QUICK START GUIDE
FOR *CBECC-RES 2019*

Quick Start Guide Topics Menu

WHAT'S NEW

If you are an experienced user of CBECC-Res 2016, you need to understand these changes to use CBECC-Res 2019 effectively:

1. CBECC-Res 2019 will only produce analyses and compliance documents for the 2019 *Building Energy Efficiency Standards* (standards) which are effective 1/1/20. Continue using CBECC-Res 2016 for projects covered by the 2016 standards.

2. CBECC-Res support email address is changed to cbecc.res@energy.ca.gov. Please include your *.ribd19 file (if possible), or mention if your question pertains to 2019 standards.

3. CBECC-Res 2019 input files are named <filename>.ribd19. It is highly recommended that you use a 2019 example file (see section 2.2 of the CBECC-Res user manual for a list of available files). If that is not possible, to convert a CBECC-Res 2016 input file see below. You will be directed to save the file with an .ribd19 extension. Save the file to your 2019 projects folder (if you did not previously copy the file to the 2019 folder.

4. Projects that complied under the 2016 standards will generally need to have additional efficiency measures to comply. See Section 1.3 of the CBECC-Res 2019 User Manual for a more complete list of what is new and different.

OVERVIEW

The California Building Energy Code Compliance 2019 residential standards compliance software (*CBECC-Res 2019.1.0)* is a software program developed by the California Energy Commission for complying with the 2019 standards.

This Quick Start Guide provides brief descriptions of the program's major features. It does not replace the need to review the CBECC-Res user manual or complete the self-guided tutorial in Chapter 3 (the user manual is opened by selecting Help from the main menu and selecting User Manual).

Frequently Asked Questions that can be downloaded from either the Energy Commission's 2019 website or the CBECC-Res project website at www.bwilcox.com/BEES/BEES.html.

SOME NOTES ABOUT THIS VERSION

1. Do not install this version over the top of your working versions of CBECC-Res 2016 or 2019. Use a different directory for the 2019 draft software.

2. It includes 28 different example files.

3. It will only perform 2019 calculations.

4. Input files generated in earlier 2016 and 2019 versions of CBECC-Res can be imported, but they must be converted iand saved as *.ribd19 files. The .ribd19 files cannot then be opened in earlier versions of CBECC-Res.

CONVERT AN INPUT FILE

5. Copy the file from the 2016 (or older) project folder and paste it in the 2019 folder.

6. Open CBECC-Res 2019, choose "open an existing file." In the field adjacent to the file name select the file type desired (2016, 2013). The default setting is a general Res Project Files (*.ribd19), or you can limit it to one of the options shown in Figure 1-3.

7. Open the file.

8. The program will provide a warning (it looks like an error) that you are opening a 2016 file. Respond OK and it will then prompt you to save it as a 2019 file.
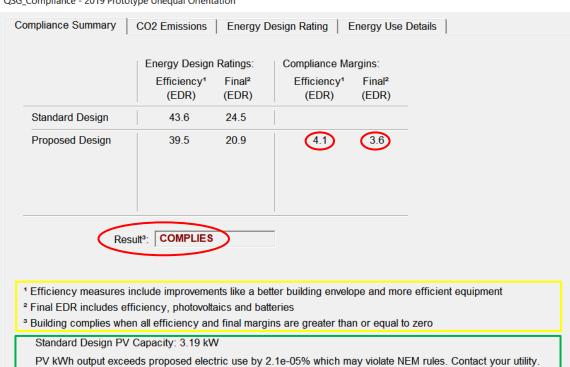
ENERGY DESIGN RATING (EDR)

CBECC-Res 2019 uses an energy design rating (EDR) metric to demonstrate compliance with the Standards. EDR uses a 2006 IECC-compliant building as the reference building. A building that just complies with the IECC home performance level has an EDR score of 100; a zero net energy (ZNE) home has an EDR score of zero. The lower the EDR, the better the building performs. The California version of the EDR uses TDV as the metric for energy.

The EDR is embedded into CBECC-Res and has two parts:

1. An "Efficiency EDR" for energy efficiency features of the building
2. A "Final EDR" that combines the Efficiency EDR and credit for PV with demand flexibility

For a building to comply, two criteria are required: (1) the proposed Efficiency EDR must be equal to or smaller than the Efficiency EDR of the standard design, and (2) the proposed Final EDR must be equal to or less than the Final Standard Design EDR target. This concept allows the user to specify more energy efficiency features and less PV and still comply, as long as the Efficiency and Final EDR scores meet or exceed their targets.

QSG_Compliance - 2019 Prototype Unequal Orientation

| Compliance Summary | CO2 Emissions | Energy Design Rating | Energy Use Details |

	Energy Design Ratings:		Compliance Margins:	
	Efficiency[1] (EDR)	Final[2] (EDR)	Efficiency[1] (EDR)	Final[2] (EDR)
Standard Design	43.6	24.5		
Proposed Design	39.5	20.9	4.1	3.6

Result[3]: **COMPLIES**

[1] Efficiency measures include improvements like a better building envelope and more efficient equipment
[2] Final EDR includes efficiency, photovoltaics and batteries
[3] Building complies when all efficiency and final margins are greater than or equal to zero

Standard Design PV Capacity: 3.19 kW
PV kWh output exceeds proposed electric use by 2.1e-05% which may violate NEM rules. Contact your utility.
PV System resized to 3.11 kWdc (a factor of 0.155) to achieve 'Maximum PV for Compliance Credit' PV scaling

The compliance summary (example above) is available in CBECC-Res following an analysis. It compares the Efficiency and Final EDRs and shows whether the Proposed Design complies or not. For compliance, BOTH EDR compliance margins must be 0 or greater as highlighted in red. The text in the yellow box describes some key details about the ratings, and the text in green highlights details about the PV system used in the run. More details are shown in the Energy Design Rating and Energy Use Details tabs.

The software also allows the user to claim significant Final EDR credit for demand flexibility measures. PV and demand flexibility measures do not affect the Efficiency EDR. Precooling as a demand response measure is available in this release and demand response heat pump water heaters are under development. These strategies are useful for buildings trying to achieve low EDR scores approaching full zero net energy (ZNE), which may be required as part of local ordinances.

BATTERY

CBECC-Res awards EDR credit for a battery storage system that is coupled with a PV array. The specified battery storage size must be 5 kWh or larger.

There are three control options available for batteries:

- **Basic**. Battery charges whenever there is excess PV. Battery discharges to meet house load when PV does not cover it. Battery only meets house loads and does not put power into grid.

- **Time of Use**. Battery charges whenever there is excess PV. During peak summer months (July-September) start discharging at the beginning of the peak period (that varies with climate zone) at maximum rate until fully discharged. Other months run with basic control. Battery will put power into grid after meeting house load if discharge rate allows it.

- **Advanced DR Control**. During peak summer months control knows that it is going to be a peak day and what the peak hours will be. On a peak day, use all PV to charge the battery until it is full. Discharge at maximum rate during highest TDV hours. Otherwise run with basic control. Battery will put power into grid after meeting house load if discharge rate allows it.
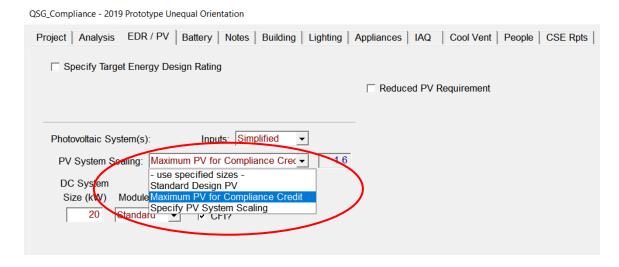
SELF-UTILIZATION CREDIT

The software now has a checkbox that allows the user to get an efficiency credit for the installation of a battery.

PV SIZING LIMIT

For Part 6 compliance, the Proposed Design EDR credit is limited to a PV size that nets out the proposed site annual kWh when there is no battery. When there is a battery, the software will allow oversizing of the Part 6 PV system by a factor of 1.6, if a battery system of at least 5 kWh is coupled with the PV system.

Bypassing the PV Size Limit. In some climate zones it may be difficult to reach full ZNE (EDR score of zero) with a PV system that is within the 1.6 sizing factor discussed above. For this reason, on the battery tab, the software includes a check box called "Allow Excess PV Generation EDR Credit for above code programs," which allows the user the bypass the 1.6 size limit. Once this box is checked, the user can enter any size PV and get full EDR credit for it. NOTE: Choosing this option may violate Net Energy Metering (NEM) sizing rules. If this option is chosen, users are advised to contact the local utility to ensure compliance with the PV sizing rules.

To enable the software to calculate the proposed PV that matches the PV size limit without requiring the user to guess the answer and rerun the software, the software now supports inputs that allow PV scaling.

There are three scaling options:

Maximum PV for Compliance Credit. This is likely the most useful choice where the software sizes the PV to match the PV Size Limit described above. Without a battery, this size is equal to a system that generates the proposed site kWh. With a battery, this size is equal to a system that generates 1.6 times the proposed site kWh.

Use Specified Size. This input is useful when the size of the PV system has already been designed and has a known size.

Standard Design PV and Specify PV System Scaling. These are less useful scaling choices that were used in the design of the software. The Standard Design PV sets the PV size equal to the same size as the Standard Design PV. The Specify PV System Scaling allows the user to specify the scaling at a multiple of the proposed site kWh.
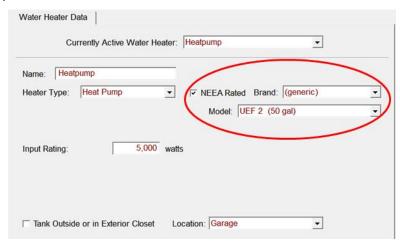
TARGET EDR

The Target EDR tool may be used when a user has a specific Final EDR target in mind and wants to know what size PV is needed to reach that EDR; the "Specify Target EDR Score" checkbox is displayed on the EDR/PV input tab. The software will calculate the required PV size based on the energy efficiency measures, demand flexibility features, and the specified target EDR. The resulting PV size is displayed on the top of the "Energy Use Detail" results tab.

Note that this feature must be used carefully and only when a PV size calculation is needed for a given EDR score; the box should remain unchecked at all other times. Leaving this box checked will increase the runtime.

ELECTRIC STANDARD WATER HEATING

When there is an electric or heat pump water heater in the proposed building, the Standard Design is now a generic heat pump water heater with a 2.0 UEF, basic compact distribution, and shower drain heat recovery dependent on the climate zone. When a building is all electric, the Standard Design is now all electric. This is available at this time for systems serving individual dwelling units or multiple units if there is no recirculation system.

HOW TO GET SUPPORT OR REPORT A PROBLEM

If you have questions about the software or run into a problem, there a number of resources where you can find help:

- This Quick Start Guide
- The CBECC-Res FAQ document
- The User's Manual available through the software's Help menu and the Program Files directory.

For a question not covered by one of these documents, or if you think CBECC-Res is not operating correctly, send an email to CBECC-Res support <cbecc.res@energy.ca.gov> and we will answer your question as soon as possible.

If reporting a CBECC-Res crash or error, please include as much of the following as possible (copy and paste this template into your email):

CBECC-Res version (Help: About): CBECC-Res 2019._._ (???)

Describe the error using as much detail as possible.

List the steps taken to produce the error, using as much detail as possible.

1.
2. etc.

If there is an error message, what is the message? If possible, use the snipping tool or take a screenshot of the error message and include in your email.

Attach your <ProjectName>.ribd19 file. This is the file you open and save from inside CBECC-Res. By default, this file is located in the C:\Users\<your username>\My Documents\CBECC-Res- 2019 projects directory.

We appreciate your willingness to help us improve CBECC-Res by taking the extra time to document and report issues in a way that will help us fix them quickly. If you include your name and phone number, we may call you to clarify the problem or ask for more details. We will not share your name, phone number, files or email address with anyone outside the CBECC-Res development team or use it for any purpose other than responding to your report.

You may also report problems with the CF1R. These reporting problems can sometimes be quickly fixed without requiring an update to the CBECC-Res program.

UPDATES AND PROJECT WEBSITE

Updates to CBECC-Res will be posted to the project website: www.bwilcox.com/BEES/BEES.html.
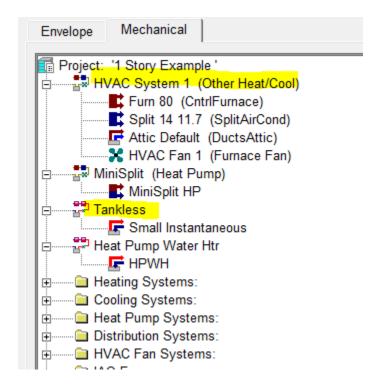
TOOL BAR

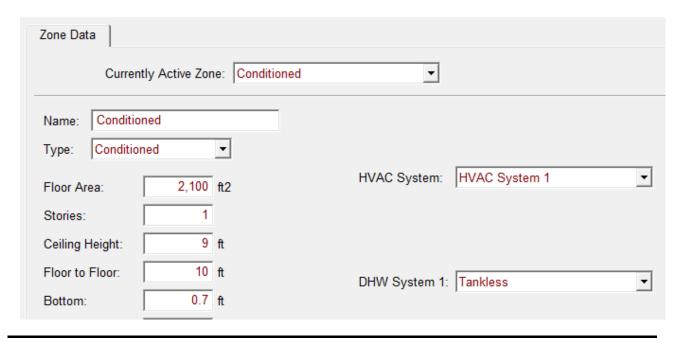See User Manual Section 2.3

MAIN SCREEN

There are three places where various inputs are entered. On the main screen (double click on project row) data about the building such as address, project scope, number of bedrooms, IAQ ventilation, whole house fan is entered.

There are also two folder tabs at the top of the main screen—Envelope and Mechanical. These tabs provide different views of the building description and provide access to two different subsets of the building description data.

NOTE: Values listed on the mechanical tab are only included in the building input file if the component is listed in the appropriate field. For example, this input file has two HVAC systems, and two water heating options.

The system used in the building when the analysis is calculated, is the system specified in the zone data. This building will be calculated with the gas furnace/split system air conditioner, and a tankless water heater, not the mini-split heat pump or the heat pump water heater.

NAVIGATING/RIGHT-CLICK MENU OPTIONS

See the User Manual for more navigating options:

- Right-click menu options (Section 2.7).
- Rapid editing using the tree control (Section 2.7.3).
- Navigating without a mouse (Section 2.8).

BUILDING TREE CONTROLS (PARENT/CHILD RELATIONSHIPS)

In order to analyze a building's energy use, it is necessary to track relationships among building components. *CBECC-Res 2019* displays these relationships using the familiar tree control, found in Windows™ Explorer and many other applications. For example, under the Envelope tab, exterior walls are shown as parents to windows (windows are connected to exterior walls and appear underneath walls) and children to spaces. The tree controls vary in the components they display depending on which folder tab is currently selected.

INPUT DIALOG WINDOWS

The attributes of each building component can be edited by opening the input dialog window for the component. The dialog can be opened by double-clicking on the component on the tree control, using the *Edit* option on the right mouse menu, or using the *Edit Component* option on the *Edit* menu. (The tree control does not appear until you have created a project description using the wizard or loaded an existing project file [Ctrl+O]).

In keeping with good practice for use of any software, we recommend that you save your building description often and revise the file name once you have substantial effort invested in editing the description under the current file name.

Files that are not completely defined will not run without error.

INPUT UNITS

The input screen shows the units for numerical inputs. For example, furnace AFUE is a % such as 80, not a fraction. If you get results that are off by significant amounts, check your units.

DEFINING NEW COMPONENTS

There are two main ways to define new components (e.g., walls or equipment) in the main program interface.

Define a New Physical Component

To define a new physical component, follow these steps from the Main Program Screen:

- Right-click on the component on the tree control to which you want to add the new component.
- Select *Create*, then the type of object you want to add. (Only applicable component types will appear on the list.)
- Accept the default name, parent, and existing component to copy from or edit these fields and click OK.
- Edit the input fields with white backgrounds to describe the new component, then click OK.

DELETING PROJECT FILES

CBECC stores a significant amount of data that is typically not needed. For file management tips see Section 2.1.3 of the user manual.

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