

## DOCKETED

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C A L I F O R N I A   E N E R G Y   C O M M I S S I O N

# 2016 Energy Design Ratings: Background

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2016 Residential ACM Reference Manual & Software  
Sacramento, CA  
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## What is an EDR?

Proposed Design / Reference Design \* 100

- Units in numerator and denominator are kTDV/sf-yr
- Whole building energy use is used:
  - Space heating & cooling
  - Ventilation
  - Water heating
  - Lighting
  - Appliances
  - Plug loads
  - PV



## High Level Objectives for 2016 EDR

- EDRs should be consistent with HERS Whole House asset ratings for existing buildings
- EDRs should better align with national HERS (RESNET)
- EDRs should be calculated using CBECC software



## EDRs & HERS Whole House

- CEC plans to update HERS Whole House regulations
- HERS Whole House updates will be consistent with changes for 2016 EDRs
- HERS Whole House update will also aim to reduce the costs & increase the quality of existing building asset ratings



## EDRs & RESNET HERS

- CEC & RESNET have been collaborating for the last year to find areas where rating alignments can happen
- CA HERS Whole House & EDR modifications resulting from this collaboration:
  - Efficiency level of Reference Design: IECC 2006, as interpreted by RESNET
  - Normalization of electricity vs. gas equipment in Reference Design



## EDR Reference Design - Envelope

- Walls: 2x4 R13 (CZ 2-15); 2x6 R19 (CZ 1&16)
- Roof/Ceilings: R30 (CZ 2-15); R38 (CZ 1&16); No radiant barriers or cool roofs.
- Floors: 2x10 R19 (CZ 2-15); 2x10 R30 (CZ 1&16)
- Slab Edges: R10 insulation 24 inches deep (CZ 1&16)
- Insulation Installation Quality: QII is modeled as “Improved”
- Air infiltration Rate: 7.2 ACH50
- Windows: 0.65 U-factor (CZ 2-15), 0.35 U-factor (CZ 1&16); 0.4 SHGC (All)



## EDR Reference Design - HVAC

- Equipment Efficiency: Follows NAECA requirements in effect in 2006. Generally 0.78% AFUE for gas central furnace, 13 SEER for central AC, 7.7 HSPF for heat pump heating
- Cooling airflow & fan power: 300 CFM/ton, 0.8 W/cfm
- Duct R-value & leakage: R8; 20%
- Thermostat Setpoint Schedules: Constant @ 68 deg F - heating & 78 deg F - cooling





## EDR Reference Design - DHW

- 0.59 Energy Factor for 40 gallon gas storage
- 0.92 Energy Factor for 40 gallon electric resistance storage

### - Appliances & Plug loads

- Energy use and internal gains for appliance and miscellaneous plug loads are modeled as specified the ANSI/RESNET/ICC 301-2014 Standard



## Normalization of gas & electric equipment energy costs in Reference Design

Space Heating, Space Cooling, **Water Heating** and **Appliance** end use TDV energy totals of PROPOSED DESIGN are modified as follows:

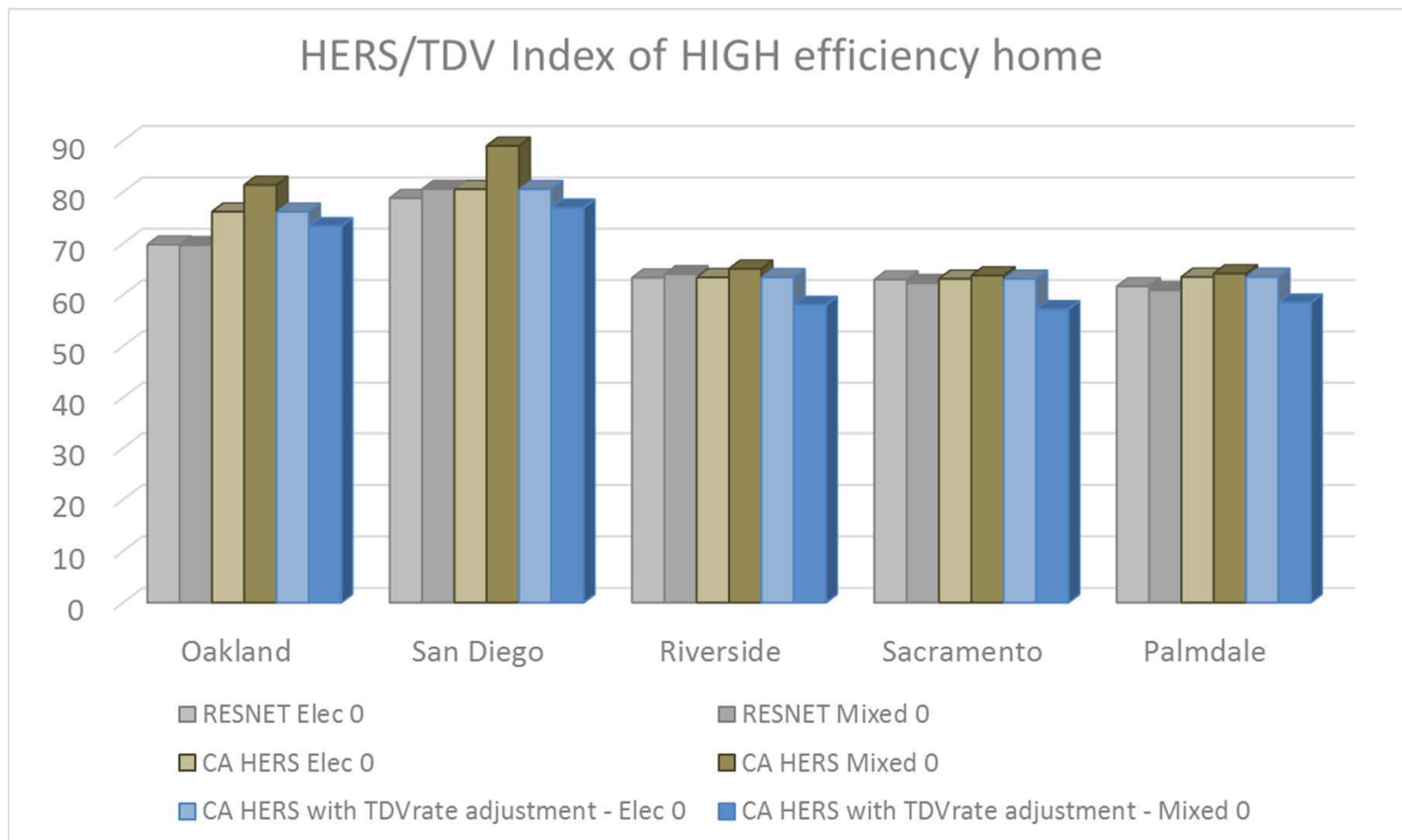
TDV prop, **end use**, gas (final) =

$$\text{TDV prop, end use, gas} * \frac{\text{TDV ref, end use, gas}}{\text{TDV ref, end use, elec}}$$

Revised Equation - Original slide had the numerator and denominator reversed.



## Impact of EDR adjustment to normalize for fuel type in Reference Design





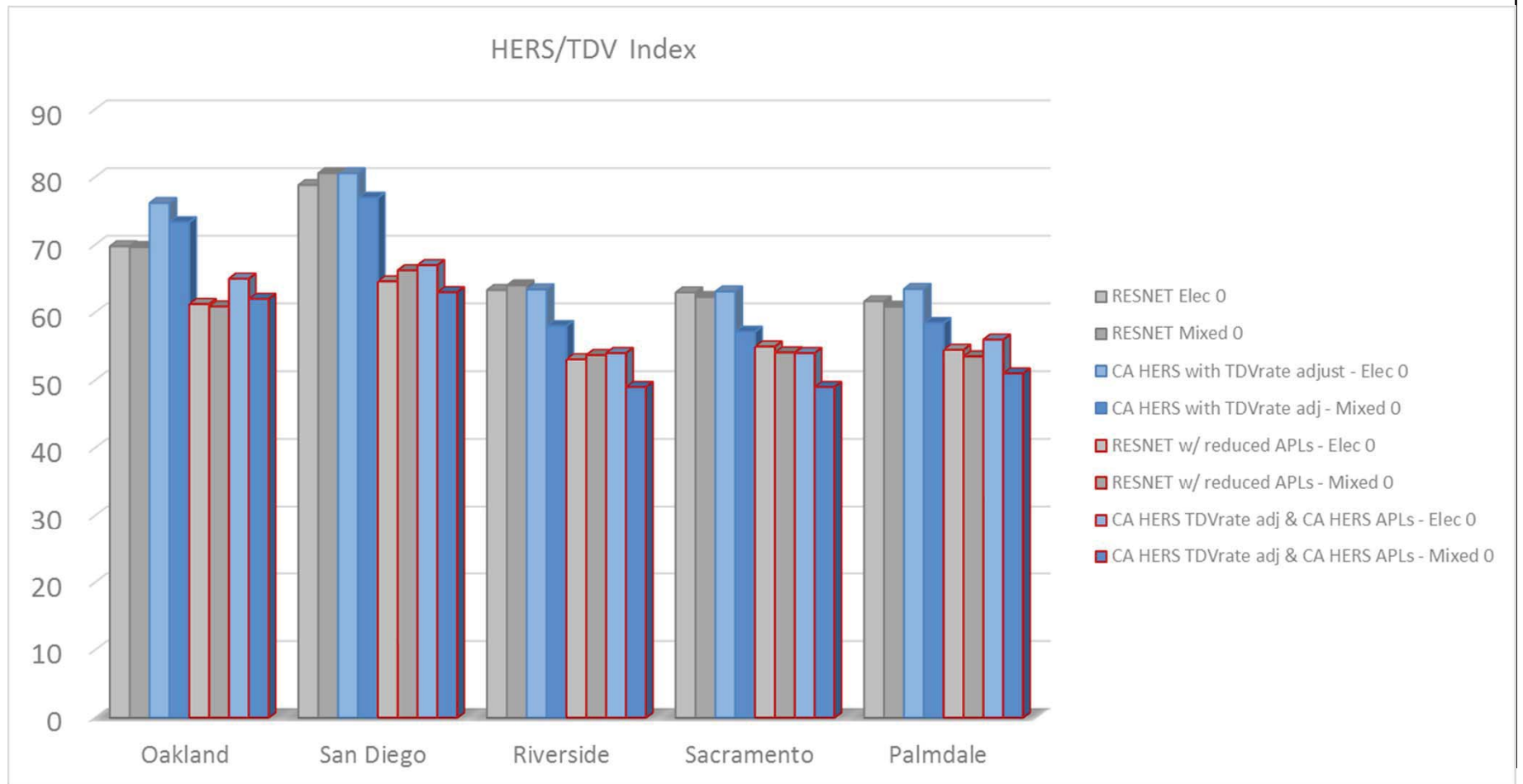
## EDR – Proposed Design assumptions

- Thermostat Setpoint Schedules:
  - Constant @ 68 deg F for Heat Pump heating
  - Setback from 68 deg F to 65 deg F for Gas Furnace heating
  - Setback from 78 deg F to 83 deg F for Air Conditioning
- Appliance & Plug Load energy use & internal gains: using CASE team updates discussed this morning



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# Example of EDRs with CA APLs





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## Discussion