

Residential New Construction Electrification



CALIFORNIA
TECHNICAL FORUM

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TRC
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Presentation Overview

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Objective: Update on draft measure package (MP)

- Overview of the Residential New Construction Electrification Measure Package
- Bundled offering approach
- Questions or Comments

Purpose of Measure Package

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- TRC runs the California Energy Smart Homes Statewide New Construction program focused on all-electric homes
- Started 1/1/2022
- Currently using custom delivery method but it is not conducive to Res NC project timelines or processes
- Goal is to streamline delivery of the program using deemed measures

CPUC Guidance on Implementation

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- CPUC Memo (5/13/2020) to clarify the application of the EE Policy Manual for residential electrification new construction.
- Net-to-gross of 0.95 for all-electric new construction.
- Application assumes a standard-practice, mixed-fuel baseline.
- Allowance for jurisdictions with additional requirements (reach codes)
- Included in PG&E's advice letter for SW NC program

Residential New Construction - Electrification

Related/approved residential measure packages in the eTRM for PY2023

- Appliances
 - Cooking Appliances
 - ✦ SWAP013-02
 - Heat Pump Clothes Dryer
 - ✦ SWAP014-02
- HVAC
 - Ductless HVAC
 - ✦ SWHC044-02 & SWHC050-02
 - Heat Pump HVAC (central)
 - ✦ SWHC045-01 & SWHC049-02
- Domestic Hot Water
 - Heat Pump Water Heater
 - ✦ SWWH025-05
 - Large Heat Pump Water Heater, Commercial and Multifamily
 - ✦ SWWH028-02

Residential New Construction - Electrification

Unique issues tackled in this “bundled measure” approach

1. Common requirements for eligibility but each measure still has its own product eligibility adopted from existing MP
2. Various baseline and savings adjustments for vintage and CZ
3. Bundled Measure Issues – Addressing
 - Separate EULs, impact profiles, tech types, categories, etc. → eTRM data challenges
 - Interactive effects
 - Cost
 - ✦ Adopting existing MP labor and material costs
 - ✦ NC Infrastructure costs → CASE 2019 study

1. Common Requirements for Eligibility

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- To qualify as an all-electric home, there must be no gas or propane connections.
- Home must pursue *Performance* compliance pathway, rather than *Prescriptive* to avoid requiring code for HPs in certain CZs.
 - ~97% new homes go through Performance pathway
- Current Programmatic Requirements
 - EV Ready Electrical infrastructure
 - Battery Ready Electrical infrastructure
 - Individually circuited systems
 -these may not be in the measure package

2. Baseline Considerations - Vintage Impacts

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- Fuel Sub Measure Packages created for Ex vintage
- No or negligible vintage impacts found for:
 - Appliances: Induction Cooking and HP Clothes Dryer
 - DHW – Storage and Central DHW (per DEER)
- Considerable Vintage Impacts for HVAC systems
 - Vintage differences for kWh and Gas found from SWHC049 and SWHC050
 - Derating factor by CZ to reduce savings for New vintage
 - Factors range:
 - ✦ kWh: 3%-21%
 - ✦ Therms: 38%-59%

2. Baseline Considerations – Electric Equipment Penetration

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- Although all-electric home has low penetration (~5%), individual electric systems can be greater
- Reviewed T24 compliance data for 2019 code cycle
- Very small penetration of electric for DHW (~2%) → no adjustment made
- Considerable HVAC penetration, variable by CZ
- Weighting of mixed fuel vs all electric savings by CZ:
 - Ductless using: SWHC044 and SWHC050
 - Central using: SWHC045 and SWHC049
- Similar weighting will be done for HVAC IE for HPCD

2. Baseline Considerations – Electric Equipment Penetration

Fuel Source	Mixed Fuel	Electric Only	All Fuels
Relavant Measure Packages	Ductless: SWHC044 Central: SWHC045	Ductless: SWHC050 Central: SWHC049	CZ % Represented
Climate Zone	% Allocation	% Allocation	
CZ01	 67%	 33%	0.1%
CZ02	 68%	 32%	0.5%
CZ03	 62%	 38%	1.2%
CZ04	 73%	 27%	1.6%
CZ05	 32%	 68%	0.6%
CZ06	 41%	 59%	1.0%
CZ07	 76%	 24%	1.5%
CZ08	 51%	 49%	2.6%
CZ09	 40%	 60%	1.8%
CZ10	 43%	 57%	19.5%
CZ11	 90%	 10%	15.9%
CZ12	 93%	 7%	31.3%
CZ13	 83%	 17%	14.1%
CZ14	 70%	 30%	5.3%
CZ15	 37%	 63%	2.3%
CZ16	 92%	 8%	0.7%
Total Percent	 75%	 25%	100.0%

n≈29k new homes

2. Baseline Considerations System Selection

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- DHW and HVAC Fuel Sub Measure Packages have various potential code compliant baselines per measure
- Storage HPWH → Tankless Gas WH
 - Most common for NC & used as baseline in compliance software (conservative savings)
- MFm Central HPWH → both central storage and boiler kept for now
 - ***Looking for Cal TF input on how to direct selection baseline (MFm unit quantity? System storage capacity?)***
- HVAC must choose 2 baselines (mixed fuel vs electric only)
 - Ductless: Window AC w/Gas Wall furnace / Ductless Minisplit HP
 - Central: Split AC w/Central Gas furnace / Central Split HP

2. Demand Impacts for Fuel Sub Measures

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- Appliance Measures – adopt “demand factor” methodology from EE equivalent measures
- Water heating measures have demand impacts found in DEER
- HVAC
 - Peak demand period occurs during cooling season
 - Adopt peak demand impacts from equivalent EE HP measures

3. Bundled Measure Issues

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- Most values are already approved in existing MPs
 - Some savings and costs may need adjusting
- Interactive Effects
 - Only Clothes Dryer measure has HVAC IE included in existing calcs
 - Additional calculation steps required for adjusting for different HVAC IE
- Each adopted measure has different parameters → Lots of eTRM exclusion tables
- Maintain Alignment
 - Measure package will need to watch updates from 8 related measure packages → Modular value tables and calculations
- Future Additions
 - If future offerings are added, watch specifically for
 - ✦ Stronger interactive effects
 - ✦ Cost implications
 - ✦ Differing electric system market penetration
 - *Cal TF Input: Any other measure ideas for future offerings?*

Questions / Next Steps

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- Measure package plan has been submitted to the CPUC for review (waiting on comments)
 - Measure package development in process now

- Questions:
 - Are there additional bundled measure issues that should be considered?