

**DOCKETED**

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<b>Document Title:</b>	Presentation - Residential Metrics and Measure Analysis
<b>Description:</b>	Updated version of a presentation originally presented at the March 2020 Staff Workshop on Compliance Metrics.
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# Residential Metrics and Measure Analysis

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# Agenda

- EDRs and 2022 CBECC-Res Performance Compliance
- Example comparison and prototype house for calculations
- Alternative 2022 Metrics
- Comparison of Alternative Metrics
  - Total TDV for a Mixed Fuel home
  - Total EDR2 for a Mixed Fuel home
  - Total TDV for an All Electric home
  - Total EDR2 for an All Electric home
  - CH4 (methane) leakage impact on measure savings for Mixed Fuel home
- Efficiency EDR2 Measure Savings using the 2022 Metric
  - Mixed Fuel
  - All Electric
- Flexibility Measure Total EDR2 Savings using Alternative Metrics
  - Savings for Increasing PV in an All Electric Home
  - Savings for adding a Battery in an All Electric Home
- Questions

# EDR (Energy Design Rating) in CBEC-Res

- Reported for the both Proposed and Standard Designs
  - Proposed Design is the building seeking a building permit
  - Standard Design is a version of that building which minimally meets the California Prescriptive Standards
- Calculated as the ratio of Energy Use of the Proposed or Standard Design to the Reference Design
  - Reference Design is a version of the Proposed Design that minimally meets the 2006 IECC (International Energy Conservation Code)

# CBEECC-Res 2022 Compliance

- One New EDR1 Criteria added
  - EDR1 is calculated in Hourly Source Energy
- Two 2019 Compliance Criteria remain as
  - EDR2 Efficiency – includes envelope, HVAC, DHW
  - EDR2 Total - adds PV, battery, demand response
- Proposed EDR < Standard EDR for All THREE Compliance Criteria to Pass
  - No tradeoffs between EDR1 and EDR2
  - Limited tradeoffs between EDR2 Efficiency and EDR2 Total

# 2022 CBECC-Res Compliance Summary

Complies if ALL three Compliance Margins are greater than or equal to 0

	Energy Design Ratings:			Compliance Margins:		
	Source (EDR1)	Efficiency <sup>1</sup> (EDR2)	Total <sup>2</sup> (EDR2)	Source (EDR1)	Efficiency <sup>1</sup> (EDR2)	Total <sup>2</sup> (EDR2)
Standard Design	46.6	49.8	33.5			
Proposed Design	44.9	47.7	31.3	1.7	2.1	2.2

Result<sup>3</sup>: **COMPLIES**

<sup>1</sup> Efficiency measures include improvements like a better building envelope and more efficient equipment

<sup>2</sup> Total EDR includes efficiency, photovoltaics and batteries

<sup>3</sup> Building complies when all source, efficiency and total margins are greater than or equal to zero

# Example Comparison of Residential Results

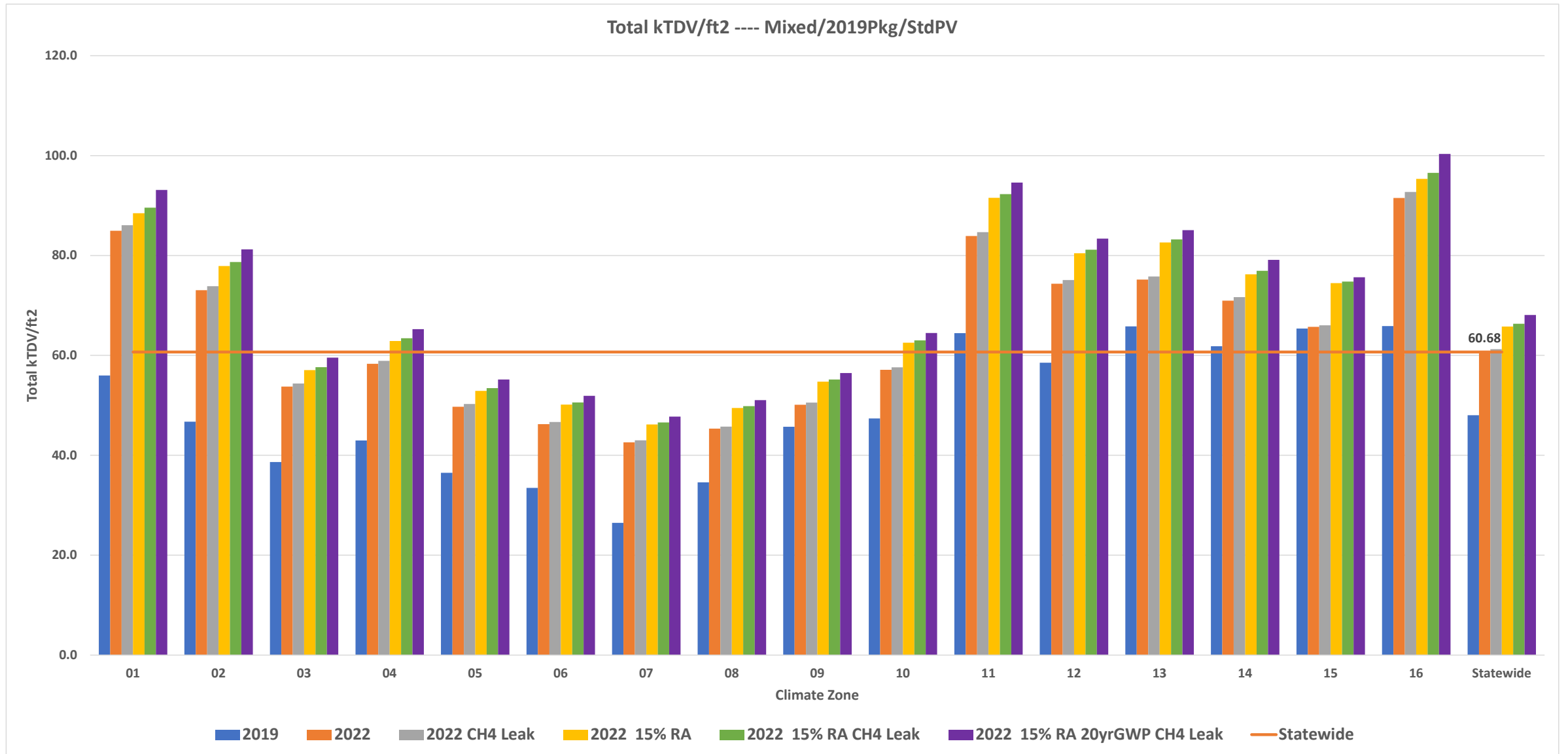
- Intended to illustrate combined impact of
  - 2022 Weather data
  - Alternative 2022 TDV Metrics
- All examples calculated for the 2700 ft<sup>2</sup> Prototype
  - 2 Story, 4 Bedroom
- 2 Cases
  - Mixed Fuel
    - Gas space, water heat, cooking, clothes drying
    - Electric cooling
  - All Electric

# Alternative TDV Metrics (Time Dependent Valuation)

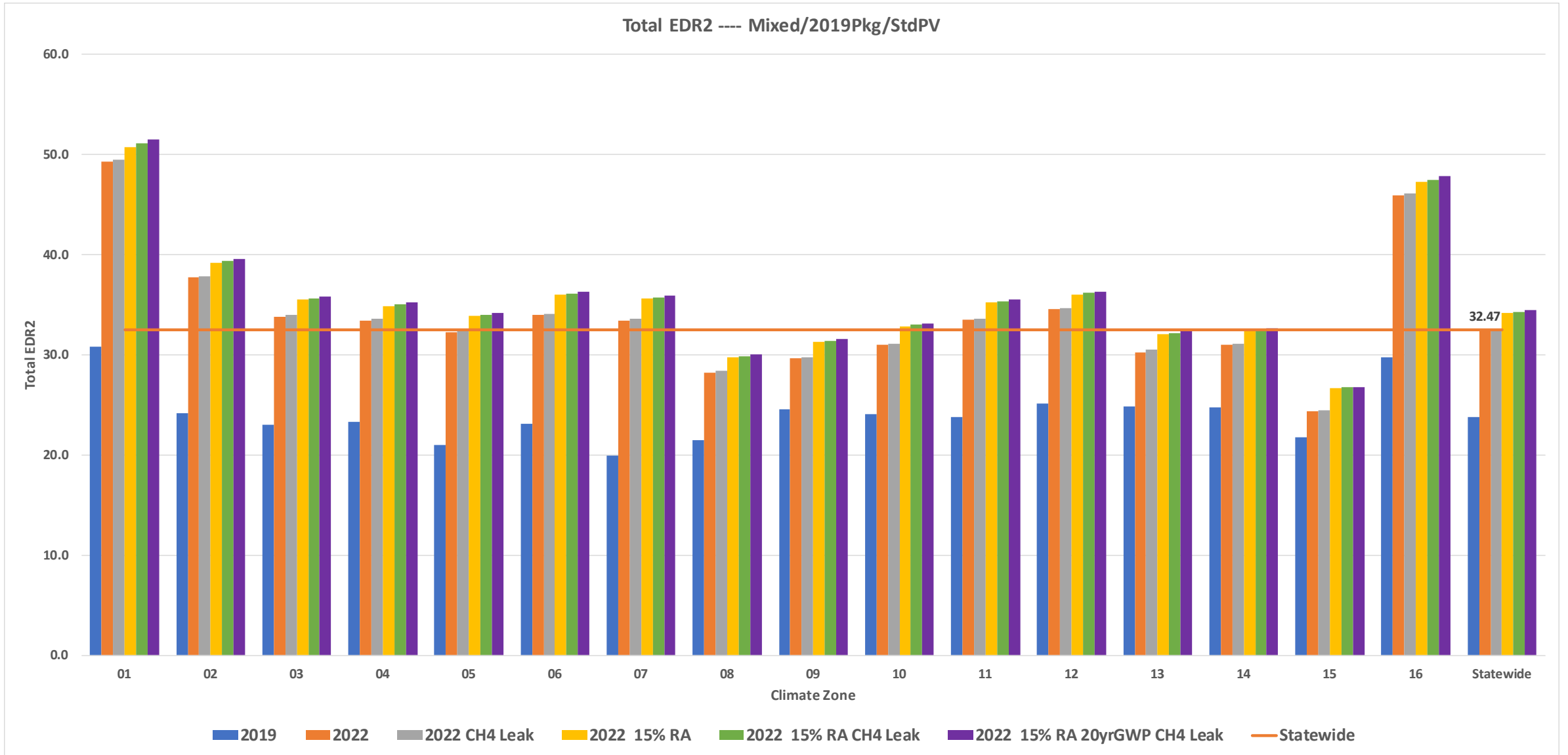
- TDV Metrics are sets of hourly values of Electricity, Natural Gas and Propane values
  - They include the cost to produce and distribute the energy for the representative weather year in each of the 16 climate zones
- Presenting 6 alternative TDV Metrics
  - 2019 - Current 2019 weather, TDV and rules
  - 2022 - Base 2022 proposed weather TDV and rules
  - 2022 CH4 leak - includes (methane) leak for gas
  - 2022 15% RA - includes 15% retail adder for electric
  - 2022 15% RA CH4 Leak - includes both electric and gas adders
  - 2022 15% RA 20yr GWP CH4 Leak - includes 20yr Global Warming Potential



# Total TDV - Mixed Fuel – 2022 > 2019

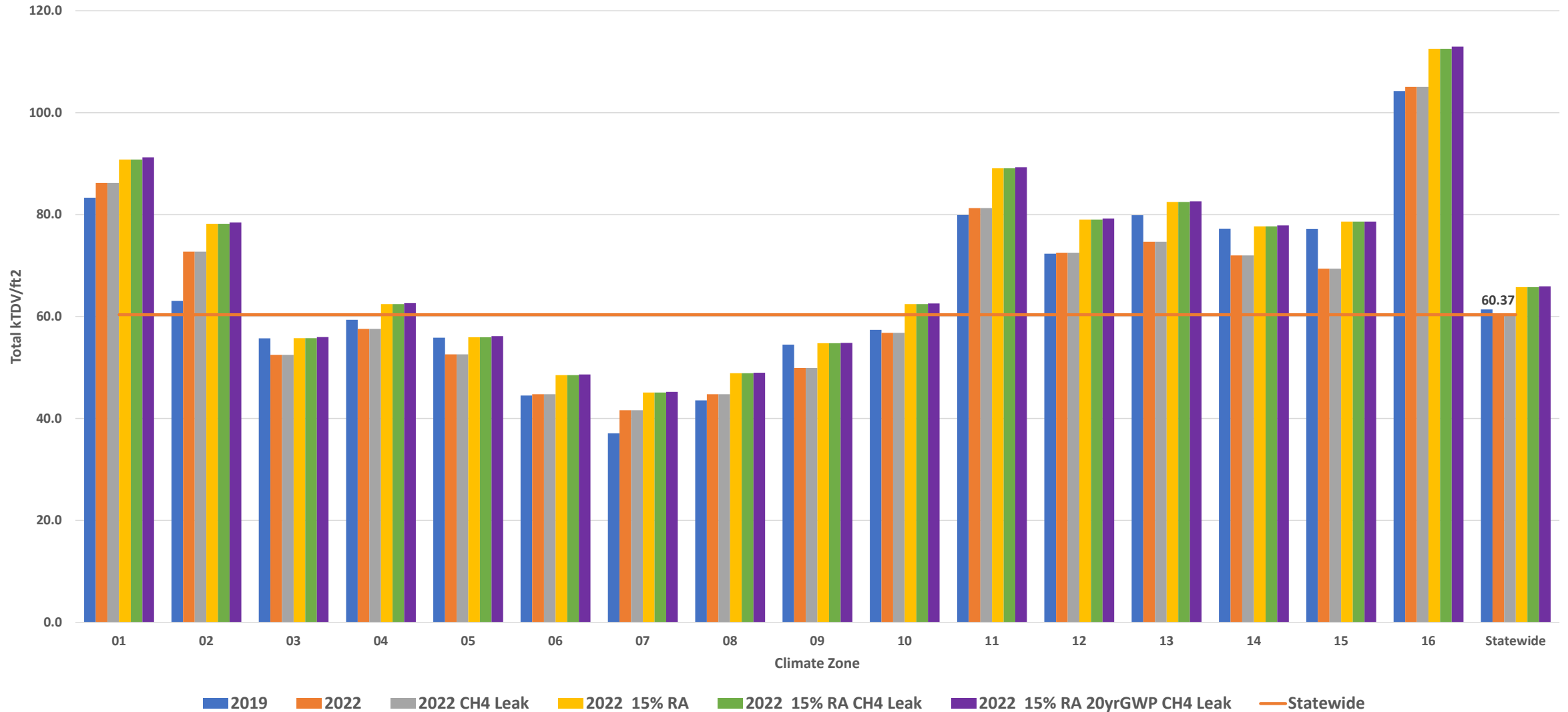


# Total EDR2 - Mixed Fuel - 2022 > 2019

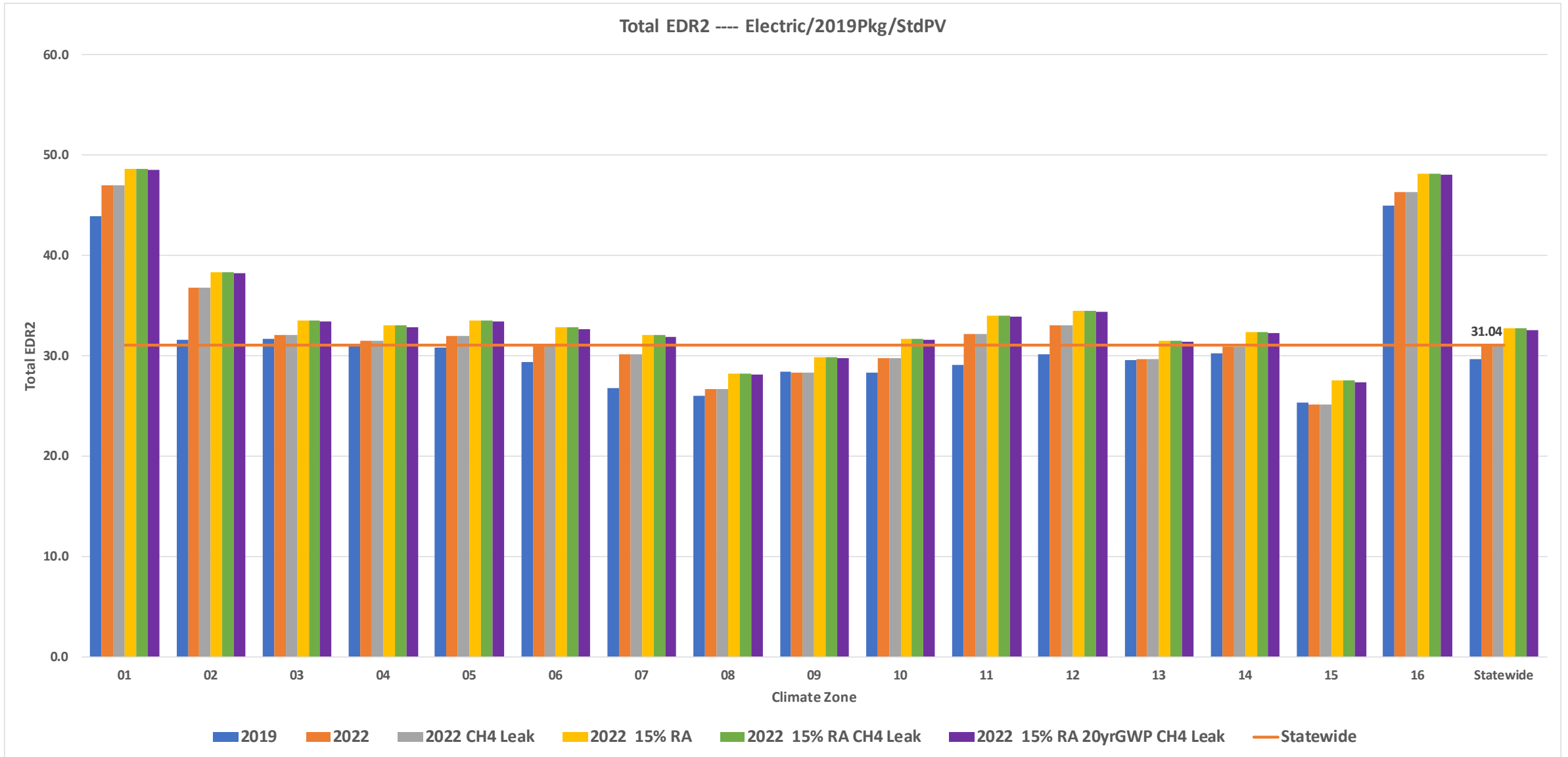


# Total TDV - All Electric

Total kTDV/ft2 ---- Electric/2019Pkg/StdPV



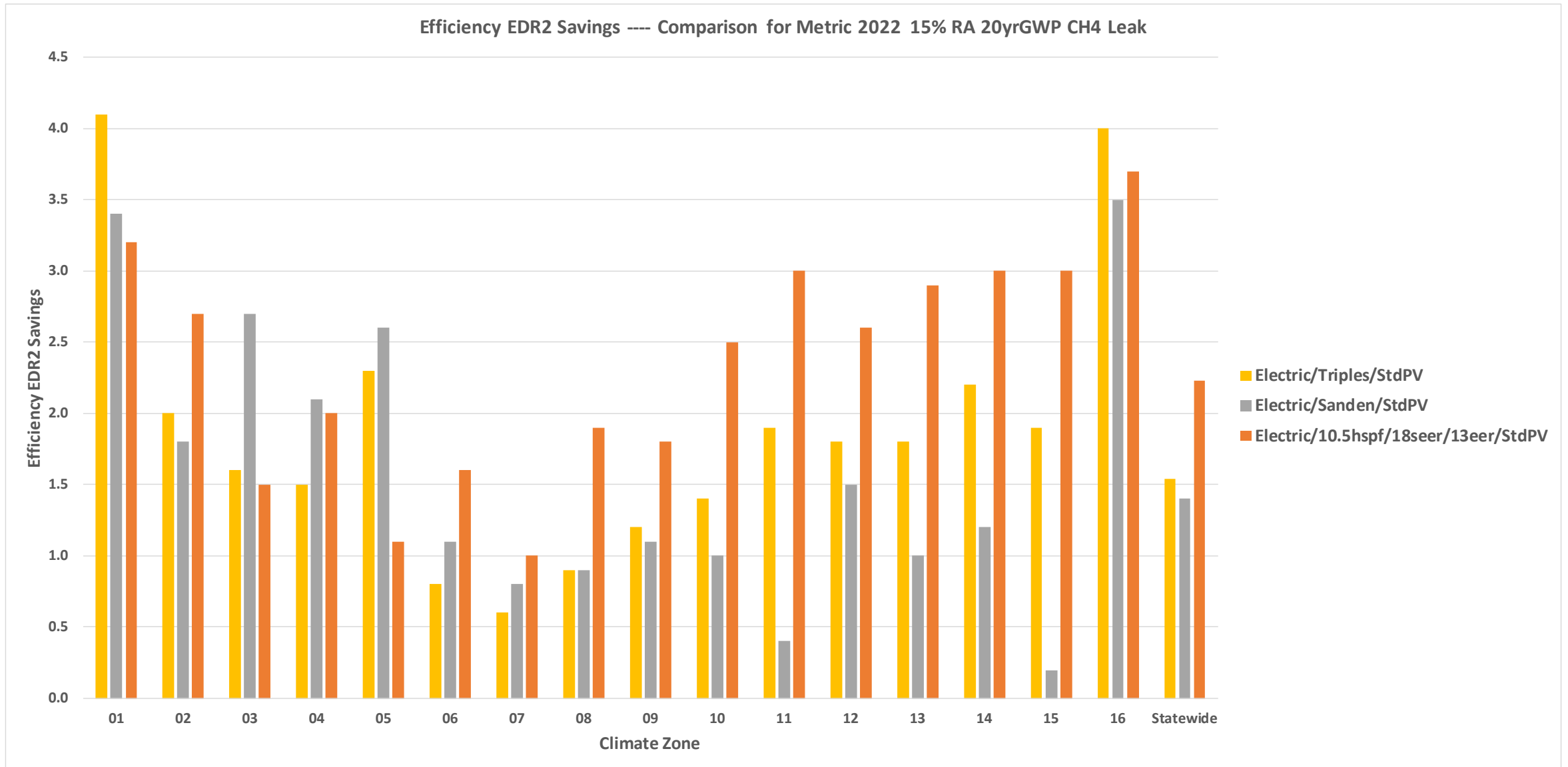
# Total EDR2 - All Electric



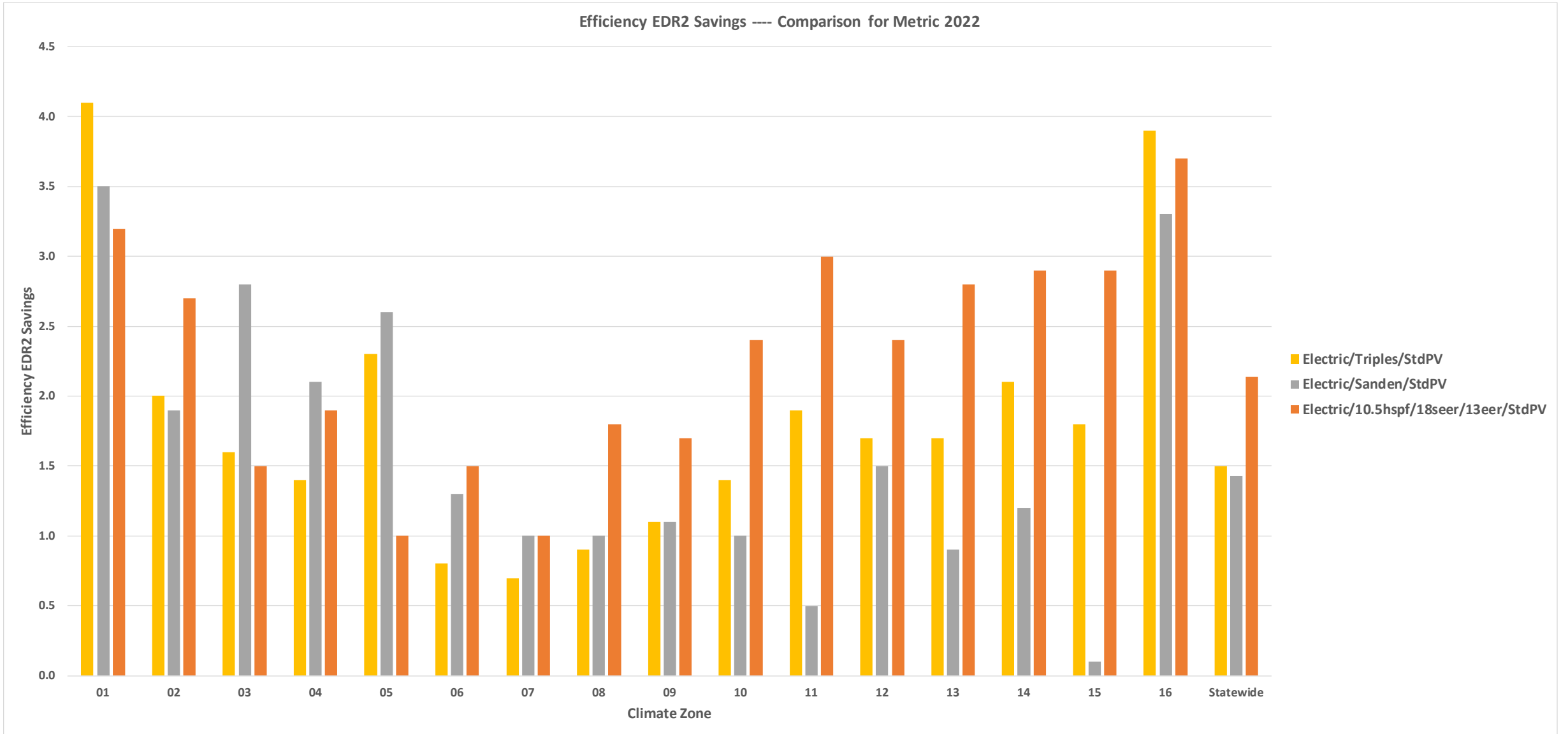
# CH4 Leakage Impact on TDV – CH4 leak minor except 20yr GWP



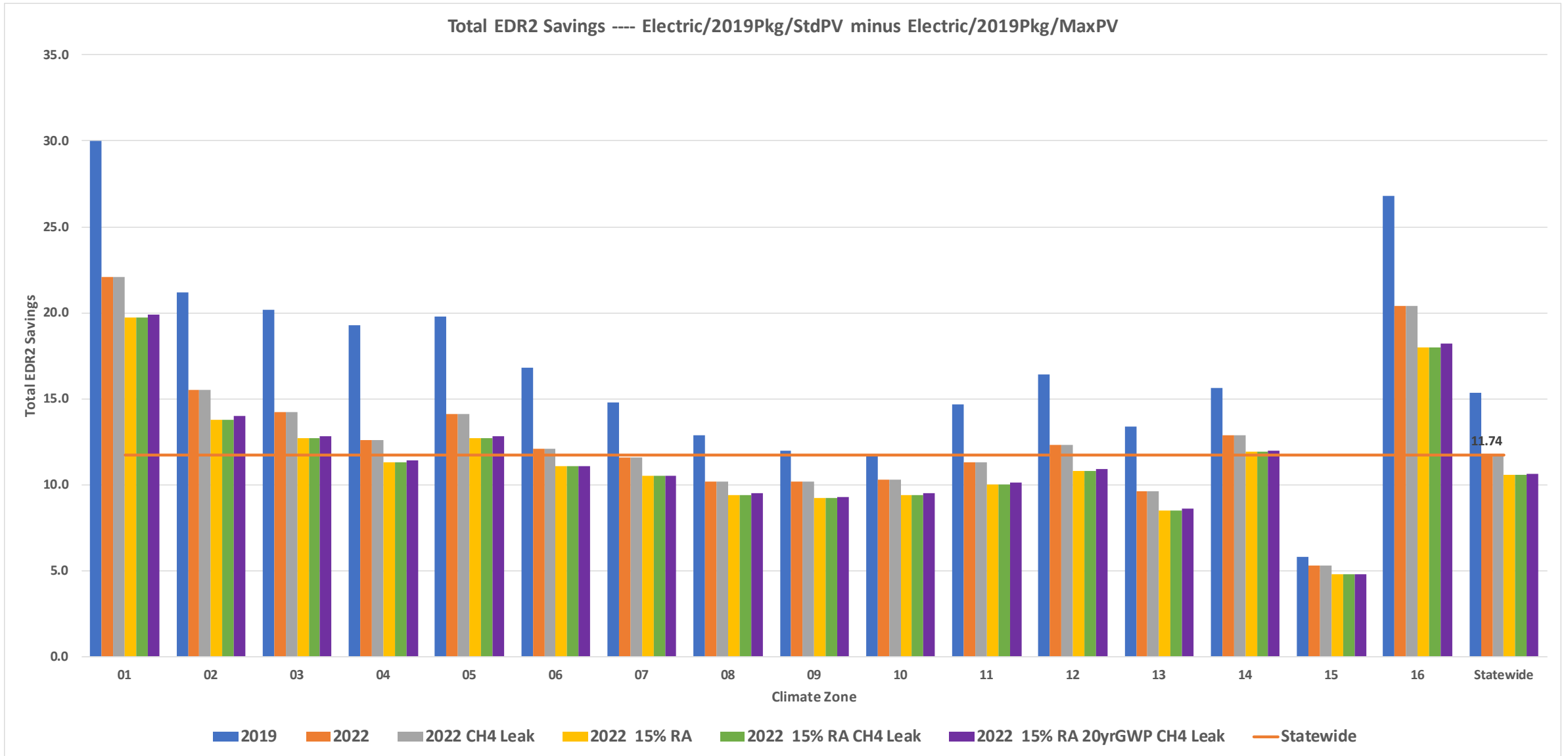
# Efficiency Measures EDR2 Savings - Mixed Fuel



# Efficiency Measures EDR2 Savings - All Electric

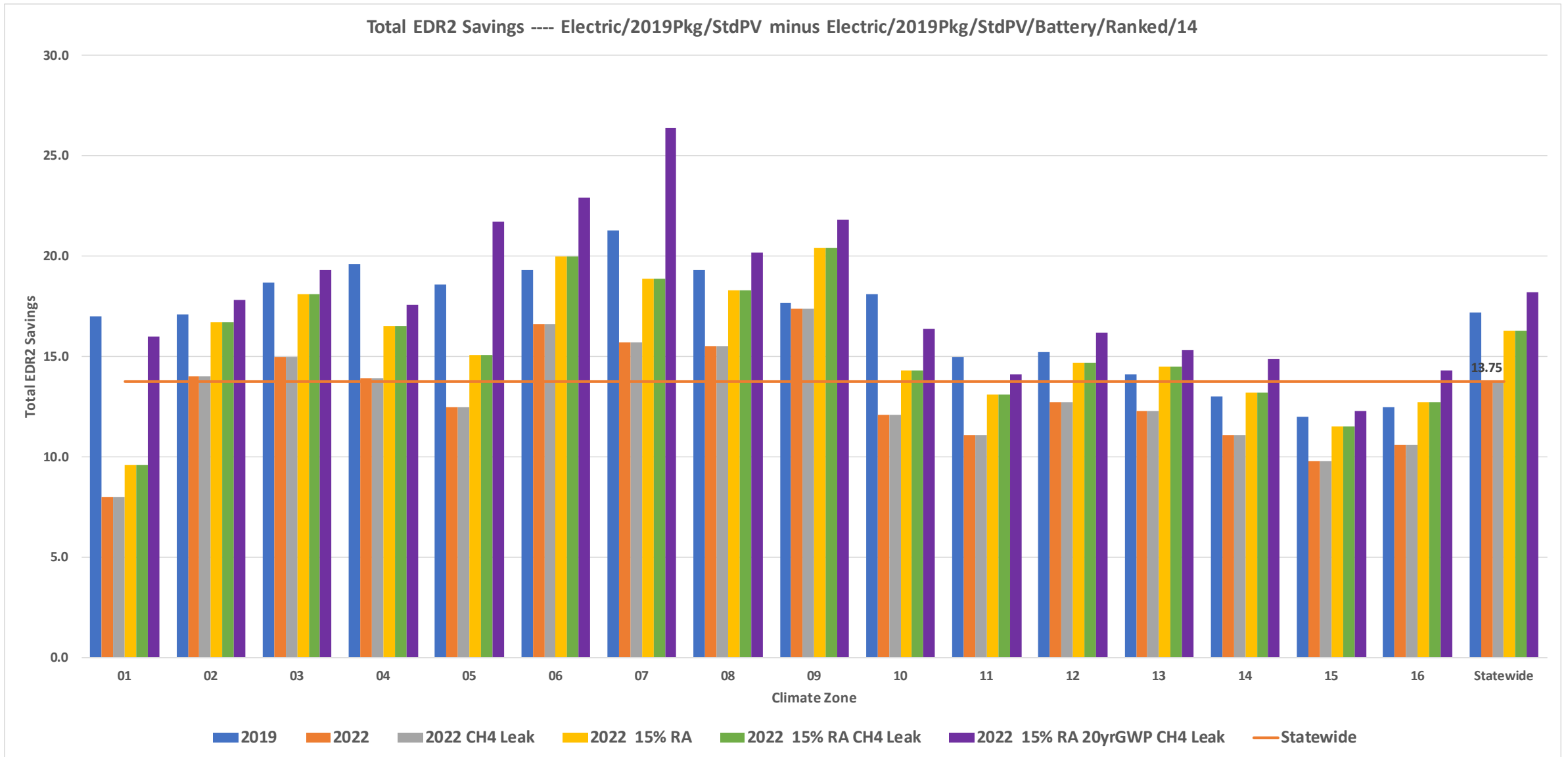


# Savings for Increasing PV - All Electric





# Savings for Adding Battery - All Electric



# Questions?

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