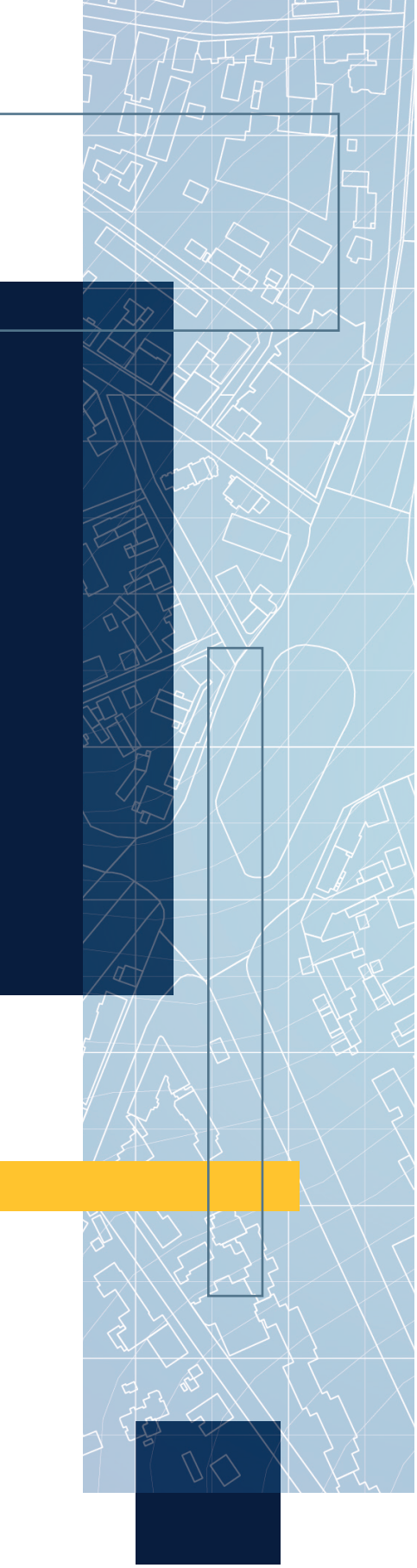

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Strip Malls to Homes: An Analysis of Commercial to Residential Conversions in California

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Introduction

After decades of constrained residential development in California, the state's housing costs have become the most expensive in the country. The consequences with respect to affordability for current and potential residents and their ability to live here are evident, with troubling implications for equality of opportunity, racial equity, access to jobs and commute patterns, and the climate.

One way of creating more housing in the state is to repurpose commercial properties for residential use, an idea that had been gaining traction in Sacramento even before the COVID-19 pandemic. The underutilization of commercial land used for office and retail has only accelerated given the tremendous uncertainty around remote work and brick-and-mortar retail in a post-pandemic economy.

A number of bills have been introduced in the state legislature to loosen restrictions on conversions of land from commercial to residential use statewide, and localities have also taken it upon themselves to create more flexible zoning and land use regulations to accommodate such conversions. That said, it is not clear how effective such policies will be in catalyzing the desired housing production, and policymakers need more tools at their disposal to fully understand how new housing on commercial properties fits into their overall housing strategies.

To better understand the role that residential redevelopment of commercial properties could play in addressing California's housing needs, this paper first estimates the amount of housing recently built on commercial lands in the state's four largest metro areas, and the extent to which it accounts for each region's overall growth. We also provide an estimate of the amount of housing that is likely to be built on commercial lands going forward under status quo land use policy and development practices. In addition, the paper sheds light on the location and characteristics of commercial land use that have been converted to residential use.

Key Findings

Conversions from commercial to residential use made up varying shares of overall housing growth, depending on the region.

From 2014 to 2019, about 38,000 homes were built on commercially zoned land across the state's four major metro areas. Of those homes, 28,000 were built in the Los Angeles region, contributing 13.8 percent of the region's net housing growth during that period. The shares were even higher for Los Angeles County (30.6 percent), potentially signaling the effectiveness of the City of Los Angeles and other Los Angeles County jurisdictions' existing allowance of conversions. In the San Francisco Bay Area, about 9,300 homes were built on previously commercial land over the period and contributed about 8.5 percent of net housing growth. Such development comprised only 2.0 percent of net housing growth in the San Diego metro area and just 0.6 percent in the Sacramento region.

Only slightly more housing can be expected to be built over the next five years on commercial land.

A predictive model of the status quo scenario yields 5-year predictions of housing construction on commercial lands slightly above those seen from 2014 to

2019, with almost 32,000 new units in the Los Angeles region and over 11,000 in the San Francisco Bay Area. These estimates represent just a small fraction—about 4 percent—of each region's state-determined housing production goals, signaling that additional housing strategies are also necessary.

Such conversions are substantially more likely near the metropolitan center, but they are not unique to downtowns.

They are more likely to occur when there are no existing buildings on a site or when existing buildings are particularly old.

Background

Interest in converting commercial properties into residential developments has increased in recent years for a number of reasons. Before the COVID-19 pandemic, traditional brick-and-mortar retail was already experiencing a slow decline given a shift towards e-commerce. The pandemic threatens to accelerate that shift, leaving retail centers even more underutilized. Moreover, with more employers incorporating flexible remote-work policies, some office properties may lose value and could be potentially good candidates for housing development.

In California, the legislature has put forward a handful of proposals designed to loosen regulations on building homes on commercial property, including Assembly Bills 3107 (2020) and 115 (2021) from Assemblymember Richard Bloom, and Senate Bills 1385 (2020) and 6 (2021) from Senator Anna Caballero. These bills ultimately did not advance, though similar proposals may be forthcoming.

At the local level, cities are under increasing pressure to meet new state-mandated housing goals established by the Regional Housing Needs Assessment (RHNA). To meet the housing goals in the 6th RHNA cycle, cities are looking at restructuring land use regulations to allow for more growth in areas that currently are restricted to retail and office use.

In 2020, the Terner Center estimated how much land in California is zoned for commercial uses, and found that there are significant amounts of land in every community that are reserved for commercial uses, such as office or retail. We found that commercial acreage per capita is greater in outlying suburban areas and in smaller cities. That report also examined local commercial zoning designations to determine the extent to which commercially zoned land already allowed for residential development. We found that about 40 percent of the commercial zoning designations in the 50 largest California jurisdictions do not appear to allow residential development in commercial areas. A random sample of statewide commercial zoning codes found that roughly 30 percent of those designations prohibit residential development.

Methodology

This paper analyzes commercial to residential conversions that took place between 2014 and 2019 in order to estimate their contribution to the housing supply in recent years and to gauge their potential importance to producing new housing going forward.

The analysis focuses on conversions in California's four largest metropolitan areas:

- The five-county Los Angeles-Long Beach, CA Consolidated Statistical Area
- The twelve-county San Jose-San Francisco-Oakland, CA Consolidated Statistical Area
- The (one-county) San Diego-Carlsbad, CA Core-Based Statistical Area
- The seven-county Sacramento-Roseville, CA Consolidated Statistical Area

In order to focus our analysis on developed land areas, we exclude census tracts that have a low population density and that are also geographically large; we use a density of less than 200 people per square mile and a land area greater than 25 square miles as the thresholds.[1,2] Commercial land is defined as parcels that are designated for office or retail use. We exclude commercially designated greenfield land that is unbuilt, as well as parcels mixing commercial and residential use, which are treated as residential.[3,4]

To identify commercial to residential conversions, we compared parcel-level county assessor data from 2019 with earlier data from 2014 and looked for changes of land use designation from commercial to residential. The data for 2014 and 2019 were obtained from the same provider and were matched to the fullest extent possible through longitudinal record identification keys (96.8 percent of records from 2014), supplemented by spatial matching (an additional 2.6 percent).[5,6,7,8]

County assessor data is often incomplete with respect to the number of residential units constructed. In 30.6 percent of cases in which a parcel converted from commercial to residential use, the number of dwelling units developed post-conversion is not observed. We address such cases by using the average density (units per acre) of the 10 nearest conversions to derive an estimated number of units.[9,10] Those estimates then helped inform aggregate estimates of the total number of housing units built on previously commercial land from 2014 to 2019.

We then predict the number of units likely to be developed on previously commercial lands over a 5-year horizon mirroring the previous 2014-2019 period using a two-step process:

- First, we estimate the probability that each commercial parcel was converted to residential use using a binary outcome (logit) model. We estimate the probability of conversion for the set of candidate commercial parcels in 2014 using a set of predictors capturing aspects of the existing commercial use, as well as certain local area characteristics and proximity to observed conversions.[11]

- We then estimate the number of units that would be built on each parcel if it were converted to residential use. We do so by applying the average density (units per acre) of the 10 nearest conversions observed in the data with information on their unit count (the same method used earlier to infer unit counts for past conversions that are missing unit count data).

The model estimated in the first step is then applied to all candidate commercial parcels as of 2019, resulting in an estimated probability of conversion for every individual parcel. Each parcel's "contribution" of housing to the prediction is then taken as its probability of conversion times the estimated number of units that would be built on it if it were converted, obtained in the second step. Finally, the total number of units predicted to be built on previously commercial land is taken as the sum of each parcel's "contribution."

The predictions correspond to a 5-year horizon that mirrors the 2014-2019 period, and to a status quo scenario in which legislative, planning, and market circumstances remain more or less the same as they were in the 2014-2019 period. Actual circumstances may stray from the status quo scenario, especially if new legislation is enacted that facilitates commercial to residential conversions, in which case the likely effect of new circumstances on the amount of conversions taking place becomes a key question.

Findings

Conversion from commercial to residential in California between 2014 and 2019 was limited.

In the state's four major metro regions, less than 1 percent of all commercially zoned parcels were converted to residential use between 2014 and 2019, yielding just over 38,000 estimated new housing units. Full metro area estimates are found in Table 1.

The Los Angeles metro area experienced the most commercial conversion of any major metro region, with about 0.72 percent of commercial parcels across the five-county region converted from commercial to residential use (just over 1,000 parcels), adding approximately 28,000 new units (Figure 1). As seen in Table 1, these conversions account for just 0.65 percent of the overall commercial area in the region.[12]

In the Bay Area, the parcel conversion rate over the period was higher, at 0.95 percent. Certain counties had higher rates of conversion; for example, San Francisco and Alameda County commercial properties converted to residential at a rate of 1.79 percent and 1.43 percent, respectively. Just over 9,000 new homes were built as a result of conversions in the Bay Area, with Santa Clara County representing the largest number (approximately 3,500) (Figure 2).

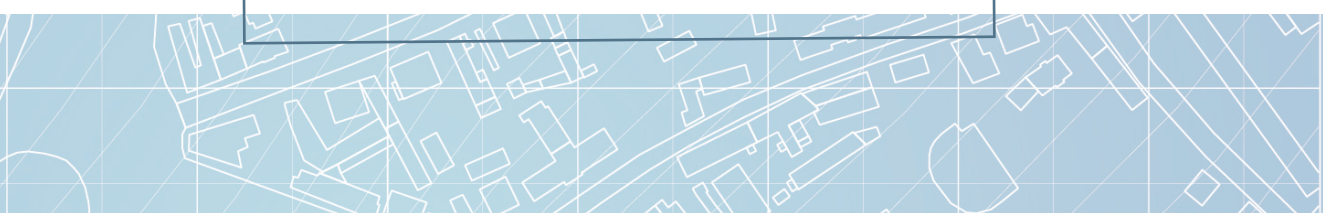


Table 1. Commercial to Residential Conversions, Rates, and Total Units Built, 2014-2019

	Commercial (2014)		Converted to Residential (2014-2019)		Conversion Rate		Average Parcel's Observed Post-Conversion Housing Density	Estimated Housing Units Built on Previously Commercial Land (2014-2019)
	Parcels	Acres	Parcels	Acres	Parcels	Acres	Units per Acre	
Los Angeles-Long Beach, CA CSA	**139,912**	**151,142**	**1,010**	**981**	**0.72%**	**0.65%**	**45.2**	**28,011**
Los Angeles County	76,810	44,986	602	266	0.78%	0.59%	63.8	23,984
Orange County	19,758	29,382	164	263	0.83%	0.89%	10.9	2,955
Riverside County	22,802	51,767	150	392	0.66%	0.76%	34.7	405
San Bernardino County	15,768	20,141	59	50	0.37%	0.25%	9.7	229
Ventura County	4,774	4,866	35	10	0.73%	0.21%	10.3	437
San Jose-San Francisco-Oakland, CA CSA	**56,484**	**52,334**	**536**	**355**	**0.95%**	**0.68%**	**43.9**	**9,298**
Santa Clara County	11,540	12,311	77	217	0.67%	1.76%	24.6	3,482
Alameda County	9,623	8,105	138	36	1.43%	0.44%	47.2	1,754
Contra Costa County	6,152	6,030	32	11	0.52%	0.18%	31.8	561
San Francisco County	5,185	1,218	93	15	1.79%	1.20%	94.8	2,369
San Joaquin County	4,502	5,092	32	13	0.71%	0.25%	8.9	155
San Mateo County	5,004	5,353	23	18	0.46%	0.34%	13.4	266
Sonoma County	4,495	4,455	39	19	0.87%	0.42%	13.8	44
Solano County	2,790	2,805	76	15	2.72%	0.53%	24.4	484
Marin County	2,751	2,712	4	1	0.15%	0.05%	7.4	8
Santa Cruz County	2,605	2,346	12	3	0.46%	0.12%	11.5	23
Napa County	1,502	1,670	10	8	0.67%	0.50%	5.4	151
San Benito County	335	238	0	0	0.00%	0.00%	...	0
San Diego-Carlsbad, CA Metro Area	**17,398**	**18,450**	**62**	**50**	**0.36%**	**0.27%**	**30.5**	**921**
San Diego County	17,398	18,450	62	50	0.36%	0.27%	30.5	921
Sacramento-Roseville, CA CSA	**15,401**	**20,700**	**63**	**78**	**0.41%**	**0.38%**	**8.2**	**157**
Sacramento County	8,818	11,178	27	10	0.31%	0.09%	8.4	100
Placer County	2,934	4,124	11	25	0.37%	0.60%	7.2	17
Yolo County	1,391	1,988	5	1	0.36%	0.06%	19.4	15
El Dorado County	879	2,025	9	39	1.02%	1.92%	4.1	10
Sutter County	600	763	7	2	1.17%	0.31%	5.9	7
Yuba County	485	347	2	0.4	0.41%	0.11%	18.0	5
Nevada County	294	276	2	0.4	0.68%	0.14%	18.1	2

Note: See methodology section for more detail.

Figure 1. Commercial to Residential Conversions—Downtown Los Angeles and Areas West

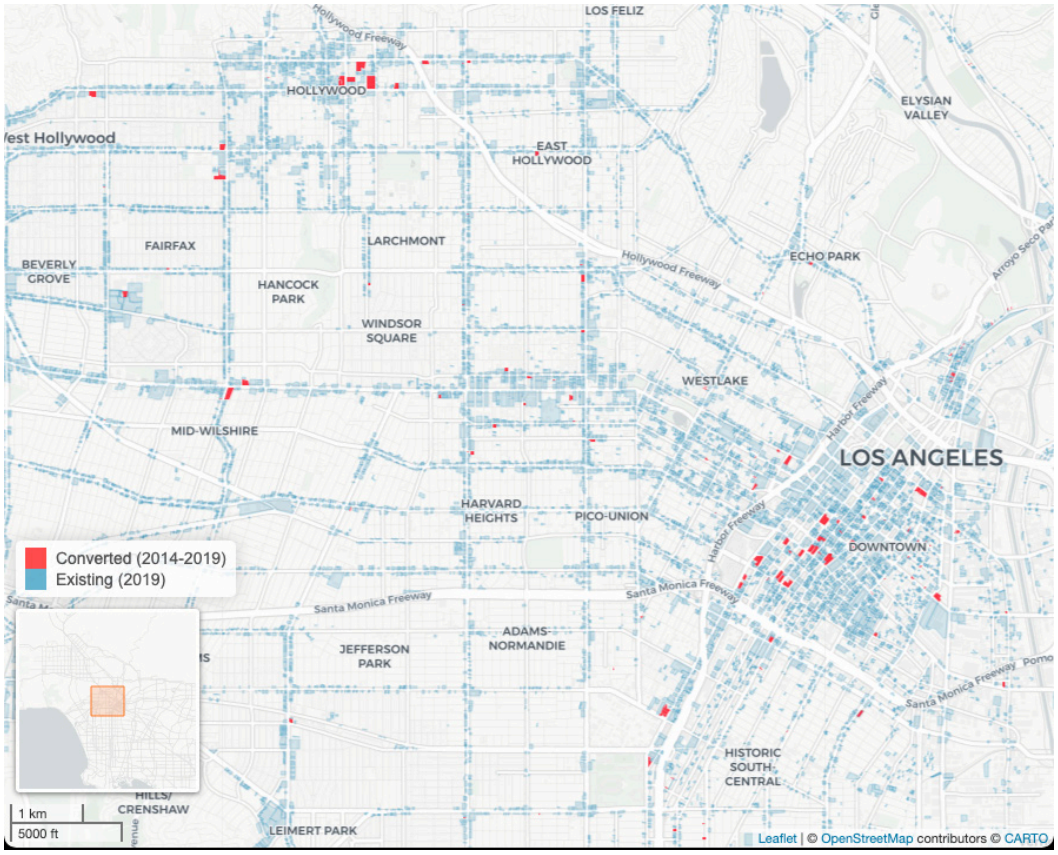
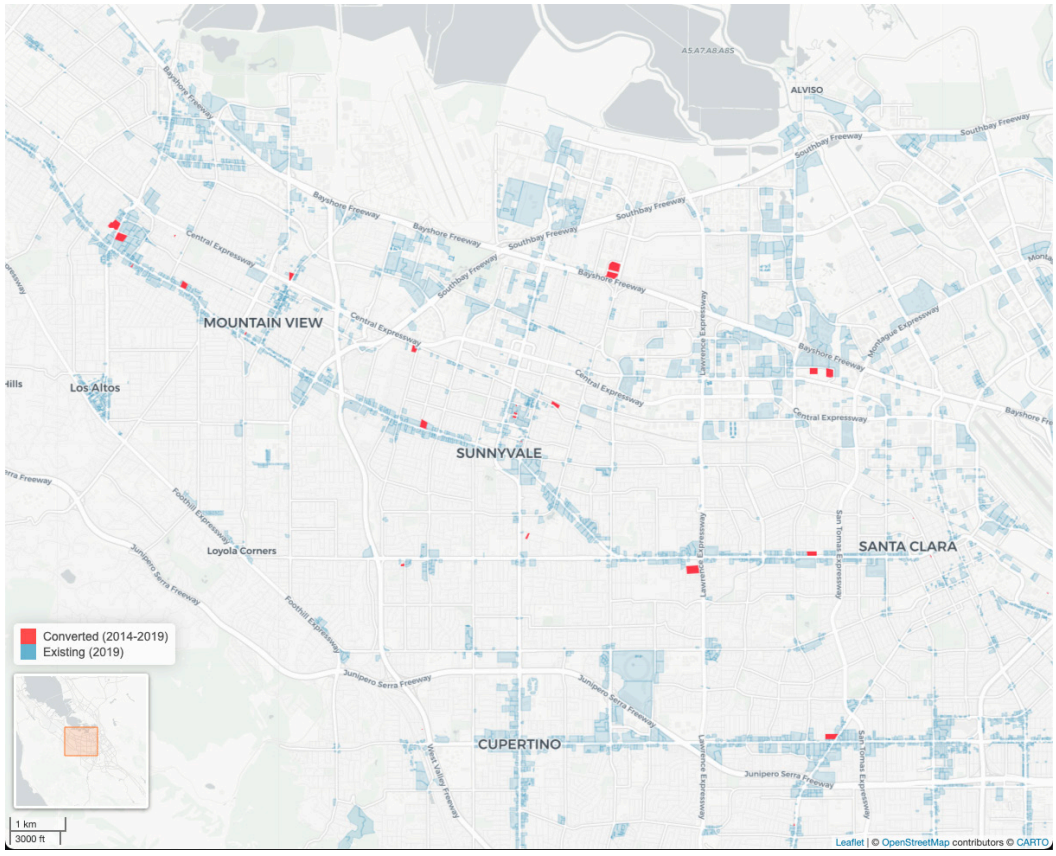


Figure 2. Commercial to Residential Conversions—Areas West of Downtown San Jose



The state's two other major metro areas—San Diego and Sacramento—experienced far less commercial to residential conversions, at 0.36 and 0.41 percent respectively. These conversions resulted in just under 1,000 homes in San Diego and 150 in Sacramento (Figures 3 and 4).

The density of the resulting residential development in commercial conversions varied significantly. For example, in Los Angeles County, residential conversions were developed at 63.8 units per acre. This density is typical of large 4- and 5-story multifamily buildings with some land set aside for parking.[13] In contrast, the average converted parcel elsewhere in the Los Angeles region was much lower, e.g., 10.9 and 10.3 units per acre in Orange and Ventura Counties.

In the Bay Area, the density of residential development in commercial conversions was the highest in San Francisco County at 94.8 units per acre but it was also high enough to indicate the prevalence of multifamily development in Alameda, Contra Costa, and Santa Clara Counties. The corresponding densities in San Mateo and Marin Counties, on the other hand, were just 13.4 and 5.4 units per acre.

In the San Diego metro area, the density of residential development in commercial conversions was 30.5 units per acre, and in the Sacramento region it was 8.2.

Figure 3. Commercial to Residential Conversions—Downtown Area San Diego

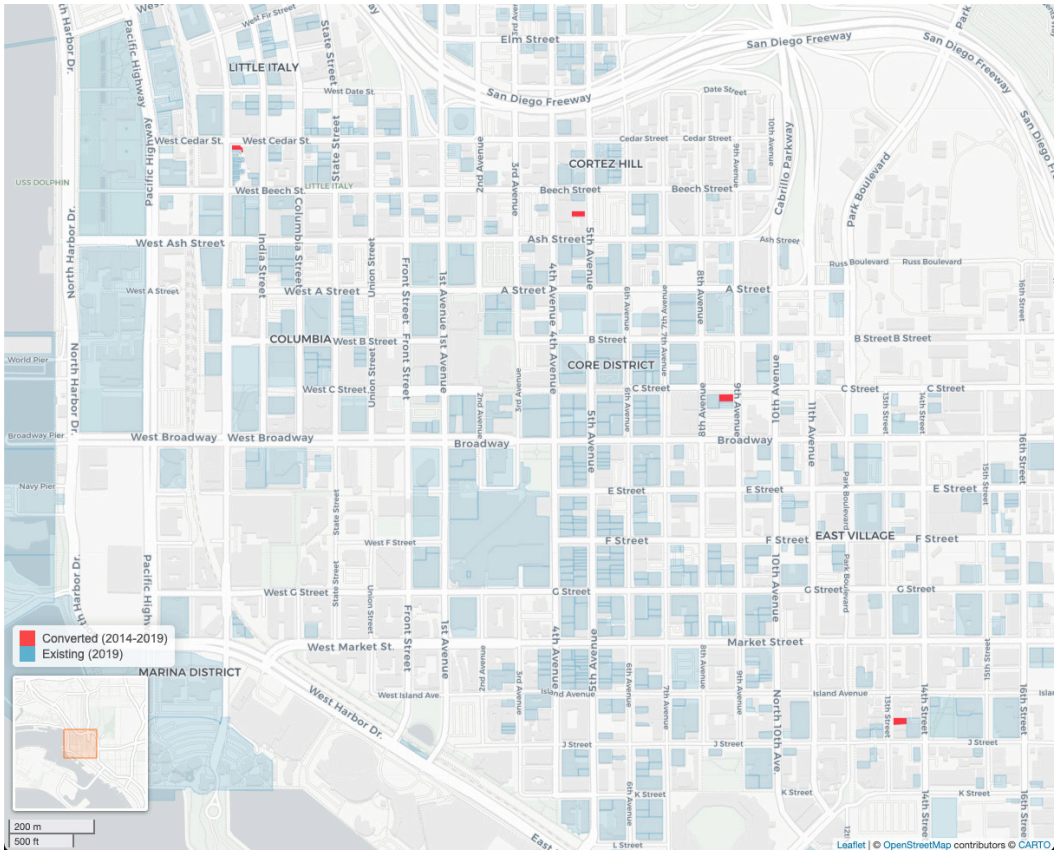
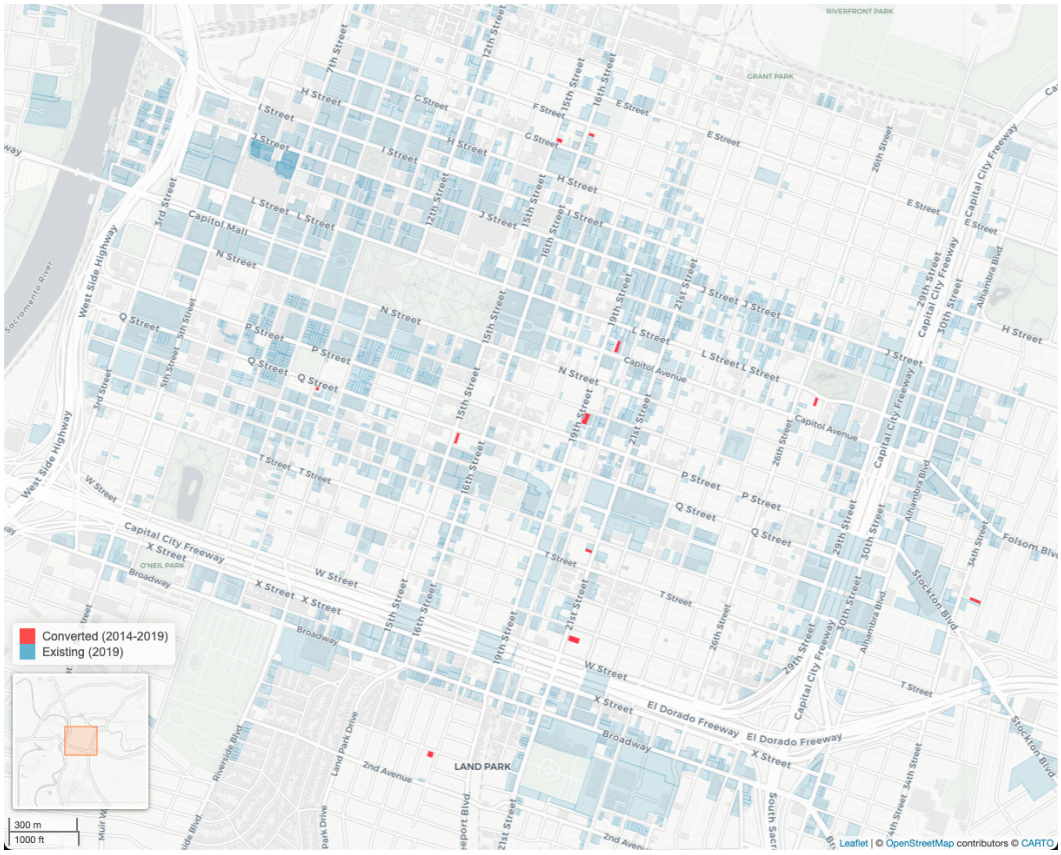


Figure 4. Commercial to Residential Conversions—Downtown Area Sacramento



New homes built on commercial parcels comprised meaningful amounts of overall housing growth in areas where commercial to residential conversions are likely explicitly allowed.

The amount of new homes built on commercial land made up relatively small amounts of each region's overall housing production between 2014 and 2019 (Table 2), though we find higher prevalence of conversions in jurisdictions that explicitly allow residential development on commercially zoned land. Based on the analysis of commercial land use designations conducted in Residential Redevelopment of Commercially Zoned Land in California, we found nearly double the rate of conversions in cities that allow multifamily development in commercial areas compared with those that do not.[14] Specifically, where multifamily was allowed, the conversation rate was 10.3 percent between 2014 and 2019, whereas it was just 5.7 percent where commercial designations did not allow multifamily.

Similarly, in the nation's two larger regions, where it is more common to allow multifamily residential development in commercial areas, conversions accounted for a larger share of overall housing growth. In the Los Angeles area, the 28,000 units built on previously commercial parcels accounted for 13.8 percent of the region's 202,500 new units built over the 5-year period, per U.S. Census figures.[15] In other words, roughly one of every seven net new homes built in the Los Angeles region was built on previously commercial land. This figure is driven largely by Los Angeles County, where housing built on previously commercial land accounts for 30.6 percent

Table 2. Commercial to Residential Conversion Share of Net Housing Growth, 2014-2019

	Estimated Housing Units Built on Previously Commercial Land	Net Housing Unit Growth*	Share of Net Housing Unit Growth Owing to Commercial Lands
	2014-2019	2014-2019	2014-2019
Los Angeles-Long Beach, CA CSA	**28,011**	**202,544**	**13.83%**
Los Angeles County	23,984	78,418	30.59%
Orange County	2,955	53,019	5.57%
Riverside County	405	42,640	0.95%
San Bernardino County	229	22,345	1.03%
Ventura County	437	6,122	7.14%
San Jose-San Francisco-Oakland, CA CSA	**9,298**	**109,449**	**8.50%**
Santa Clara County	3,482	31,064	11.21%
Alameda County	1,754	19,757	8.88%
Contra Costa County	561	8,238	6.81%
San Francisco County	2,369	24,515	9.66%
San Joaquin County	155	10,893	1.43%
San Mateo County	266	5,921	4.50%
Sonoma County	44	1,734	2.54%
Solano County	484	2,235	21.67%
Marin County	8	1,494	0.54%
Santa Cruz County	23	1,324	1.74%
Napa County	151	538	28.11%
San Benito County	0	1,736	0.00%
San Diego-Carlsbad, CA Metro Area	**921**	**45,886**	**2.01%**
San Diego County	921	45,886	2.01%
Sacramento-Roseville, CA CSA	**157**	**28,377**	**0.55%**
Sacramento County	100	12,909	0.77%
Placer County	17	10,984	0.16%
Yolo County	15	2,915	0.51%
El Dorado County	10	421	2.38%
Sutter County	7	597	1.19%
Yuba County	5	992	0.54%
Nevada County	2	...	...

Note: * Net housing unit growth figures are drawn from the Census' 1-year American Community Survey. Nevada County is estimated to have lost housing units during the periods. See methodology section for details.

of net new housing—the highest share of any county in the four large California metros. This suggests that the City of Los Angeles and other Los Angeles County jurisdictions' policies of allowing residential in commercial areas has facilitated a significant share of the region's housing growth. In contrast, units built on previously commercial land accounted for only 5.6 and 7.1 percent of net housing growth in Orange and Ventura Counties and for only about 1 percent of net housing growth in Riverside and San Bernardino Counties.

Net housing growth from 2014 to 2019 in the San Francisco Bay Area was approximately 109,500 units. Of that growth, 8.5 percent is attributable to units built on previously commercial land. That share was somewhat higher in Santa Clara, San Francisco, and Alameda Counties, at 11.2, 9.7, and 8.9 percent. This may be attributable to the larger jurisdictions in those counties—San Francisco, Oakland, and San Jose—which explicitly allow for residential development in most commercial areas. Napa and Solano Counties also saw a significant share of new homes coming from commercial conversions, 26.1 and 28.7, respectively. This may be driven by the cities of Vallejo and Napa, which both allow for residential uses in their commercially zoned areas. The share of overall housing attributable to commercial conversions was lower in Contra Costa County, at 6.8 percent, substantially lower in San Mateo County, at 4.5 percent, and negligible in Marin County.

Only 2.0 percent of net new housing in the San Diego metro area was built on previously commercial land, and just 0.6 percent of new housing in the Sacramento region. Like Riverside and San Bernardino counties, the Sacramento region relies on greenfield residential development for much larger shares of their net new housing than the other areas considered here.

Conversions were more likely to occur in urban cores and on parcels with older buildings.

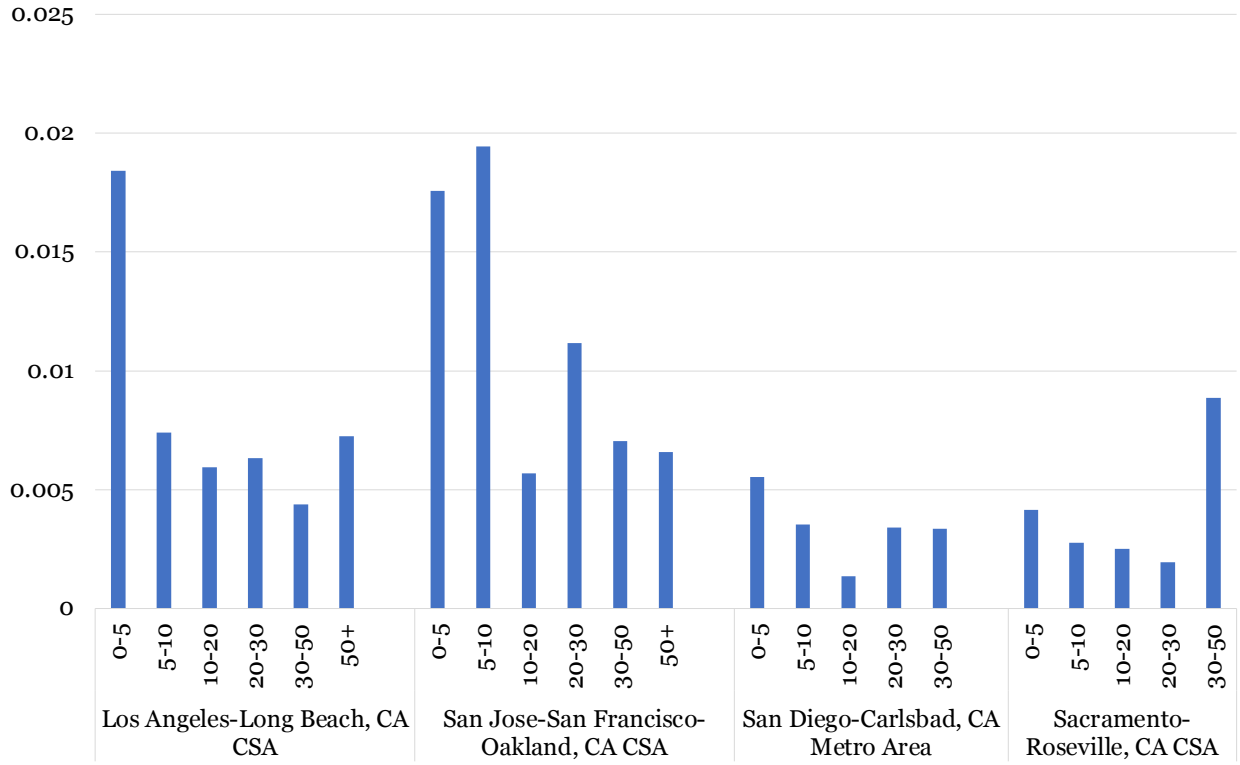
In Residential Redevelopment of Commercially Zoned Land in California, we reported that commercial acreage is more plentiful farther from metro areas' central business districts (CBDs) and to a lesser extent also in smaller cities. However, our findings indicate that commercial to residential conversions were more likely to occur closer to the center of major metro regions, as illustrated in Table 3 and Figure 5. That finding is particularly evident in the Los Angeles region, where the parcel conversion rate within a 5-mile radius of Downtown Los Angeles was 1.84 percent—about three times the rate throughout the rest of the region. Although greater acreage was converted in the outer rings, post-conversion densities were higher near the center such that the distribution of total units built on commercial lands skewed heavily towards downtown. We estimate that about 10,700 units were built on commercial lands within 5 miles of downtown, another 6,800 and 5,700 in the 5-10 and 10-20 mile rings, respectively, and only 3,300 units beyond 20 miles. In contrast, all new housing production—not just on commercial lands—skewed farther from the metropolitan center: more than 64 percent of net new housing in the Los Angeles region emerged beyond the 20 mile mark. The tendency of commercial conversions to concentrate towards the center while overall housing production skewed towards the periphery was such that the share of net new housing owing

Table 3. Conversion Statistics by Distance from Metropolitan Center

	Distance from Center (Miles)	Population (2019)	Commercial (2014)		Converted to Residential (2014-2019)		Conversion Rate		Average Parcel's Observed Post-Conversion Housing Density	Estimated Housing Units Built on Previously Commercial Land	Net Housing Unit Growth	Share of Net Housing Unit Growth Owing to Commercial Lands
			Parcels	Acres	Parcels	Acres	Parcels	Acres	Units per Acre	2014-2019	2014-2019	2014-2019
Los Angeles-Long Beach, CA CSA	0-5	1,231,838	10,371	3,430	191	53	1.84%	1.53%	204.1	10,725	26,085	41.1%
	5-10	2,252,565	22,666	8,886	168	77	0.74%	0.87%	87.8	6,797	24,068	28.2%
	10-20	4,571,769	34,317	21,748	204	101	0.59%	0.46%	56.0	5,654	20,608	27.4%
	20-30	3,114,543	17,066	18,497	108	79	0.63%	0.43%	19.4	1,528	21,926	7.0%
	30-50	4,528,590	24,819	42,488	109	248	0.44%	0.58%	9.8	2,446	57,062	4.3%
	50+	4,439,783	29,807	49,550	216	354	0.72%	0.72%	2.4	846	47,381	1.8%
San Jose-San Francisco-Oakland, CA CSA	0-5	797,053	4,780	1,106	84	13	1.76%	1.20%	172.2	2,290	23,150	9.9%
	5-10	751,378	5,451	3,099	106	21	1.94%	0.68%	73.5	1,554	3,425	45.4%
	10-20	1,316,539	9,659	7,382	55	24	0.57%	0.32%	24.2	571	7,060	8.1%
	20-30	1,361,490	8,686	10,309	97	27	1.12%	0.26%	32.6	866	15,652	5.5%
	30-50	2,649,617	18,050	19,787	127	236	0.70%	1.19%	15.4	3,630	39,248	9.2%
	50+	1,416,724	9,715	10,378	64	35	0.66%	0.33%	10.4	360	17,329	2.1%
San Diego-Carlsbad, CA Metro Area	0-5	562,672	4,508	2,802	25	10	0.55%	0.37%	42.5	442	14,549	3.0%
	5-10	782,746	4,532	3,955	16	8	0.35%	0.21%	21.8	182	8,305	2.2%
	10-20	945,801	3,644	5,587	5	2	0.14%	0.03%	14.7	22	11,130	0.2%
	20-30	586,199	2,634	3,489	9	9	0.34%	0.25%	3.9	34	8,306	0.4%
	30-50	536,702	2,080	2,617	7	21	0.34%	0.80%	11.5	241	3,596	6.7%
Sacramento-Roseville, CA CSA	0-5	426,882	3,848	3,660	16	3	0.42%	0.09%	7.5	24	4,242	0.6%
	5-10	554,357	2,523	3,550	7	4	0.28%	0.12%	13.0	56	1,668	3.4%
	10-20	1,055,353	5,178	8,084	13	13	0.25%	0.16%	3.2	41	14,389	0.3%
	20-30	246,638	1,030	1,620	2	7	0.19%	0.42%	0.8	5	5,364	0.1%
	30-50	373,559	2,822	3,785	25	50	0.89%	1.33%	0.6	30	2,714	1.1%

Note: See methodology section for more detail.

Figure 5. Parcel Conversion Rate by Distance from Metropolitan Center



to conversions fell sharply with distance from the center. Of net new housing within 5 miles of downtown Los Angeles, 41.1 percent came from conversions, compared to 28.2 percent and 27.4 percent in the 5-10 and 10-20 mile rings, and single-digit percentages beyond that.

In the Bay Area, the highest parcel conversion rates were in the 0-5 and 5-10 mile radiuses around downtown San Francisco, which also includes central Oakland.[16] However, while conversions within 5 miles of central San Francisco accounted only for about 10 percent of net new housing, they amounted to 45.4 percent of net new housing in the 5-10 mile radius, which includes downtown Oakland. In addition, the 30-50 mile radius had the most new homes built on commercial lands, owing to conversions in the South Bay: from Fremont and Milpitas in the east, through San Jose, and up to Sunnyvale and Mountain View in the west.

The San Diego and Sacramento regions exhibit smaller reductions in parcel conversion rates further from the center. An exception is the outermost, 30-50 radius around Sacramento, which had a higher parcel conversion rate, reflecting conversions in the northeastern edge of the Sacramento area near Auburn and Colfax.

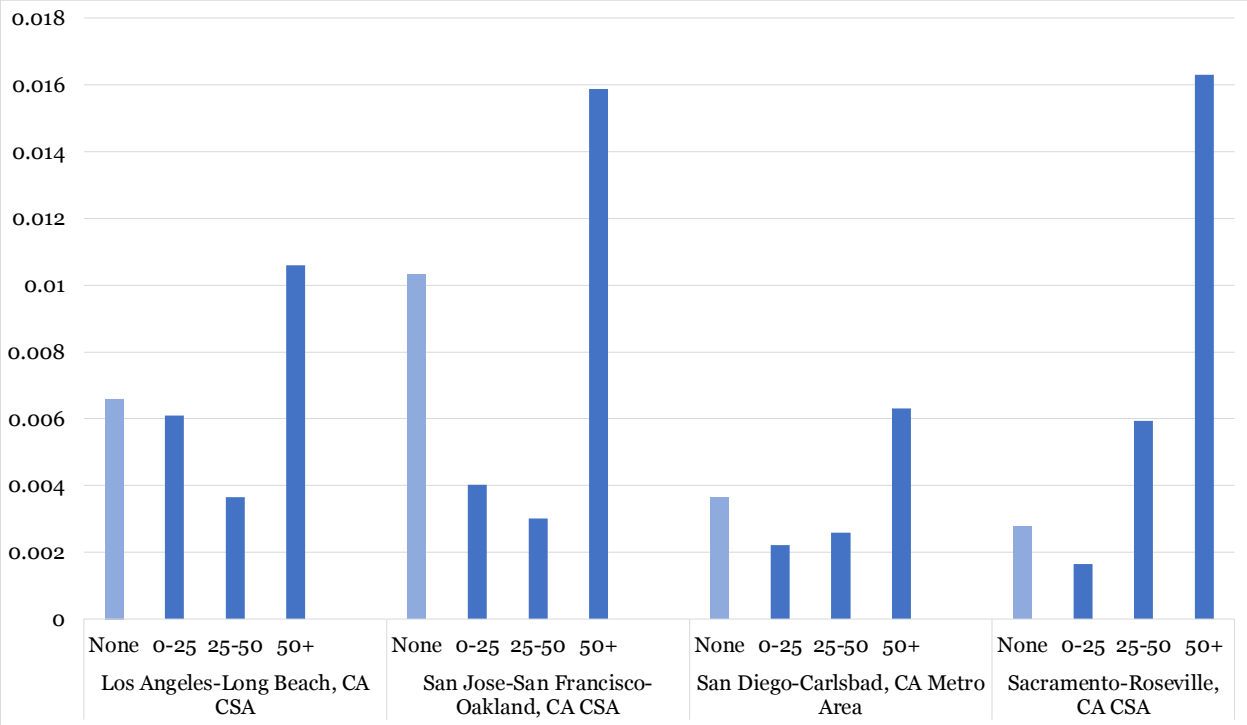
Parcels with older commercial buildings were more likely to be converted to residential use across all four metro areas, as shown in Table 4 and Figure 6.[17] That finding is consistent with the previous one, as older buildings and areas are more common towards the center and older buildings are more likely to be run-down or outdated, thereby lending themselves to redevelopment. Commercial parcels without building age information—a likely indication of the lack of a building, e.g., a parking lot—also had an elevated conversion rate relative to newer buildings.

Table 4. Conversion Statistics by Distance from Metropolitan Center

	Age of Structures (Years)	Commercial (2014)		Converted to Residential (2014-2019)		Conversion Rate		Average Parcel's Observed Post-Conversion Housing Density	Estimated Housing Units Built on Previously Commercial Land (2014-2019)
		Parcels	Acres	Parcels	Acres	Parcels	Acres	Units per Acre	
Los Angeles-Long Beach, CA CSA	-	40,044	79,796	264	607	0.66%	0.76%	10.5	6,355
	0-25	13,175	18,815	81	57	0.61%	0.30%	74.3	4,206
	25-50	34,608	32,208	123	158	0.36%	0.49%	41.9	6,615
	50+	52,085	20,323	542	160	1.04%	0.79%	67.8	10,835
San Jose-San Francisco-Oakland, CA CSA	-	21,401	20,330	221	201	1.03%	0.99%	11.9	2,393
	0-25	6,131	10,294	25	29	0.41%	0.28%	29.5	858
	25-50	12,553	15,089	36	68	0.29%	0.45%	42.5	2,872
	50+	16,399	6,620	254	58	1.55%	0.87%	55.2	3,175
San Diego-Carlsbad, CA Metro Area	-	6,036	5,820	22	16	0.36%	0.28%	24.7	403
	0-25	2,813	5,169	7	22	0.25%	0.42%	11.9	258
	25-50	5,206	6,338	12	8	0.23%	0.12%	26.1	204
	50+	3,343	1,123	21	4	0.63%	0.36%	14.0	56
Sacramento-Roseville, CA CSA	-	10,767	14,279	30	46	0.28%	0.32%	2.1	97
	0-25	1,724	3,150	3	15	0.17%	0.48%	0.2	3
	25-50	1,569	2,097	9	7	0.57%	0.34%	1.8	13
	50+	1,341	1,174	21	10	1.57%	0.83%	4.5	44

Note: See methodology section for more detail.

Figure 6. Parcel Conversion Rate by Existing Structure Age (or Absence)



In the Bay Area and the Los Angeles region, commercial conversions were more likely in racially segregated areas with high poverty rates.

Parcel conversion rates broken out by California's Tax Credit Allocation Committee (TCAC) and Housing and Community Development (HCD) Opportunity Area Map designations reveal that areas characterized by racial segregation and high poverty had the highest rates of conversion in both the Bay Area and the Los Angeles region, as shown in Table 5 and Figure 7. These maps assign each census tract in the state to one of five categories based on an index of economic, educational, and environmental characteristics that research has shown to be important for improving outcomes for low-income children and adults.[18] In Residential Redevelopment of Commercially Zoned Land in California, we found that commercial property is distributed relatively evenly across opportunity areas in each of the major metro regions. However, the likelihood of commercial to residential conversion is not the same across these designations in the state's two largest metro regions.

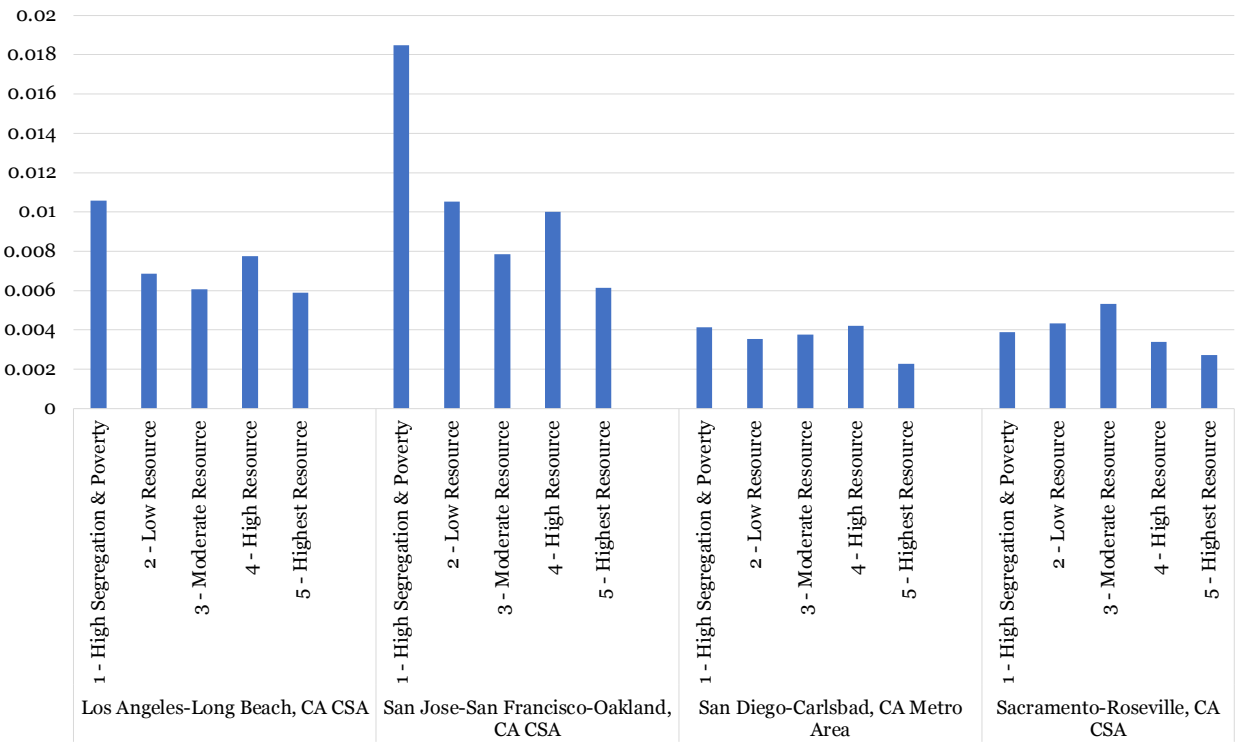
In the Bay Area, the parcel conversion rate in neighborhoods assigned to the High Segregation and Poverty designation was 75 percent higher than the rate in neighborhoods in the Low Resource category, and more than three times higher than the rate in the Highest Resource areas.[19] That said, this result is tempered by the fact that conversion rates are low in all opportunity categories, meaning that small differences in the number of commercial conversions can result in larger percent differences.[20] Moreover, the result does not hold on a per-acre conversion rate basis, suggesting that within High Segregation and Poverty areas conversions were concentrated among smaller parcels.[21]

Table 5. Conversion Statistics by TCAC Opportunity Areas

	TCAC Opportunity Area	Population (2019)	Commercial (2014)		Converted to Residential (2014-2019)		Conversion Rate		Average Parcel's Observed Post-Conversion Housing Density	Estimated Housing Units Built on Previously Commercial Land	Net Housing Unit Growth	Share of Net Housing Unit Growth Owing to Commercial Lands
			Parcels	Acres	Parcels	Acres	Parcels	Acres	Units per Acre	2014-2019	2014-2019	2014-2019
Los Angeles-Long Beach, CA CSA	High Segregation & Poverty	2,468,709	21,277	14,075	225	71	1.06%	0.50%	81.7	5,781	28,071	20.6%
	Low Resource	4,980,477	33,818	34,266	232	153	0.69%	0.45%	31.7	4,839	30,687	15.8%
	Moderate Resource	4,798,961	33,303	38,376	202	253	0.61%	0.66%	32.0	8,093	52,655	15.4%
	High Resource	3,931,761	25,657	31,381	199	310	0.78%	0.99%	13.8	4,282	48,594	8.8%
	Highest Resource	4,048,000	25,086	30,198	148	190	0.59%	0.63%	26.4	5,012	40,484	12.4%
San Jose-San Francisco-Oakland, CA CSA	High Segregation & Poverty	310,608	3,572	1,857	66	11	1.85%	0.62%	36.7	419	2,581	16.2%
	Low Resource	2,394,891	18,629	16,727	196	67	1.05%	0.40%	46.4	3,130	29,303	10.7%
	Moderate Resource	2,341,746	16,064	15,617	126	193	0.78%	1.23%	15.1	2,909	43,859	6.6%
	High Resource	1,723,112	9,401	9,211	94	67	1.00%	0.73%	30.5	2,054	19,605	10.5%
	Highest Resource	1,542,891	8,809	8,897	54	17	0.61%	0.19%	47.2	785	14,091	5.6%
San Diego-Carlsbad, CA Metro Area	High Segregation & Poverty	258,956	1,935	891	8	2	0.41%	0.27%	33.0	80	6,215	1.3%
	Low Resource	909,306	5,358	5,404	19	8	0.35%	0.15%	17.0	136	11,236	1.2%
	Moderate Resource	891,600	3,455	3,913	13	23	0.38%	0.58%	11.6	261	6,226	4.2%
	High Resource	647,896	3,556	4,440	15	11	0.42%	0.25%	30.2	336	10,822	3.1%
	Highest Resource	706,362	3,084	3,651	7	6	0.23%	0.15%	19.3	108	11,387	0.9%
Sacramento-Roseville, CA CSA	High Segregation & Poverty	264,531	2,312	2,944	9	3	0.39%	0.10%	3.4	10	2,031	
	Low Resource	702,217	5,066	6,111	22	26	0.43%	0.43%	3.0	78	3,928	0.5%
	Moderate Resource	567,244	3,377	4,653	18	19	0.53%	0.41%	2.5	47	4,274	2.0%
	High Resource	542,479	2,366	2,781	8	9	0.34%	0.33%	1.3	12	4,492	1.1%
	Highest Resource	575,184	2,211	4,185	6	20	0.27%	0.49%	0.5	9	13,484	0.3%

Note: See methodology section for more detail.

Figure 7. Parcel Conversion Rate by TCAC Opportunity Areas



In the Los Angeles region, High Segregation and Poverty areas had conversion rates between 35 and 80 percent higher than the other opportunity categories. However, some of these differences vanish once estimates are conditioned on distance from the center and structure age or when per-acre conversion rates are considered. Conversion rates in the San Diego and Sacramento areas were relatively uniform across all opportunity categories.

The results suggest that future commercial to residential conversion patterns, if they extend recent trends, could run counter to fair housing goals that aim to distribute new housing production across a range of communities, including single-family neighborhoods that have traditionally resisted new growth. On the other hand, many of these properties are located along commercial corridors and near transit networks, increasing supply in line with the state's ambitious greenhouse gas reduction targets.

Future residential growth on commercial parcels will not be enough for regions to meet their housing goals.

If commercial conversions in the next five years follow the same trends as between 2014 and 2019, our analysis predicts that the state's four major metro areas stand to gain roughly 45,000 new homes. That predicted growth represents about 4 percent of the homes needed to meet state-mandated housing targets in the Los Angeles region and the Bay Area, and just 2 and 1 percent respectively in the San Diego and Sacramento metro areas, as shown in Table 6.

In each region, the anticipated housing growth from commercial conversions falls far short of what would be needed to meet state-mandated housing goals. Even if conditions for commercial to residential conversions were to improve, the likelihood of meeting these goals through

Table 6. Predicted Future Housing Growth on Commercial Land Relative to 6th Cycle RHNA Allocations

	Estimated Housing Units Built on Previously Commercial Land		6th Cycle RHNA Allocation (8-Year Period)	Prediction (Adjusted for 8-Year Period), as Share of 6th Cycle RHNA Allocation	To meet the RHNA allocation with housing built on commerical land only, the prediction would need to be increased by a factor of...
	2014-2019	5-Year Prediction			
Los Angeles-Long Beach, CA CSA	**28,011**	**31,648**	**1,341,827**	**3.77%**	**26.5**
Los Angeles County	23,984	25,209			
Orange County	2,955	2,786			
Riverside County	405	1,844			
San Bernardino County	229	996			
Ventura County	437	813			
San Jose-San Francisco-Oakland, CA CSA	**9,298**	**11,335**	**441,176**	**4.11%**	**24.3**
Santa Clara County	3,482	2,750			
Alameda County	1,754	2,225			
Contra Costa County	561	809			
San Francisco County	2,369	2,720			
San Joaquin County	155	462			
San Mateo County	266	438			
Sonoma County	44	599			
Solano County	484	803			
Marin County	8	146			
Santa Cruz County	23	108			
Napa County	151	269			
San Benito County	0	5			
San Diego-Carlsbad, CA Metro Area	**921**	**1,957**	**171,685**	**1.82%**	**54.8**
San Diego County	921	1,957			
Sacramento-Roseville, CA CSA	**157**	**941**	**153,512**	**0.98%**	**101.9**
Sacramento County	100	525			
Placer County	17	118			
Yolo County	15	79			
El Dorado County	10	134			
Sutter County	7	37			
Yuba County	5	30			
Nevada County	2	20			

Note: See methodology section for details. Also, the San Jose-San Francisco-Oakland, CA CSA includes a 12-county area, whereas the reported 6th Cycle RHNA allocation reported in the table corresponds to the Association of Bay Area Government's (ABAG) RHNA allocation, which includes only 9 of those counties (it does excludes San Joaquin, Santa Cruz, and San Benito Counties). As a result, the 4.11% figure in the second to last column should slightly overstate the actual figure, and the 24.3 factor in the last column slightly understates the actual figure.

conversions alone would be small. For example, if market and regulatory changes resulted in a doubling of conversion rates the residential development on commercial lands would account for 7.5 percent of the Los Angeles region's 6th Cycle RHNA allocation and 8.2 percent of the Bay Area's. If they tripled the conversion rate, those numbers would increase to 11.3 and 12.3 percent for the two regions, respectively. To put it another way, if the Los Angeles and Bay Area regions were to meet their allocations entirely through conversions they would need to increase approximately 25 fold. These shortfalls are even more pronounced in San Diego and Sacramento.

Comprehending the magnitude of the shortfall is important as it suggests that despite the potential benefits of commercial conversions, cities and regions cannot rely on those conversions alone to meet their RHNA allocations, regardless of future regulatory or market changes.

Moreover, our prior work indicates that commercial land is most often clustered along transportation corridors and intersections. That placement is advantageous from a transit perspective. However, it also suggests that, unless existing residential areas grow denser, housing in California's major metros could become more sharply divided between increasingly unaffordable single-family areas and segregated clusters of multifamily housing. Allowing the densification of existing residential areas alongside policies that facilitate commercial to residential conversion could help dull such sharpened divisions.

Policy Implications

Despite the prevalence of commercially zoned land throughout the state's major metro areas, less than 1 percent of this land was converted into new housing between 2014 and 2019. However, the prevalence of conversions appears to be greater in areas where such conversions are explicitly allowed under local zoning codes. Given the need for all localities to plan for higher housing goals per the state's RHNA process, reforming land use policies to allow and encourage more housing to be built on underutilized office and retail parcels can be an important part of the overall solution for meeting these goals.

Even in the most ambitious scenarios, commercial conversions can only make up a small portion of overall housing growth. To that end, policymakers should continue exploring additional reforms as part of a broader strategy for addressing housing supply and affordability issues, such as supporting affordable housing development and allowing multifamily growth in lower density neighborhoods.

With regards to increasing the prevalence of commercial to residential conversions, policymakers should consider the following steps as part of broader reforms to meet housing goals:

- If they do not already, local jurisdictions should explore reforming commercial land use to allow for multifamily residential development as well. This could include creating zoning overlays or simply reforming their commercial zoning code. Some cities may also explore creating new programs that combine allowing for more commercial to residential conversions with other important policy priorities. The City of Los Angeles offers an

encouraging example, where the Transit Oriented Communities (TOC) program has catalyzed development along commercial corridors by offering significant supplemental density boosts and other flexibilities to developments that incorporate certain policy goals.

- To facilitate local commercial zoning changes, the state and regional entities (metropolitan planning organizations (MPOs) and councils of government (COGs)) could prioritize technical support for cities that lack the capacity to undertake such reforms, using existing Regional Early Action Program funds or other state and regional funds. The state could also incentivize these changes by increasing the score for commercial rezonings in their Prohousing Designation Program.
- In addition to local efforts to reform commercial zoning, the legislature should continue exploring a statewide standard. This could include the creation of a baseline level of new homes allowed in commercial areas throughout the state—provided certain conditions are met—while still allowing local design and land use rules to apply. Proposed legislation has offered up various versions of this concept, and legislators should endeavor to find a compromise to push such efforts forward, given the likelihood that many jurisdictions will decide not to undertake such reforms on their own.

Conclusion

Encouraging greater conversions of commercial land into residential should be an important part of the overall strategy to address the shortage of housing in California. As our prior work has shown, commercial land is ubiquitous throughout the state, and the changing economic landscape may provide further opportunities to reimagine commercial land use patterns to catalyze greater housing growth.

However, it is also clear that building new homes on commercial land can only get cities and regions a small part of the way towards their state-mandated housing goals. While strategies such as those recommended above should be pursued at local, regional, and state levels, additional strategies must also be pursued in parallel to ensure that the need for more housing in California is met.

ENDNOTES

1. The distribution of tracts' population densities is bimodal, with a mode near zero and another at substantially higher densities. Research underpinning the study cited below found that 200 people per square mile is a density that clearly separates the two modes. In addition, non-residentially developed parcels within broader densely-populated areas often contain relevant commercial parcels, yet tend to have low population densities themselves. Tracts' geographical size is useful in identifying such cases, because tracts are defined by the Census to have a roughly similar population (of around 4,000 people), and as a result they tend to be large in rural areas and small in developed ones, which remains the case for non-residentially developed parcels in developed areas. See: Romem, I. "Has The Expansion of American Cities Slowed Down?" Buildzoom. Retrieved from: https://www.buildzoom.com/blog/cities-expansion-slowing.

2. The Sacramento region was further restricted to a radius of 50 miles from the center of Sacramento, in order to omit the towns and ski resorts surrounding Lake Tahoe from influencing that metro's results.

3. Commercial land also excludes all parcels over 100 acres in size, as they do not generally correspond to the infill development opportunities on which this study is focused (examples include George Lucas' Skywalker Ranch in Marin County and the San Diego Zoo). Commercial land also excludes the funeral home and mortuary land use category, which often includes cemeteries. The latter tend to be large lots, and are generally not genuinely commercial or candidates for conversion to residential use.

4. The data generally consist of one or more sub-parcel records per parcel. Parcels that mix commercial and residential uses can be identified as such explicitly when one or more records are explicitly designated for such mixed use or implicitly when records associated with the parcel include both commercially and residentially designated uses. Commercial and residential mixed-use parcels identified either way were treated as residential, i.e., they were omitted from the set of commercial parcels that were candidates for conversion in 2014 (and for prediction in 2019), and, when commercial parcels as of 2014 were found to be mixed in 2019, such cases were considered as conversions.

5. The data were acquired from DMP LightBox and come from its LandVision offering.

6. The results of spatial matching are reliable in the vast majority of cases. Within a random sample of 58,000 (sub-parcel) records

from 2014 (1,000 from each county in California), virtually all of those which were matched with 2019 parcels based on their ID could also be matched spatially, and in 97.8 percent of cases the matches produced by the two methods were consistent with each other.

7. Approximately 0.61 percent of 2014 (sub-parcel) records could not be matched with 2019 parcels by either ID-based or spatial matching, almost always because they lacked spatial information. Such records are more likely to reflect data errors than other records and, given their small share of the total, were assumed as such, i.e., the remaining 99.39 percent of records were taken to be the full set of data.

8. The cases in which ID-based matching failed and reliance on spatial matching was necessary are especially likely to reflect situations in which lot assembly and/or disassembly took place, and data on parcel acreage is consistent with that. Whereas ID-based matches generally resulted in similar parcel acreage being observed for each parcel in 2014 and 2019, the acreage of parcels matched spatially was on average 86.9 percent larger in 2019 than it was for the matched records from 2014 (suggesting parcel assembly was more dominant than disassembly).

9. In some instances, the unit count is not observed directly but it can be inferred from the land use description, e.g., when a duplex implies two units.

10. While using the average density (units per acre) of the 10 nearest conversions to derive an estimate of the number of units built on a converted parcel is probably inaccurate at the individual parcel level, it performs well on average. The method's performance was gauged by comparing the average observed and estimated densities for the subset of conversions whose actual unit count (and density) is known. In the Los Angeles region, the average observed post-conversion density was 69.1 units per acre, and the average estimated post-conversion density was 73.2 units per acre. In the San Francisco Bay Area the observed and estimated densities were 53.4 and 55.9 units per acre, respectively. In the San Diego metro area they were 30.8 and 37.0 units per acre, and in the Sacramento region they were 7.7 and 8.0 units per acre.

11. The set of predictors includes an indicator variable for each metro area, as well as metro-specific indicators for bins of existing commercial structures' age and FAR (including the absence of such information, e.g., in parking lots), and metro-specific indicators for bins of distance to the metropolitan center, as well as within-metro percentiles of assessed total value per acre (incl. improvements).

Coordinates for metropolitan centers were obtained from Fee, K., and Hartley, D. (2013). "The Relationship Between City Center Density and Urban Growth or Decline," in S. Wachter and K. Zeuli, eds, Revitalizing American Cities, and coordinates for downtown Los Angeles and San Francisco were applied to the entirety of their corresponding CSAs. The set of predictors also includes indicators for sufficiently common detailed commercial land use categories that are not metro-specific. The predictors also include within-metro percentiles of home values, rents, and median household incomes (at the tract level, from the 2014 1-year ACS). Finally, the predictors include the share of the nearest 100 observed conversions that fall within a 1-, 5- and 10-mile radius of each candidate parcel.

12. Even if no new commercial land were added, using commercial land for residential development at this pace would be sustainable for a very long time: it would take 769 years to fully deplete existing commercial land. However, using commercial land with current residential development densities at a pace sufficient to meet the Los Angeles region's 6th Cycle RHNA allocation would deplete all commercial land within just 29 years and would likely be unsustainable well before then, simply because some commercial land will remain necessary.

13. For visual examples illustrating different density levels in U.S. cities, see: Metropolitan Council. (2020). "Density of Development." Retrieved from: https://metrocouncil.org/Transportation/Planning-2/Key-Transportation-Planning-Documents/Transportation-Policy-Plan/The-Adopted-2040-TPP-(1)/Land-Use-Illustrations/Density-of-Development-Examples.aspx; Bengford, Bob. (2017). "Visualizing Compatible Density." The Urbanist. Retrieved from: https://www.theurbanist.org/2017/05/04/visualizing-compatible-density/. For a more in-depth resource, see: Campoli, J. & MacLean, A. S. (2007). Visualizing Density. Lincoln Institute for Land Policy. Retrieved from: https://www.lincolninst.edu/publications/books/visualizing-density.

14. The analysis in Residential Redevelopment of Commercially Zoned Land in California examined the commercial zoning designations for the 50 most populous cities in California to determine which designations explicitly allowed for residential development. Of these designations, 45 of them were within the four major metro areas examined in this paper. Of those 45, 16 explicitly allow for residential development, while the remaining designations did not.

15. Note that residential development of land that was purely commercial beforehand does not involve the reduction of any pre-existing housing units; so, the number of units it produces is equal to the net addition it produces.

16. The elevated conversion rate in the 20-30 mile ring is due to a concentration of conversions in downtown Vallejo.

17. In the Los Angeles Region and the Bay Area, newer buildings (0-25 years) had a higher conversion rate than those that were between 25 and 50 years old. This could be the result of a process called dynamic selection, which is best explained with an example: consider a pool of light bulbs that includes a mix of long-lasting LED bulbs and short-lived incandescent ones. As time goes by and incandescent bulbs fail at a higher rate than LEDs, the mix of bulb types will shift more and more towards long-lasting LED bulbs, potentially causing the pool-wide failure rate to fall over time. If some types of commercial properties are more prone to redevelopment than others (including via residential conversion) then, all else equal, those types will be less common in the 25-50 year-old pool than in the 0-25 year-old one, and that could result in the former having a lower conversion rate than the latter.

18. California Fair Housing Task Force. (2020). "Draft Methodology for the 2020 TCAC/HCD Opportunity Map." Retrieved from: https://www.treasurer.ca.gov/ctcac/opportunity/draft-2020-tcac-hcd-methodology-december.pdf.

19. The differences between the parcel conversion rate for the High Segregation and Poverty areas and those of each other opportunity category are all statistically significant at the 1 percent level. When conditioned on distance from the center, structure age, and FAR bins via linear regression, those differences remain significant at the 5 percent level.

20. Parcel conversion rates on the order of 1 percent over a 5-year period are meaningful, but low. One way of gauging the pace is asking how many years it would take to deplete the 2014 stock of commercial land if it continued to be converted at this pace (in terms of parcel numbers per period, not percent). A 1 percent per 5 years pace would require 500 years to deplete the 2014 stock of commercial land; in contrast, a 5 percent per 5 years pace would require 100 years, and a 25 percent per 5 years pace would require 20 years.

21. The per-acre conversion rate in High Segregation and Poverty areas was more than 3 times higher than the rate in the Highest Resource areas, but it was only about half as high as the rate in Moderate Resource areas.

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