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NORESCO

June 17, 2026

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Building Standards Branch
California Energy Commission

From: Fatemeh Yousefi, Eric Shadd, Jaret Kadlec, Joe Singer, and Rahul Athalye, NORESCO

Re: Nonresidential Buildings Construction Forecasts for the 2028 Energy Code Cycle

INTRODUCTION

The construction forecast analysis estimates floor area distribution across building types and climate zones. These estimates are essential to weight results for statewide energy savings associated with proposed code changes and policy evaluations.

This memo describes the methodology used to develop the 2028 Energy Code construction forecast for new and existing nonresidential buildings. The methodology used for this analysis is based on the framework established during the 2025 code cycle with several enhancements. The sections below present an overview of the methodology, key updates, and the resulting forecast for new construction and existing buildings.

METHODOLOGY

Key Terms

Two building classifications systems were used throughout this analysis:

Broad Building Types: General building classifications aligned with those used by the Energy Commission's Energy Assessments Division[1] (EAD) in their forecast analysis and by Dodge Data and Analytics (Dodge)[2] in their Building Stock Data (BSD), whose data served as primary inputs to this work.

Detailed Building Types: More granular classifications, generally aligned with Energy Code building prototypes, but also including buildings without defined prototypes. Detailed Building Types are used to report the forecasted floor area for these building types used for the Energy Code.

For example, school is a Broad Building Type, while High School, Large School, and K–8 School are Detailed Building Types. Each Broad Building Type was mapped to one or more Detailed Building Types. Table 1 summarizes the relationship between these two classification systems. In some cases, a Detailed Building Type may be associated with more than one Broad Building Type due to differences in classification across data sources. For example, Small Office as a Detailed Building Type appears under both office and miscellaneous Broad Building Types. This is because the Small Office Detailed Building Type covers both typical small office buildings and facilities such as post offices and courthouses. Post offices and courthouses, however, were categorized under Miscellaneous Broad Building Type by EAD. As a result, the Small Office Detailed Building Type spans both the office and miscellaneous Broad Building Types.

Further details on these mappings are provided in Table 2 in the "Detailed Building Type Shares" section.

Table 1: Allocation of Broad Building Types to Detailed Building Types

Broad Building Types (EAD/BSD)	**Detailed Building Types**
Office	(Small Office), (Medium Office), (Large Office)
Retail	Strip Mall, Medium Retail, Large Retail, Grocery
Restaurant	Restaurant
School	K-8 School, (High School), Large School
Hotel	Hotel
Hospital	Hospital
Warehouse	(Non-refrigerated Warehouse)
Refrigerated Warehouse	Refrigerated Warehouse, (Non-Refrigerated Warehouse)
Manufacturing Labs and Manufacturing Plants	Manufacturing, (Laboratory)
Parking Garage	Enclosed Parking, Open Parking
Miscellaneous	Miscellaneous, Assembly, (Small Office), (Medium Office), (Large Office), (High School), (Laboratory), (Non-refrigerated Warehouse), Vehicle Service, CEH

Note: Parentheses indicate that the Detailed Building Type is sourced from more than one Broad Building Type. As explained in the Methodology section, the miscellaneous Broad Building Type includes some Detailed Building Types that are also listed separately

1 https://www.energy.ca.gov/about/divisions-offices/assessments
2 https://www.construction.com/

under their respective Broad Building Types. The associated Detailed Building Types are shown in parentheses to differentiate them from those associated exclusively with a single Broad Building Type.

Overview

The 2028 construction forecast methodology is broken into three main steps:

1. The first step was mapping the construction starts data from Dodge [1] to Broad Building Types and then to Detailed Building Types. The construction data had location information specified at the county level and therefore, a mapping was necessary between counties and climate zones to allocate county data to climate zones.
2. For state-owned buildings, a separate dataset from the Department of General Services (DGS) [2] was used. This dataset was mapped to the appropriate Broad Building Types and Detailed Building Types, and then further mapped to climate zones using its location information. The updated DGS data was then incorporated into the Dodge dataset by removing the state-owned records from the Dodge dataset and replacing them with the DGS records. Further details are provided in the State-Owned Buildings section.
3. Lastly, the construction data-to-Detailed Building Type mapping was combined with the total forecasted square footage by Broad Building Type from EAD [3] forecast to develop the final forecasted square footage by Detailed Building Type and climate zone.

Several supplementary data sources were used to refine the analysis, including the incorporation of Dodge building stock data alongside the EAD forecast in Step 3, and use of additional sources to refine building type shares in Step 1. Further details are provided in the following sections.

Data Sources

The major data sources used for the analysis were as follows:

1. 2025 Dodge building datasets [1]: Four sets of data from the Dodge Data and Analytics group were used in this analysis including:
    - New construction starts data (CAS): Comprised of actual permits pulled for new construction within a given month. The CAS data extends from 1967 to 2025 with 2024 being the final full year of data. Buildings are categorized by CAS Structures Codes (STC) and include a wide variety of nonresidential buildings.
    - New construction completions data (CASC): Generated by Dodge from the Dodge starts database with time-to-completion lags applied to convert starts into completions. The lags were based on both project type and value class and were defined based on Dodge's internal methodology.
    - Building stock data (BSD): Estimated amount of square footage 'in place' as of the specific year, location, and building type. This data also includes construction forecasts to the year 2029.
    - Data Center data: Estimated new construction of data center buildings between 2008 and 2024.

2. 2025 DGS Dataset [2]: State-owned properties, including information on property name, year built, floor area, usage type, address, and managing agency.
3. 2022 University of California (UC) Owned Dataset [4]: Properties owned by the UC system. This dataset provides information on property name, year built, floor area, and address, and was used to refine the DGS dataset.
4. 2020 United States (US) Census Bureau [5]: Weights from the 2025 forecast, derived from US Census Bureau population data [5], were used in the 2028 analysis to map county-level construction data to California climate zones.
5. 2025 EAD forecast [3]: The forecast from EAD, serves as the primary construction forecast used in multiple analyses completed by the California Energy Commission (CEC).

Analytical Framework

Figure 1 illustrates how multiple data sources were integrated to estimate the distribution of Broad Building Types across Detailed Building Types and climate zones, as well as to determine the forecasted floor area for each Broad Building Type. These two components—the shares of Detailed Building Types and the forecasted floor area of Broad Building Types—are then combined (multiplied) to produce the final estimated floor area by Detailed Building Type across climate zones of California.

The framework describes the inputs to the analysis, which are the data sources, intermediate processing steps, and outputs at each stage of the process. Additional details on each processing step are provided in Table 2 and in subsequent sections.

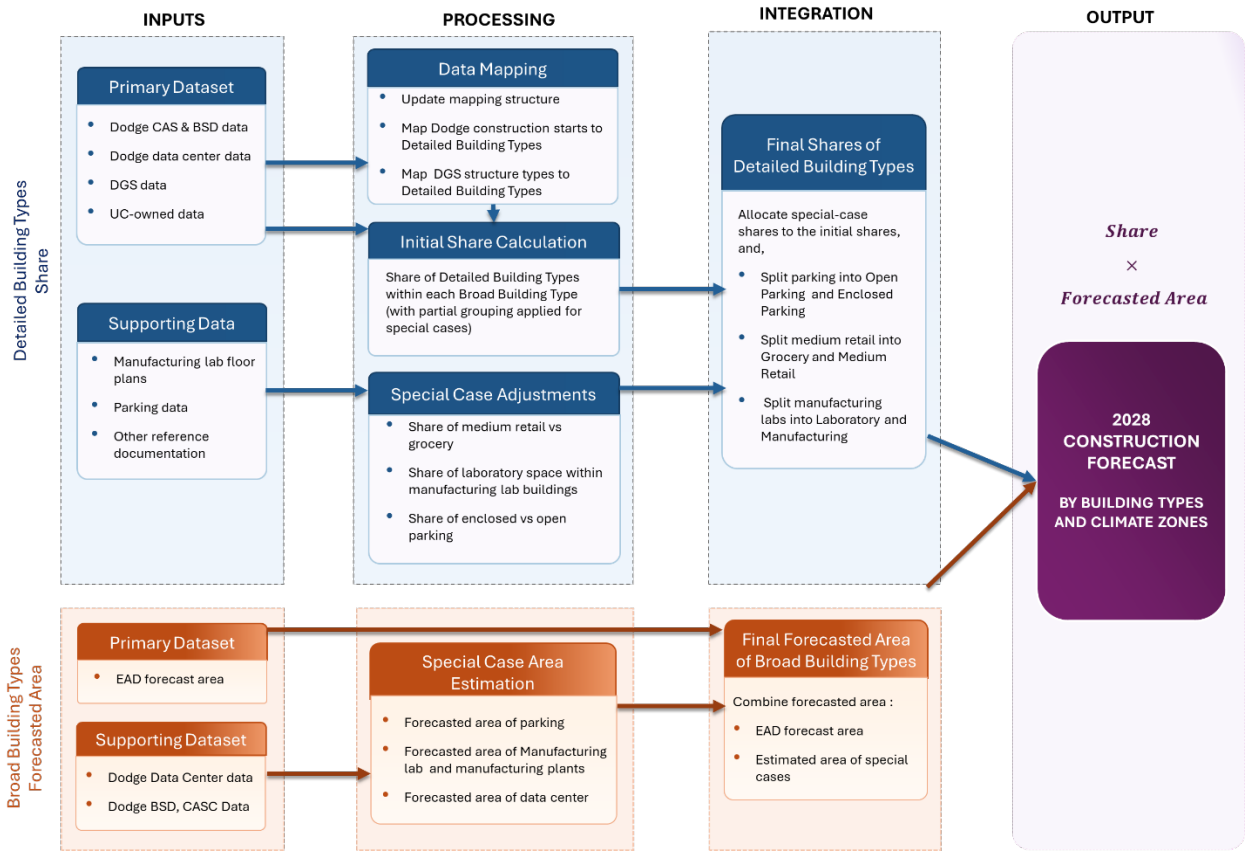

Figure 1: Analytical Framework for the 2028 Construction Forecast

Detailed Building Type Shares

Construction Starts to Detailed Building Types

Table 2 shows the mapping of STC to Detailed Building Types and Broad Building Types. The first column lists all Detailed Building Types, and the second column indicates how these types are represented in the EAD or BSD forecasts—identifying from which Broad Building Category the Detailed Building Type floor area is derived. The subsequent columns identify the specific Dodge buildings mapped to each Broad Building Type and Detailed Building Type, along with the basis for those mappings.

While the 2028 analysis builds on the mapping approach used in 2025, several key updates have been incorporated, as described below.

- Schools: In the 2028 analysis, school and college records have been handled differently than in the 2025 analysis. In 2025, schools were classified as either “Small School” or “Large School” based on building size. For 2028, the methodology was revised to reflect building use categories based on the STC codes. Under this approach, colleges and community colleges were classified as Large Schools; primary schools and junior high schools as K-8 Schools; and senior high school, vocational school and others as High Schools. This change means classification is driven by building use/function rather than floor area. Four facilities serving students with special needs have also been included in the High School Detailed Building Type.
- Warehouse and Refrigerated Warehouse: Dodge records with the STC name of “Mfg War”, which were previously misinterpreted as military manufacturing buildings due to limited documentation and ambiguity in the classification, were reclassified as either Warehouse or Refrigerated Warehouse for the 2028 analysis. This issue was identified and resolved following discussions with CEC and a review of the EAD mapping methodology, which clarified the categorization of manufacturing and military buildings. The associated existing floor area in the Dodge dataset is approximately 140 million square feet, representing about 20% of the total Manufacturing floor area in the 2025 analysis.
- Laboratory: 33 percent of the Dodge BSD [Manufacturing Laboratories] floor area was added to the Laboratory Detailed Building Type. 33 percent was derived from available data sources [6, 7]. The remaining 67 percent stayed in the Manufacturing Detailed Building Type.
- Miscellaneous: Dodge Animal/Fish/Plant records prior to 1997 were included under the Miscellaneous Detailed Building Type. These records were previously excluded from the 2025 analysis.

- Data Center: Data center projections were developed based on Dodge records. A trendline approach was used to estimate total 2028 floor area, which was then distributed across climate zones using the same proportional shares observed in the Dodge dataset.
- EAD forecast alignment: EAD's forecast classified special schools, libraries, and museums, and laboratories under EAD's miscellaneous category. The 2028 analysis aligns with this instead of the previous categorization under schools.

Table 2: Mapping of Dodge CAS data to Detailed Building Types and Broad Building Types

Detailed Building Types	Broad Building Types (EAD/BSD)	Dodge records			
		Dodge STC Names	Number of Stories	Floor Area [sf]	Notes
Assembly	Miscellaneous	*Arenas/Coliseums (Non-School/Univ); *Auditoriums (Non-School/College); *Railroad Terminals; *Religious Bldgs now in STC 53; *Gyms/Field Houses (Non-School/Univ); *YMCA/YWCA; *Amusement, Recreational (Reg 8 & 9); Airline Terminals; Arenas/Coliseums; Auditoriums; Bus, Truck and Railroad Terminals; Clubs and Lodges; Exhibition Halls; Funeral/Internment Facilities; Houses of Worship, Other Religious Bldgs; Libraries; Museums; Theaters; Miscellaneous Amusement/Recreational; Gyms/Field Houses/Indoor Pools; Bowling Alleys	Any	Any	
Controlled-environment Horticulture (CEH)	Miscellaneous	Animal/Fish/Plant Facilities	Any	Any	California legalized medicinal cannabis use in 1996. According to Dodge, recent construction in this STC is almost entirely due to controlled-environment horticulture. Construction after 1996 in animal/fish/plant facilities was mapped to CEH.
Hospital	Hospital	Hospitals; Clinics/Nursing Convalescent Facilities; *Hospitals and Other Health Treatment (incl all owner)	Any	Any	
Hotel	Hotel	Hotels/Motels 1-3 Stories; Hotels/Motels 4+ Stories; Hotels/Motels (Stories Unknown or Alts)	Any	Any	
Large Office	Office	Offices, 4+ stories; Offices, 1-3 stories; *Offices and Banks/Financial Bldgs (incl all owner); Banks/Financial, 1-3 stories; Banks/Financial, 4+ stories	≥ 5	If story data absent in Dodge and floor area ≥ 150k sf, map to Large Office	5 stories is the boundary used by PNNL [8]. The boundary of 150k sf was taken from system mapping for offices and other spaces in the 2022 NR ACM [9].
	Miscellaneous	Capitols/Court Houses/City Halls; Police/Fire Stations; Post Offices			
Medium Office	Office	Offices, 1-3 stories; Offices, 4+ stories; *Offices and Banks/Financial Bldgs (incl all owner); Banks/Financial, 1-3 stories; Banks/Financial, 4+ stories;	2 - 4	if story data absent in Dodge and floor area ≥ 25k and < 150k, map to Medium Office	2 - 4 stories is the boundary used by PNNL [8]. The boundaries of 25k and 150k sf were taken from system mapping for offices and other spaces in the 2022 NR ACM.

Detailed Building Types	Broad Building Types (EAD/BSD)	Dodge records			
		Dodge STC Names	Number of Stories	Floor Area [sf]	Notes
	Miscellaneous	Capitols/Court Houses/City Halls; Police/Fire Stations; Post Offices			
Small Office	Office	Offices, 1-3 stories; Offices, 4+ stories; *Offices and Banks/Financial Bldgs (incl all owner); Banks/Financial, 1-3 stories; Banks/Financial, 4+ stories	1	if story data absent in Dodge and floor area < 25k, map to Small Office	One story is the boundary used by PNNL [8]. The boundaries of 25k and 150k were taken from system mapping for offices and other spaces in the 2022 NR ACM.
	Miscellaneous	Capitols/Court Houses/City Halls; Police/Fire Stations; Post Offices			
Restaurant	Restaurant	Food/Beverage Service	Any	Any	
Large Retail	Retail	Stores; *Stores and Other Mercantile Bldgs	Any	≥ 50k	Typical large stores, such as Target and Home Depot are larger than 100k.
Medium Retail	Retail	Stores; *Stores and Other Mercantile Bldgs	Any	< 50k	Assumption. The average Walgreens is around 13.5k. See Grocery for how this type was split.
Grocery	Retail	Stores; *Stores and Other Mercantile Bldgs	Any	< 50k	Used PNNL's ratio of Supermarket to Medium Retail by IECC climate zone [8]. Mapped IECC climate zones to California climate zones, then same ratio was applied to California.
Strip Mall Retail	Retail	Shopping Centers	Any	Any	
Large School	School	Colleges/Universities Except Community; Community Colleges	Any	Any	
High School	School	Senior High Schools; Vocational Schools; *Schools-Educational/ Science Bldgs;	Any	Any	
	Miscellaneous	Special Schools; *Sunday Schools now in STC 53	Any	Any	
K-8 School	School	Primary Schools; Junior High Schools	Any	Any	
Laboratory	Miscellaneous	Laboratories/Testing/R&D	Any	Any	
	Manufacturing Labs	33% of All "Mfg Labs" Mfg Labs=Manufacturing Labs	Any	Any	33% is the approximate percentage of floor area of research labs in facilities that include both research and manufacturing floor areas. It is derived from [6, 7].
Warehouse	Warehouse	Warehouses (Non-Refrigerated)	Any	Any	
	Miscellaneous	*Freight Terminals, Air; *Freight Terminals, Marine; *Freight Terminals, Trucks; Freight Terminals, Truck Rail and Marine	Any	Any	

Detailed Building Types	Broad Building Types (EAD/BSD)	Dodge records			
		Dodge STC Names	Number of Stories	Floor Area [sf]	Notes
	Refrigerated Warehouse	All "Mfg War" (Manufacturing Warehouses) except those mentioned under Refrigerated Warehouse	Any	Any	
Refrigerated Warehouse	Refrigerated Warehouse	Refrigerated Warehouses; Mfg War: Food and Kindred Products; Mfg War: Chemical Plants	Any	Any	
Vehicle Service	Miscellaneous	Aircraft Service; Auto Service; Bus and Truck Service; Railroad/Boat/Other Vehicle Service; *Truck Service	Any	Any	
Manufacturing	Manufacturing Plants	All "Mfg: Plants" (Manufacturing Plants)	Any	Any	
	Manufacturing Labs	67% of the floor area of all "Mfg Labs"			67% of the floor area of all STCs beginning with 'Mfg Labs' is classified as Manufacturing and the rest is captured under Laboratory
Enclosed Parking Garage	Parking Garages	Parking Garages	Any	Any	Split with Open Parking Garage is based on publicly available parking garage data[1]
Open Parking Garage	Parking Garages	Parking Garages	Any	Any	Split with Enclosed Parking Garage based on publicly available parking garage data [10]
Miscellaneous	Miscellaneous	Miscellaneous Non-Residential Buildings, Communications Buildings, Animal/Fish/Plant Facilities before 1997	Any	Any	
Data Center	Data Center	Data Center	Any	Any	

State-Owned Buildings

For state-owned buildings, two datasets—DGS data and data from the University of California—were used to replace the Dodge state records. The state maintains comprehensive records of its own buildings supporting a wide range of administrative, operational, and analytical functions. To ensure consistency with other state analyses, the state developed datasets were used to represent state-owned buildings in this study.

The DGS dataset provides information on properties and their managing agencies, with each property encompassing multiple buildings. Because the DGS building classification system (referred to as "structure type" by DGS) differs from the terminology used by the CEC, a stepwise mapping approach was applied to align the two classification systems.

1. First, a mapping framework was developed to assign each record to a STC and subsequently a Broad Building Type (such as office, retail, school) based on both the property-level classification and the individual building's structure type. Residential, dormitory, nonbuilding, and unassigned

categories were removed. Table 3 presents the assignment of the remaining nonresidential DGS structure types to Broad Building Types.

2. Some properties included multiple buildings. For such properties, the Broad Building Type was determined based on the type of the building with the largest floor area. Properties with names explicitly referencing “UC” (University of California), “CSU” (California State University), or “School” were classified as Schools. This property-level classification was then used to assign the Broad Building Type to structures whose function is determined from the principal building.
3. State educational buildings were classified according to their associated agency, with facilities under CSU or UC categorized as Large Schools. All other state educational buildings were grouped under the High School category to reflect their operational characteristics, including extended schedules and typical HVAC system types. In practice, many of the non-universities’ state educational buildings appear to be used for employee training or after-school programs that extend beyond standard schools’ hours, making K–8 scheduling assumptions inappropriate. Additionally, based on their size and agency designation, most of these buildings do not appear to be served by central boiler/chiller systems. For these reasons, the Large School category was not appropriate for non-university state-owned educational buildings, which were instead classified as High Schools.
4. Office and retail buildings were subdivided into Detailed Building Types following the Dodge mapping methodology. Some building types were defined as subordinate uses rather than independent functions. For example, a shower, laundry, toilet, or locker room is not considered an independent building type; its function is determined by, and subordinate to, the principal building it serves. For instance, if the primary property was classified as a school, these associated spaces were also classified as school.
5. Due to missing built-year information in many DGS records, the University of California (UC-owned) building dataset was used to infer construction years. Building names that appeared in both datasets were used as the primary connector to identify potential matches between DGS records and UC-owned building records. Where a match was identified, the construction year from the UC dataset was used to supplement the missing built-year information in the DGS dataset. Following a cross-check, the DGS dataset was updated to incorporate the missing years.

Finally, the state-owned building records from the Dodge dataset were removed and replaced with the refined DGS building records.

Table 3: Mapping of DGS Structure Types to Broad Building Types

DGS structure type	Broad Building Types
First Aid Room; Hospital/Clinic/Treatment Center; Relocatable Medical Facility; Hospital/Care Facility Site; Veterinary Hospital	Hospital
Hotel/Lodge/Cabin	Hotel
Dairy; Utility; Wastewater Treatment Facility	Manufacturing Plants and Manufacturing Lab
Admissions/Toll Booth/Kiosk; Air Monitoring Station; Air Operations Building; Air Traffic Control Tower; Computer Reem; Conference Room; Credit Union; Emergency Command Center; Inspection Station; Lookout (Forestry); Lookout (Guard Station); Mailroom/Reproduction; Office (Field); Office (General); Office (Institutional); Relocatable Office; Security Room	Office

DGS structure type	Broad Building Types
Garage/Parking Structure	Parking Garage
Relocatable Refrigerator; Relocatable Freezer	Refrigerated Warehouse
Concession; Dining/Cafeteria; Kitchen	Restaurant
Barber Shop; Canteen; Relocatable Store; Store (Retail)	Retail
Classroom; Relocatable Classroom	School
Warehouse; Archives; Hangar; Relocatable Storage; Salt/Sand House; Shed; Storage; Storage Building; Vault	Warehouse
Equipment/Maintenance Building; Relocatable Shop; Service Station; Shop	Miscellaneous (Vehicle Service*)
Auditorium/Hall; Chapel; Gymnasium; Historical Building (Calif Register); Historical Building (National Register); Library; Museum; Natatorium/Swimming Pool; Recreation Building; Student Union; Theater; Training Facility; Transit Station Building; Visitation Facility; Visitor Center/Exhibit;	Miscellaneous (Assembly*)
Communication Building; Miscellaneous	Miscellaneous (Miscellaneous*)
Firehouse/Forest Fire Station; Post Office	Miscellaneous (Office *)
Hatchery/Fisheries	Miscellaneous (CEH**)
Laboratory; Relocatable Laboratory; Water Monitoring Station	Miscellaneous (Laboratory**)
Combination Restroom; Comfort Station/Restrooms/Lavatories; Floating Restroom; Fuel House; Kennel; Lactation Room; Laundry; Locker Room; Railroad Facilities; Relocatable Locker Room; Relocatable Restroom; Shower; Toilet (Vault); Used by State Program; Vending Machine Building; Weather Station; Work Change	Inherit***

*For the Miscellaneous Broad Building Type, the associated Detailed Building Types are shown in parentheses to differentiate among the various structure types.

**CEH and Laboratory are not standalone Broad Building Types; both were classified under the “miscellaneous” category. In the DGS data, however, they were directly mapped to the corresponding Detailed Building Type.

***“Inherit” is not a distinct Broad Building Type; rather, it indicates that a building adopts the classification of the primary building it serves. For example, a vending machine building associated with an office property was classified as office Broad Building Type.

Construction Data Location Mapping to California Climate Zones

Dodge data uses county codes from the Federal Information Processing Standards (FIPS) to express the county for each record in the database. Using tools available from the CEC[1], a mapping of counties and zip codes to California climate zones was created. In some cases an entire county maps to a single climate zone. However, several counties within the state include more than one climate zone mapped to zip codes within the county. So, a means of proportioning out the floor area to climate zones within those counties required more mapping using the zip code data.

Population data from the US Census Bureau by zip code was used as a proxy for construction floor area. This was consistent with the Energy Analysis Division (EAD) methodology for apportioning their forecast

[1] The zip code list and zip code to county tool provide the data: https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/climate-zone-tool-maps-and.

zones to climate zones. Thus, each record in the Dodge database, and its associated floor area, was mapped to a climate zone.

Existing and New Construction Shares

Using the floor area distributed across California's 16 climate zones and the mapping information summarized in Table 2 and Table 3, two sets of Detailed Building Type shares were developed: one for existing buildings and one for new construction. These shares represent the percentage distribution of floor area from each Broad Building Type to the corresponding Detailed Building Types.

For existing buildings, the full combined dataset was used to calculate the Detailed Building Type shares. For new construction, the shares were calculated using the average annual floor area added from 2021 through 2023. A multi-year average was used because annual new construction activity can fluctuate significantly, and relying on a single year may not provide a representative distribution across climate zones and building types.

The 2021–2023 period was selected to balance recency and representativeness. Using a more recent period helps capture current construction patterns and market trends, while using multiple years reduces the effect of year-to-year variability. Earlier years were not included to avoid potential distortions associated with reduced construction activity during the COVID-19 pandemic. An initial 2022–2023 period was evaluated; however, the two-year window did not provide sufficient coverage across all climate zones and resulted in zero representation of floor area for certain Detailed Building Type and climate zone combinations, such as hospitals in climate zone 1. Therefore, the analysis period was expanded to include 2021. Although 2021 construction activity might be somewhat below typical levels, including that year improved the distribution of new construction shares across climate zones.

Broad Building Types Forecasted Floor Area

The EAD forecast for existing and new construction buildings in California is used across the CEC for analysis and policymaking. Therefore, the objective for developing the forecasted construction floor area was to use the improved construction data-to-Detailed Building Type mapping together with the total forecasted floor area established by EAD. The EAD forecasted floor area for 2029, the first year the 2028 Energy Code will be in effect, was used for all Broad Building Types except parking garages, manufacturing laboratory and manufacturing plants, for which EAD does not provide forecasts. For these categories, Dodge BSD and CASC datasets were used to extract data for both newly constructed and existing buildings. For existing buildings, the 2029 forecast from the BSD dataset was applied directly. 2028 building stock is estimated as the building stock for 2027 plus new construction in 2028 less demolition in 2028. An average demolition rate was calculated based on data from 2004 through 2023, and applied to the 2027 BSD projection to estimate the demolished area. Then this estimated area was combined with the year-over-year change in BSD projections between 2027 and 2028 to derive the gross new construction area.

The EAD forecast uses the same Dodge CAS database, and because the Detailed Building Types (developed here) and the EAD Broad Building Types were both mapped to the STCs, there was a correspondence between the EAD Broad Building Types and the Detailed Building Types. However, the correspondence was not one-to-one. As described previously, the EAD analysis groups STCs into broad building categories appropriate for an econometric model, which is different from the Detailed Building Types grouping developed here that is suitable for code analysis.

RESULTS

The results calculated by combining the estimated shares of Detailed Building Types with the floor area of each Broad Building Type, derived from EAD and BSD, are presented in Table 4 through Table 8 by climate zone.

Table 4 shows the forecasted 2028 nonresidential new construction floor area for building types with prototypes. Table *5* shows the same information as Table 4 except as a percentage of the total floor area. Table 6 shows the floor area of Detailed Building Types that do not have matching prototypes. Table 7 and Table 8 show the existing buildings floor area by climate zone and building type for prototyped and non-prototyped buildings, respectively.

The current forecasted floor area for Data Center buildings is subject to change. The estimate is based on currently available Dodge data center records, which may not represent the California data center building stock. The estimate may be refined as additional information is incorporated. After the review is complete, the report will be updated, and a final version will be issued, or an amendment will be prepared.

Table 4: 2028 forecasted nonresidential new construction floor area (millions of square feet) for building types with matching prototypes.

	Climate Zone															
Detailed Building Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Large Office	0	0	2.6873	1.3067	0	1.3482	1.0063	1.9950	4.6512	0.6521	0	3.2248	0	0.2151	0.0431	0.0295
Medium Office	0.0892	0.6786	1.2519	0.9677	0.3828	1.4325	0.8697	2.0598	2.5619	1.5211	0.3920	0.3758	0.5392	0.3245	0.2547	0.1260
Small Office	0.0483	0.1502	0.3027	0.0523	0.1116	0.2171	0.0256	0.2933	0.6438	0.1921	0.0890	0.3763	0.3332	0.0910	0.0469	0.0428
Large Retail	0	0	1.7721	0.3515	0.0807	0.8687	0.9966	1.1808	1.8848	0.9389	0.3579	0.8443	0	0.0788	0.1181	0.0703
Medium Retail	0.0992	0.5601	0.8065	0.6717	0.1012	0.7494	0.4268	1.0138	2.0367	1.9643	0.2411	2.2203	1.2307	0.4186	0.3143	0.1382
Strip Mall	0	0	0.0966	0.2966	0.0894	0.5479	0	0.9080	0.6857	0.6676	0	0.0859	0.0719	0.3037	0.0502	0.0412
Large School	0.0750	0.2305	1.1456	0.4571	0.1085	0.6130	0.5610	1.0340	1.1688	0.4045	0.0854	0.3356	0.1650	0.1148	0.0150	0.0221
High School	0.0063	0.1735	0.6641	0.4190	0.1713	0.3859	0.3814	0.2933	0.8304	0.4914	0.1315	0.7133	0.6086	0.1408	0.0385	0.0292
K-8 School	0.0041	0.1599	0.4179	0.2428	0.0302	0.3232	0.3011	0.4982	1.0991	0.8820	0.3510	1.2594	0.3826	0.1412	0.1815	0.1014
Non-refrigerated Warehouse	0.0621	0.4288	1.9253	0.9912	0.1707	1.4211	0.6673	2.0490	3.0206	2.1720	0.4921	2.5681	0.7919	0.4970	0.3901	0.1591
Hotel	0.0333	0.1976	0.8781	0.4499	0.0938	0.5403	0.4744	0.7722	1.1371	0.5026	0.1357	0.7324	0.2426	0.1247	0.0949	0.0404
Assembly	0.1136	0.4288	0.4785	0.7071	0.0488	0.7687	0.5101	1.1296	2.0891	0.8987	0.2103	1.2626	0.3455	0.1119	0.2066	0.0726
Hospital	0.0364	0.2164	0.9242	0.4715	0.0998	0.3756	0.4884	0.5337	0.9920	0.8033	0.1767	0.9213	0.3541	0.1525	0.0913	0.0552
Laboratory	0.000016	0.0087	2.3957	0.2665	0.00084	0.1828	0.6684	0.3041	0.2278	0.4987	0.0020	0.7976	0.3351	0.0475	0.0129	0.0186
Restaurant	0.0137	0.0815	0.3105	0.1581	0.0317	0.3444	0.2057	0.5055	0.8240	0.4909	0.0751	0.3409	0.1543	0.1146	0.0548	0.0335
Enclosed Parking Garage	0.00047	0.0333	1.4103	1.5166	0.0080	0.8949	0.9810	1.9426	1.9197	0.1221	0.0452	0.0814	0.0090	0.0270	0.0066	0.0137
Open Parking Garage	0.0061	0.4303	1.9062	2.0500	0.1030	1.2630	1.6691	2.7417	2.7094	1.5792	0.5842	1.0529	0.1163	0.3491	0.0855	0.1778

Table 5: Percent distribution of 2028 nonresidential new construction floor area across prototypes and climate zones.

	Climate Zone																
Detailed Building Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**Prototype Total**
Large Office	0.0%	0.0%	1.7%	0.8%	0.0%	0.9%	0.7%	1.3%	3.0%	0.4%	0.0%	2.1%	0.0%	0.1%	0.0%	0.0%	11.1%
Medium Office	0.1%	0.4%	0.8%	0.6%	0.2%	0.9%	0.6%	1.3%	1.7%	1.0%	0.3%	0.2%	0.3%	0.2%	0.2%	0.1%	9.0%
Small Office	0.0%	0.1%	0.2%	0.0%	0.1%	0.1%	0.0%	0.2%	0.4%	0.1%	0.1%	0.2%	0.2%	0.1%	0.0%	0.0%	2.0%
Large Retail	0.0%	0.0%	1.1%	0.2%	0.1%	0.6%	0.6%	0.8%	1.2%	0.6%	0.2%	0.5%	0.0%	0.1%	0.1%	0.0%	6.2%
Medium Retail	0.1%	0.4%	0.5%	0.4%	0.1%	0.5%	0.3%	0.7%	1.3%	1.3%	0.2%	1.4%	0.8%	0.3%	0.2%	0.1%	8.4%
Strip Mall	0.0%	0.0%	0.1%	0.2%	0.1%	0.4%	0.0%	0.6%	0.4%	0.4%	0.0%	0.1%	0.0%	0.2%	0.0%	0.0%	2.5%
Large School	0.0%	0.1%	0.7%	0.3%	0.1%	0.4%	0.4%	0.7%	0.8%	0.3%	0.1%	0.2%	0.1%	0.1%	0.0%	0.0%	4.2%
High School	0.0%	0.1%	0.4%	0.3%	0.1%	0.2%	0.2%	0.2%	0.5%	0.3%	0.1%	0.5%	0.4%	0.1%	0.0%	0.0%	3.5%
K-8 School	0.0%	0.1%	0.3%	0.2%	0.0%	0.2%	0.2%	0.3%	0.7%	0.6%	0.2%	0.8%	0.2%	0.1%	0.1%	0.1%	4.1%
Non-refrigerated Warehouse	0.0%	0.3%	1.2%	0.6%	0.1%	0.9%	0.4%	1.3%	2.0%	1.4%	0.3%	1.7%	0.5%	0.3%	0.3%	0.1%	11.5%
Hotel	0.0%	0.1%	0.6%	0.3%	0.1%	0.3%	0.3%	0.5%	0.7%	0.3%	0.1%	0.5%	0.2%	0.1%	0.1%	0.0%	4.2%
Assembly	0.1%	0.3%	0.3%	0.5%	0.0%	0.5%	0.3%	0.7%	1.4%	0.6%	0.1%	0.8%	0.2%	0.1%	0.1%	0.0%	6.1%
Hospital	0.0%	0.1%	0.6%	0.3%	0.1%	0.2%	0.3%	0.3%	0.6%	0.5%	0.1%	0.6%	0.2%	0.1%	0.1%	0.0%	4.3%
Laboratory	0.0%	0.0%	1.6%	0.2%	0.0%	0.1%	0.4%	0.2%	0.1%	0.3%	0.0%	0.5%	0.2%	0.0%	0.0%	0.0%	3.7%
Restaurant	0.0%	0.1%	0.2%	0.1%	0.0%	0.2%	0.1%	0.3%	0.5%	0.3%	0.0%	0.2%	0.1%	0.1%	0.0%	0.0%	2.4%
Enclosed Parking Garage	0.0%	0.0%	0.9%	1.0%	0.0%	0.6%	0.6%	1.3%	1.2%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	5.8%
Open Parking Garage	0.0%	0.3%	1.2%	1.3%	0.1%	0.8%	1.1%	1.8%	1.8%	1.0%	0.4%	0.7%	0.1%	0.2%	0.1%	0.1%	10.9%
Total	0.4%	2.4%	12.5%	7.4%	1.1%	7.9%	6.6%	12.5%	18.4%	9.6%	2.2%	11.1%	3.7%	2.1%	1.3%	0.8%	100.0%

Table 6: 2028 forecasted nonresidential new construction floor area (millions of square feet) for building types without prototypes.

	Climate Zone															
Detailed Building Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Grocery	0.0075	0.0738	0.0878	0.0930	0.0140	0.0474	0.0256	0.0609	0.1237	0.1180	0.0149	0.1343	0.0739	0.0251	0.0191	0.0094
Refrigerated Warehouse	0.0060	0.0358	0.1747	0.0883	0.0194	0.0483	0.0076	0.0692	0.1152	0.0616	0	0.0362	0.1133	0.0188	0.0096	0.0119
CEH	0.00047	0.0554	0.1358	0.0426	0.0731	0.0074	0.0786	0.0064	0.0064	1.1750	0.0050	0.0604	0.0242	0.3862	0.0476	0.0602
Vehicle Service	0.00087	0.0646	0.0642	0.4895	0.0120	0.4630	0.0548	0.6020	0.5321	0.2623	0.2832	0.5397	0.1490	0.0572	0.0503	0.0249
Data Center	0	0.00014	0.0837	1.0194	0.0010	0.0020	0.0012	0.0040	0.0086	0.00048	0	0.1582	0	0.00047	0.0000011	0.00044
Manufacturing	0.0025	0.0637	0.1364	0.2439	0.0426	0.0835	0.0537	0.1139	0.1596	0.2637	0.0259	0.1496	0.1110	0.0575	0.0270	0.0250
Miscellaneous	0	0	0	0	0	0.3156	0	0.4743	1.1759	0.0020	0	0.0089	0	0.0300	0.000014	0.0090

Table 7: 2028 forecasted nonresidential existing construction floor area (millions of square feet) for building types with matching prototypes.

	Climate Zone															
Detailed Building Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Large Office	0.0565	2.805	132.12	66.18	1.677	106.03	74.40	170.77	301.78	62.35	2.759	88.00	8.659	20.67	4.130	4.480
Medium Office	2.816	29.28	71.22	39.58	12.68	49.01	44.83	61.07	83.34	69.54	17.00	95.23	24.95	13.37	10.34	4.109
Small Office	4.464	12.41	19.56	9.022	7.015	13.19	8.446	13.18	22.07	24.63	10.64	40.87	22.73	5.575	7.389	2.948
Large Retail	1.045	9.470	61.37	28.14	4.565	34.86	27.11	47.31	70.07	59.46	12.58	63.03	24.77	12.00	10.56	3.552
Medium Retail	1.230	13.28	45.94	25.98	5.378	47.41	35.90	71.11	111.65	73.07	10.69	63.99	26.05	16.86	9.831	5.659
Strip Mall	3.462	10.14	38.11	18.88	5.214	42.85	28.96	59.78	86.14	72.63	12.43	50.86	26.03	16.61	9.578	4.949
Large School	2.463	6.453	55.63	21.61	5.067	35.87	17.35	30.95	51.35	17.18	4.685	35.17	6.30	3.063	1.115	1.641
High School	1.448	9.951	28.70	17.06	3.604	24.09	23.23	42.97	66.34	48.91	9.837	40.57	26.98	11.92	6.847	3.944
K-8 School	0.6427	10.80	28.00	18.16	2.960	20.64	22.97	40.91	56.55	55.15	13.46	45.69	28.04	11.96	7.824	3.908
Non-refrigerated Warehouse	3.525	20.52	107.79	53.77	9.756	95.70	50.80	137.48	211.45	194.41	33.21	141.57	55.70	41.48	30.80	12.40
Hotel	1.722	10.23	45.42	23.33	4.758	31.04	33.89	42.84	64.99	36.99	6.897	39.47	12.76	7.897	5.625	2.383
Assembly	3.204	14.71	62.75	26.13	4.953	48.15	29.72	76.39	101.41	79.83	14.48	60.60	25.82	16.56	10.82	5.492
Hospital	1.998	11.87	50.95	25.95	5.498	30.85	29.47	44.54	72.89	41.81	11.53	55.81	24.32	9.286	4.835	3.401
Laboratory	0.4082	4.226	43.44	37.31	0.8915	11.33	19.53	15.90	16.39	16.94	0.9838	14.89	5.376	2.212	0.5969	0.7177
Restaurant	0.6137	3.646	14.59	7.424	1.519	17.00	10.74	24.60	39.73	33.66	3.599	17.27	7.881	7.077	3.576	1.954
Enclosed Parking Garage	0.0181	0.6171	44.03	32.78	0.3204	31.64	23.98	63.93	76.63	3.124	0.4684	3.348	0.5029	0.9565	0.1706	0.4719
Open Parking Garage	0.2344	7.980	59.52	44.31	4.143	44.66	40.79	90.23	108.16	40.40	6.058	43.30	6.503	12.37	2.206	6.103

Table 8: 2028 forecasted nonresidential existing construction floor area (millions of square feet) for building types without prototypes.

	Climate Zone															
Detailed Building Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Grocery	0.0935	1.751	5.002	3.597	0.74	3.000	2.16	4.271	6.781	4.389	0.6612	3.869	1.565	1.013	0.5963	0.3846
Refrigerated Warehouse	0.0366	1.053	1.480	0.5559	0.6446	0.9453	0.0702	0.98	1.622	1.348	0.6032	4.754	4.857	0.3981	0.3215	0.2544
CEH	0.5147	0.4388	2.145	0.6292	5.332	6.593	0.8460	0.6048	1.302	8.039	2.282	4.207	4.381	2.173	0.6638	0.3778
Vehicle Service	0.9804	5.647	22.49	8.733	2.737	28.06	15.62	42.09	67.77	47.32	6.296	33.65	16.02	13.14	5.672	3.291
Data Center	0	0.0010	0.6177	7.520	0.0074	0.0149	0.0085	0.0292	0.0635	0.0036	0	1.167	0	0.0035	0.000008	0.0033
Manufacturing	3.416	14.55	48.90	69.68	4.607	67.47	30.56	114.29	156.12	44.31	9.541	42.35	21.11	15.31	4.368	8.313
Miscellaneous	0.4301	6.498	11.37	4.957	1.332	8.673	3.932	10.33	19.37	9.207	3.684	17.00	5.292	2.407	1.302	1.295

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