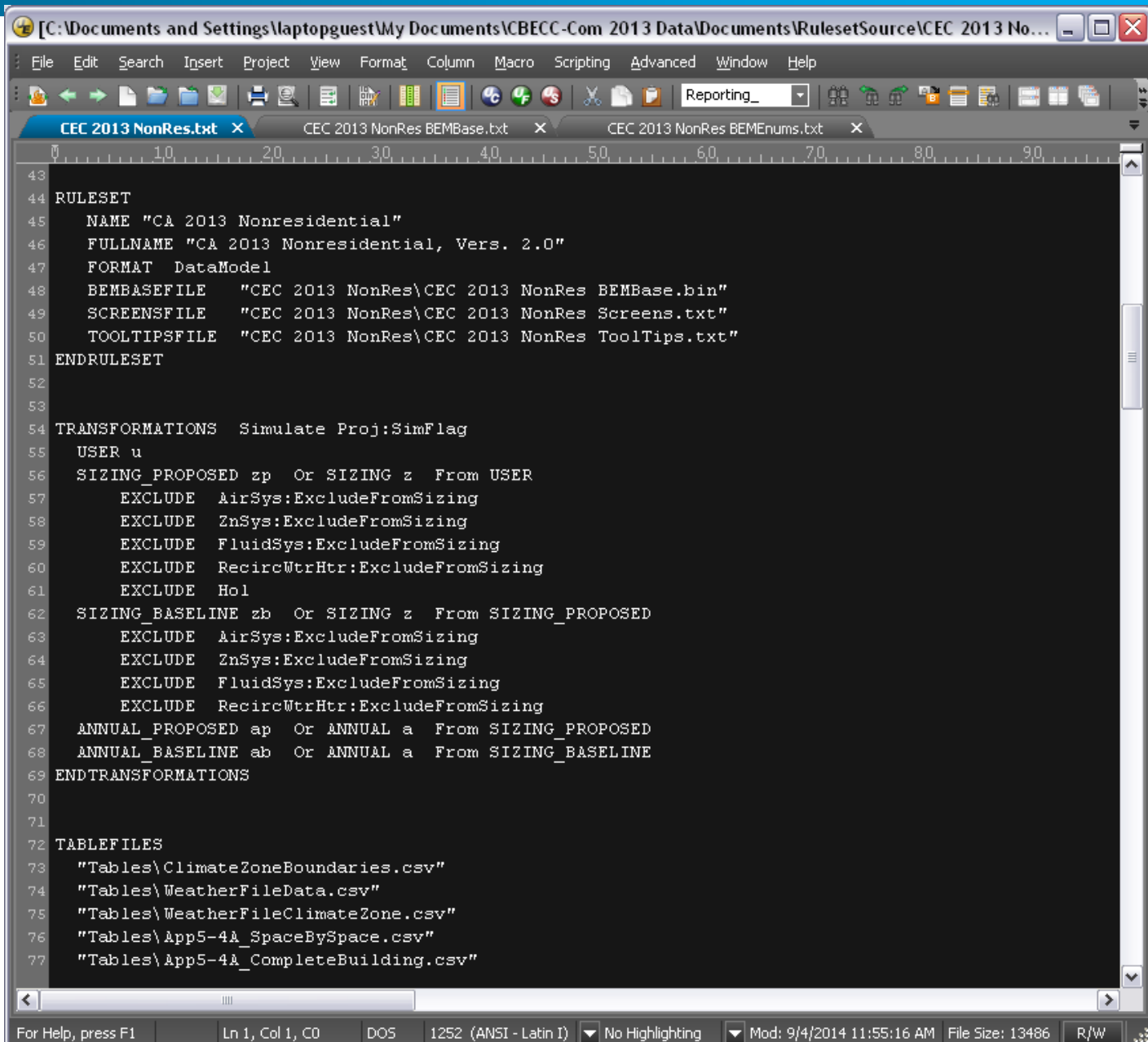
• *.csv

e.g.
Zip code/climate zone/weather
file maps; Default Ufactor/SHGC;
Light Heat Gain Distributions

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Under the Hood: main ruleset file

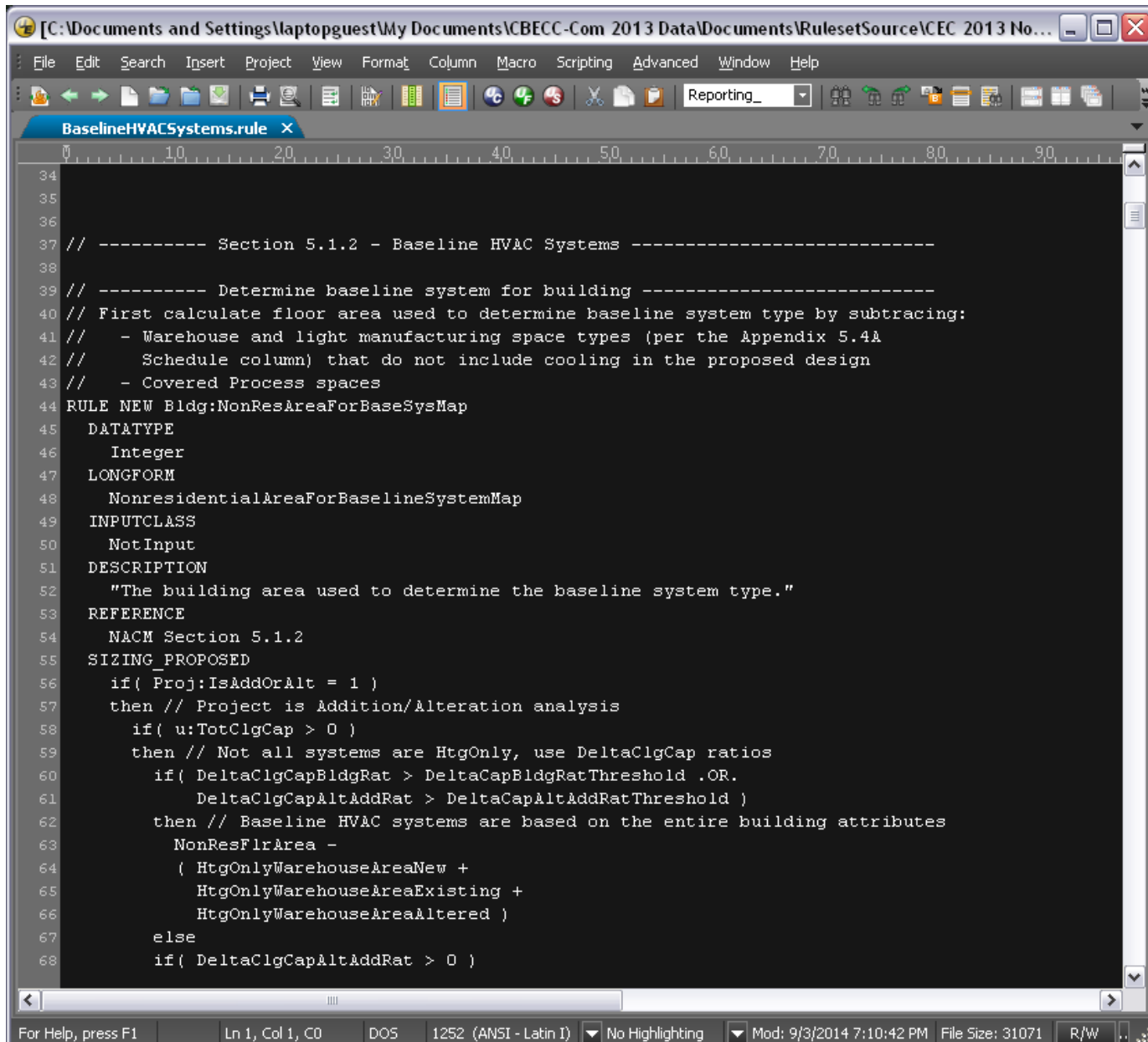


```
43
44 RULESET
45   NAME "CA 2013 Nonresidential"
46   FULLNAME "CA 2013 Nonresidential, Vers. 2.0"
47   FORMAT DataModel
48   BEMBASEFILE "CEC 2013 NonRes\CEC 2013 NonRes BEMBase.bin"
49   SCREENSFILE "CEC 2013 NonRes\CEC 2013 NonRes Screens.txt"
50   TOOLTIPSFILE "CEC 2013 NonRes\CEC 2013 NonRes ToolTips.txt"
51 ENDRULESET
52
53
54 TRANSFORMATIONS Simulate Proj:SimFlag
55   USER u
56   SIZING_PROPOSED zp Or SIZING z From USER
57     EXCLUDE AirSys:ExcludeFromSizing
58     EXCLUDE ZnSys:ExcludeFromSizing
59     EXCLUDE FluidSys:ExcludeFromSizing
60     EXCLUDE RecircWtrHtr:ExcludeFromSizing
61     EXCLUDE Hol
62   SIZING_BASELINE zb Or SIZING z From SIZING_PROPOSED
63     EXCLUDE AirSys:ExcludeFromSizing
64     EXCLUDE ZnSys:ExcludeFromSizing
65     EXCLUDE FluidSys:ExcludeFromSizing
66     EXCLUDE RecircWtrHtr:ExcludeFromSizing
67   ANNUAL_PROPOSED ap Or ANNUAL a From SIZING_PROPOSED
68   ANNUAL_BASELINE ab Or ANNUAL a From SIZING_BASELINE
69 ENDTRANSFORMATIONS
70
71
72 TABLEFILES
73   "Tables\ClimateZoneBoundaries.csv"
74   "Tables\WeatherFileData.csv"
75   "Tables\WeatherFileClimateZone.csv"
76   "Tables\App5-4A_SpaceBySpace.csv"
77   "Tables\App5-4A_CompleteBuilding.csv"
```

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Under the Hood: baseline HVAC rules file



```
34
35
36
37 // ----- Section 5.1.2 - Baseline HVAC Systems -----
38
39 // ----- Determine baseline system for building -----
40 // First calculate floor area used to determine baseline system type by subtracting:
41 //   - Warehouse and light manufacturing space types (per the Appendix 5.4A
42 //     Schedule column) that do not include cooling in the proposed design
43 //   - Covered Process spaces
44 RULE NEW Bldg:NonResAreaForBaseSysMap
45   DATATYPE
46     Integer
47   LONGFORM
48     NonresidentialAreaForBaselineSystemMap
49   INPUTCLASS
50     NotInput
51   DESCRIPTION
52     "The building area used to determine the baseline system type."
53   REFERENCE
54     NACM Section 5.1.2
55   SIZING_PROPOSED
56     if( Proj:IsAddOrAlt = 1 )
57     then // Project is Addition/Alteration analysis
58       if( u:TotClgCap > 0 )
59       then // Not all systems are HtgOnly, use DeltaClgCap ratios
60         if( DeltaClgCapBldgRat > DeltaCapBldgRatThreshold .OR.
61           DeltaClgCapAltAddRat > DeltaCapAltAddRatThreshold )
62         then // Baseline HVAC systems are based on the entire building attributes
63           NonResFlrArea =
64             ( HtgOnlyWarehouseAreaNew +
65               HtgOnlyWarehouseAreaExisting +
66               HtgOnlyWarehouseAreaAltered )
67         else
68           if( DeltaClgCapAltAddRat > 0 )
```

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2013
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Under the Hood: TDV table

TDVbyCZandFuel.csv - Microsoft Excel

	A	B	C	D	E	F	G	H	I	J	K
1			2013 CEC Nonresidential TDV factors by climate zone, fuel and hour								
2			Source:		AEC						
3			Last modified:		SAC - 6/1/13 - updated Res table w/ Nonres values & updated format/structure						
4					Note: Different UNITS here vs. in Res table						
5			1	2	3	4	5	6	7	8	9
6			CZ:	1		CZ:	2		CZ:	3	
7			Elec	NatGas	Propane	Elec	NatGas	Propane	Elec	NatGas	Propane
8			MoDaHr	kTDV/kWh	kTDV/therm	kTDV/therm	kTDV/kWh	kTDV/therm	kTDV/therm	kTDV/kWh	kTDV/therm
9	TABLE TDVbyCZandFuel										
10		MoDaHr	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV	TDV
11		CZ=	1	1	1	2	2	2	3	3	3
12		Fuel=	Elec	NatGas	Propane	Elec	NatGas	Propane	Elec	NatGas	Propane
13		10101	16.13	192.01	438.49	16.07	192.01	438.49	16.08	192.01	438.49
14		10102	15.56	192.01	438.49	15.51	192.01	438.49	15.52	192.01	438.49
15		10103	15.32	192.01	438.49	15.27	192.01	438.49	15.28	192.01	438.49
16		10104	15.21	192.01	438.49	15.16	192.01	438.49	15.17	192.01	438.49
17		10105	15.73	192.01	438.49	15.67	192.01	438.49	15.68	192.01	438.49
18		10106	17.73	192.01	438.49	17.67	192.01	438.49	17.68	192.01	438.49
19		10107	20.09	192.01	438.49	20.04	192.01	438.49	20.05	192.01	438.49
20		10108	20.33	192.01	438.49	20.27	192.01	438.49	20.28	192.01	438.49
21		10109	20.76	192.01	438.49	20.71	192.01	438.49	20.72	192.01	438.49
22		10110	20.26	192.01	438.49	20.2	192.01	438.49	20.21	192.01	438.49
23		10111	20.01	192.01	438.49	19.96	192.01	438.49	19.97	192.01	438.49
24		10112	20.02	192.01	438.49	19.96	192.01	438.49	19.97	192.01	438.49
25		10113	20.13	192.01	438.49	20.07	192.01	438.49	20.08	192.01	438.49
26		10114	20.13	192.01	438.49	20.07	192.01	438.49	20.08	192.01	438.49

Title 24
2013
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Under the Hood: data model & ruleset compiler

Program Files

CBECC-Com 2013

EPlus

T24DHW

- **BEMPCmpl.exe**

Data Model & Ruleset Compiler

Data Model Compiler

Data Model Definitions File: CEC 2013 Nonres BEMBase.txt

Data Model Enumerations File: CEC 2013 Nonres BEMEnums.txt

Compiled Data Model File: CEC 2013 Nonres BEMBase.bin

Compile Data Model

Ruleset Compiler

Primary Ruleset File: CEC 2013 Nonres.txt

Compiled Ruleset File: CEC 2013 Nonres.bin

Ruleset Log/Error File: Rules Log.out

Compile Ruleset

Under the Hood: reference documents

- CBECC-Com 2013 Data
 - ComplianceForms
 - Documents
 - EPW
 - Rulesets
- CBECC-Com 2013 Projects

-
- Rulesets
 - CEC 2013 Nonres

CEC 2013 NonRes Screens.txt

Compiled data model → CEC 2013 NonRes BEMBase.bin

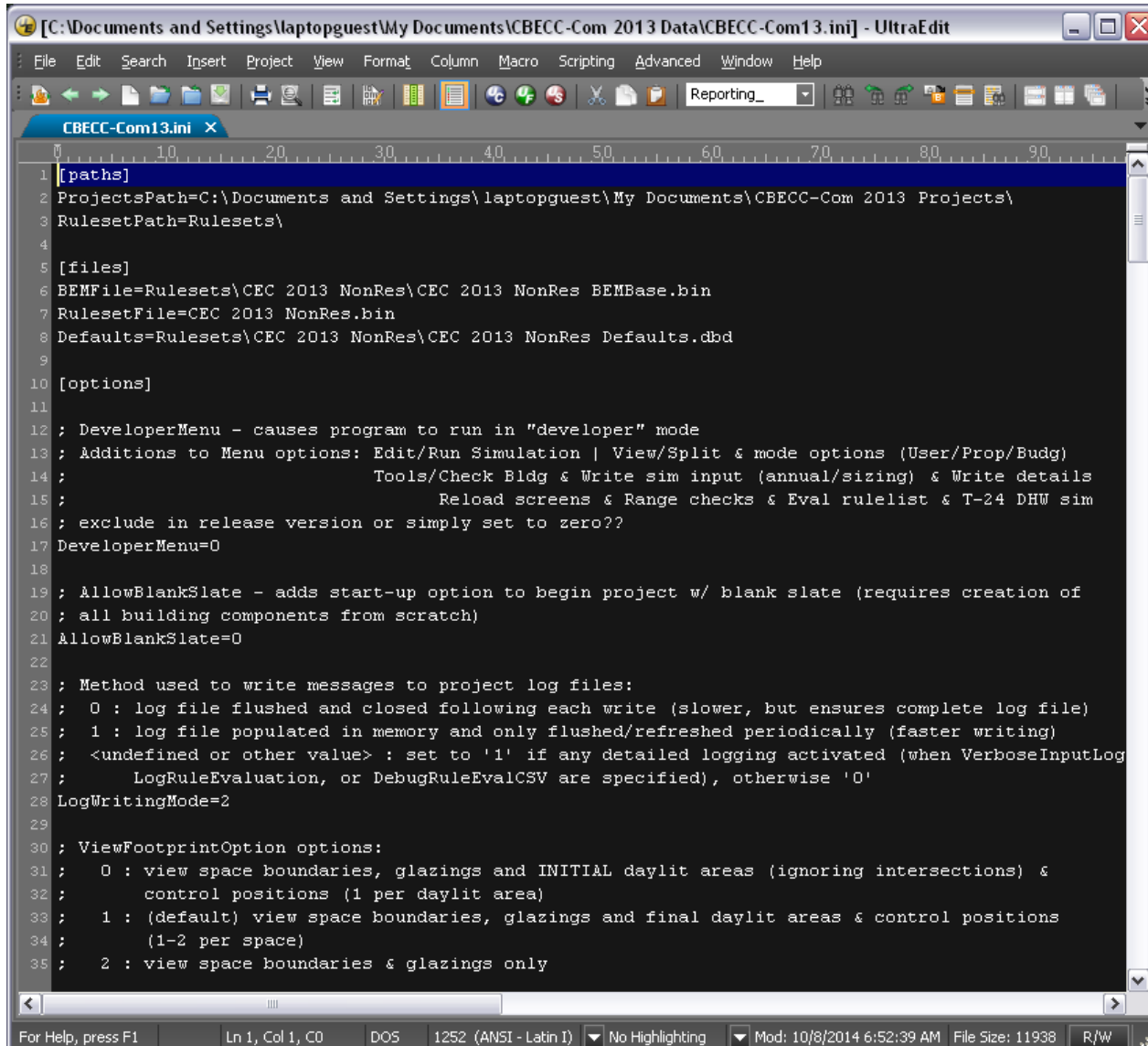
CEC 2013 NonRes.bin ← Compiled ruleset

Title 24
2013
Standards



Under the Hood: CBECC-Com13.ini

CBECC-Com 2013 Data

A screenshot of the UltraEdit text editor showing the CBECC-Com13.ini file. The window title is "[C:\Documents and Settings\laptopguest\My Documents\CBECC-Com 2013 Data\CBECC-Com13.ini] - UltraEdit". The menu bar includes File, Edit, Search, Insert, Project, View, Format, Column, Macro, Scripting, Advanced, Window, and Help. The toolbar shows various editing and file management icons. The file content is as follows:

```
1 [paths]
2 ProjectsPath=C:\Documents and Settings\laptopguest\My Documents\CBECC-Com 2013 Projects\
3 RulesetPath=Rulesets\
4
5 [files]
6 BEMFile=Rulesets\CEC 2013 NonRes\CEC 2013 NonRes BEMBase.bin
7 RulesetFile=CEC 2013 NonRes.bin
8 Defaults=Rulesets\CEC 2013 NonRes\CEC 2013 NonRes Defaults.dbd
9
10 [options]
11
12 ; DeveloperMenu - causes program to run in "developer" mode
13 ; Additions to Menu options: Edit/Run Simulation | View/Split & mode options (User/Prop/Budg)
14 ; Tools/Check Bldg & Write sim input (annual/sizing) & Write details
15 ; Reload screens & Range checks & Eval rulelist & T-24 DHW sim
16 ; exclude in release version or simply set to zero??
17 DeveloperMenu=0
18
19 ; AllowBlankSlate - adds start-up option to begin project w/ blank slate (requires creation of
20 ; all building components from scratch)
21 AllowBlankSlate=0
22
23 ; Method used to write messages to project log files:
24 ; 0 : log file flushed and closed following each write (slower, but ensures complete log file)
25 ; 1 : log file populated in memory and only flushed/refreshed periodically (faster writing)
26 ; <undefined or other value> : set to '1' if any detailed logging activated (when VerboseInputLog
27 ; LogRuleEvaluation, or DebugRuleEvalCSV are specified), otherwise '0'
28 LogWritingMode=2
29
30 ; ViewFootprintOption options:
31 ; 0 : view space boundaries, glazings and INITIAL daylight areas (ignoring intersections) &
32 ; control positions (1 per daylight area)
33 ; 1 : (default) view space boundaries, glazings and final daylight areas & control positions
34 ; (1-2 per space)
35 ; 2 : view space boundaries & glazings only
```

The status bar at the bottom shows: For Help, press F1; Ln 1, Col 1, C0; DOS; 1252 (ANSI - Latin I); No Highlighting; Mod: 10/8/2014 6:52:39 AM; File Size: 11938; R/W.

Title 24
2013
Standards



Under the Hood: projects folder

CBECC-Com 2013 Projects

Samples

Standard Tests

Other Tests

*.cibd

*.log

*- AnalysisResults.xml

- AnalysisResults-BEES.xml

020012-OffSml-CECStd – run

zp, ap, zb, ab - *.csv

envelope, space loads, HVAC

zp, ap, zb, ab - *.xml

complete building model

Under the Hood: AnalysisResults.xml

The screenshot shows a software application window with a menu bar (File, Edit, Search, Insert, Project, View, Format, Column, Macro, Scripting, Advanced, Window, Help) and a toolbar. The main window displays an XML file named "020012-OffSml-CECStd - AnalysisResults.xml". The XML content is as follows:

```

1 <?xml version="1.0" encoding="UTF-8"?>
2 <SDDXML xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/
3   <RulesetFilename file="CEC 2013 NonRes.bin"/>
4   <Model Name="User Input">
5     <Proj>
6       <Name>020012-OffSml-CECStd</Name>
7       <BldgEngyModelVersion>7</BldgEngyModelVersion>
8       <CreateDate>1409988510</CreateDate>
9       <ModDate>1409988510</ModDate>
10      <RunDate>1409988511</RunDate>
11      <ZipCode>95814</ZipCode>
12      <DDWeatherFile>D:/AEC Ruleset/branches/CBECC-Com13-BZ/Data/EPW/SACRAMENTO-EXECUTIVE_724830
13      <AnnualWeatherFile>D:/AEC Ruleset/branches/CBECC-Com13-BZ/Data/EPW/SACRAMENTO-EXECUTIVE_72
14      <ExcpctCondNoClgSys>No</ExcpctCondNoClgSys>
15      <ExcpctCondRtdCap>No</ExcpctCondRtdCap>
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26      <MatRef index="1">Compliance Insulation R13.99</MatRef>
27      <MatRef index="2">Air - Metal Wall Framing - 16 or 24 in. OC</MatRef>
28      <MatRef index="3">Gypsum Board - 1/2 in.</MatRef>
29    </ConsAssm>
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The status bar at the bottom of the window displays the following information: "For Help, press F1", "Ln 1, Col 1, CO", "UNIX UTF-8", "XML", "Mod: 10/10/2014 6:30:58 AM", "File Size: 2346122", "R/W", and "INS".

Title 24 2013 Standards



Under the Hood: *.csv

Title 24
2013
Standards



Issues & Opportunities



Title 24
2013
Standards



Issues & Opportunities

Compliance Analysis Run Time

- Adding option to use reduced calendar (# of weeks) for design parametrics
- Must still complete annual simulation for compliance certificate w/o watermark (once)
- No CEC guarantee that reduced run periods will match annual compliance results
- Available in November 2014 release



Issues & Opportunities

Compliance Forms

- Working to reduce the bulk of prescriptive forms needed to supplement PERF-1
- Utility ACE team working with building departments, energy consultants, CEC to re-design PERF-1
- January 2015 – PERF-1 produced by CBECC-Com will stand alone – no additional prescriptive forms will be needed



Issues & Opportunities

HVAC Sizing

- 2013 Nonres ACM Manual specifies that HVAC sizes must be specified for the Proposed Design
- Energy consultants must work with mechanical designers to obtain these equipment specifications
- PERF-1 will not be generated if proposed HVAC equipment does not meet the calculated loads
- CBECC-Com includes the ability to specify in the PERF-1 if it is necessary to model equipment that will not be installed



Issues & Opportunities

Shading

- 2D Geometry version of CBECC-Com currently does not include modeling of shading
- Some options to gain credit for shading will be added in early 2015



A photograph of several yellow poppies with dark green stems and buds, set against a clear blue sky with soft, out-of-focus clouds. The flowers are in various stages of bloom, with one prominently in the foreground.

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