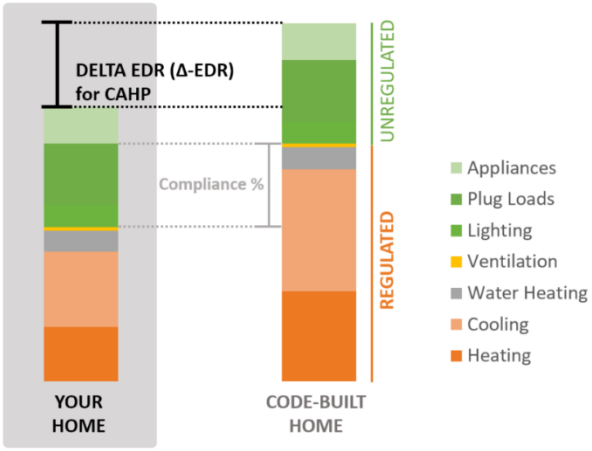
2019-CODE
ENERGY DESIGN RATING FACT SHEET

A NEW WAY OF CALCULATING CODE COMPLIANCE



The 2019 residential energy code (2019-Code) will use a new energy efficiency metric to gauge code compliance: the Energy Design Rating (EDR) will replace compliance percent. Each metric accomplishes a similar task – determining if a proposed-home uses less energy than a prescriptive-home of the same size and in the same climate zone. The difference between compliance percent and EDR is simply the mathematical construct used behind the scenes in the modeling software and the inclusion of all energy end uses within EDR. CAHP participants may be familiar with the EDR already as it's being used for program compliance with the 2016-Code program.

The primary differences between the two metrics are as follows:

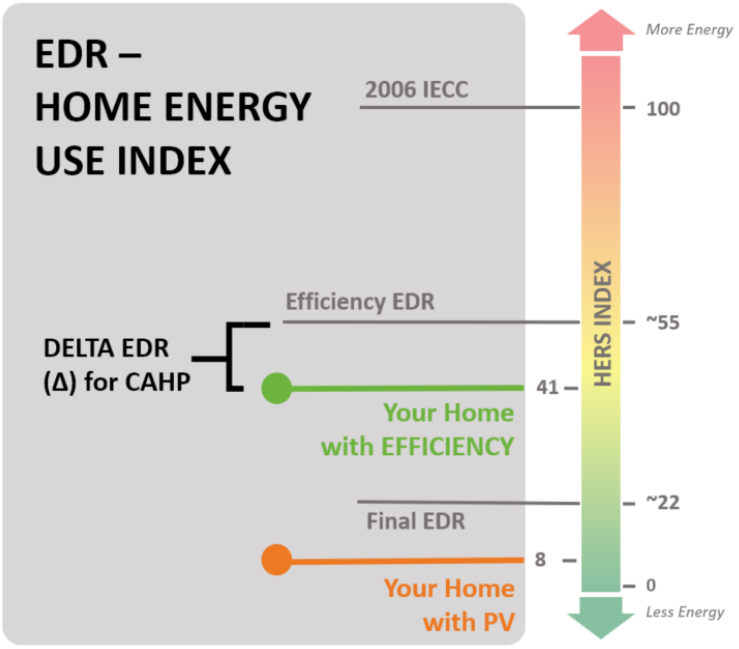
2019 Code	Compliance Percent
EDR is an energy-use index, similar to the national RESNET HERS index, expressed on a scale that goes from 0 (a zero-TDV home) to 100 (a 2006 IECC code home). A lower EDR is better. The EDR is similar to the RESNET-HERS index, including the baseline reference building used to define a rating of 100.	Compliance percent is the margin of energy use between the *proposed* home and the *standard* prescriptive home, expressed as a percent of the prescriptive home's energy use. A higher compliance percent is better.
The 2019-Code requires that a user meet both an efficiency-only EDR target (Efficiency EDR) and an efficiency plus photovoltaic and batteries target (Final EDR), thus separating efficiency from onsite generation and load shifting[1].	Title 24 energy codes to-date mandate a positive compliance percent to meet code. Compliance percent in the 2016-Code allows a PV credit, when certain conditions are met, in support of meeting the efficiency target.
The EDR considers all energy loads; both regulated (heating, cooling, domestic hot water, ventilation) and unregulated (lighting, plug loads and appliances).	Compliance percent only considers the regulated energy loads of cooling, heating, domestic hot water, and ventilation.

CALCULATING THE EDR IN 2016-CODE SOFTWARE:

Calculations for the EDR are currently available in CBECC-Res 2016 and EnergyPro 7. Instructions to activate and surface the EDR calculations can be found here. And Delta-EDR, the difference between a proposed home's EDR and the prescriptive-home EDR, is the basis for eligibility with the California Advanced Homes Program's 2016-Code offering.

However, it's critical to note that the EDR when calculated using 2016-Code software uses 2016-Code TDV multipliers and modeling algorithms. It can't be used to determine 2019-Code compliance or to predict what the EDR of a home will be under 2019-Code calculations. For those, a user must test the home using 2019-Code CBECC-Res beta software. See this CAHP factsheet for instructions on 2019-code beta software setup and testing. The 2019-Code beta software (CBECC-Res 2019) calculates the EDR automatically, as the primary demonstration of code compliance.

TWO-LIMITS: 2019 CODE COMPLIANCE USING THE EDR



The 2019-Code separates compliance into two stages. First – the home's energy efficiency features must be sufficient to meet the Efficiency-EDR limit, without the help of PV or battery storage[1]. Second – the home's total energy use - after PV and batteries are included - must meet the Final-EDR limit. A home must meet, or come below, both limits - which means that excess energy efficiency may be used for the Final-EDR, reducing PV-sizing needs, but the opposite is not true – oversized PV panels cannot be used to meet the Efficiency-EDR.

The Efficiency-EDR and Final-EDR limits of the *Standard* prescriptive home are each calculated from the *Proposed* home. They therefore vary by climate zone, home dimensions, and equipment choices. As a general guideline – most homes will have an Efficiency EDR limit from 45 to 60 and a Final EDR limit from 15 to 30. In the example above - the home's *Standard* Efficiency EDR is 55 and the *Standard* Final EDR is 22.

WHERE DID THOSE TWO LIMITS COME FROM?

The *Standard* Efficiency-EDR is derived in a very similar way as the code-*Standard* for compliance-percent was derived in prior code cycles. The software takes the *Proposed* home's size, dimensions, and other features (such as the fuel choice for heating) – and translates those into a version of the same home that adheres to prescriptive-code energy efficiency requirements following the rules described in the code's Alternative Calculation Method reference manual. This is deemed the *Standard* home and results from a modeling simulation are compared to those from the *Proposed* home.

The *Standard* Final-EDR represents the remaining energy the *Standard* home will use after solar PV is accounted for. The software calculates the kWh load of the *Standard* home from all loads that traditionally use kWh in a mixed-fuel house. This includes space cooling, ventilation, the fan-power associated with gas-furnace heating (but not the gas-use itself), lighting, appliances, and plug loads. It then converts that kWh to TDV and indexes that amount of TDV generation against the EDR index for that home. That value is deemed the *EDR of Standard Design PV* and represents the energy the panel will produce, expressed in terms of EDR points. The software will also calculate and display the size of PV panel (expressed in nominal kW-DC power) needed to produce that much energy. This is a helpful reference to estimate if the home will have enough roof space for that PV system, or if the home needs additional energy efficiency features or a home battery to offset PV panel sizing.

[1] As of the printing of this document, there is conflicting information on whether the battery credit (also known as the flexiblity credit, the grid-harmonization credit, or the self-utilization credit) can be used in support of meeting the Efficiency-EDR limit, or if it too is only permited to support meeting the Final-EDR. A future fact sheet from CAHP will help explain the details of the battery credit – including the necessary conditions to take the credit, anticipated verification requirements, battery control scheme options, and the impact to both Efficiency EDR and Final EDR compliance calculations.