Post-Fire Energy Futures:

Estimating the Energy Impacts of Residential Rebuild Footprint and Building Electrification after the Palisades and Eaton Fires

Technical Appendix

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Data and Methods

This technical appendix expands on the Methods section included in the full report.

At a high level, for each future rebuilding scenario (s) under consideration, we project the total post-fire energy consumption in the affected regions (En) by multiplying the future total new building square footage ($SQFT$) in each of the fire zones (n) by a median energy use intensity (EUI). The EUIs were derived from analysis of metered consumption data for recently constructed buildings in the two regions. Each scenario differs in terms of assumptions about the square footage of the rebuilt properties as well as the specific EUIs that have been applied based on the electrification scenario. This approach is depicted in Equation 1 below.

$$En_{n,s} = SQFT_{n,s} * \ EUI_{n,s} \qquad \text{(Equation 1)}$$

The details of each step in this process are described in the following subsections.

Step 1: Defining Rebuilding Scenarios and Boundaries

Our first step was defining the residences of interest and the rebuilding scenarios. In this analysis, we included homes categorized as *Minor Damage* (10-25%), *Major Damage* (26-50%), or *Destroyed* (50% or more damaged) in the CAL FIRE Damage Inspection Program (DINS) dataset, which we refer to as the "Rebuild" residences (CAL FIRE, Office of the State Fire Marshal, 2025). The square footage and consumption from these homes prior to the fires make up the *Pre-Fire Baseline*, which we use as a mode of comparison for the future evaluation scenarios.[1]

The future evaluation scenarios were defined to capture potential variations in the sizes of rebuilt properties and the degree to which their previous gas appliances come to be replaced with electrified alternatives. Under Governor Newsom's Executive Order N-4-25, projects to restore, demolish, or replace property substantially damaged by the fires can receive an exemption from California Environmental Quality Act and California Coastal Act requirements if they rebuild at no more than 110% of original building footprint and height (California Office of the Governor, 2025). In addition to analyzing if there is rebuilding at 100% of Pre-Fire square footage, we apply 110% as an additional scenario. The square footage scenarios are applied equally across the full population of damaged buildings: all homes rebuild at 100% of original square footage; and all homes rebuild at 110% of original square footage. From these two options (100% and 110% square footage), we further evaluate the energy use impacts of four potential electrification packages, creating eight scenarios in all.

The first assumes the same patterns of electric appliance adoption as were present in properties that had been recently constructed prior to the fires. The second assumes all homes have been rebuilt with high-efficiency electric heat pumps and water heaters, with other end uses (cooking, clothes drying) following previous fuel use patterns. This second electrification package reflects

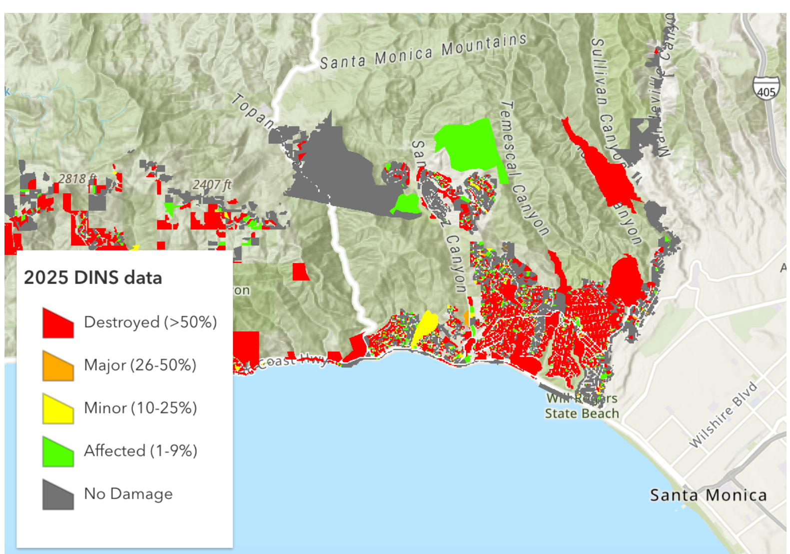
[1] We use premise-level energy consumption data in the following Zip Codes: 90272, 90290, 90265, 91001, 92204, 91042, 91103, 91011, and 91107.

South Coast Air Quality Management District (SCAQMD) and California Air Resources Board (CARB) proposals to phase out gas-powered space and water heating (South Coast Air Quality Management District, 2025a, 2025b). The third package assumes all homes have been rebuilt with high-efficiency electric appliances for all end-uses (no natural gas). The fourth assumes all homes have been rebuilt with low-efficiency electric appliances for all end-uses (no natural gas). These all-electric packages were included to provide insights for those advocating for all-electric rebuilding, as well as to assess what would likely happen if the City of Los Angeles' municipal requirement for all-electric new construction had not been waived for fire-affected homes (City of Los Angeles, Office of the Mayor, 2025). The methods to develop the Pre-Fire Baseline and eight future evaluation scenario components are discussed in more detail in the following subsections.

Step 2: Assessing Fire Damage and Parcel Data Collection

The second step in this process was identifying the total square footage that will potentially be rebuilt. By joining the CAL FIRE Damage Inspection (DINS) database with LA County parcel data (Los Angeles County Office of the Assessor, 2025), we were able to calculate the total square footage of buildings in the burn region, summed by building type and damage level. The DINS and LA County parcel data were each extracted from hosted ArcGIS feature layers as CSVs. The DINS data was first subset to exclude any non-residential structures. Each row in DINS represents an individual damaged structure – for which there were frequently multiple structures to a single parcel. Parcel, identified by the assessor's parcel number (APN), is a critical join key across the applied datasets, given the inconsistent and non-standardized nature of addresses. In order to use the APN as a join field, the DINS data needed to be summarized by parcel. In cases where there was more than one DINS record on a parcel, the more severe value was used. The DINS and parcel data were then joined using the APN to match the damage information with residential building square footage and year built.

Figure 1. Screenshot of data from the DINS ArcGIS mapping platform for properties in the Eaton Fire area. These data are available for download and are used in this report.



Step 3: UCLA Energy Atlas Energy Consumption Data Cleaning (2019)

After damaged and destroyed buildings were identified via the DINS dataset, we calculated both their Pre-Fire baseline energy consumption values and Post-Fire scenario consumption values using utility meter data processed and stored for the UCLA Energy Atlas (California Center for Sustainable Communities, 2025). The Energy Atlas, developed by the California Center for Sustainable Communities (CCSC), is a database of historical, premise-level, metered energy consumption records for utilities throughout California. In the database, these usage records have also been linked to a host of other building and property attributes. The Energy Atlas currently includes records for customers in most of the utilities of interest for this project: LADWP (electricity consumption, Palisades), SCE (electricity consumption, Altadena, Topanga and Malibu), and SoCalGas (natural gas consumption, both regions). Premise-level data are stored securely and are not publicly accessible but can be utilized in secure working environments for research projects, as well as presented publicly in an aggregated or otherwise anonymized format.

UCLA CCSC, as part of the Energy Atlas data processing methods, geocodes the utility addresses and conducts a spatial join with parcel datasets. The most recent available vintage of complete energy consumption data in the Energy Atlas database is 2020, however, during this year, energy consumption patterns were likely to be significantly altered by shelter-in-place orders associated with the COVID-19 pandemic. We therefore selected 2019 as the year for all analysis of baseline consumption.

There are cases where a parcel represents only part of a building (merely the ground floor footprint), such as in condominiums. These cases are represented in the source data as stacked parcels, sets of entities possessing identical geometries but distinct attributes. The identical geometries pose a methodological challenge to analysis of the Energy Atlas data because the relationship from service address to parcel is determined by spatial intersection, thus making it possible for a single address centroid to correspond to multiple parcel polygons. Researchers solved this issue by aggregating these types of individual parcels into single unified geometries with summed square footage and concatenated use types, building designs, vintages and identification numbers. These derived spatial entities are termed megaparcels and are used to replace the stacked parcels when building the back-end energy database.

Energy Consumption Baseline

To assess baseline energy consumption of damaged and destroyed buildings, we needed to join the Atlas and DINS data. We split the megaparcels, which were stored as a list, into columns such that there was only one APN per column. We then performed a left join, keeping all of the Atlas data and joining the parcel data when the parcel data APN matched with one of the Atlas APN across the multiple columns.

We summarized baseline consumption by building type and rebuilding assumption, rather than more detailed damage values, to adhere to California Public Utilities Commission privacy rules (California Public Utilities Commission, 2014).

Accounting for solar photovoltaic (PV) adoption prior to the fires was critical to assess Pre-Fire baseline consumption. Net metered consumption data available in the Energy Atlas does not include electricity consumption from local solar. Therefore, we estimated annual solar production using NREL's PVWatts Calculator to capture the electricity produced and consumed directly from distributed generation (National Renewable Energy Laboratory, 2022).

Table 1. Solar Production Estimates in the Fire Regions.

Customer	Reference Zip Code	Estimated Annual System Output per kW (kWh/Year)	Approximate Solar Adoption (2019) (kW)
SCE Customers (Eaton Fire)	91001	1,657	3,072
LADWP Customers (Palisades Fire)	90272	1,762	376
SCE Customers (Palisades Fire)	90290	1,702	740

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Lastly, there was a gap in electricity utilities available in the Energy Atlas database and the utilities serving the fire regions. This corresponded to areas affected by the Eaton fire that are served by Pasadena Water and Power, a local municipally owned utility. Given the lack of access to consumption data for Pasadena Water and Power customers, we developed simple electricity usage estimates using the electricity usage intensities (kWh/sqft) for neighboring SCE customers. We calculated electricity usage intensities using both the total net metered consumption and the estimated total consumption accounting for distributed solar generation. We then multiplied the electricity usage intensities by the estimated square footage of the Pasadena Water and Power residential customers – the building square footage associated with APNs that were matched with the APNs of SoCal Gas customers but not SCE customers.

Recent Construction

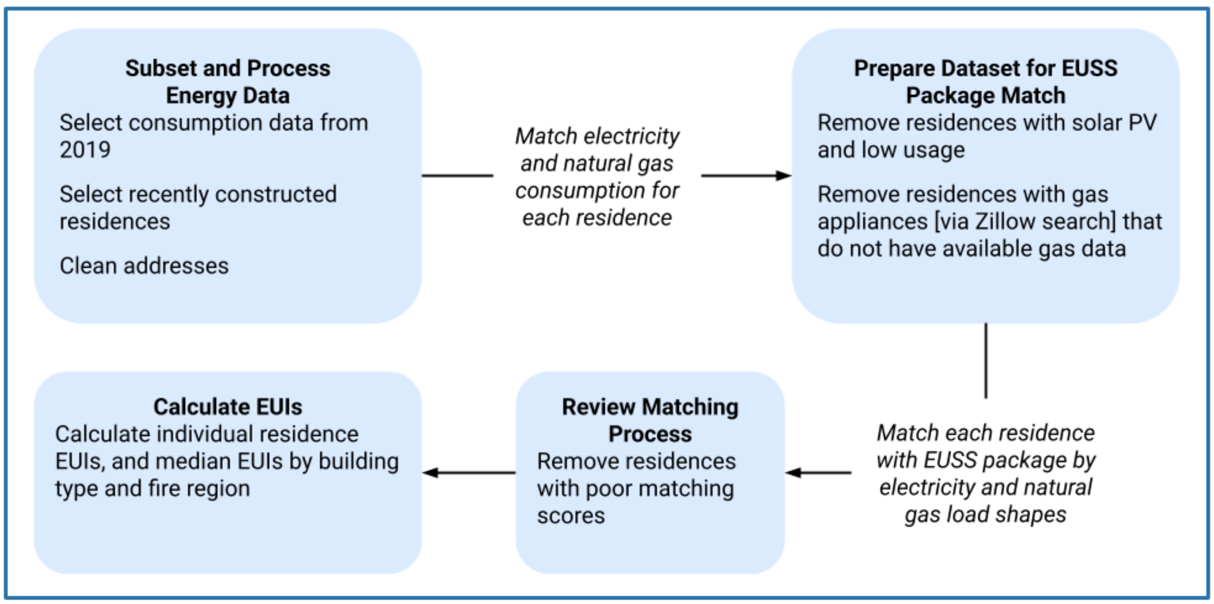
The Energy Atlas data was also used to determine EUIs for electricity and natural gas in buildings near each of the fire regions that were recently constructed or underwent recent major renovations *prior to the fires*.[2] We defined recent builds as having a building vintage or major renovation date after 2015 for single-family residences, and during or after 2000 for multi-family

[2] Zip codes sampled include: 90272, 90290, 90265, 91001, 92204, 91042, 91103, 91011, and 91107.

residences.[3] Because there were no recent-build mobile homes in the fire regions, we did not conduct the recent build EUI analysis for mobile homes.[4]

In addition to the recent-build requirements, we only included residences with all 12 months of both electricity and natural gas data available in the Energy Atlas; except in cases where gas consumption was missing and full electrification seemed feasible based on our analysis. We also exclude buildings with a net energy metering (NEM) tariff out of consideration for the consumption that would be masked by distributed energy resources, as previously introduced. The full process of data cleaning, matching, and selection for the recent construction samples is shown in Figure 2.

Figure 2. Data cleaning pipeline for recent-build samples.



After this sample of recently constructed properties was identified, we calculated the electricity and natural gas EUIs for each residence (r). This was done by dividing the residence's annual electricity (E_r) and natural gas (NG_r) consumption by its square footage $(SQFT_r)$, which was sourced from the Los Angeles County parcel database (Eqs. 2 and 3). These individual EUIs were then aggregated by building type (bt) by computing the median across all residences of that type (Eqs. 4 and 5).

$$EUI_r^{(e)} = \frac{E_r}{SQFT_r} \qquad \text{(Equation 2)}$$

$$EUI_r^{(ng)} = \frac{NG_r}{SQFT_r} \qquad \text{(Equation 3)}$$

3 The "Effective Year" in the UCLA Energy Atlas and LA County Parcel data refers to the most recent date of either the building vintage or last major construction.

4 Thus, when evaluating totals in comparison to the Pre-Fire baseline for electricity and gas, we include the pre-fire mobile home consumption.

$$EUI_{bt}^{(e)} = median(EUI_r^{(e)} | \, r \in bt) \qquad \text{(Equation 4)}$$
$$EUI_{bt}^{(ng)} = median(EUI_r^{(ng)} | \, r \in bt) \qquad \text{(Equation 5)}$$

The results of this process, including the sample sizes and EUIs, are depicted in Table 2.

Table 2. Recently Constructed Building Characteristics

	Eaton Fire		**Palisades Fire**	
	Multi Family	Single Family	Multi Family	Single Family
Sample Size (# of residences)	109	73	149	129
Median Electricity EUI (kWh/sqft)	3.8	Masked*	2.99	3.9
Median Natural Gas EUI (Therms/sqft)	0.17	Masked*	0.14	0.22
Median Total EUI (kbtu/sqft)	29.67	Masked*	23.38	34.91

** Values are masked due to data privacy rules for residential consumption in groups of fewer than 100 residences.*

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We used these aggregated EUIs as a direct proxy for the broader building stock's EUIs after rebuilding (the "new build baseline" scenarios). This approach depends on the assumption that the energy usage behavior of the recent-construction buildings (i.e.at-home EV charging preferences) is representative of the full fire-impacted population's pre- and post-fire energy usage behavior, such that the Pre-Fire baseline energy consumption calculations serve as a like-for-like comparison with Post-Fire consumption estimates.[5]

For the other possible future scenarios that involved electrification measures, we transformed the recent-construction building EUIs using data from the National Renewable Energy Laboratory's (NREL's) ResStock End Use Load Savings Shape Dataset (National Renewable Energy Laboratory, 2022). The dataset and transformation process are described more in the following section.

[5] The only energy characteristic that is treated differently is solar. We explicitly remove homes with solar from the recent construction dataset (see Fig. 2) so that EUIs represent only non-solar households. Solar is then accounted for in Step 6 of our methodology.

Step 4: Applying NREL ResStock Analysis

Introducing ResStock

NREL developed the ResStock End-Use Savings Shapes (EUSS) dataset to evaluate the impact of different types of electrification measures on household energy usage (National Renewable Energy Laboratory, 2022). ResStock models energy consumption profiles for different electrification scenarios across the U.S. (lower 48 and D.C.) housing stock, split up by climate region. For this report we used the modeled building consumption time series (i.e. load shapes) for Climate Zone 3B, Warm Dry Climate, which contains Los Angeles and other parts of the Southwest. We used the 11 provided measure packages in ResStock, as well as one hybrid package of building electrification technologies that we custom designed for the purposes of this project (see Table xx). Each package models electricity and gas usage across 5 building types: Mobile Homes, Multi-Family 2-4 Units, Multi-Family 5+ Units, Single Family Attached, and Single Family Detached.

Figure 3. 2021 International Energy Conservation Code (IECC) Climate Zones (Building America Solution Center, n.d.)

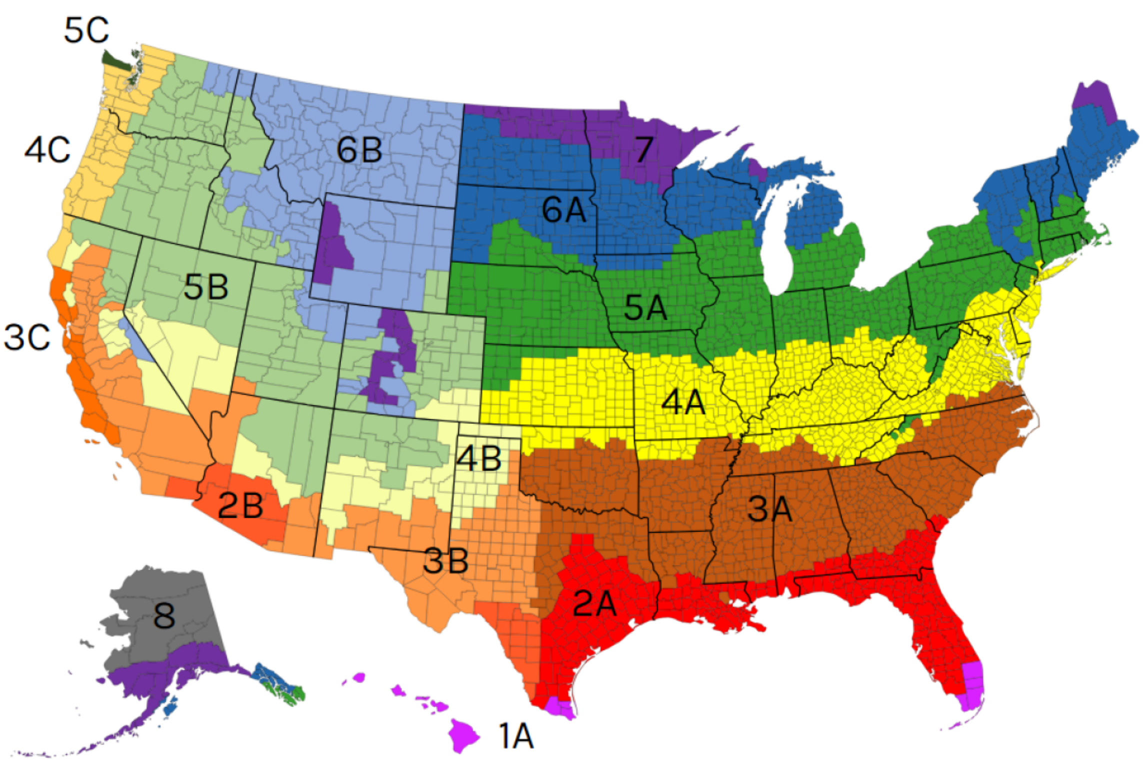

Table 3. NREL and ResStock Energy Efficiency and Electrification Packages

Number	Scenario	Description	Status
1	Baseline	Existing mix of gas + electric appliances	Original ResStock package
2	Basic enclosure	Existing mix of gas + electric appliances, additional building insulation	Original ResStock package
3	Enhanced enclosure	Existing mix of gas + electric appliances, further additional building insulation	Original ResStock package
4	Heat pump (min efficiency, electric backup)	Space heating/cooling from low efficiency electric heat pump, otherwise existing appliances	Original ResStock package
5	Heat pump (high-efficiency, electric backup)	Space heating/cooling from high efficiency electric heat pump, otherwise existing appliances	Original ResStock package
6	Heat pump (min efficiency, existing heating as backup)	Space heating/cooling from high efficiency electric heat pump, otherwise existing appliances	Original ResStock package
7	Heat pump water heater	Electrified high efficiency water heater, otherwise existing appliances	Original ResStock package
8	All-electric (min efficiency)	Min efficiency electrified water heater, heat pump for space heating/cooling, electric range, electric dryer	Original ResStock package
9	All-electric (high efficiency)	High efficiency electrified water heater, heat pump for space heating/cooling, electric range, electric dryer	Original ResStock package
10	All-electric (high efficiency + basic enclosure package)	High efficiency electrified water heater, heat pump for space heating/cooling, electric range, electric dryer + additional building insulation	Original ResStock package
11	All-electric (high efficiency + enhanced enclosure package)	High efficiency electrified water heater, heat pump for space heating/cooling, electric range, electric dryer + further additional building insulation	Original ResStock package
12	Electric space and water heating (high efficiency)	High efficiency electrified water heater and heat pump for space heating/cooling, existing other appliances	Custom hybrid

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Matching Recent Construction with ResStock Packages

We used the ResStock EUSS packages to translate the electricity and natural gas EUIs from the Pre-Fire recently constructed buildings (representing real-life combinations of appliance fuel sources in these residences) to those of the partially- and all-electric rebuild scenarios. After translating, these EUIs could then be multiplied by the 100% and 110% square footage growth scenarios to predict energy use under the partially- and all-electric rebuild scenarios.

The first step of this translation was estimating the combinations of appliance fuels in the Pre-Fire recent construction buildings. Because appliance fuels are not available in any comprehensive or publicly available dataset, we estimated each residence's combination of appliance fuels by matching its monthly electricity and gas load profiles to a best-match EUSS package. The EUSS packages include: baseline, baseline with basic enclosure, baseline with enhanced enclosure, heat pump water heater, heat pump (high efficiency, electric backup), heat pump (min efficiency electric backup), heat pump (min efficiency, existing heating as backup), electric space and water heating, all-electric (min efficiency), and all-electric (high efficiency).

To assign the best-match EUSS package for each residence based on load shape similarity, we first preprocessed the data. Although the EUSS packages are presented at 15-minute resolution, the sample residences' electricity and natural gas consumption are available only at the monthly level. Thus, we aggregated the EUSS load shapes to monthly values for matching. Next, we normalized the monthly electricity and natural gas load shapes for both the residences and the EUSS packages, such that each time series represented only the shape of consumption (i.e., the relative distribution across months), not total usage.

Next, for each package p and residence r, we computed the cosine similarity—a mathematical measurement of the distance between two vectors—for their monthly electricity (e) profiles and natural gas (ng) profiles (Eqs. 6 and 7). This similarity metric was chosen due to its robustness to differences in the absolute magnitude of the vector components.

$$sim_e(r,p) = \frac{\sum_{m=1}^{12} E_{rm} * E_{pm}}{\sqrt{\sum_{m=1}^{12} E_{rm}^2} * \sqrt{\sum_{m=1}^{12} E_{pm}^2}} \quad \text{(Equation 6)}$$

$$sim_{ng}(r,p) = \frac{\sum_{m=1}^{12} NG_{rm} * NG_{pm}}{\sqrt{\sum_{m=1}^{12} NG_{rm}^2} * \sqrt{\sum_{m=1}^{12} NG_{pm}^2}} \quad \text{(Equation 7)}$$

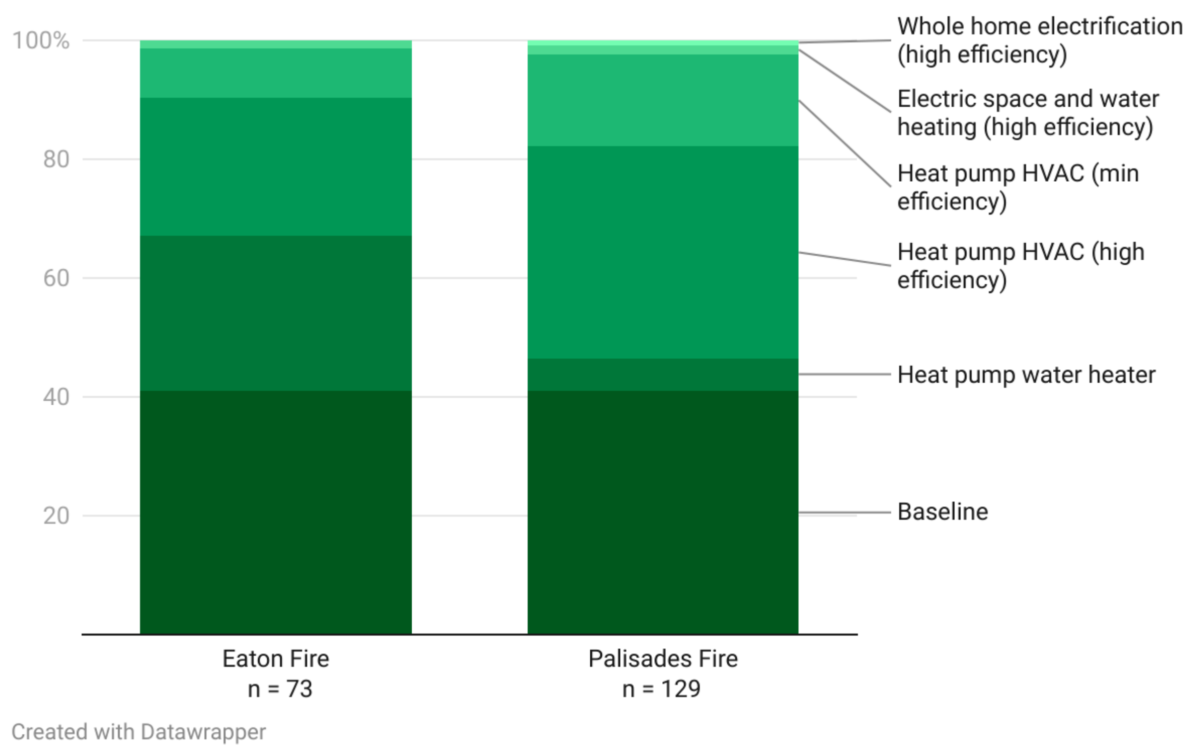
Where E_{rm} was electricity consumption in month m for residence r, E_{pm} was electricity consumption in month m for package p, NG_{rm} was the natural gas consumption in month m for residence r, and NG_{pm} is natural gas consumption in month m for package p.

These similarity scores were weighted equally to compute an overall match score (s_{rp}) for each package (Eq. 8). The EUSS package with the highest overall score (p_r^*) was assigned to residence r (Eq. 9). This process is repeated for each residence in each of the pre-fire recent-construction sets.

$$s_{r,p} = 0.5(sim_e(r,p) + sim_{ng}(r,p)) \quad \text{(Equation 8)}$$
$$p_r^* = \underset{p}{argmax}\, s_{r,p} \quad \text{(Equation 9)}$$

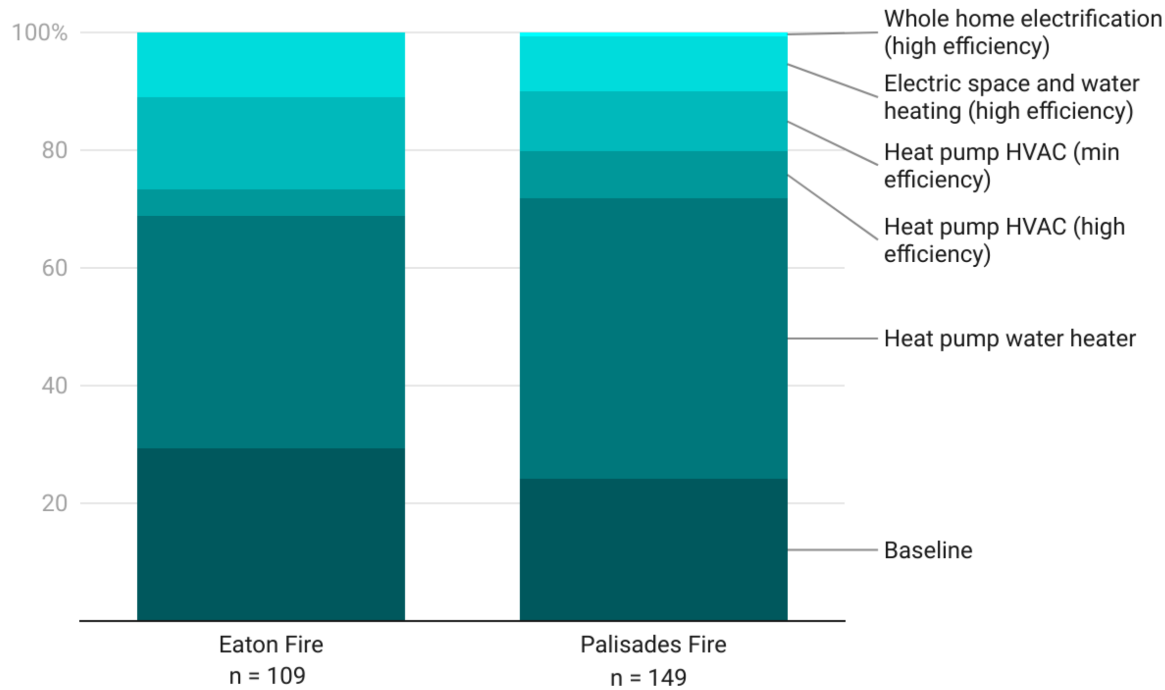
The assigned EUSS packages for each of the Single Family, Multi Family, and Mobile Home[6] residences from the recent construction samples are presented in Figures 6-7.

Figure 6. Assigned ResStock Electrification Packages for Single Family recent construction in the Palisades and Eaton regions, by number of residences.



[6] There are separate EUSS packages for the five different building types listed above (Mobile Home, Multi-Family 2-4 Units, Multi-Family 5+ Units, Single Family Attached, and Single Family Detached). Here we match each building to a package using its specific building type label, and then, to simplify analysis, combine Multi-Family 2-4 Units and Multi-Family 5+ Units into *Multi Family*, and Single Family Attached and Single Family Detached into *Single Family*.

Figure 7. Assigned ResStock Electrification Packages for Single Family recent construction in the Palisades and Eaton regions, by number of residences.



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Transforming EUIs to Reflect Rebuilding Scenarios

After each residence was assigned an EUSS package, its consumption could be transformed to represent consumption under a partially or fully electrified scenario.

The new build baseline scenario uses the median recent-construction EUI based on real consumption patterns; it was not transformed. The EUSS packages used for each of the three electrification scenarios, however, are presented in Table 4.

Table 4. EUSS Package Assignments for EUI Transformation by Scenario

Electrification Scenario	Upgrade Package
Recent build baseline	Best matched package (no change)
Electric space and water heating (high efficiency)	12. Electric space and water heating (high efficiency)
All-electric (min efficiency)	9. All electric (min efficiency)
All-electric (high efficiency)	8. All electric (high efficiency)

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The end goal of the transformation was to identify median EUIs (from the sample residences) to use for each of the electrified scenarios. Because we had normalized the hourly profiles for electricity and natural gas taken from the starting EUSS package, $p_{r,s}^{(e)}$ and $p_{r,s}^{(ng)}$, to represent only the shape of the monthly consumption profile, we needed to scale up these hourly profiles to equal residence's total consumption, ${E_r}^{(e)}$and $NG_r^{(e)}$ (Eqs. 10 and 11).

$$e_{r,s} = p_{r,s}^{(e)} * {E_r}^{(e)} \quad \text{(Equation 10)}$$

$$ng_{r,s} = p_{r,s}^{(ng)} * {NG_r}^{(ng)} \quad \text{(Equation 11)}$$

To simulate the effect of a building upgrade, we then multiplied the scaled profiles, $e_{r,s}$ and $ng_{r,s}$, by package-specific adjustment factors, or multipliers, derived from EUSS profiles (Eqs. 14 and 15). The multipliers, $m_{s\to u}^{(e)}$ and $m_{s\to u}^{(ng)}$, represent the ratio of annual modeled energy use in the chosen upgrade package to that in the currently assigned package, calculated from each of the package's total annual consumption (Eqs. 12 and 13). These values adjust the scaled consumption to reflect expected electricity use and natural gas use under the upgraded package.

$$m_{s\to u}^{(e)} = \frac{\sum_{h=1}^{8760} p_{r,u}^{(e)}(h)}{\sum_{h=1}^{8760} p_{r,s}^{(e)}(h)} \quad \text{(Equation 12)}$$

$$m_{s\to u}^{(ng)} = \frac{\sum_{h=1}^{8760} p_{r,u}^{(ng)}(h)}{\sum_{h=1}^{8760} p_{r,s}^{(ng)}(h)} \quad \text{(Equation 13)}$$

$$u_r^{(e)} = e_{r,s} * m_{s\to u}^{(e)} \quad \text{(Equation 14)}$$

$$u_r^{(ng)} = ng_{r,s} * m_{s\to u}^{(ng)} \quad \text{(Equation 15)}$$

Next, we summed the upgraded hourly profiles, $u_r^{(e)}$ and $u_r^{(ng)}$ to find total post-upgrade annual consumption for each fuel type for each sample residence (Eqs. 16 and 17).

$$E_{upgrade}^{(r)} = \sum_{h\,=\,1}^{8760} u_r^{(e)}(h) \quad \text{(Equation 16)}$$

$$NG_{upgrade}^{(r)} = \sum_{h\,=\,1}^{8760} u_r^{(ng)}(h) \quad \text{(Equation 17)}$$

We then calculated EUIs for each residence by dividing the residence's total electricity and natural gas consumption under the upgrade scenario by the building square footage (Eqs. 19 and 20).

$$EUI_{r,upgrade}^{(e)} = \frac{E_{upgrade}^{(r)}}{SQFT_r} \quad \text{(Equation 19)}$$

$$EUI_{r,upgrade}^{(ng)} = \frac{NG_{upgrade}^{(r)}}{SQFT_r} \quad \text{(Equation 20)}$$

Finally, we aggregated by building type and fire region, computing the median electricity and natural gas EUIs for each building type's sample set (bt) (Eqs. 21 and 22).

$$EUI_{bt,upgrade}^{(e)} = median(EUI_{r,upgrade}^{(e)} | \, r \in bt) \quad \text{(Equation 21)}$$

$$EUI_{bt,upgrade}^{(ng)} = median(EUI_{r,upgrade}^{(ng)} | \, r \in bt) \qquad \text{(Equation 22)}$$

This process was repeated for each of the three electrification upgrade scenarios.

Step 5: Estimating Post Fire Loads

The next step in the process was to combine the transformed EUIs from the previous step with estimated rebuilding square footage to project electricity and natural gas usage across all eight future evaluation scenarios (for each of the fire regions), using Equation 1.

The first component of this calculation was estimating the total square footage to be rebuilt (buildings classified as *Minor Damage*, *Major Damage,* and *Destroyed)*. The two scenarios were 100% and 110% of the Pre-Fire square footage for the two fire-affected regions, presented in Table 5.

Table 5. Estimated New Construction Total Square Footage Relative to Pre-Fire Building Stock

	Eaton Fire				Palisades Fire			
	Multi Family	Single Family	Total	% of Fire Region Building Stock*	Multi Family	Single Family	Total	% of Fire Region Building Stock*
100%	201,841	9,682,746	9,889,777	7.8%	439,162	11,547,498	12,286,660	22.7%
110%	222,025	10,651,021	10,878,755	8.6%	483,078	12,702,248	13,515,326	25%

**Percent is defined on the basis of square footage. Fire region building stock includes residences in zip codes that are within or substantially overlapping with the fire perimeters.*

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Each square footage was multiplied by the four sets of computed electric and natural gas EUIs: new build baseline (matching recent-construction selections), electric space and water heating, all-electric (min efficiency), and all-electric (high efficiency). Each results set contained the electricity and natural gas consumption by building type for that scenario, which could be aggregated by building type to consider local infrastructure impacts.

Step 6: Solar PV Sensitivity

Finally, we estimated net metered single family residential electricity consumption with projected 100% solar adoption, in line with California Building Energy Efficiency Standards (Energy Code). The 2019 Energy Code introduced solar PV system requirements for all newly constructed low-rise residential buildings (California Building Standards Commission, 2022). Eaton and Palisades residential property rebuilds will need to comply with these current code requirements, including installing solar panels (LA County Recovers, 2025). While we recognize the potential complexity in PV system sizing, we assumed a 4 kW size default for each residence.[7] For each fire region, we used NREL's PVWatts model to estimate annual solar system output (see Table 1).[8] This was then multiplied by the number of single family homes in each region to estimate the total annual solar output.

[7] 4 kW is the default system size for NREL's PVWatts Calculator.

[8] Solar system outputs of 1,657 kWh and 1,732 kWh per kW were used for Eaton and Palisades regions respectively. The estimated solar performance in the Palisades was based on an average of the values used for SCE and LADWP customers in Step 3.

Additional Results Tables

Table 6. Estimated Electricity Consumption (kWh) compared to Pre-Fire Baseline by Rebuild Scenario.

Scenario	Eaton Fire			Palisades Fire		
	Multi Family	Single Family	Total*	Multi Family	Single Family	Total*
Pre-fire baseline	865,485	Masked**	Masked**	1,536,406	55,440,631	57,416,825
100% Floor Area Rebuild						
Recent build baseline	736,284	Masked**	Masked**	1,555,420	54,302,156	56,297,364
Electric space and water heating (high efficiency)	683,910	26,204,392	26,888,301	1,522,267	52,765,021	54,727,076
All-electric (high efficiency)	683,866	28,196,246	28,880,112	1,522,171	56,775,807	58,737,766
All-electric (min efficiency)	846,907	36,097,702	36,944,609	1,883,916	72,025,379	74,349,084
110% Floor Area Rebuild						
Recent build baseline	809,913	Masked**	Masked**	1,710,962	59,732,372	61,927,100
Electric space and water heating (high efficiency)	752,300	28,824,831	29,577,131	1,674,494	58,041,523	60,199,784
All-electric (high efficiency)	752,253	31,015,870	31,768,123	1,674,388	62,453,388	64,611,542
All-electric (min efficiency)	931,598	39,707,473	40,639,070	2,072,308	79,227,917	81,783,992

** Totals for first four rebuild scenarios include pre-fire baseline consumption from Mobile Homes, adjusted for square footage.*
*** EUIs for the Eaton Fire single family homes are masked due to data privacy rules for groups of under 100 residences. Because comparisons are made, pre-fire is also masked.*

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Table 7. Estimated Natural Gas Consumption (Therms) compared to Pre-Fire Baseline by Rebuild Scenario.

Scenario	Eaton Fire			Palisades Fire		
	Multi Family	**Single Family**	**Total***	**Multi Family**	**Single Family**	**Total***
Pre-fire baseline	74,870	Masked**	Masked**	181,620	3,818,199	4,048,307
100% Floor Area Rebuild						
Recent build baseline	32,077	Masked**	Masked**	70,800	3,036,606	3,155,894
Electric space and water heating (high efficiency)	10,507	380,758	391,265	24,780	791,995	865,263
All-electric (high efficiency)	0	0	0	0	0	0
All-electric (min efficiency)	0	0	0	0	0	0
110% Floor Area Rebuild						
Recent build baseline	35,285	Masked**	Masked**	77,880	871,195	1,002,411
Electric space and water heating (high efficiency)	11,557	418,834	430,391	27,258	871,195	951,790
All-electric (high efficiency)	0	0	0	0	0	0
All-electric (min efficiency)	0	0	0	0	0	0

** Totals for first four rebuild scenarios include pre-fire baseline consumption from Mobile Homes, adjusted for square footage.*
*** EUIs for the Eaton Fire single family homes are masked due to data privacy rules for groups of under 100 residences. Because comparisons are made, pre-fire is also masked.*

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References

Building America Solution Center. (n.d.). *2021 IECC Climate-Specific Building Assemblies*. U.S. Department of Energy. Retrieved June 16, 2025, from https://basc.pnnl.gov/building-assemblies

CAL FIRE, Office of the State Fire Marshal. (2025). *Eaton Palisades DINS* [Dataset]. ArcGIS REST Services Directory. https://services.arcgis.com/HdtZMT2FmI4wPzTM/ArcGIS/rest/services/Eaton_Palisades_DINS/FeatureServer/2

California Building Standards Commission. (2022). *2022 California Energy Code* [California Code of Regulations]. https://www.energy.ca.gov/sites/default/files/2022-12/CEC-400-2022-010_CMF.pdf

California Center for Sustainable Communities. (2025). *UCLA Energy Atlas* [Dataset]. https://energyatlas.ucla.edu/

California Office of the Governor. (2025). *Executive Order N-4-25* [Executive Order]. https://www.gov.ca.gov/wp-content/uploads/2025/01/EO-N-4-25-Rebuilding-Final-signed.pdf

California Public Utilities Commission. (2014). *Decision 14-05-016: Order Instituting Rulemaking to Consider Smart Grid Technologies*. https://docs.cpuc.ca.gov/publisheddocs/published/g000/m090/k845/90845985.pdf

City of Los Angeles, Office of the Mayor. (2025). *Emergency Executive Order No. 1: Return and Rebuild* [Mayoral Executive Order]. https://clkrep.lacity.org/onlinedocs/2022/22-0151_ord_187714_1-23-23.pdf

LA County Recovers. (2025, February). *Fire Rebuild FAQs*. https://recovery.lacounty.gov/wp-content/uploads/2025/02/Fire-Rebuild-FAQ.pdf

Los Angeles County Office of the Assessor. (2025). *Los Angeles County Assessor Parcel Data* (Version 10.91) [Dataset]. LA County Cache. https://public.gis.lacounty.gov/public/rest/services/LACounty_Cache/LACounty_Parcel/MapServer/0/

National Renewable Energy Laboratory. (2022). *ResStock End Use Savings Shapes* (Version 2022.1) [Dataset]. https://resstock.nrel.gov/datasets

South Coast Air Quality Management District. (2025a). *Proposed Amended Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired Furnaces*. South Coast Air Quality Management District. https://www.aqmd.gov/docs/default-source/rule-book/proposed-rules/1111-and-1121/draft-par-1111-(1).pdf?sfvrsn=7e5b9f61_2

South Coast Air Quality Management District. (2025b). *Proposed Amended Rule 1121 – Reduction of NOx Emissions from Natural Gas Fired Water Heaters*. South Coast Air Quality Management District. https://www.aqmd.gov/docs/default-source/rule-book/proposed-rules/1111-and-1121/draft-par-1121-(1).pdf?sfvrsn=545b9f61_2