

PACIFIC GAS & ELECTRIC COMPANY
MARKET ACTORS STUDY
FINAL REPORT

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Prepared for:
Valerie Richardson
Pacific Gas & Electric Company
123 Mission Street
San Francisco, California

Prepared by:
RLW Analytics, Inc.
1055 Broadway
Sonoma, CA 95476

Project PG&E-11

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Executive Summary

This report describes the community of architectural and engineering firms that worked on nonresidential new construction (NRNC) projects in California and in Pacific Gas & Electric's service territory between 1995 to 1998, using the F. W. Dodge New Construction Project Starts data for the four years. The report describes:

- Statewide Construction Trends - Timeseries analysis of the amount of NRNC activity in California
- Construction Trends in the PG&E Area - Timeseries Analysis of the amount of NRNC activity in the PG&E service territory
- Market Actors in California - cross tabulations of the architectural and engineering firms working on projects in California
- Market Actors in the PG&E Area -cross tabulations of the architectural and engineering firms working on projects in the PG&E utility service territory

Here are some highlights of the study:

- ❑ There were about 5,000 new projects in the California NRNC market per year, involving about 18 billion dollars of construction per year.
- ❑ The NRNC market experienced a slump in new project starts in 1996, especially for smaller projects that responded more quickly to the changes in the economic conditions. Due to the momentum of large projects, the total valuation of construction starts did not fall until 1997. The NRNC market enjoyed a very strong recovery in 1998.
- ❑ Offices dominated the valuation and square footage of the NRNC market, followed by the 'other' category, retail and schools. In terms of the number of projects, the market was equally divided between new and alteration/renovation. But new projects dominate the market in terms of valuation and square footage. Over 70% of all valuation was in private projects.
- ❑ The NRNC market was served by over 7,100 architectural and engineering firms, including over 5,100 architectural firms, almost 1,500 engineering firms, and about 500 joint firms.
- ❑ Extra large firms who work primarily on new projects served almost 85% of the total valuation in the NRNC market.

Introduction

This report describes the community of architectural and engineering firms that worked on nonresidential new construction (NRNC) projects in California and in Pacific Gas & Electric's service territory between 1995 to 1998. The report provides as complete and accurate a statistical picture as is practical using the F. W. Dodge New Construction Project Starts data for these years. The firms are characterized according to the markets that they serve - by the building type (office, retail, etc), project type (new, addition, etc.), and ownership (Federal, other public, private) of the projects that dominate their practice.

In addition to describing the firms that work in the NRNC market, this report characterizes the amount of construction activity in the NRNC market in each of the last four years. These sections of the report provide timeseries graphs showing the number of projects, valuation, and square footage by year within each market segment, e.g., building type, project type, and ownership. This analysis is provided statewide and within PG&E's service territory.

The NRNC project data and information on architectural and engineering firms was developed from the F. W. Dodge New Construction Database for non-residential new construction projects in California. The Dodge New Construction Database for a given year contains a listing of construction projects that were started during that year. The database provides limited information about each project including the location of the project and a list of architectural and engineering firms that worked on the project. The information reported here has been developed directly from the Dodge database.

No additional survey of the firms has been undertaken in this Market Actors study. However the information in this report can be readily combined with the in-depth survey information reported in the Nonresidential New Construction Baseline Study.¹ More than 200 interviews and surveys were conducted with architectural and engineering firms listed in the 1994, 1995, and 1997 Dodge Databases for the Baseline Study.

One conclusion that came from the study is that the key actors in the NRNC market are inter-related in many ways. Figure 1 shows a model of these relationships. The architect is assumed to be the primary contact with the owner and is the project leader, while the engineer takes a secondary role in the final processes of the design of a building. The specific role of each of the market actors in the design and construction process is studied in more detail in the Baseline report. Therefore in this Market Actors study, we will not attempt to characterize the roles of the key actors, but rather we will attempt to describe the community of all the architectural and engineering firms presently working in the NRNC market.

¹ "Non-Residential New Construction Baseline Study," Prepared for Southern California Edison on behalf of the California Board for Energy Efficiency, RLW Analytics, Inc. 1999.

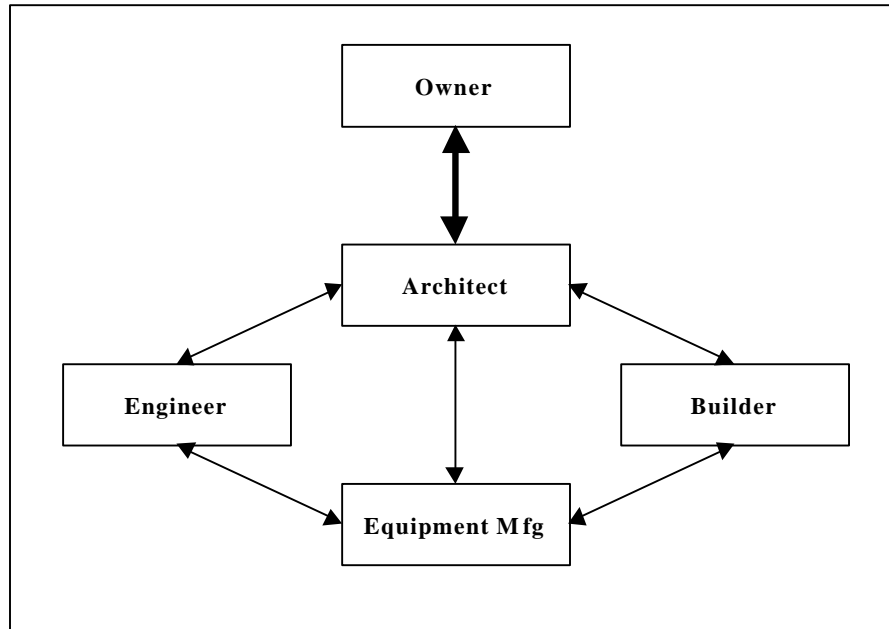


Figure 1: Basic Relationships in New Construction

The report first presents the findings and then describes the methodology that was used to generate those findings. The report is divided into the following major sections:

- Statewide Construction Trends - Timeseries analysis of the amount of NRNC construction activity in California²
- Construction Trends in the PG&E Area - Timeseries Analysis of the amount of NRNC construction activity in the PG&E service territory
- Market Actors in California - cross tabulations of the architectural and engineering firms working on projects in California
- Market Actors in the PG&E Area -cross tabulations on the architectural and engineering firms working on projects in the PG&E utility service territory
- Methodology - descriptions of the data cleaning, classification, and assembly of the databases
- Database Products - descriptions of the three databases that will be provided with the final report

² The statewide construction Timeseries totals include projects that fall outside of the service territories of the three investor-owned electric utilities - PG&E, SCE, and SDG&E. Therefore the statewide totals will not equal the sum of results reported for each of the individual utilities.

Statewide Construction Trends

This section reports information on the amount of nonresidential new construction that has occurred over the course of the last four years throughout California. This section will present the number of permits (projects), the total valuation (\$), and the total square footage of projects by year. The results are also crosstabulated by the following:

- Building Type (17 CEC / Title 24 Building Types)
- Project Type (New, Addition, Addition/Alteration, Addition & Alteration/Renovation)
- Ownership Type (Private, Public³, Federal)

This section will describe the changes that have occurred over time in the new construction market, and will enable planners to better predict future market potential. This statewide section of the report contains results for all California projects, and is not restricted to any unique utility territory.

Number of Permits

This section describes results on the number of permits. F.W. Dodge uses the term 'permit' to refer to a unique project. The term permit reflects the fact that the data describe projects that are scheduled to start within 60 days of the date indicated in the database. The terminology permit and project will be used interchangeably throughout this report.

Figure 2 shows the total number of permits by year. The largest number of permits occurred in 1995. The actual number of permits that met the criteria⁴ of this study is shown in Table 1. Note that the number of permits in 1995 is almost 1,000 more than in any other year. There was an upward trend in the number of permits beginning in 1996.

³ The 'Public' ownership type category refers to all public buildings, with the exception of federal buildings. Dodge classified 'federal' buildings separately from 'public', thus for consistency, we have used this naming convention throughout the report.

⁴ The criteria for acceptance in this study are provided in the methodology section of this report.

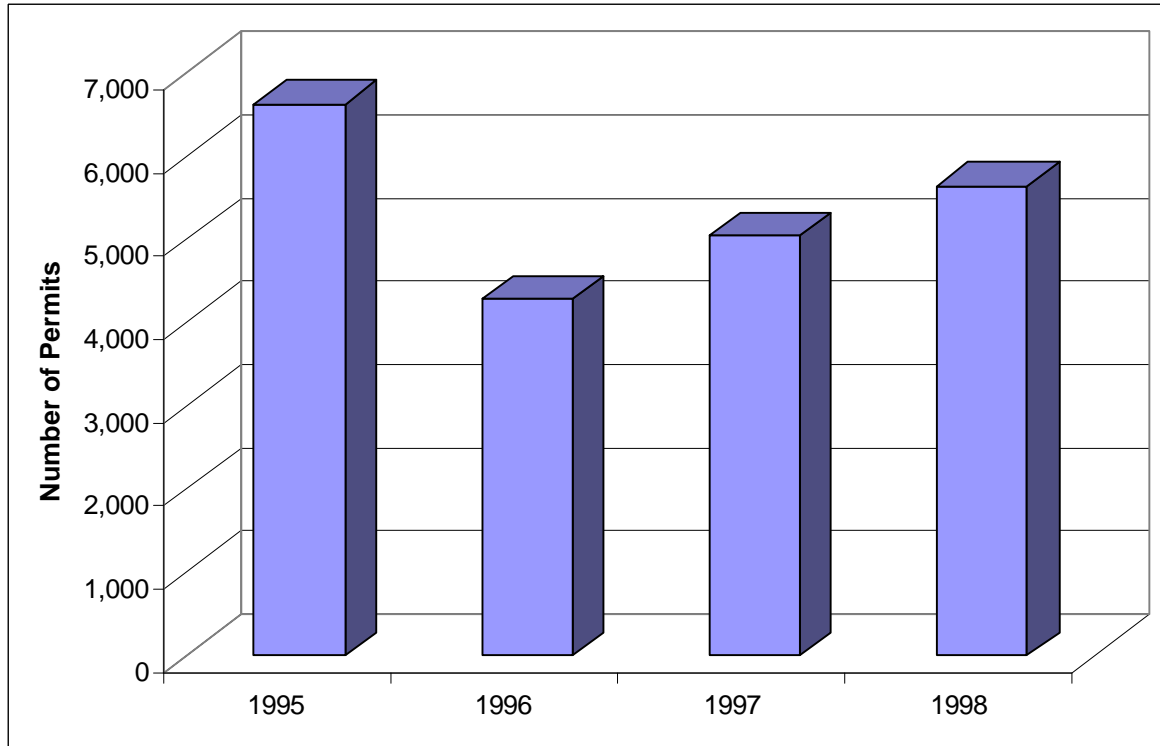


Figure 2: Number of Permits by Year

Year	Number
1995	6,617
1996	4,276
1997	5,038
1998	5,637
Total	21,568

Table 1: Number of Permits by Year

Table 2 shows the actual number of permits by building type in each year. Because of the large number of building types, Figure 3 and Figure 4 are used to display this information. Figure 3 shows that the construction of grocery stores and libraries was quite sporadic over time. C&I storage and general C&I work were also depressed in 1997. By contrast, the construction of community centers remained fairly constant. Figure 4 shows that office buildings dominated the NRNC market. The number of offices was more than double the number of any other building type. The number of offices fell off sharply in 1996 but recovered well by 1997.

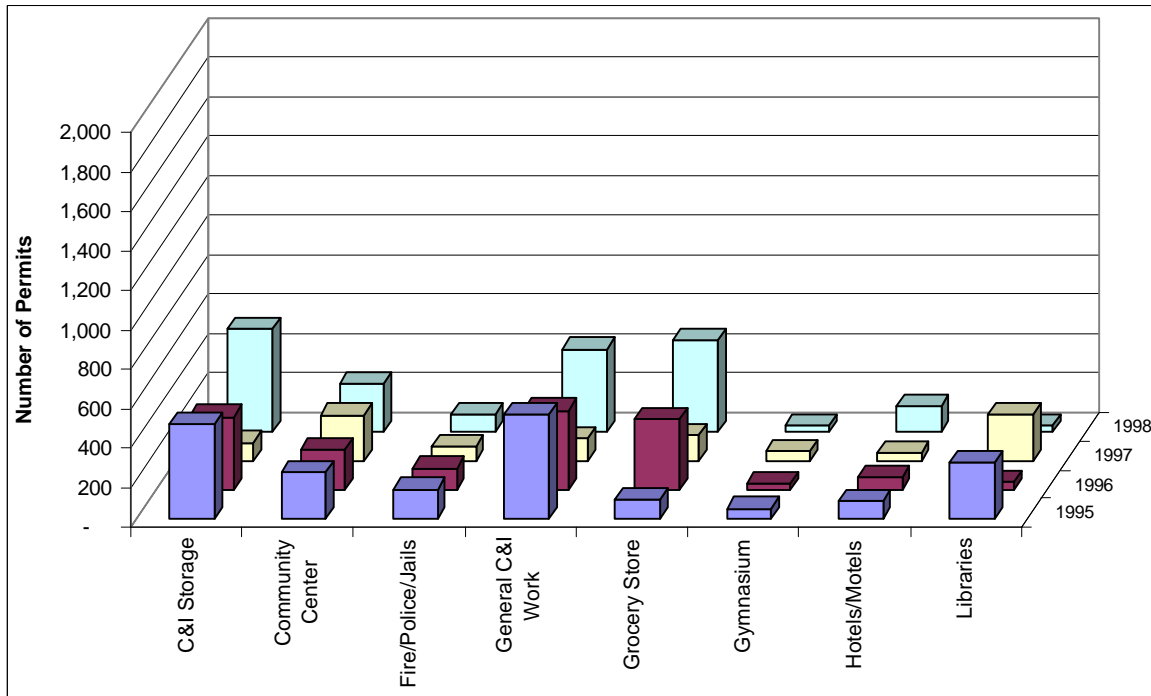


Figure 3: Number of Permits by Building Type and Year

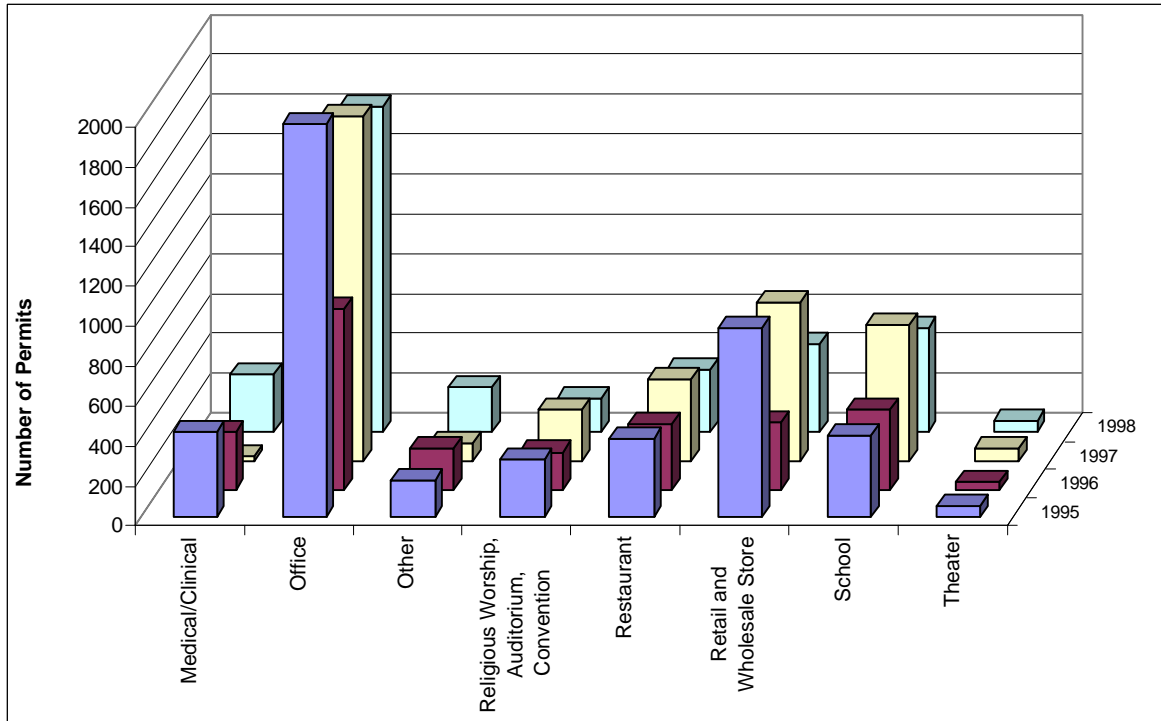


Figure 4: Number of Permits by Building Type and Year

Building Type	1995	1996	1997	1998	Total
C&I Storage	481	371	94	526	1,472
Community Center	239	206	234	249	928
Fire/Police/Jails	151	110	74	92	427
General C&I Work	529	404	117	421	1,471
Grocery Store	94	362	129	467	1,052
Gymnasium	53	35	51	37	176
Hotels/Motels	92	67	42	134	335
Libraries	283	44	237	32	596
Medical/Clinical	427	289	27	293	1,036
Office	1,973	902	1,730	1,636	6,241
Other	186	203	87	228	704
Auditorium, Convention	293	186	260	171	910
Restaurant	398	324	410	316	1,448
Wholesale Store	948	338	800	449	2,535
School	409	400	682	525	2,016
Theater	61	35	64	61	221
Total	6,617	4,276	5,038	5,637	21,568

Table 2: Number of Permits by Building Type and Year

Figure 5 and Table 3 show the number of permits by project type – new construction, additions, alterations/renovations, and projects that involve both additions and alterations/renovations. One can see that projects in the NRNC market are about equally divided between new and alterations/renovations. Both categories increased since the 1996 slump.

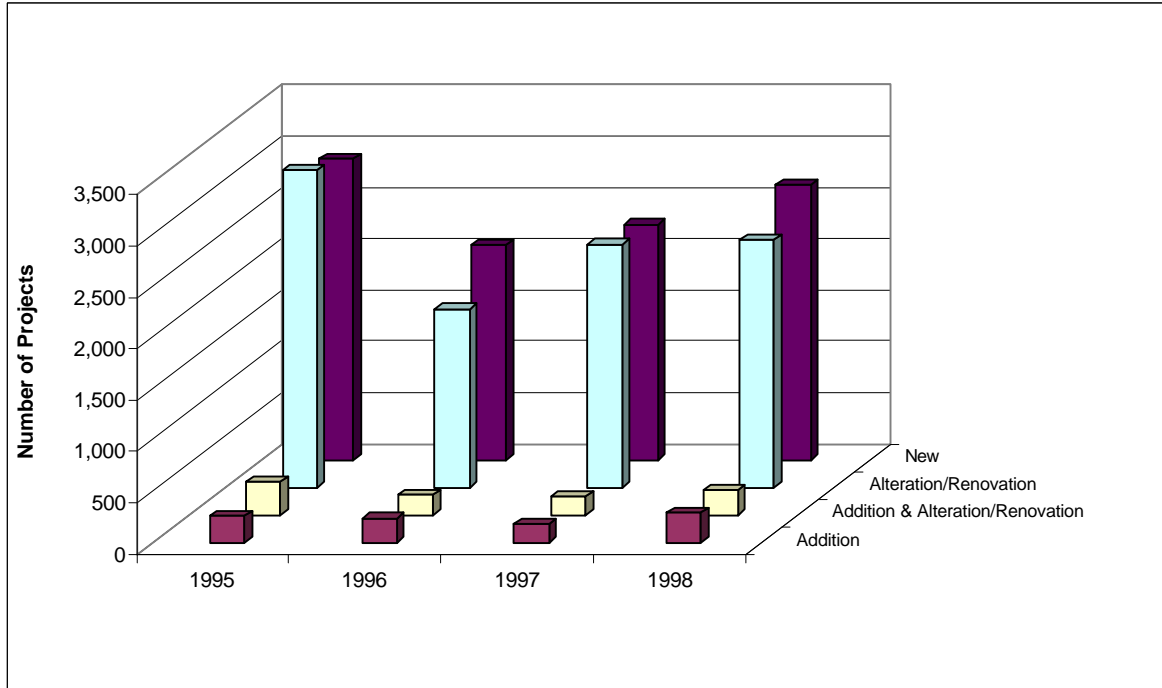


Figure 5: Number of Permits by Project Type and Year

Project Type	1995	1996	1997	1998	Total
Addition	259	240	182	297	978
Addition & Alteration/Renovation	327	201	182	244	954
Alteration/Renovation	3,098	1,741	2,377	2,411	9,627
New	2,933	2,094	2,297	2,685	10,009
Total	6,617	4,276	5,038	5,637	21,568

Table 3: Number of Permits by Project Type and Year

Figure 6 and Table 4 show the number of permits by ownership type and year. In terms of number of projects, the NRNC market was dominated by private projects. The number of federal projects fell throughout the period. The 1996 slump was seen in both the private and public (non-federal) sectors.

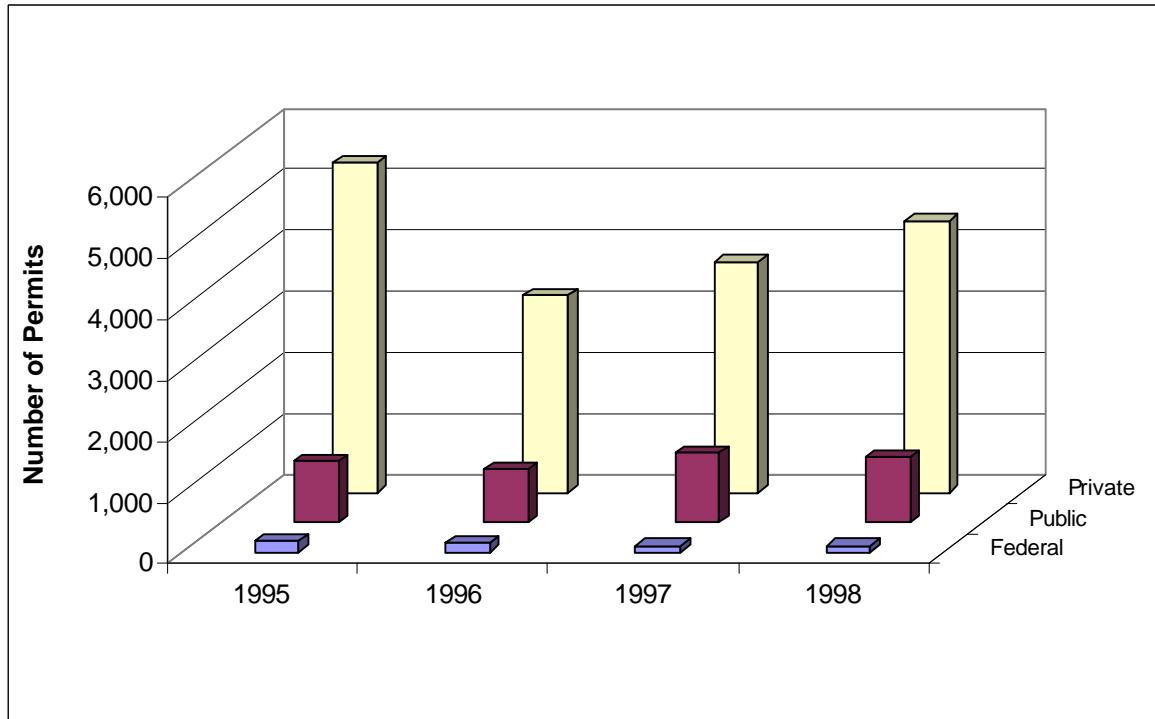


Figure 6: Number of Permits by Ownership Type and Year

Owner	1995	1996	1997	1998	Total
Federal	196	162	108	103	569
Public	1,010	875	1,140	1,075	4,100
Private	5,411	3,239	3,790	4,459	16,899
Total	6,617	4,276	5,038	5,637	21,568

Table 4: Number of Permits by Ownership Type and Year

Total Valuation

This section describes the total valuation of the NRNC projects throughout California. Figure 7 and Table 5 show the total valuation of the projects by year. Figure 7 shows a drastically different trend than in Figure 2. While the number of permits was largest in 1995, the total valuation was largest in 1998. In fact, the 1996 slump in the number of projects was not felt in the valuation until 1997. In other words, the downturn in larger projects did not occur until 1997. This seems to indicate that the smaller projects were more immediately responsive to changing business conditions than the larger projects. The strong recovery of the California economy is shown in these results. The valuation of projects started in 1998 was almost three times higher than in 1995.

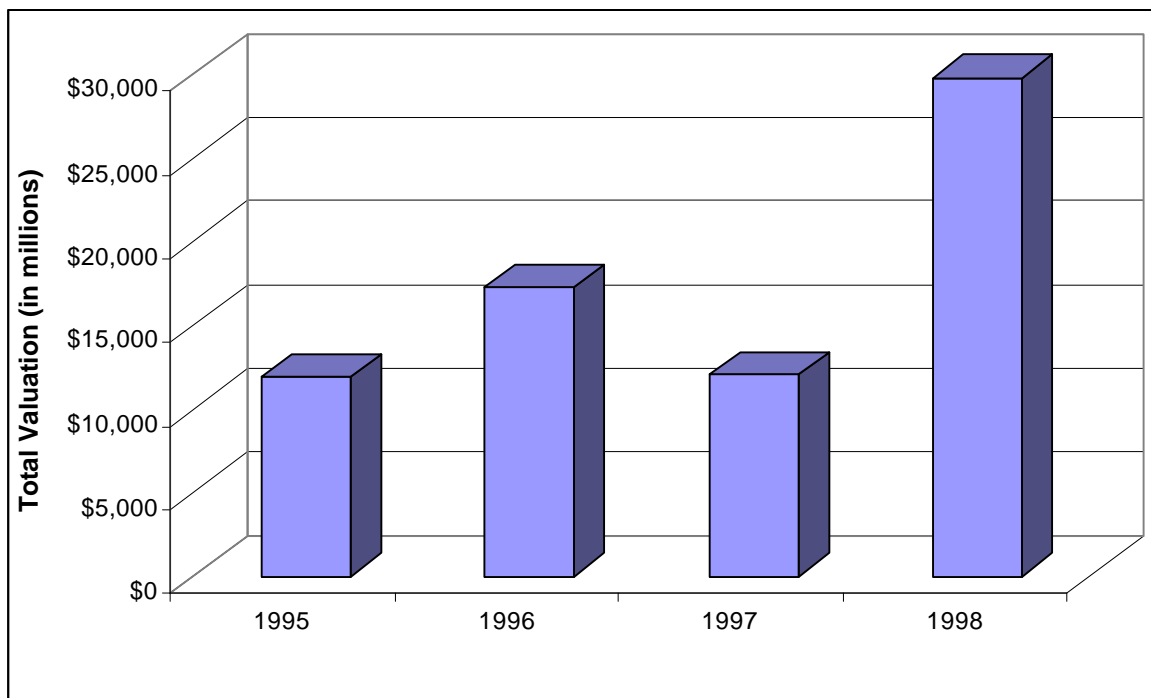


Figure 7: Total Valuation by Year

Year	Total Valuation (in millions)
1995	\$ 11,893
1996	\$ 17,229
1997	\$ 12,008
1998	\$ 29,806
Total	\$ 70,936

Table 5: Total Valuation by Year (\$millions)

Figure 8, Figure 9 and Table 6 show the total valuation by building type and year. Offices dominated the NRNC market in terms of valuation, followed by the 'other' sector. These two sectors were responsible for much of the high valuation seen in 1998. However most of the other sectors also were at relatively high levels in 1998.

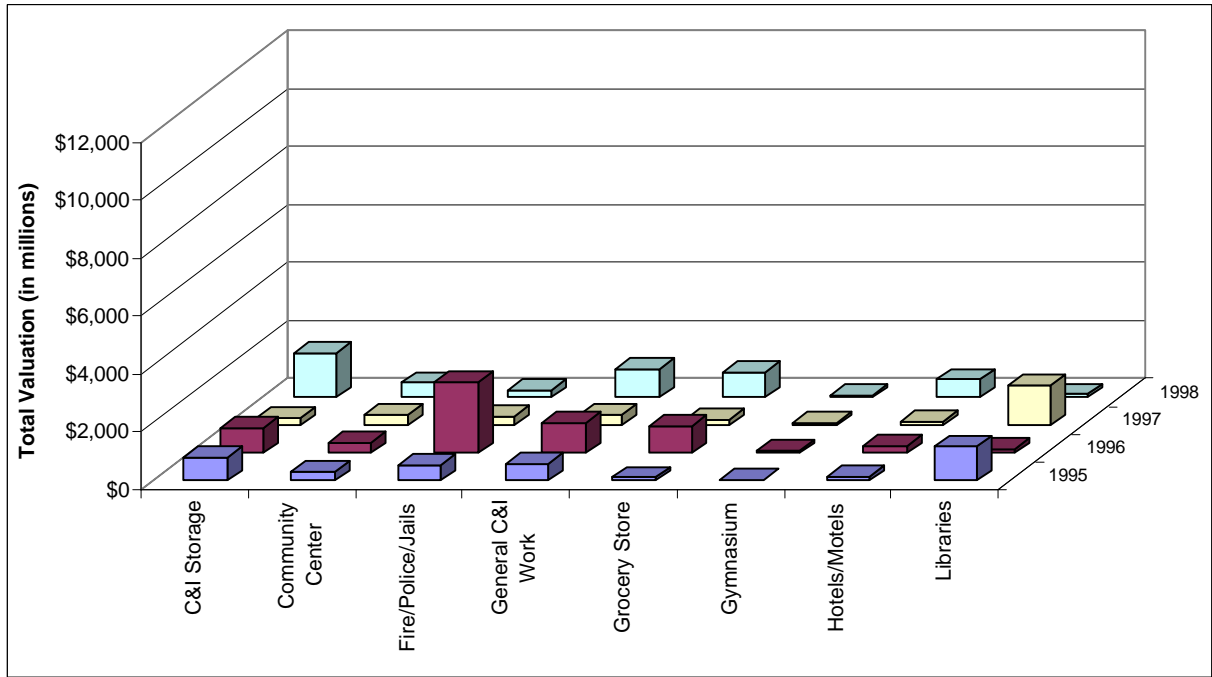


Figure 8: Total Valuation by Building Type and Year

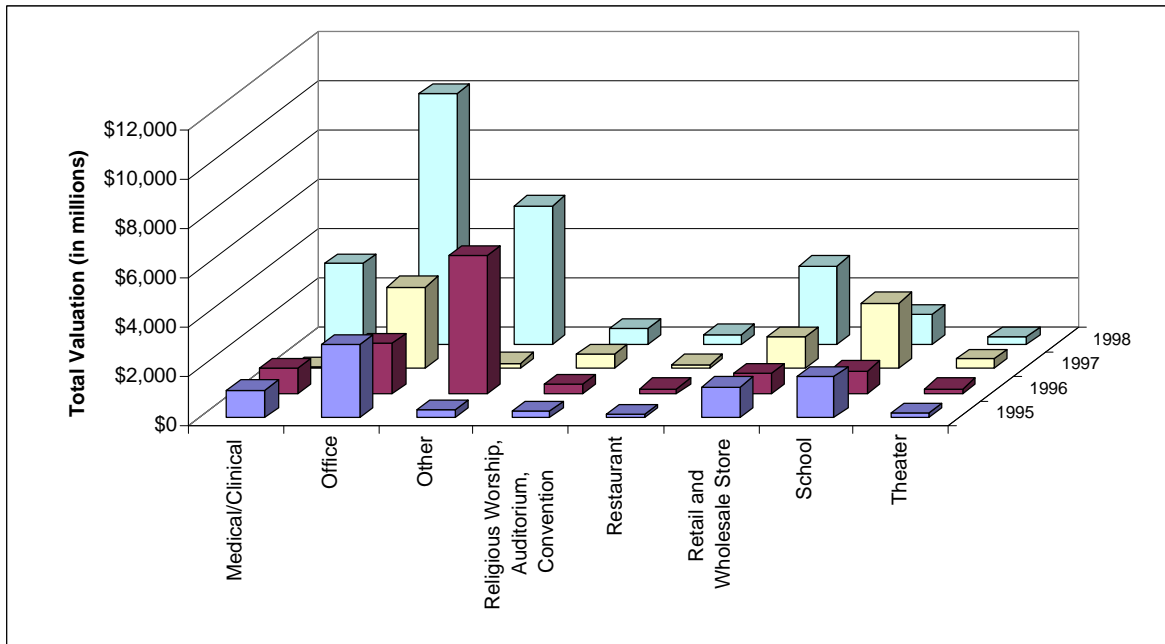


Figure 9: Total Valuation by Building Type and Year

Building Type	1995	1996	1997	1998	Total
C&I Storage	\$ 813	\$ 858	\$ 236	\$ 1,536	\$ 3,443
Community Center	\$ 316	\$ 359	\$ 388	\$ 501	\$ 1,564
Fire/Police/Jails	\$ 547	\$ 2,451	\$ 327	\$ 253	\$ 3,578
General C&I Work	\$ 590	\$ 1,027	\$ 357	\$ 982	\$ 2,957
Grocery Store	\$ 120	\$ 908	\$ 199	\$ 852	\$ 2,080
Gymnasium	\$ 52	\$ 66	\$ 79	\$ 86	\$ 283
Hotels/Motels	\$ 126	\$ 246	\$ 164	\$ 622	\$ 1,158
Libraries	\$ 1,184	\$ 130	\$ 1,394	\$ 112	\$ 2,820
Medical/Clinical	\$ 1,149	\$ 1,014	\$ 94	\$ 3,264	\$ 5,521
Office	\$ 2,961	\$ 2,032	\$ 3,347	\$ 10,199	\$ 18,540
Other	\$ 361	\$ 5,578	\$ 250	\$ 5,637	\$ 11,827
Religious Worship, Auditorium,	\$ 288	\$ 368	\$ 581	\$ 642	\$ 1,879
Restaurant	\$ 167	\$ 210	\$ 190	\$ 418	\$ 985
Retail and Wholesale Store	\$ 1,279	\$ 838	\$ 1,290	\$ 3,184	\$ 6,591
School	\$ 1,703	\$ 924	\$ 2,697	\$ 1,199	\$ 6,522
Theater	\$ 235	\$ 219	\$ 415	\$ 318	\$ 1,187
Total	\$ 11,893	\$ 17,229	\$ 12,008	\$ 29,806	\$ 70,936

Table 6: Total Valuation by Building Type and Year (\$million)

Figure 10 and Table 7 show the total valuation by project type and year. The value of new buildings was much larger than any other project type. This would make sense due to the fact that in renovations, the exterior structure of the building generally remains intact, and only the inside of the building is altered.

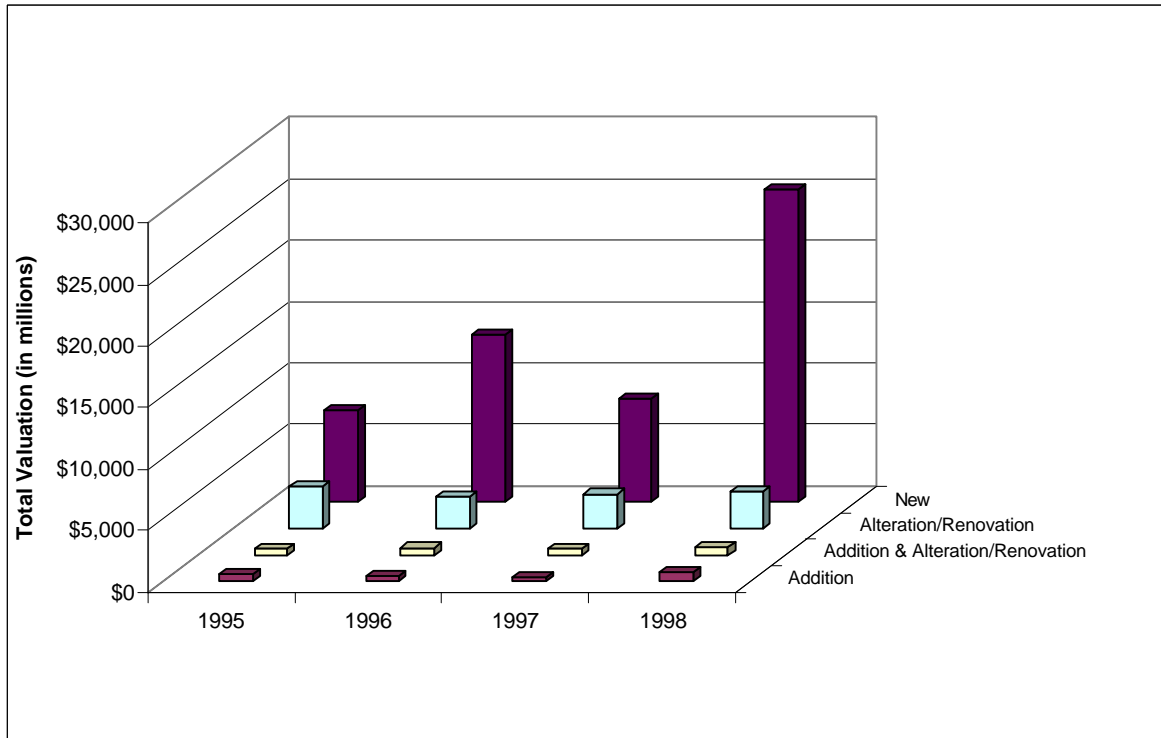


Figure 10: Total Valuation by Project Type and Year

Project Type	1995	1996	1997	1998	Total
Addition	\$ 624	\$ 499	\$ 270	\$ 696	\$ 2,088
Addition & Alteration/Renovation	\$ 461	\$ 568	\$ 482	\$ 687	\$ 2,197
Alteration/Renovation	\$ 3,384	\$ 2,596	\$ 2,806	\$ 3,052	\$ 11,838
New	\$ 7,424	\$ 13,566	\$ 8,451	\$ 25,372	\$ 54,813
Total	\$ 11,893	\$ 17,229	\$ 12,008	\$ 29,806	\$ 70,936

Table 7: Total Valuation by Project Type and Year (\$million)

Figure 11 and Table 8 show the total valuation by ownership type and year. The valuation was much higher in private buildings than in public buildings. The number of permits for private buildings was fairly constant, while the valuation increased over time. Thus, the proportion of higher valued projects increased over these years.

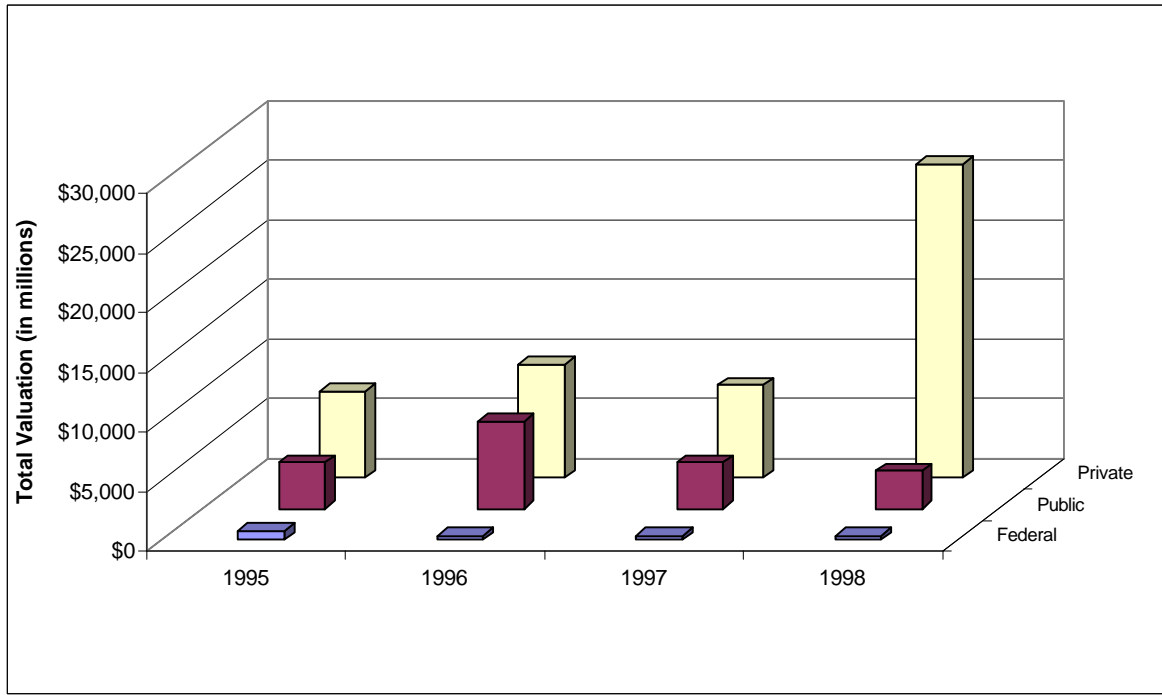


Figure 11: Total Valuation by Ownership Type and Year

Owner	1995	1996	1997	1998	Total
Federal	\$ 789	\$ 382	\$ 336	\$ 375	\$ 1,882
Public	\$ 3,850	\$ 7,340	\$ 3,872	\$ 3,166	\$ 18,228
Private	\$ 7,253	\$ 9,507	\$ 7,800	\$ 26,265	\$ 50,825
Total	\$ 11,893	\$ 17,229	\$ 12,008	\$ 29,806	\$ 70,936

Table 8: Total Valuation by Ownership Type and Year (\$million)

Total Square Footage

Figure 12 and Table 9 show the total square footage of projects in California from 1995 to 1998. The amount of square feet increased over time with a slight reversal in 1997. The amount of square footage started in 1998 was about double the amount in each of the other years.

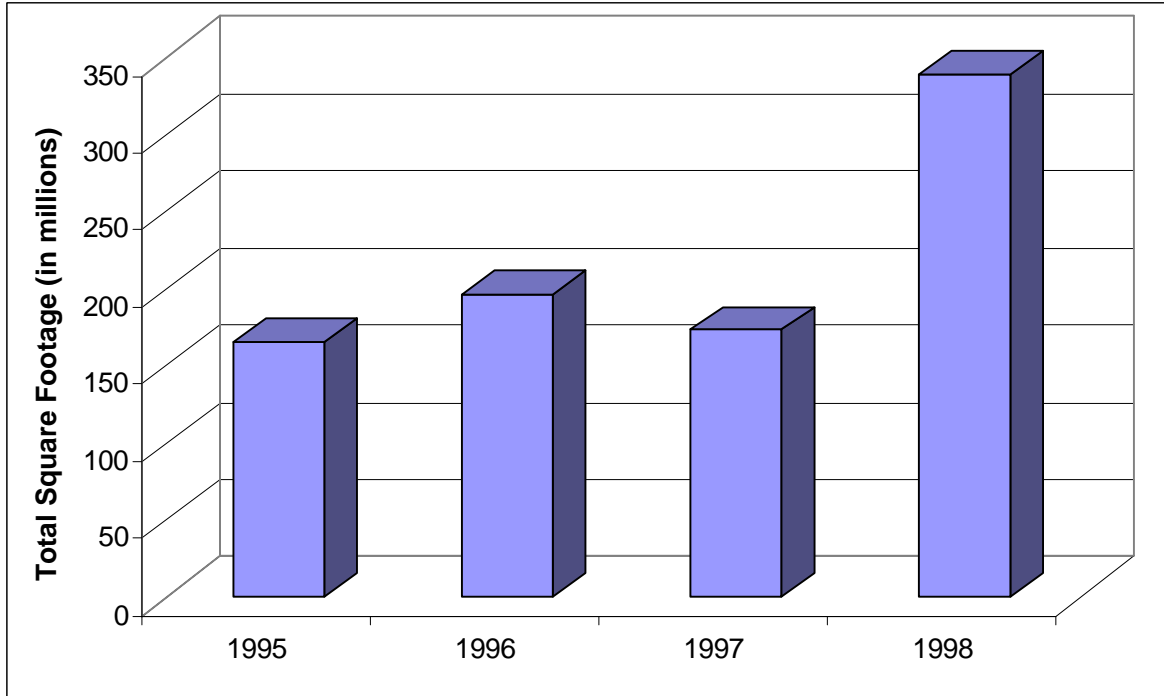


Figure 12: Total Square Footage by Year

Year	Total Sq. Footage
1995	166
1996	197
1997	174
1998	340
Total	876

Table 9: Total Square Footage by Year (in millions)

Figure 13, Figure 14 and Table 10 show the total square footage of the projects in California by year and building type. In 1998 and over the four years together, offices accounted for the most square footage followed by the 'other' category, retail / wholesale stores and C&I storage.

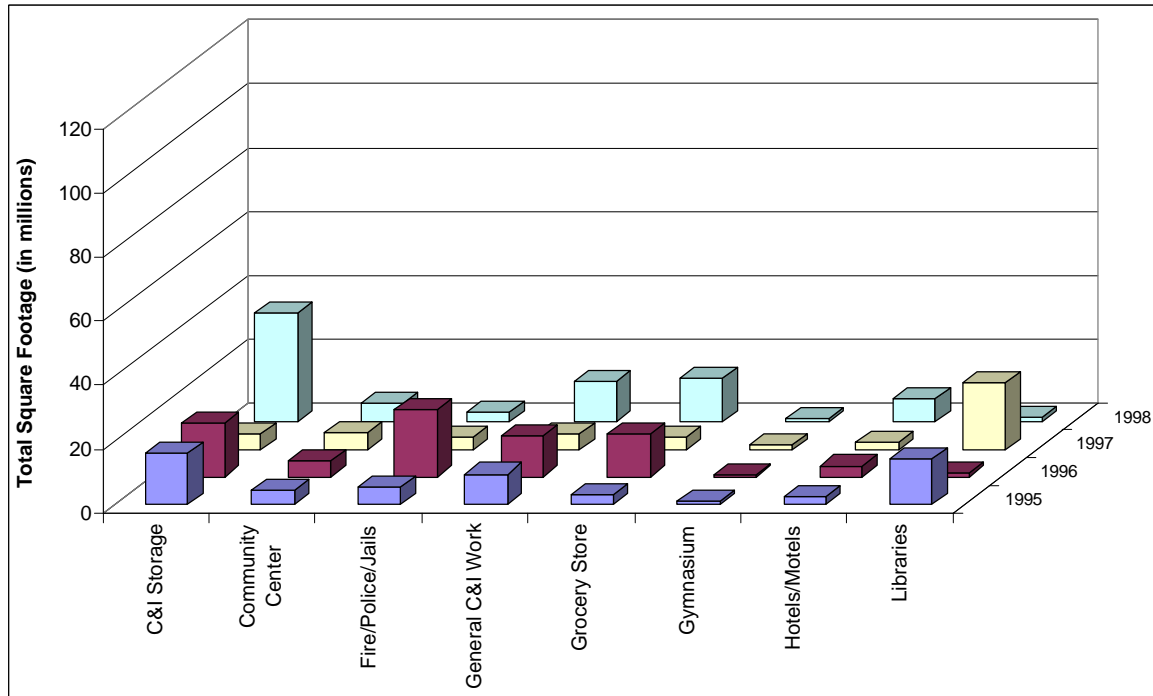


Figure 13: Total Square Footage by Building Type and Year

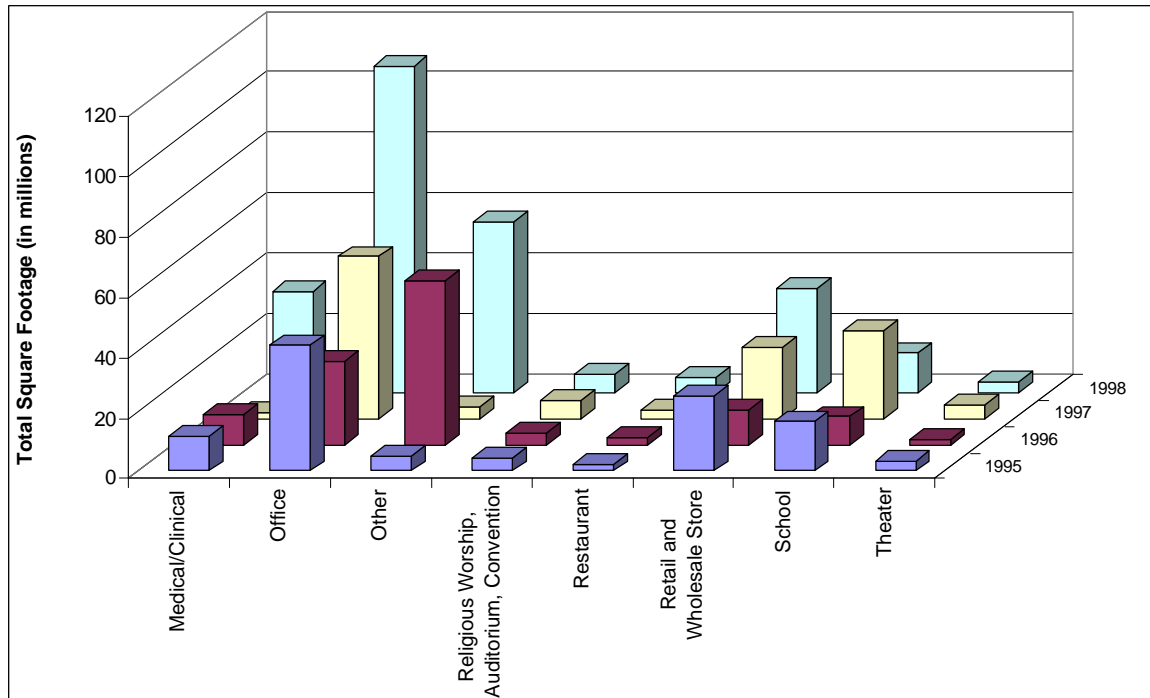


Figure 14: Total Square Footage by Building Type and Year

Building Type	1995	1996	1997	1998	Total
C&I Storage	16.0	16.8	4.6	34.1	71.5
Community Center	4.4	5.0	5.2	5.9	20.5
Fire/Police/Jails	5.7	21.3	3.7	2.8	33.5
General C&I Work	9.6	13.1	4.8	12.9	40.4
Grocery Store	3.0	13.6	4.0	13.5	34.1
Gymnasium	1.0	0.8	1.2	0.9	4.0
Hotels/Motels	2.6	3.4	2.5	7.3	15.7
Libraries	14.3	1.4	20.7	1.3	37.8
Medical/Clinical	11.7	10.2	2.1	33.4	57.3
Office	41.6	27.5	53.6	107.9	230.6
Other	4.8	54.2	4.3	56.6	119.8
Religious Worship, Auditorium, Convention	4.3	3.9	6.1	6.2	20.5
Restaurant	2.4	2.6	3.0	5.1	13.1
Retail and Wholesale Store	25.0	11.5	23.8	34.5	94.8
School	16.5	9.4	29.3	13.2	68.5
Theater	3.4	2.0	4.7	3.8	14.0
Total	166.2	196.8	173.5	339.5	876.1

Table 10: Total Square Footage by Building Type and Year (in millions)

Figure 15 and Table 11 show the total square footage by project type and year. In terms of square footage, new buildings dominate the NRNC market since new buildings tend to be much larger than alterations / renovations. The amount of square footage increased in new buildings, while square footages were fairly constant over time in the other categories.

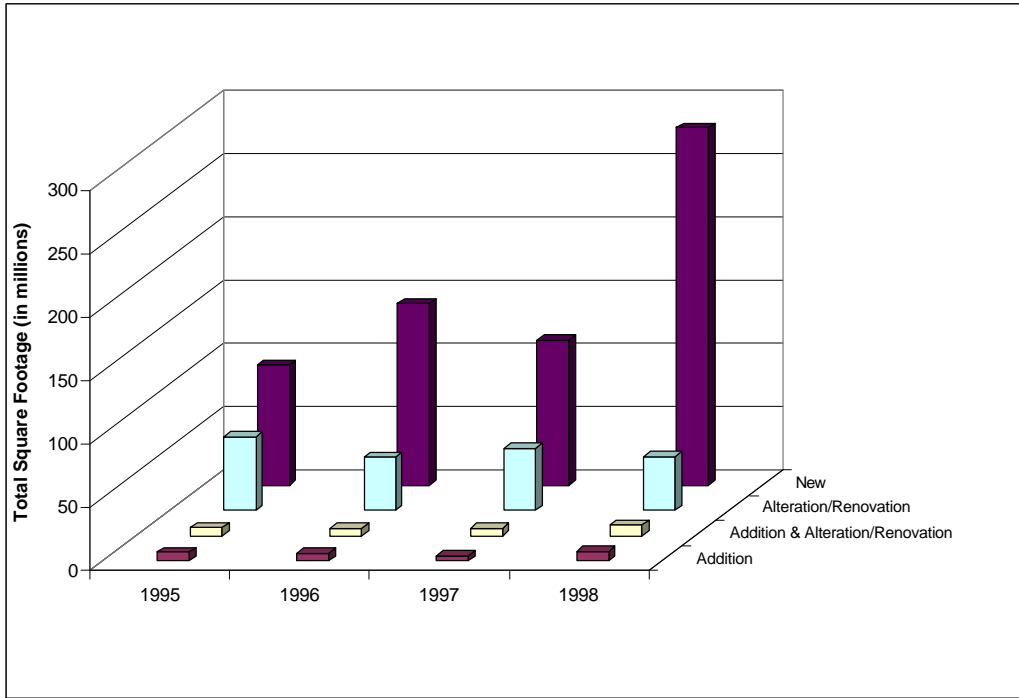


Figure 15: Total Square Footage by Project Type and Year

Project Type	1995	1996	1997	1998	Total
Addition	7	6	4	8	25
Addition & Alteration/Renovation	6	5	6	8	26
Alteration/Renovation	58	42	50	42	192
New	95	143	114	282	634
Total	166	197	174	340	876

Table 11: Total Square Footage by Project Type and Year (in millions)

Figure 16 and Table 12 show the total square footage by ownership type and year. The square footage of private buildings was drastically higher than that of other categories. By comparing Figure 16 to Figure 6, it can be seen that the size of private buildings increased sharply in 1998.

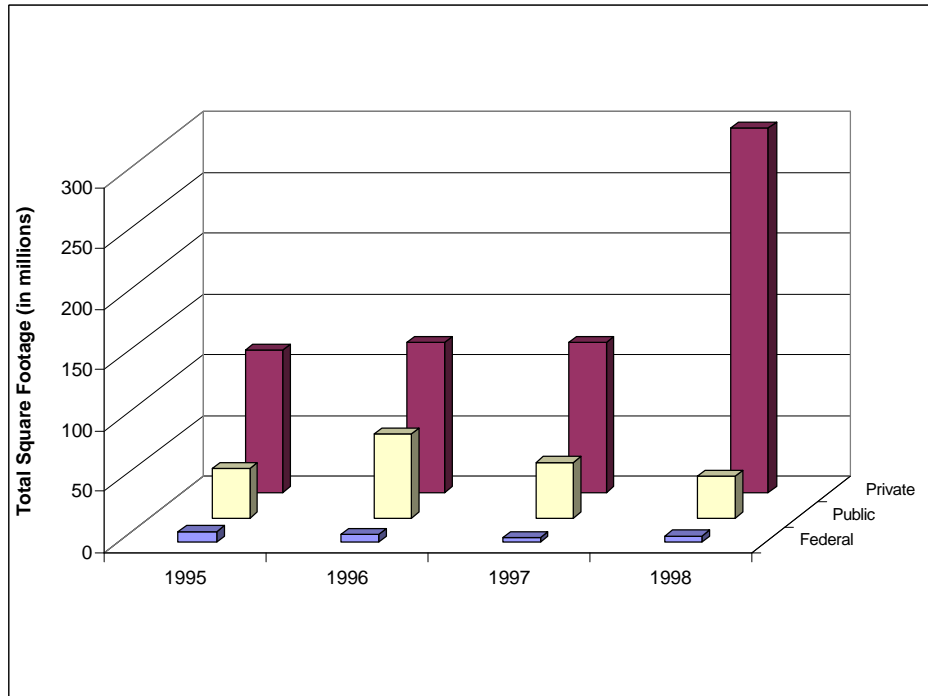


Figure 16: Total Square Footage by Ownership Type and Year

Owner	1995	1996	1997	1998	Total
Federal	9	6	4	5	24
Public	40	68	46	35	188
Private	117	123	124	300	663
Total	166	197	174	340	876

Table 12: Total Square Footage by Ownership Type and Year (in millions)

Construction Trends in the PG&E Area

This section of the report presents the number of permits, the total valuation, and the total square footage of projects by year, and crosstabulated by building type, project type, and ownership type. This section of the report is specific to PG&E Utility Service Territory only. All projects outside of PG&E’s territory have been excluded from this section.

Number of Permits

Figure 17 and Table 13 show the number of permits by year in the PG&E region. The number of permits filed in 1998 was only slightly higher than the other years. The trend over time in the number of permits in the PG&E region is the same trend that surfaces in the statewide findings.

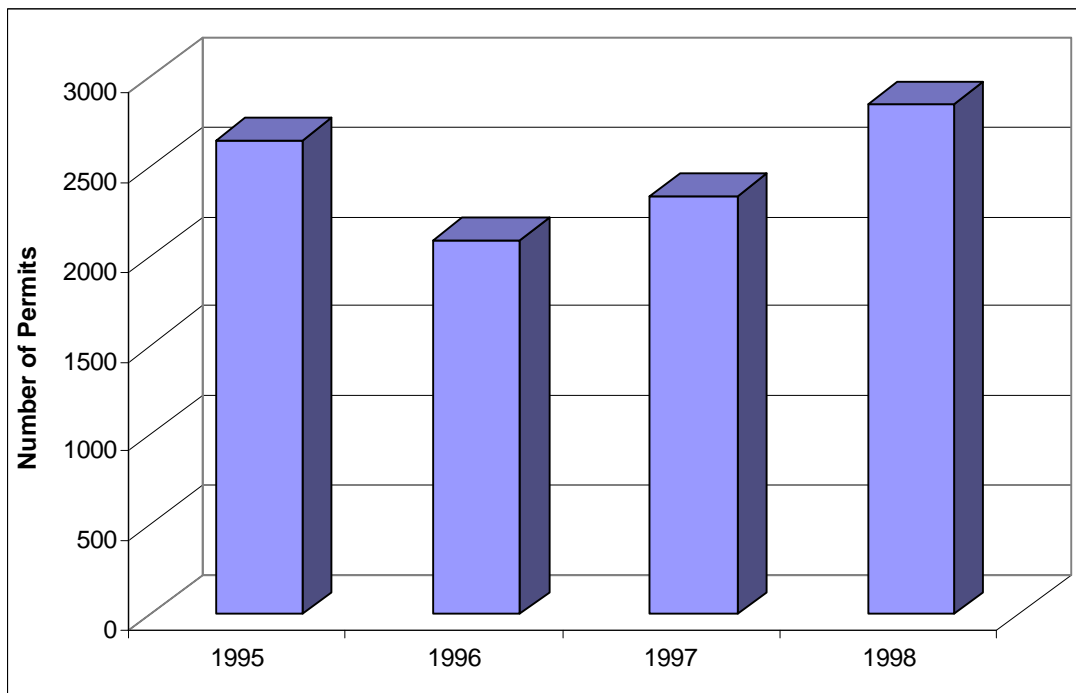


Figure 17: Number of Permits by Year

Year	Number
1995	2,643
1996	2,089
1997	2,334
1998	2,846
Total	9,912

Table 13: Number of Permits by Year

Figure 18, Figure 19, and Table 14 show the number of permits by building type. As in the statewide findings, office buildings comprised a large portion, approximately 30 percent, of the non-residential new construction in the PG&E territory.

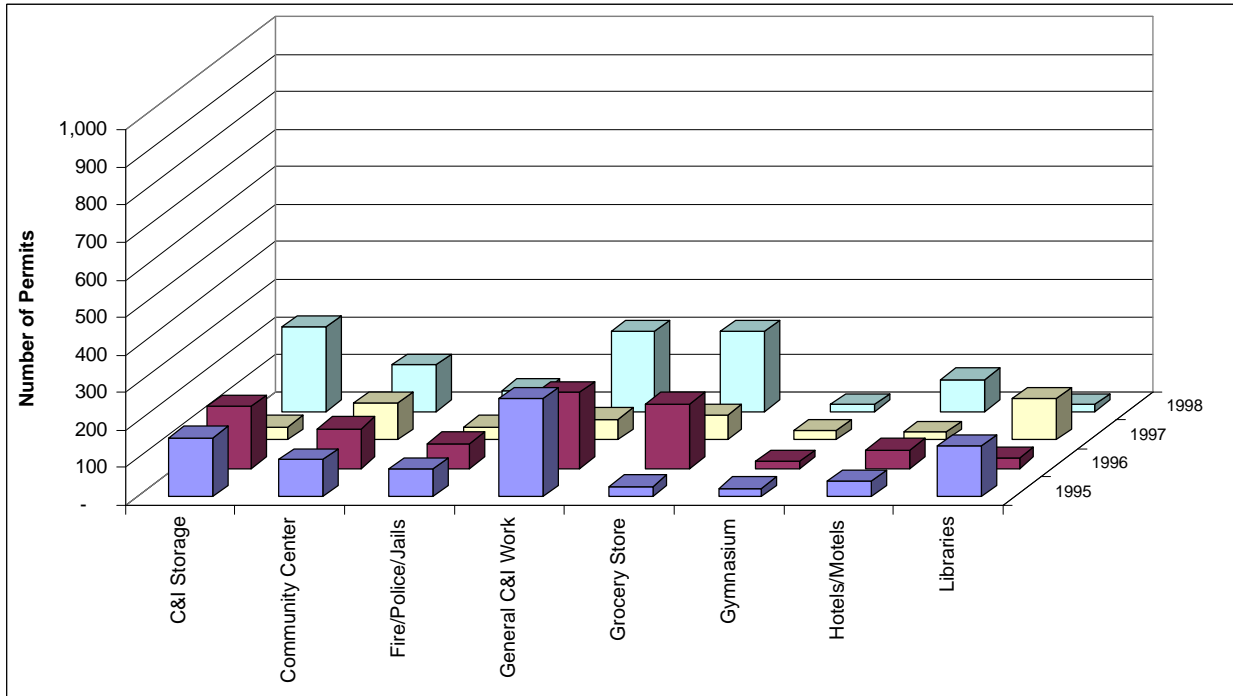


Figure 18: Number of Permits by Building Type and Year

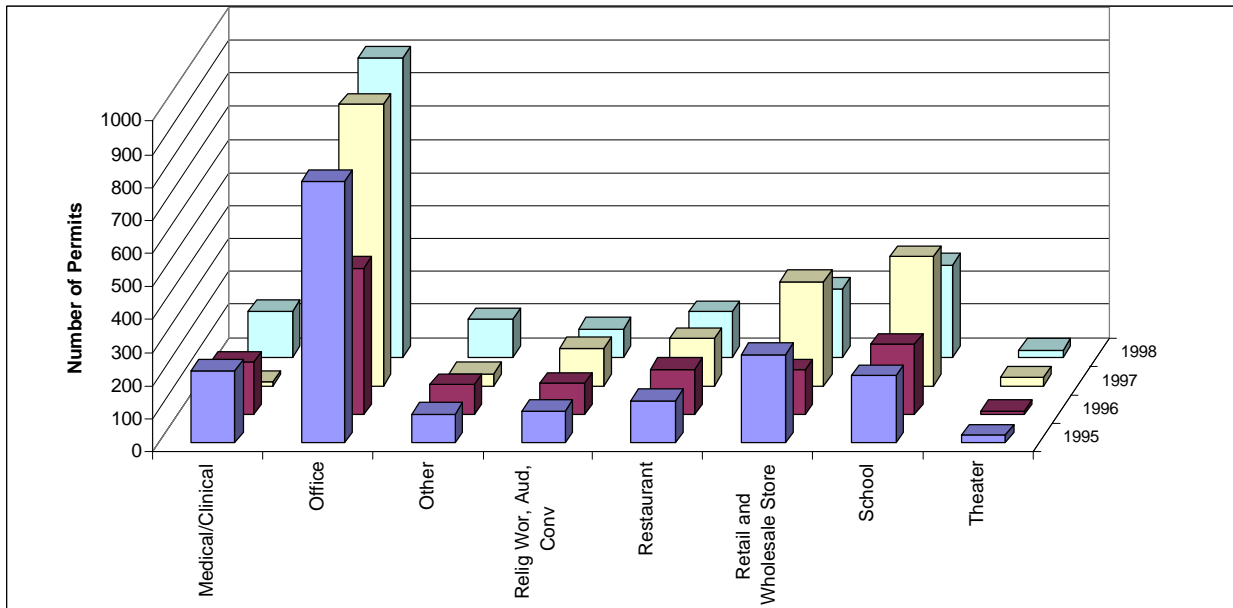


Figure 19: Number of Permits by Building Type and Year

Building Type	1995	1996	1997	1998	Total
C&I Storage	158	166	34	226	584
Community Center	99	106	98	124	427
Fire/Police/Jails	74	65	34	56	229
General C&I Work	262	202	55	213	732
Grocery Store	28	172	65	213	478
Gymnasium	24	20	24	17	85
Hotels/Motels	42	50	20	85	197
Libraries	136	28	110	17	291
Medical/Clinical	219	157	12	140	528
Office	793	444	852	907	2,996
Other	87	90	37	116	330
Relig Wor, Aud, Conv	98	94	115	85	392
Restaurant	129	138	143	138	548
Retail and Wholesale Store	269	135	317	207	928
School	203	211	392	280	1,086
Theater	22	11	26	22	81
Total	2,643	2,089	2,334	2,846	9,912

Table 14: Number of Permits by Building Type and Year

Figure 20 and Table 15 show the number of permits by project type and year. The number of new and alteration/renovation permits remained just about equal over time, with a slight increase from 1996 to 1998.

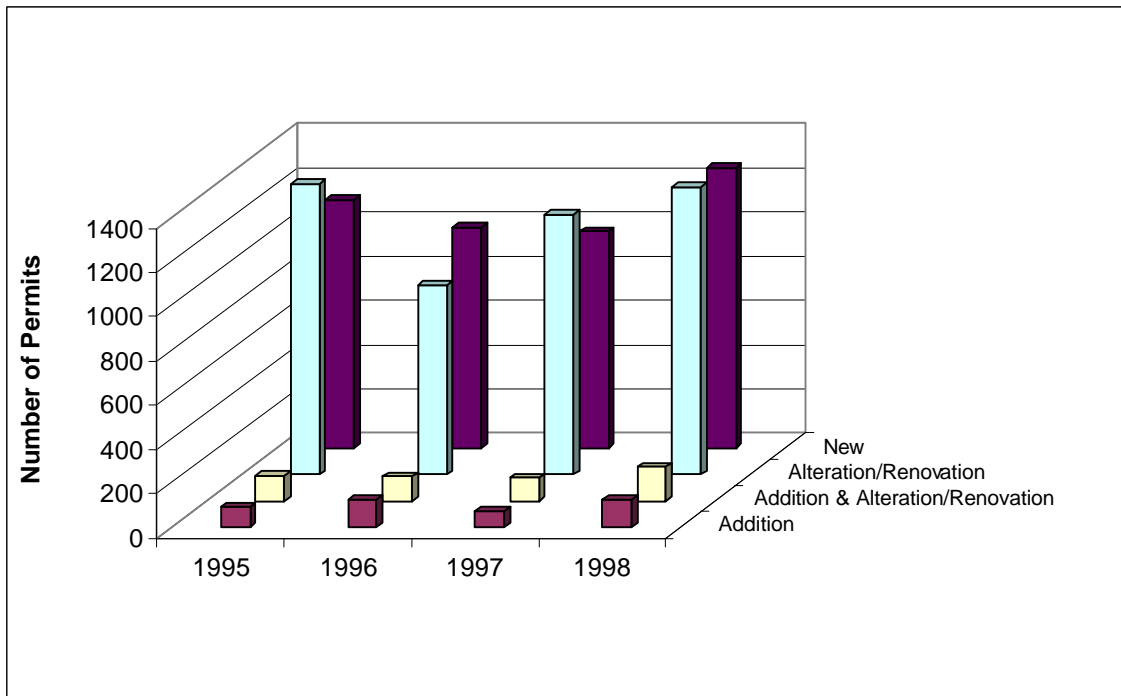


Figure 20: Number of Permits by Project Type and Year

Project Type	1995	1996	1997	1998	Total
Addition	92	126	74	126	418
Addition & Alteration/Renovation	114	110	103	154	481
Alteration/Renovation	1,315	855	1,175	1,299	4,644
New	1,122	998	982	1,267	4,369
Total	2,643	2,089	2,334	2,846	9,912

Table 15: Number of Permits by Project Type and Year

Figure 21 and Table 16 show the number of permits by ownership type and year in the PG&E service territory. Once again, we see an increase in the number of permits in private buildings from 1996 to 1998.

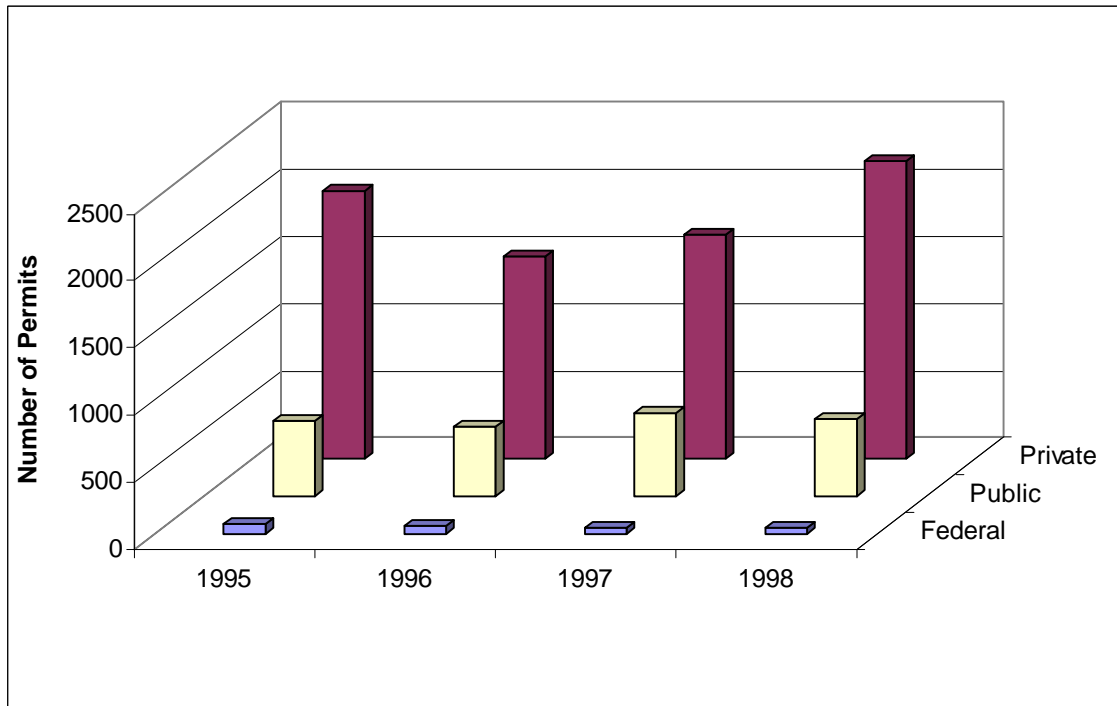


Figure 21: Number of Permits by Ownership Type and Year

Owner	1995	1996	1997	1998	Total
Federal	77	61	41	45	224
Public	564	520	618	577	2,279
Private	2,002	1,508	1,675	2,224	7,409
Total	2,643	2,089	2,334	2,846	9,912

Table 16: Number of Permits by Ownership Type and Year

Total Valuation

Figure 22 and Table 17 show the total valuation of projects in PG&E territory by year in millions of dollars. Interestingly, 1998 far surpassed the other years in valuation. In the previous section, we saw that the number of permits in 1998 was only slightly higher than the other years. Thus, we can conclude that the dollar value of projects increased significantly over the previous three years. As in the number of permits filed, the trend in the total valuation over time in the PG&E territory is the same as the trend in the statewide findings.

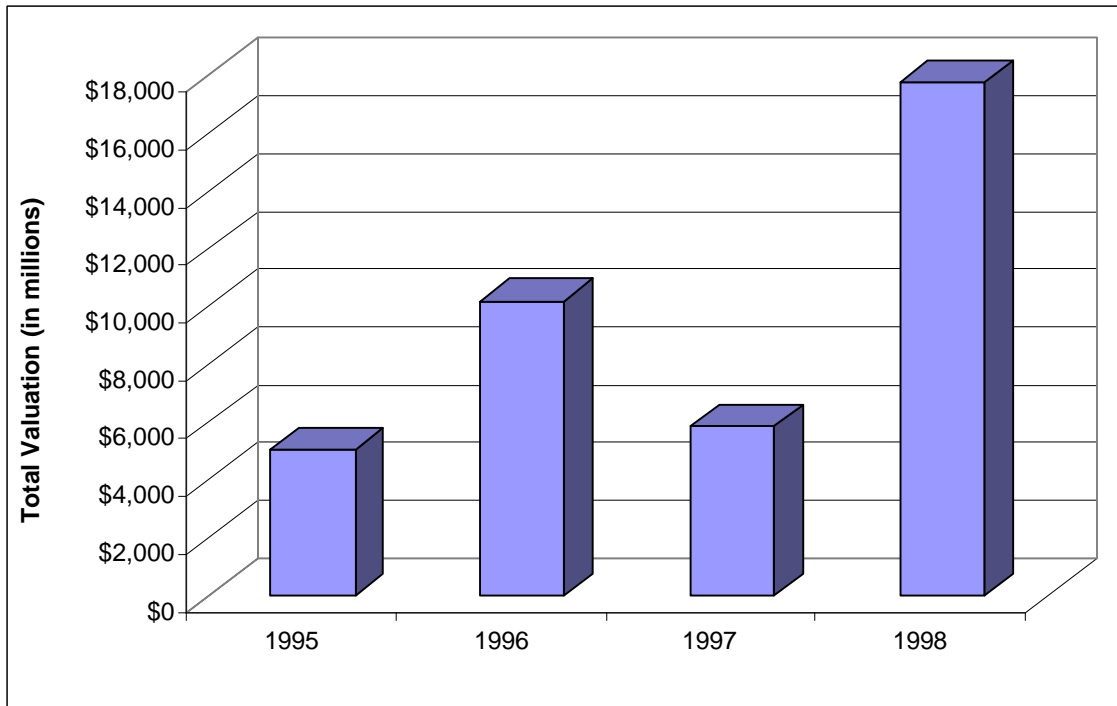


Figure 22: Total Valuation by Year

Year	Total Valuation (in millions)
1995	\$ 5,049
1996	\$ 10,215
1997	\$ 5,851
1998	\$ 17,810
Total	\$ 38,926

Table 17: Total Valuation by Year (\$million)

Figure 23, Figure 24 and Table 18 show the total valuation by building type and year in millions of dollars in the PG&E territory. Notice the enormous increase in the valuation of office buildings in 1998. This trend does not exist in the number of permits, thus the value per project increased in 1998 over the previous years.

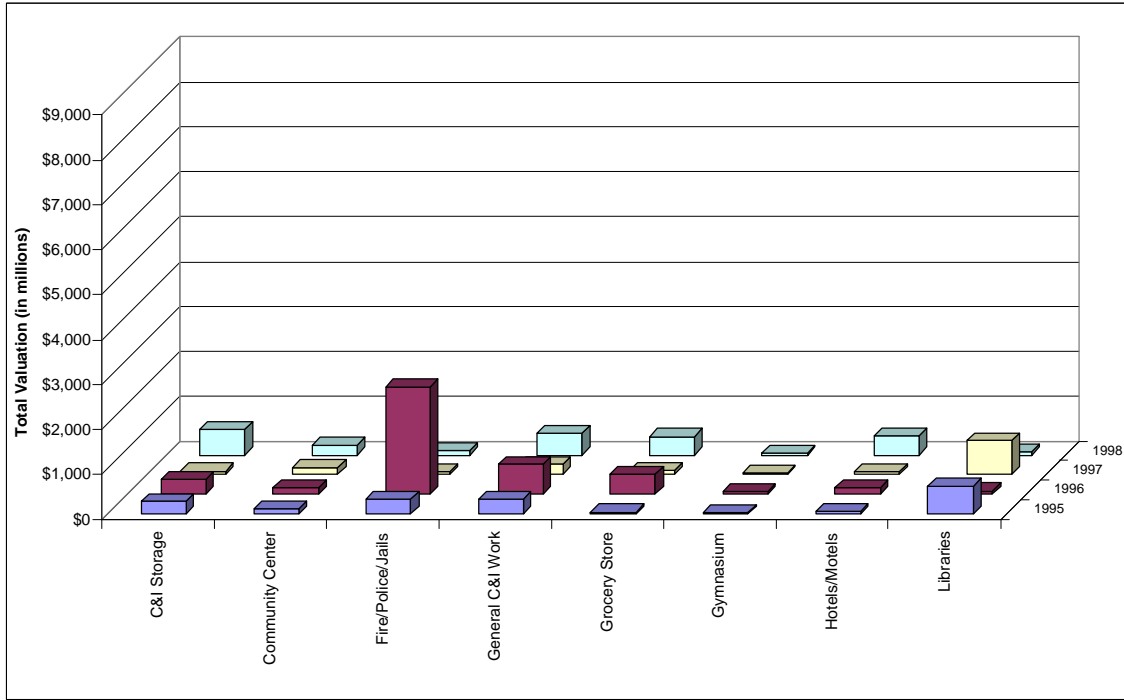


Figure 23: Total Valuation by Building Type and Year

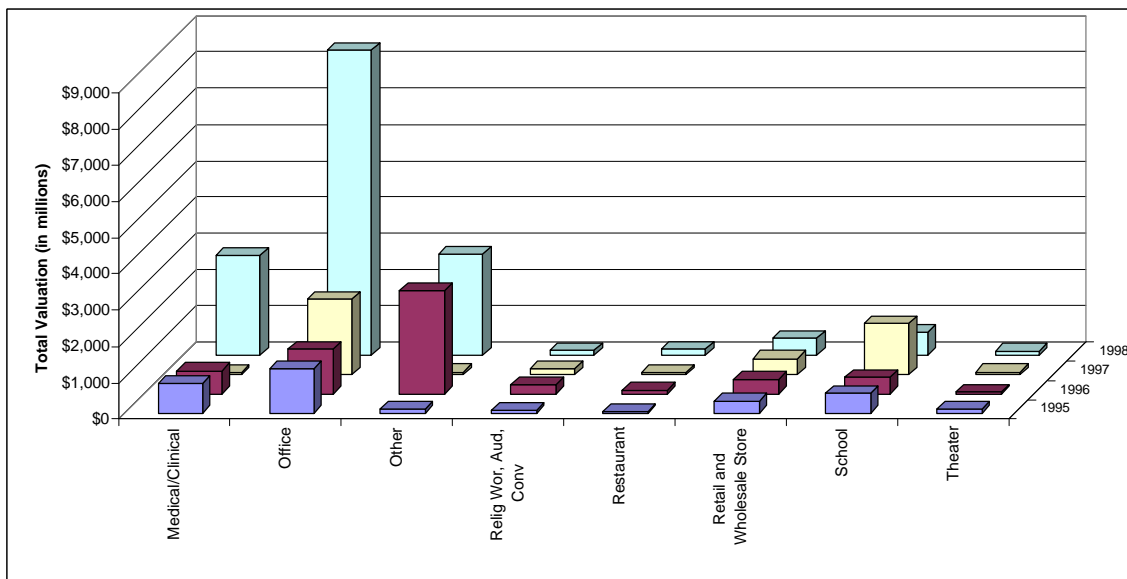


Figure 24: Total Valuation by Building Type and Year

Building Type	1995	1996	1997	1998	Total
C&I Storage	\$ 271	\$ 329	\$ 78	\$ 563	\$ 1,240
Community Center	\$ 111	\$ 138	\$ 158	\$ 219	\$ 627
Fire/Police/Jails	\$ 332	\$ 2,386	\$ 71	\$ 106	\$ 2,896
General C&I Work	\$ 317	\$ 663	\$ 222	\$ 481	\$ 1,684
Grocery Store	\$ 31	\$ 441	\$ 83	\$ 417	\$ 972
Gymnasium	\$ 24	\$ 48	\$ 42	\$ 36	\$ 150
Hotels/Motels	\$ 49	\$ 131	\$ 54	\$ 428	\$ 662
Libraries	\$ 615	\$ 66	\$ 757	\$ 68	\$ 1,506
Medical/Clinical	\$ 814	\$ 643	\$ 62	\$ 2,767	\$ 4,286
Office	\$ 1,223	\$ 1,242	\$ 2,083	\$ 8,404	\$ 12,952
Other	\$ 111	\$ 2,845	\$ 79	\$ 2,789	\$ 5,824
Relig Wor, Aud, Conv	\$ 88	\$ 264	\$ 164	\$ 134	\$ 650
Restaurant	\$ 56	\$ 102	\$ 71	\$ 160	\$ 390
Retail and Wholesale Store	\$ 338	\$ 411	\$ 448	\$ 479	\$ 1,677
School	\$ 562	\$ 459	\$ 1,398	\$ 644	\$ 3,063
Theater	\$ 106	\$ 46	\$ 82	\$ 115	\$ 349
Total	\$ 5,049	\$ 10,215	\$ 5,851	\$ 17,810	\$ 38,926

Table 18: Total Valuation by Building Type and Year (\$million)

Figure 25 and Table 19 show the total valuation in millions of dollars by project type and year. New construction increased drastically in 1998, while the other project types remained fairly constant over the years.

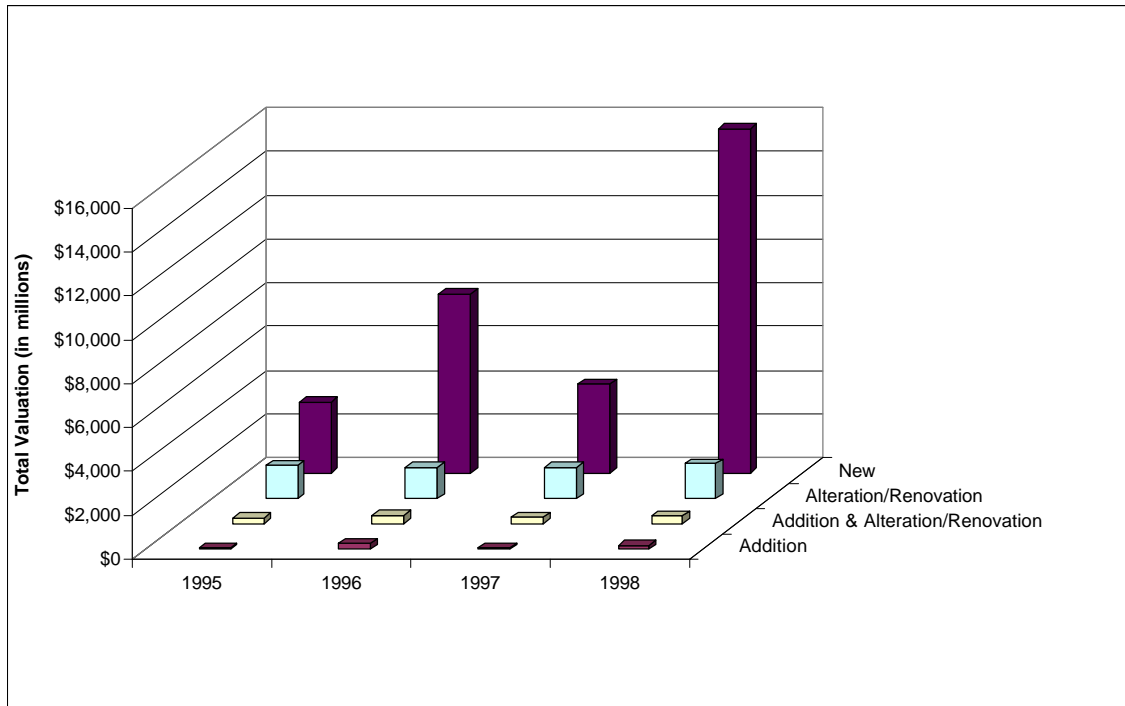


Figure 25: Total Valuation by Project Type and Year

Project Type	1995	1996	1997	1998	Total
Addition	\$ 68	\$ 243	\$ 68	\$ 164	\$ 543
Addition & Alteration/Renovation	\$ 245	\$ 378	\$ 278	\$ 357	\$ 1,258
Alteration/Renovation	\$ 1,513	\$ 1,413	\$ 1,432	\$ 1,573	\$ 5,931
New	\$ 3,223	\$ 8,182	\$ 4,073	\$ 15,716	\$ 31,194
Total	\$ 5,049	\$ 10,215	\$ 5,851	\$ 17,810	\$ 38,926

Table 19: Total Valuation by Project Type and Year (\$million)

Figure 26 and Table 20 show the total valuation in millions by ownership type and year. Once again we see a drastic increase in valuation, this time in the private sector. From the previous graphs, we can conclude that mainly new offices in the private sector are contributing to the higher valuations that we are seeing in 1998.

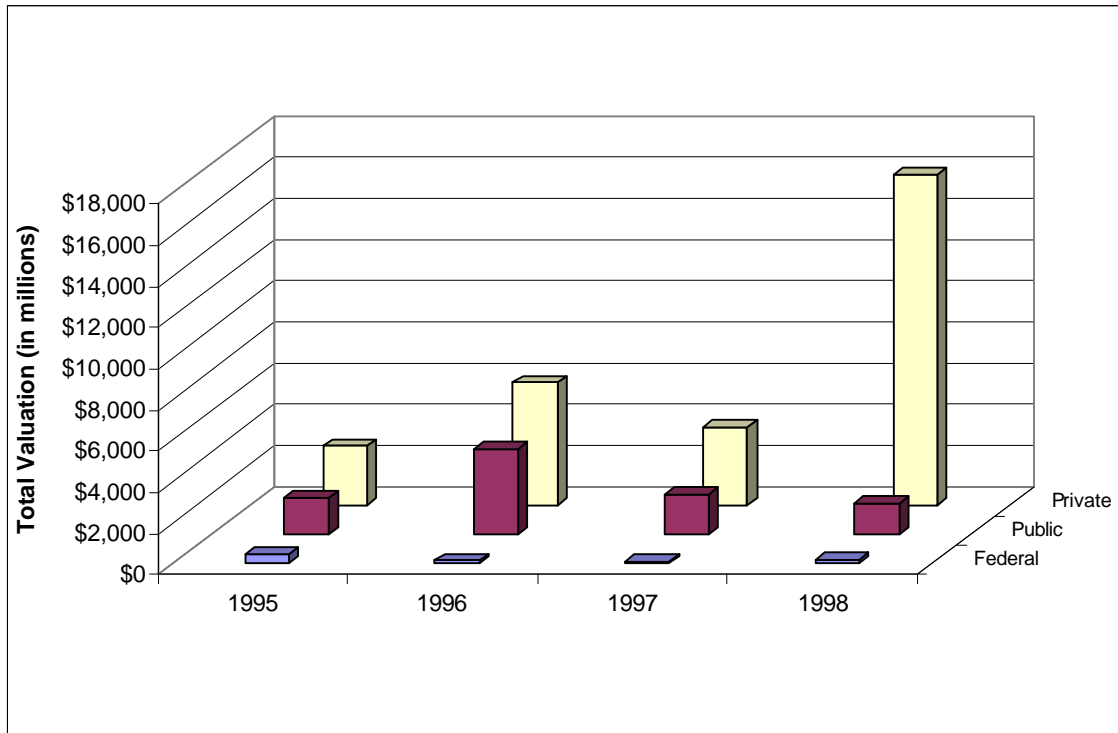


Figure 26: Total Valuation by Ownership Type and Year

Owner	1995	1996	1997	1998	Total
Federal	\$ 467	\$ 158	\$ 87	\$ 226	\$ 937
Public	\$ 1,730	\$ 4,120	\$ 1,969	\$ 1,527	\$ 9,345
Private	\$ 2,852	\$ 5,938	\$ 3,796	\$ 16,058	\$ 28,643
Total	\$ 5,049	\$ 10,215	\$ 5,851	\$ 17,810	\$ 38,926

Table 20: Total Valuation by Ownership Type and Year (\$million)

Total Square Footage

Figure 27 and Table 21 show the total square footage for projects in PG&E territory by year. The largest square footage occurred in 1998. This fact coincides with the trend in the valuation of projects. Thus, NRNC buildings were larger in 1998 in both size and value. The trend in total square footage in the PG&E territory is the same as the trend in the statewide section.

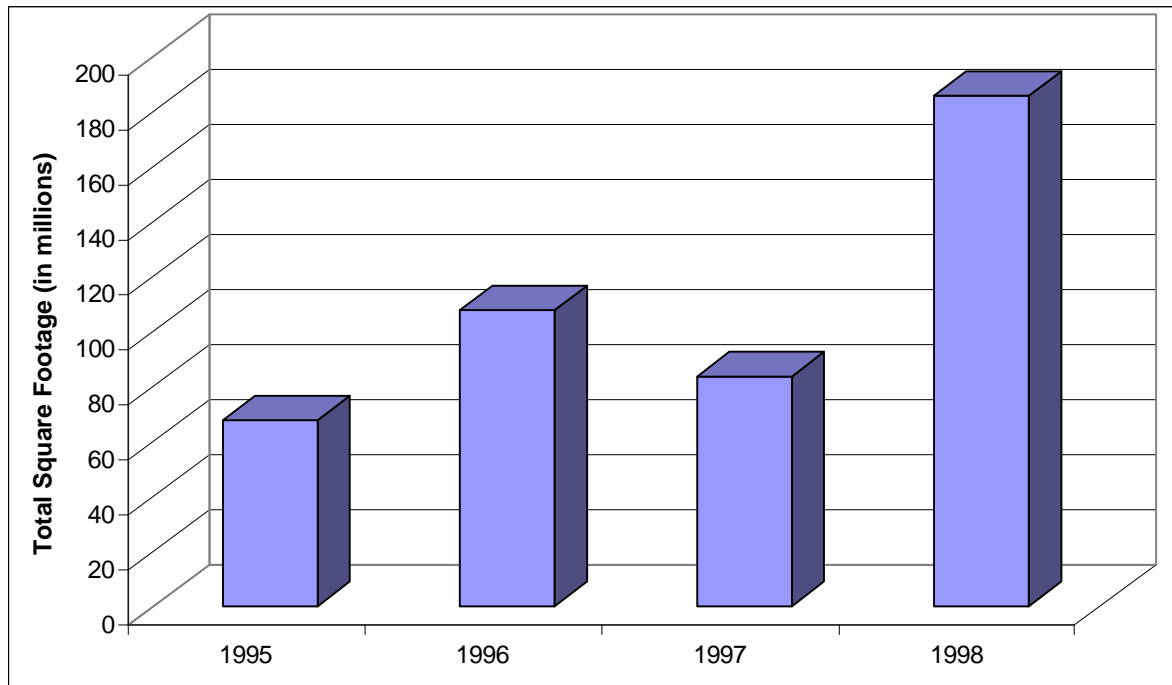


Figure 27: Total Square Footage by Year

Year	Total
1995	68
1996	108
1997	84
1998	186
Total	446

Table 21: Total Square Footage by Year (in millions)

Figure 28, Figure 29, and Table 22 show the total square footage by building type and year. Once again, the square footage for offices was the largest of all building types. In 1996, the square footage for fire/police/jails was large relative to the other years in this building type. That trend also appeared in the valuation.

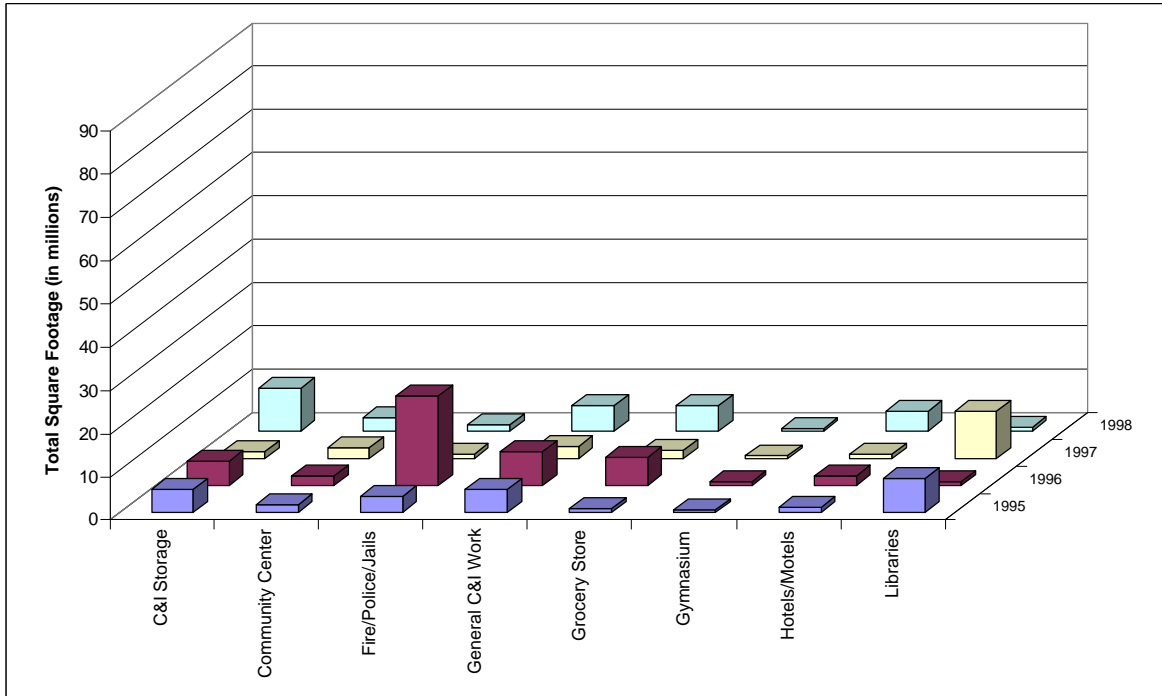


Figure 28: Total Square Footage by Building Type and Year

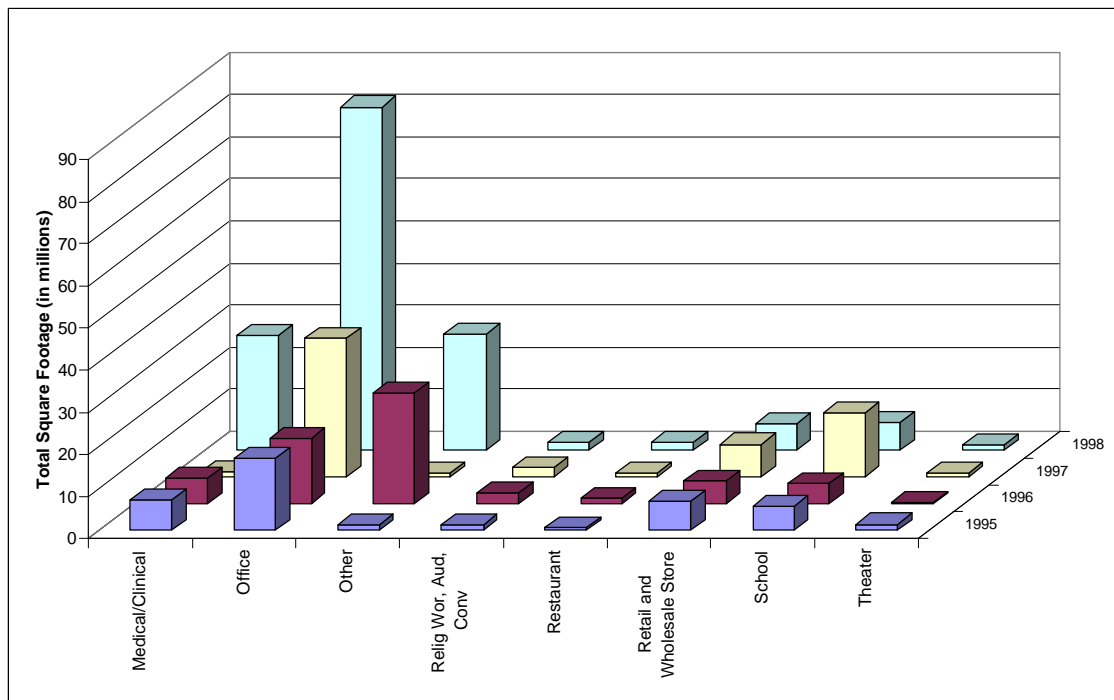


Figure 29: Total Square Footage by Building Type and Year

Building Type	1995	1996	1997	1998	Total
C&I Storage	5.2	5.5	1.5	10.0	22
Community Center	1.6	2.1	2.3	2.9	9
Fire/Police/Jails	3.6	20.4	0.7	1.3	26
General C&I Work	5.2	7.6	2.8	5.7	21
Grocery Store	0.8	6.4	1.8	6.0	15
Gymnasium	0.4	0.6	0.6	0.5	2
Hotels/Motels	1.0	2.0	0.9	4.6	8
Libraries	7.6	0.9	10.7	0.7	20
Medical/Clinical	7.4	6.1	1.3	27.1	42
Office	17.1	15.5	33.0	81.5	147
Other	1.5	26.3	1.0	27.5	56
Relig Wor, Aud, Conv	1.5	2.6	2.3	2.0	8
Restaurant	0.9	1.2	1.1	1.9	5
Retail and Wholesale Store	7.0	5.4	7.8	6.4	27
School	5.9	4.7	15.2	6.7	33
Theater	1.5	0.5	1.0	1.4	4
Total	68	108	84	186	446

Table 22: Total Square Footage by Building Type and Year (in millions)

Figure 30 and Table 23 show the total square footage by project type and year within PG&E territory. The square footage of new projects in 1998 outnumbered any other year and project type.

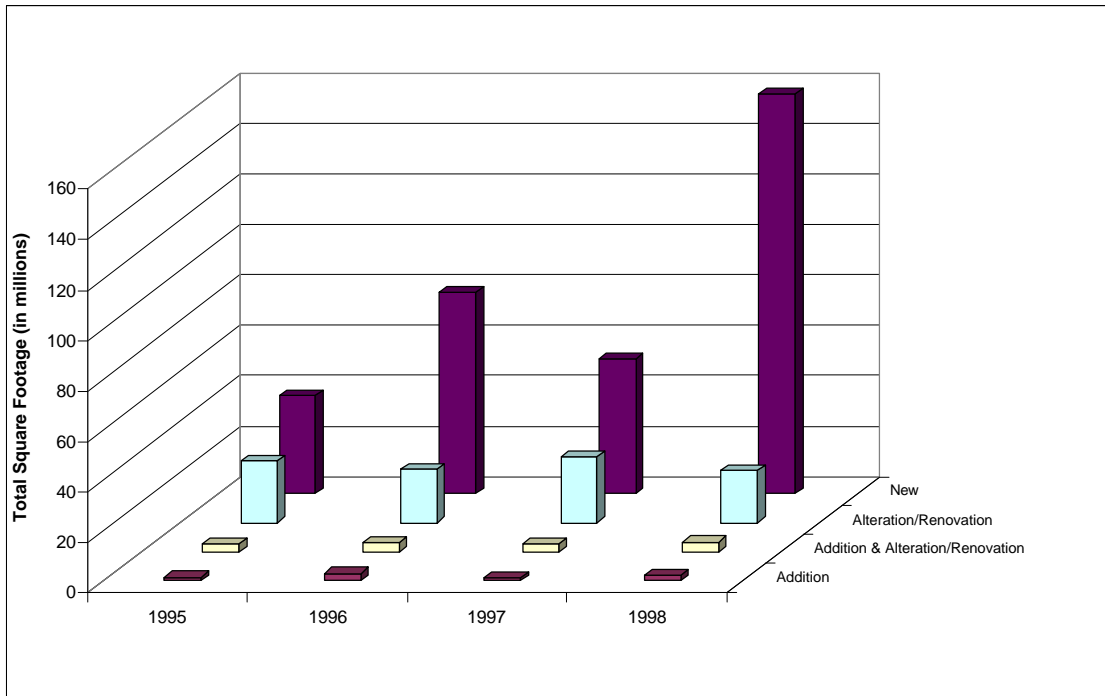


Figure 30: Total Square Footage by Project Type and Year

Project Type	1995	1996	1997	1998	Total
Addition	1.4	3.0	1.0	2.4	8
Addition & Alteration/Renovation	3.0	3.5	3.2	3.9	14
Alteration/Renovation	24.7	21.4	26.3	20.9	93
New	39.0	79.9	53.5	158.7	331
Total	68	108	84	186	446

Table 23: Total Square Footage by Project Type and Year (in millions)

Figure 31 and Table 24 show the total square footage by ownership type and year. Private buildings again had the largest square footage in 1998. The public and federal sectors were fairly constant over the years.

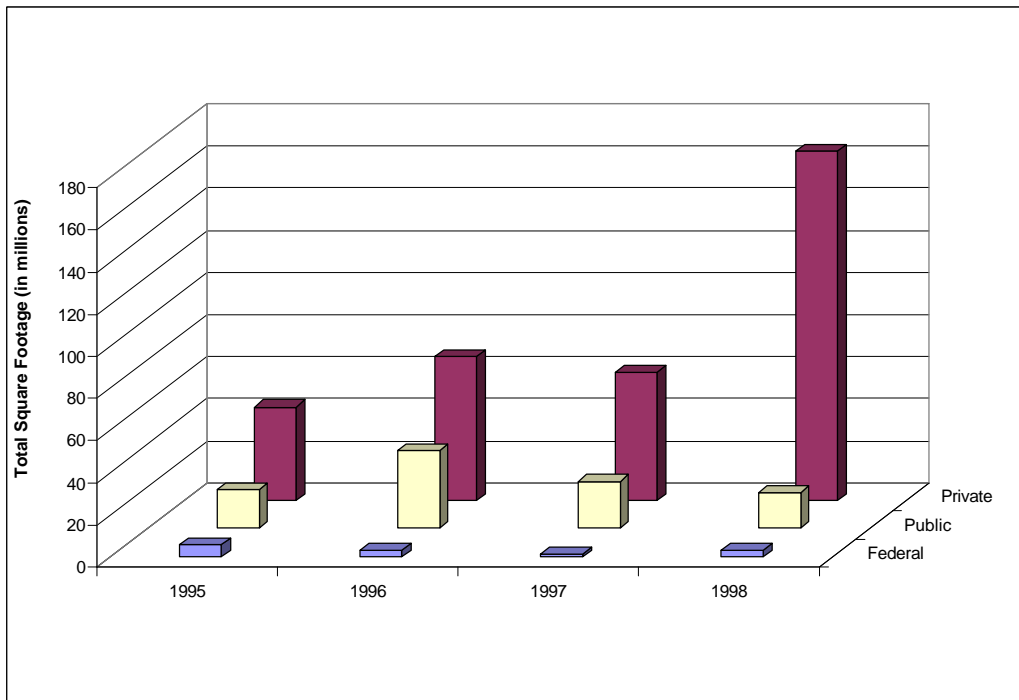


Figure 31: Total Square Footage by Ownership Type and Year

Sum of Square Feet	Year				
Owner	1995	1996	1997	1998	Total
Federal	5.6	3.0	1.2	2.9	13
Public	18.1	36.6	22.3	17.2	94
Private	44.4	68.1	60.6	165.8	339
Total	68	108	84	186	446

Table 24: Total Square Footage by Ownership Type and Year (in millions)

Market Actors in California

This section of the report describes the architectural and engineering, firms serving the NRNC market in California over the last four years. This section will present the number of firms, number of projects worked on by each firm, the total valuation of the projects worked on by each firm, and the total square footage of the projects worked on by each firm. This information will be cross tabulated by:

- Type of Firm (architecture, engineering, joint),
- Firm Size category based on total project valuation (very small, small, medium, large, very large),
- Primary market served by firm, and
- Primary market served based on owner code.

This statewide section of the report contains results for all California projects, and is not restricted to any unique utility territory.

All architectural and engineering firms were classified into the following firm size categories based on total project valuation: extra small, small, medium, large, and extra large. For simplicity, this category will be referred to as firm size throughout the remainder of this report. Firms were classified into size categories by the total valuation of all NRNC projects in California on which they worked, using the Dodge data for the years 1995 through 1998. Table 25 displays cutpoints used to classify the firms, together with the number of firms in each size category. For example, if a given firm's total valuation over the four year timeperiod was greater than \$400,000 and less than \$850,000, that firm was classified as small. The cutpoints were chosen to equalize the number of firms in each category.

Table 25 shows that between 1995 and 1998, over 7,100 architectural and engineering firms⁵ served the California NRNC market. About 20% of these firms had a very small amount of work in the NRNC market – less than \$400,000 total valuation throughout the four year time period. By contrast the largest 20% had almost \$8,000,000 valuation during the four years.

Size	Up To	Number
Extra Small	\$400,000	1,446
Small	\$850,000	1,442
Medium	\$2,373,678	1,426
Large	\$7,915,556	1,433
Extra Large	Higher	1,431
Total		7,178

Table 25 : Number of Firms by Size Classification

All firms were classified according to the dominant type of project served by the firm, i.e. Addition, Alteration/Renovation, Addition & Alteration/Renovation, and New. For each firm, we tabulated the total statewide valuation of all projects worked on by the firm classified by project. The firm's primary project type was defined to be the category that accounted for the most valuation.

⁵ If a firm maintained offices in two or more locations, each office was counted separately. However, only a small fraction of the firms had multiple offices.

Similarly, firms were also categorized according to the dominant type of project served by the firm based on owner type, i.e. Federal, Private, or Public. For each firm, we computed the total valuation for each owner type – private, federal and other public - and defined the firm’s primary owner type to be the category that accounted for the most valuation.

Number of Firms

Figure 32 and Table 26 present the number of architectural, engineering, and joint architectural & engineering firms by firm size. Altogether there are over 5,100 architectural firms, almost 1,500 engineering firms, and about 500 joint firms. Note that the architectural firms tend to be smaller than engineering and joint firms.

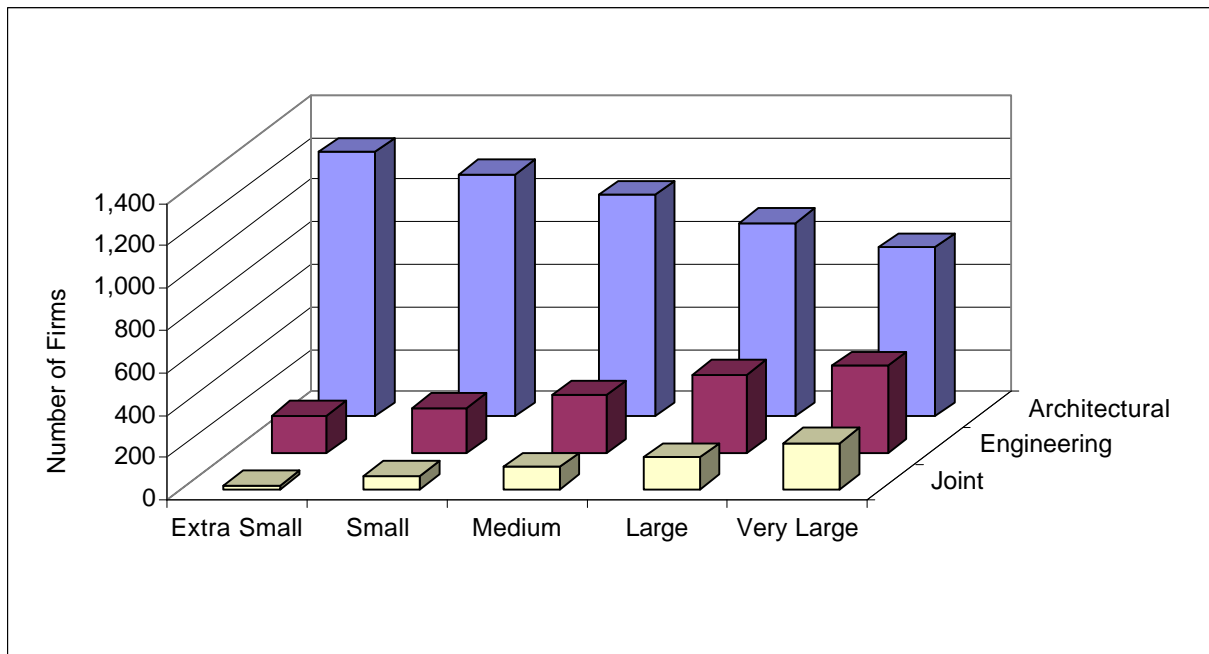


Figure 32: Number of Firms by Size and Type of Firm

Firm Type	Firm Size					Total
	Extra Small	Small	Medium	Large	Very Large	
Architectural	1,251	1,142	1,047	914	799	5,153
Engineering	176	216	275	369	413	1,449
Joint	19	64	104	150	219	556
Total	1,446	1,422	1,426	1,433	1,431	7,158

Table 26: Number of Firms by Size and Type of Firm

Figure 33 and Table 27 display the number of firms by primary ownership type and firm type. The majority of firms primarily serve private owners; few firms primarily serve federal owners.

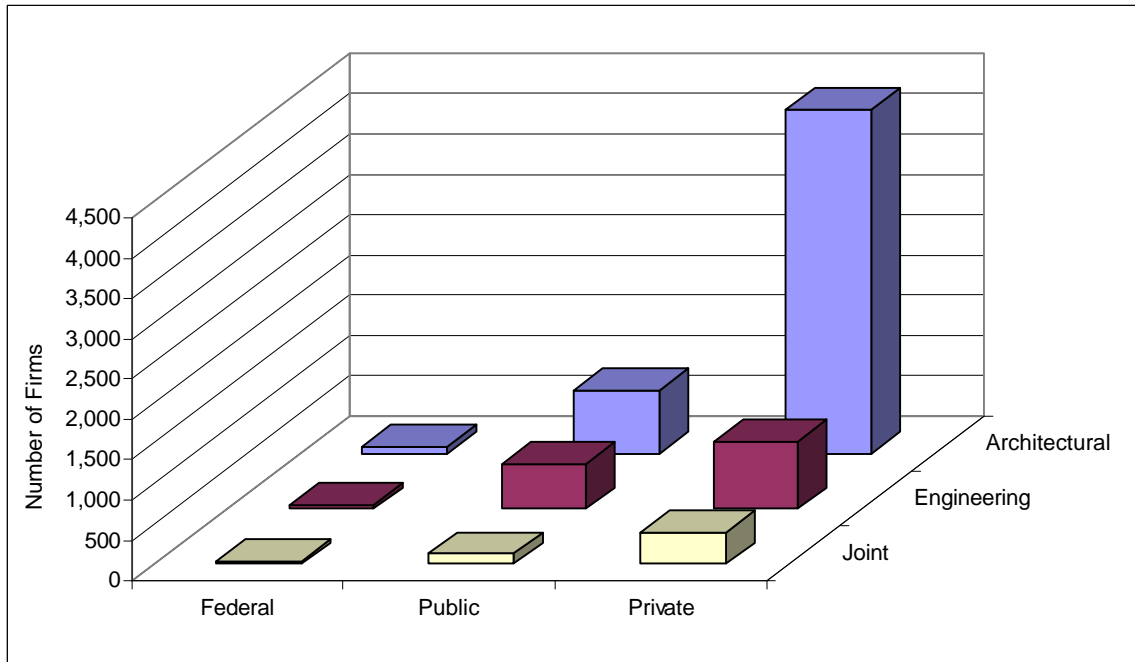


Figure 33: Number of Firms by Primary Ownership Type and Type of Firm

Firm Type	Primary Owner Type			Total
	Federal	Public	Private	
Architectural	87	790	4,276	5,153
Engineering	52	558	839	1,449
Joint	30	130	396	556
Total	169	1,478	5,511	7,158

Table 27: Number of Firms by Primary Ownership Type and Type of Firm

Figure 34 and Table 28 present the number of firms by primary project type. For architectural and joint firms, approximately 50% of the firms work primarily on new projects, while nearly two-thirds of engineering firms work primarily on new projects. This likely a function of the fact that the most common project type is new construction projects.

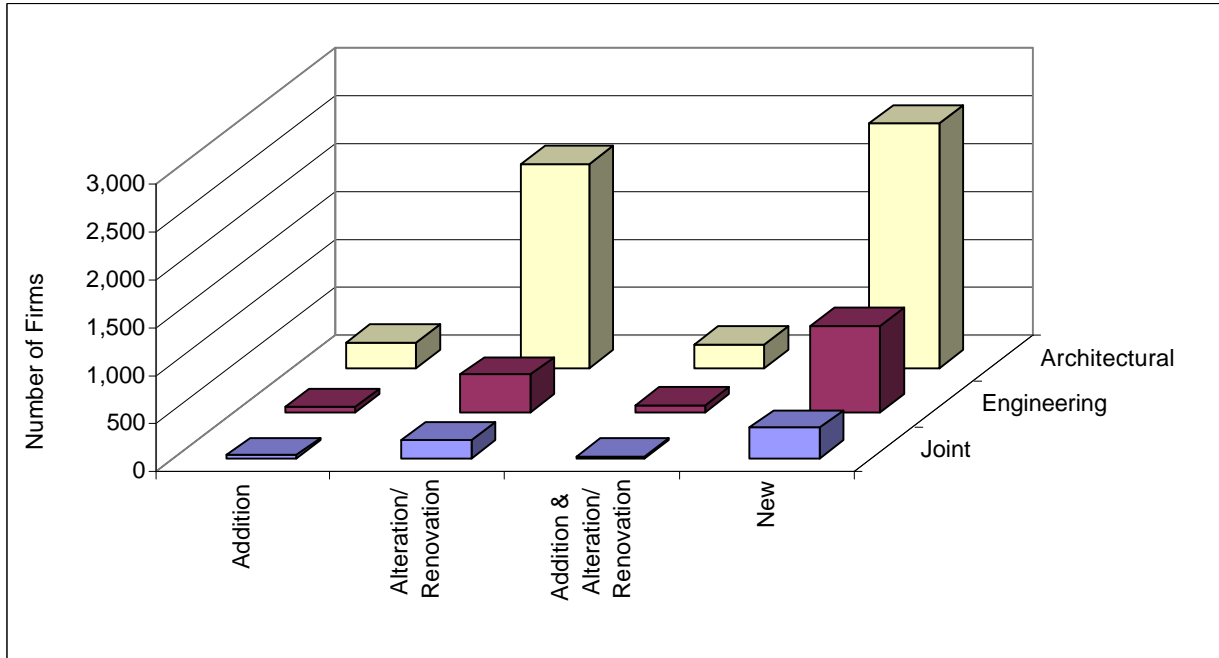


Figure 34: Number of Firms by Primary Project Type and Type of Firm

Firm Type	Primary Project Type				Total
	Addition	Alteration/Renovation	Addition & Alteration/Renovation	New	
Architectural	256	2,116	238	2,543	5,153
Engineering	68	398	77	906	1,449
Joint	26	196	21	313	556
Total	350	2,710	336	3,762	7,158

Table 28: Number of Firms by Primary Project Type and Type of Firm

Figure 35 and Table 29 display the number of firms by primary ownership type and firm size. As we also saw in Figure 33, the majority of the firms primarily serve the private market. However a cluster of almost 500 firms serve the extra large public market.

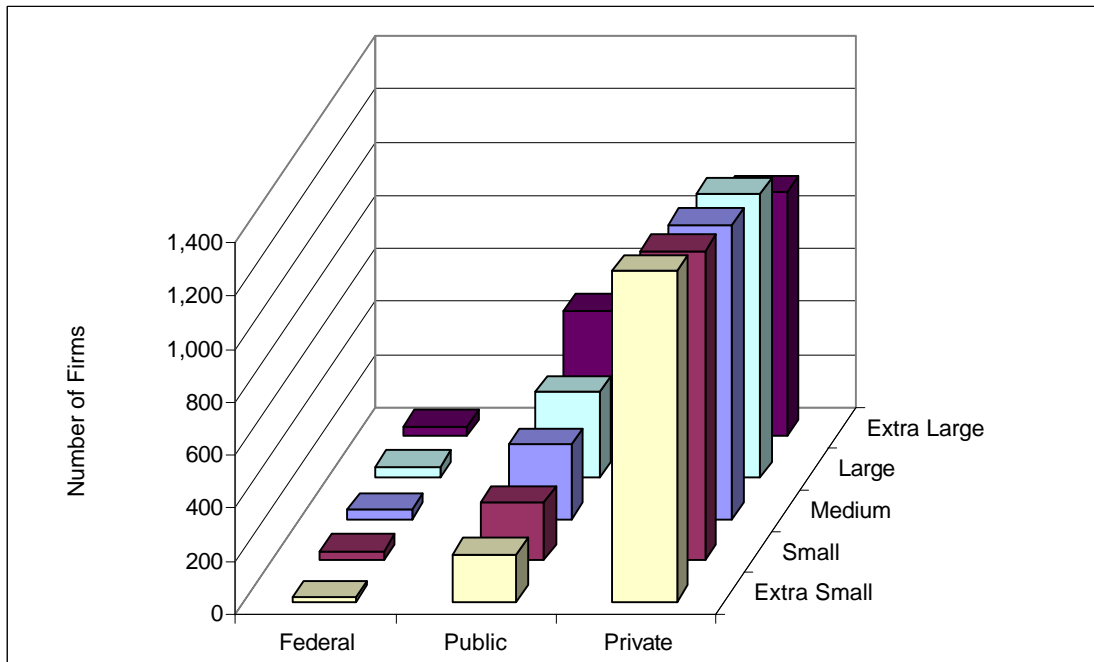


Figure 35: Number of Firms by Primary Ownership Type and Size of Firm

Firm Size	Primary Owner Type			Total
	Federal	Public	Private	
Extra Small	19	181	1,246	1,446
Small	37	219	1,166	1,422
Medium	34	281	1,111	1,426
Large	41	323	1,069	1,433
Extra Large	38	474	919	1,431
Total	169	1,478	5,511	7,158

Table 29: Number of Firms by Primary Ownership Type and Size of Firm

Figure 36 and Table 30 show the number of firms classified by primary project type and firm size. The figure shows that the firms mostly serving the alterations/renovation market tend to work on smaller projects than the firms mostly serving new projects, which is not surprising given the nature of the alteration/renovation market.

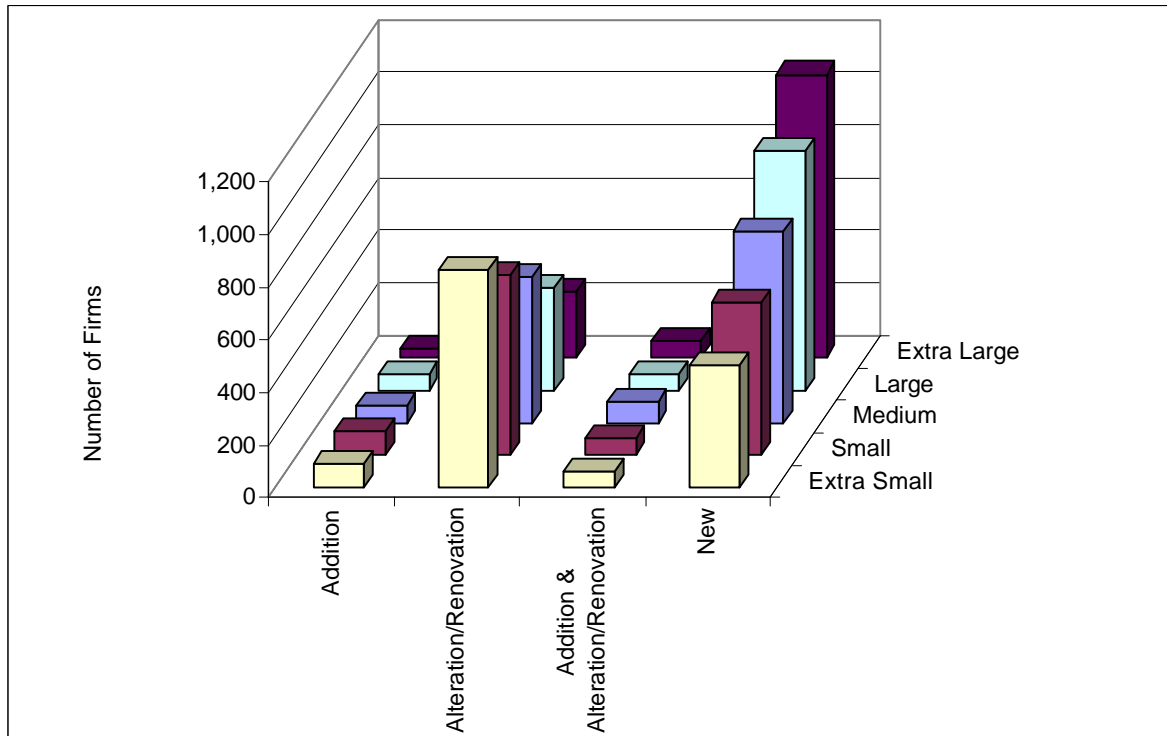


Figure 36: Number of Firms by Primary Project Type and Size of Firm

Firm Size	Primary Project Type				Total
	Addition	Alteration/Renovation	Addition & Alteration/Renovation	New	
Extra Small	89	827	64	466	1,446
Small	92	688	63	579	1,422
Medium	67	553	79	727	1,426
Large	64	392	64	913	1,433
Extra Large	38	250	66	1077	1,431
Total	350	2,710	336	3,762	7,158

Table 30: Number of Firms by Primary Project Type and Size of Firm

Number of Permits

Figure 37 and Table 31 display the number of construction permits by size and type of firm. As may be expected, the number of permits increases with firm size for all firm types. Comparing Table 31 with Table 26 shows that the very small firms typically worked on only one project in the NRNC market in these four years.⁶ The very large firms control a large share of the new construction market. This is especially true for the engineering and joint firms.

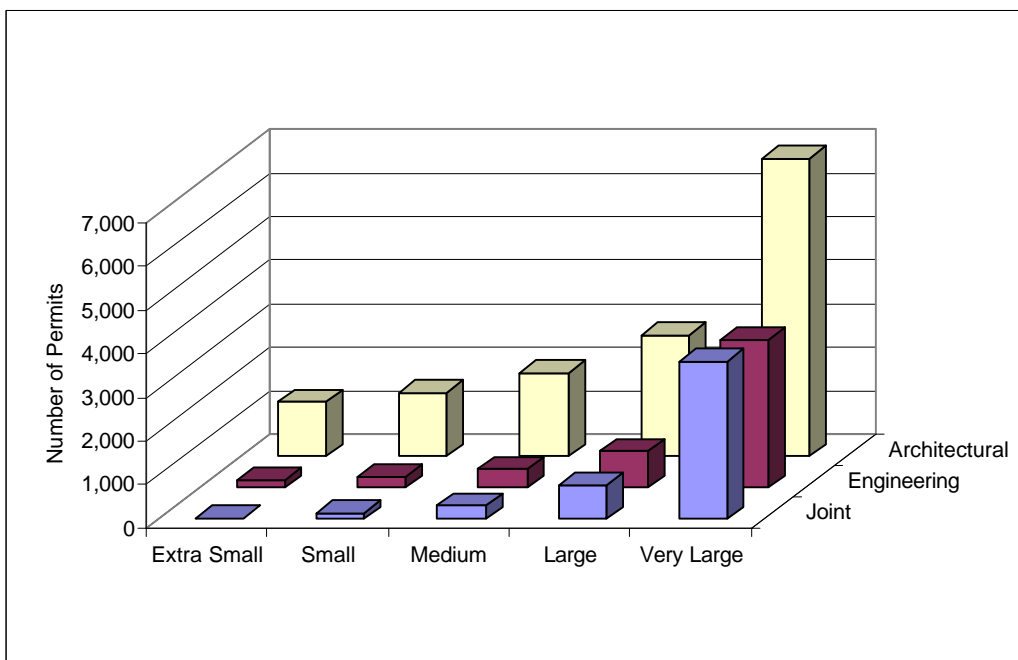


Figure 37: Number of Permits by Size and Type of Firm

Firm Type	Firm Size					Total
	Extra Small	Small	Medium	Large	Very Large	
Architectural	1,251	1,450	1,903	2,781	6,831	14,216
Engineering	176	239	409	823	3,379	5,026
Joint	19	128	297	774	3,619	4,837
Total	1,446	1,817	2,609	4,378	13,829	24,079

Table 31: Number of Permits by Size and Type of Firm

⁶ The small number of projects per firm calls into question the completeness of the Dodge database. It may be that Dodge undercounts projects in the NRNC market or that many of these firms work on projects outside of the California NRNC market. Quite possibly, firms with only one or two permits throughout the time period work primarily on residential projects or commercial projects with valuation less than \$200,000. Additionally, many firms in the Dodge database were located out of state; it is likely that these firms work primarily on projects outside of California. Some building owners were also listed as the architect for the project, indicating the owner used an internal architect.

Figure 38 and Table 32 show the number of permits by primary ownership type and firm type. For all firm types, more than half of the projects were worked on by those firms who primarily serve private owners. This is not surprising since the majority of firms work primarily for the private sector.

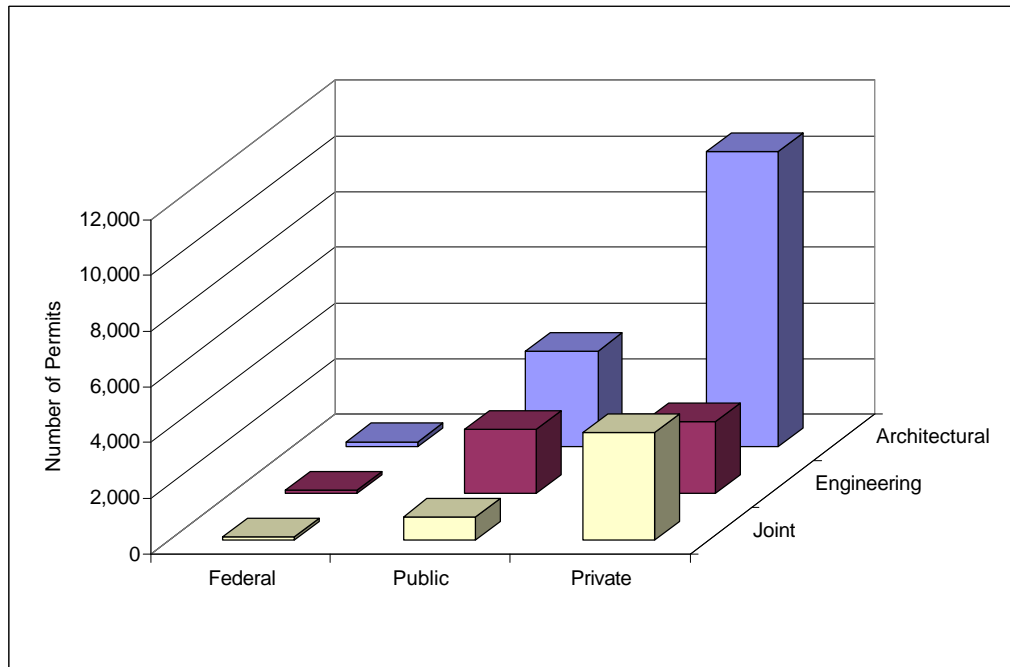


Figure 38: Number of Permits by Primary Ownership Type and Type of Firm

Firm Type	Primary Owner Type			Total
	Federal	Public	Private	
Architectural	206	3,416	10,594	14,216
Engineering	111	2,326	2,589	5,026
Joint	129	861	3,847	4,837
Total	446	6,603	17,030	24,079

Table 32: Number of Permits by Primary Ownership Type and Type of Firm

Figure 39 and Table 33 display the number of construction permits by primary project type and firm type. Most of the projects were worked on by firms that predominately serve the new construction market. Architectural firms concentrating on the alterations/renovations market worked on over 5,000 of the permits.

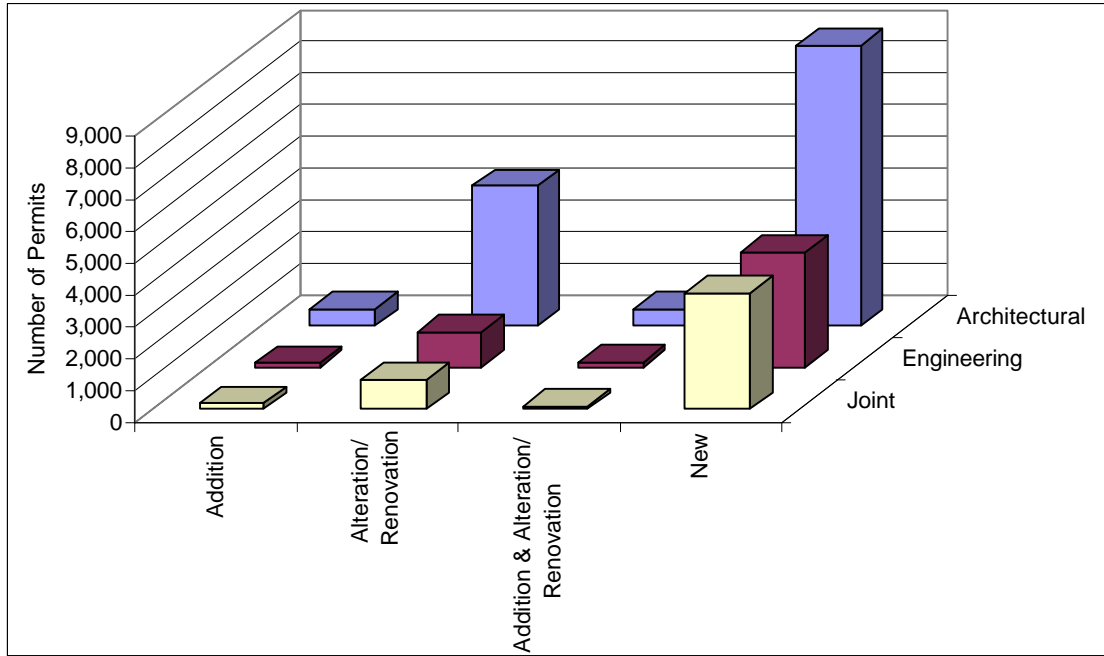


Figure 39: Number of Permits by Primary Project Type and Type of Firm

Firm Type	Primary Project Type				Total
	Addition	Alteration/ Renovation	Addition & Alteration/ Renovation	New	
Architectural	529	4,369	523	8,795	14,216
Engineering	146	1,102	159	3,619	5,026
Joint	168	917	104	3,648	4,837
Total	843	6,388	786	16,062	24,079

Table 33: Number of Permits by Primary Project Type and Type of Firm

Figure 40 and Table 34 present the number of permits by primary ownership type and firm size. Extra large firms primarily serving the private sector worked on over 33% of all projects.

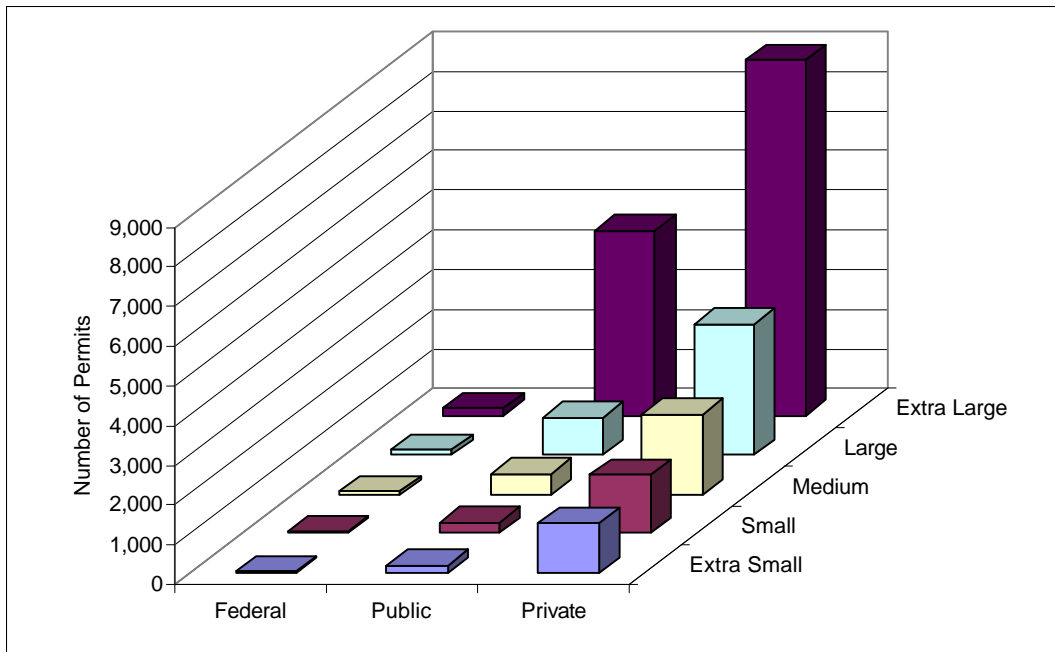


Figure 40: Number of Permits by Primary Ownership Type and Size of Firm

Firm Size	Primary Owner Type			Total
	Federal	Public	Private	
Extra Small	19	181	1,246	1,446
Small	43	283	1,491	1,817
Medium	62	519	2,028	2,609
Large	123	960	3,295	4,378
Extra Large	199	4,660	8,970	13,829
Total	446	6,603	17,030	24,079

Table 34: Number of Permits by Primary Ownership Type and Size of Firm

Figure 41 and Table 35 show the number of permits by primary project type and size of firm. Extra large firms who work primarily on new projects have worked on slightly more than 50% of all construction projects in California.

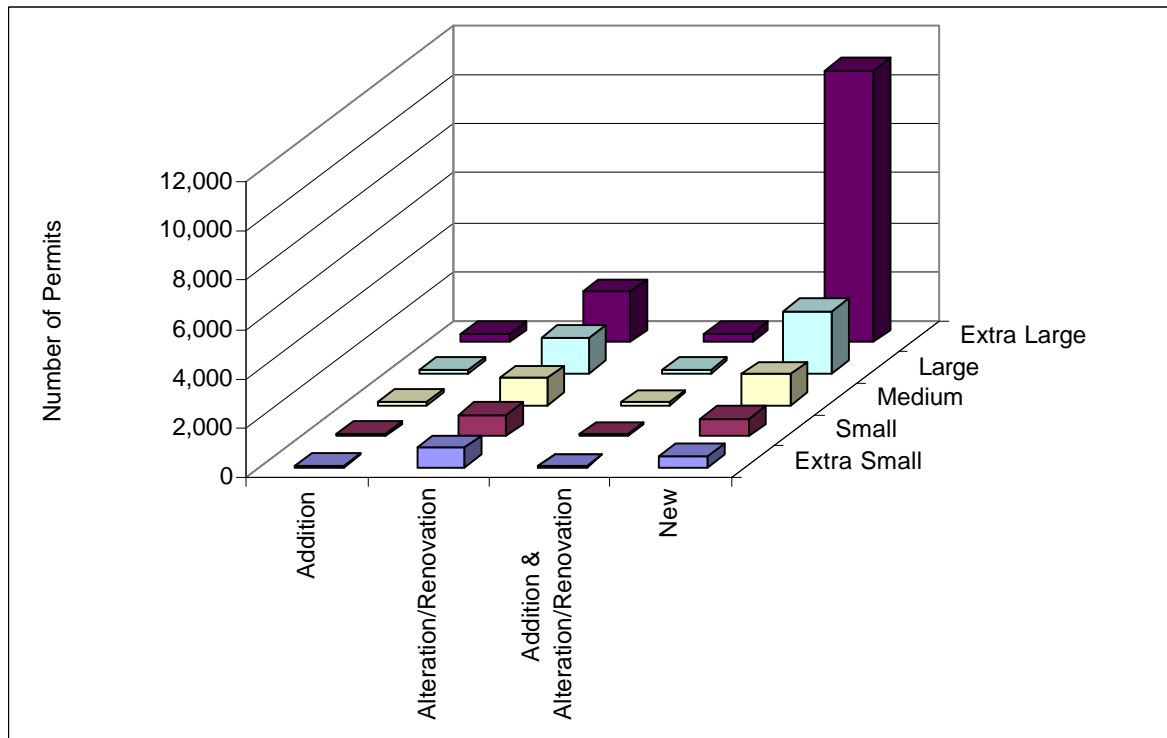


Figure 41: Number of Permits by Primary Project Type and Size of Firm

Firm Size	Primary Project Type				Total
	Addition	Alteration/ Renovation	Addition & Alteration/ Renovation	New	
Extra Small	89	827	64	466	1,446
Small	117	898	79	723	1,817
Medium	126	1,102	121	1,260	2,609
Large	174	1,474	168	2,562	4,378
Extra Large	337	2,087	354	11,051	13,829
Total	843	6,388	786	16,062	24,079

Table 35: Number of Permits by Primary Project Type and Size of Firm

Total Valuation

Figure 42 and Table 36 present the total valuation by size and type of firm. As expected, within each firm type, the amount of total valuation increases with firm size. This is not surprising since firms were categorized into sizes based on the total valuation of all projects in California on which they worked. However, the extra large firms work on a very high proportion of all valuation. Specifically, the largest 20% of the firms worked on over 90% of all valuation.

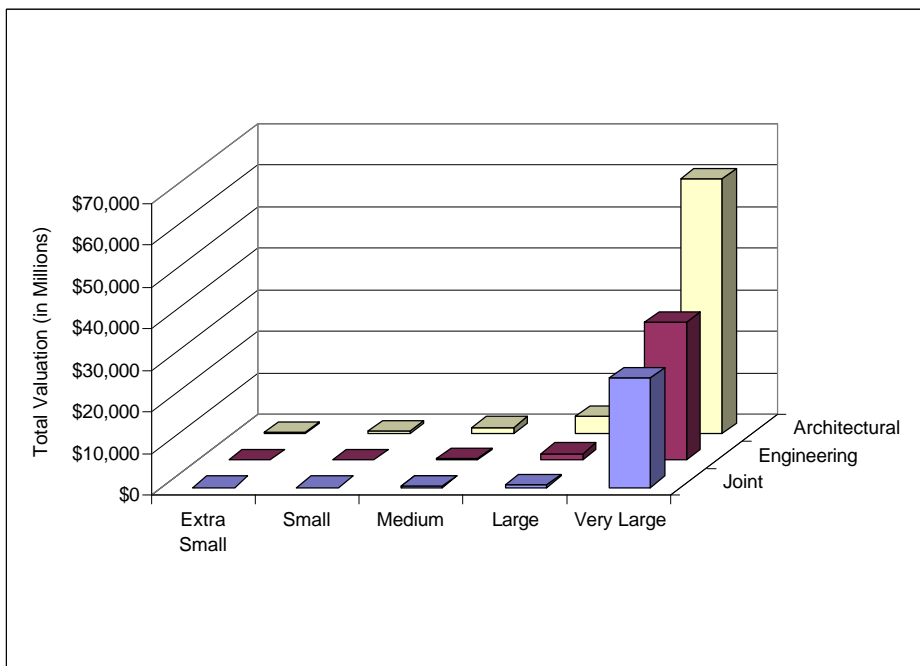


Figure 42: Total Valuation by Size and Type of Firm

Firm Type	Firm Size					Total
	Extra Small	Small	Medium	Large	Very Large	
Architectural	\$341	\$664	\$1,497	\$4,077	\$60,962	\$67,540
Engineering	\$50	\$128	\$391	\$1,669	\$33,153	\$35,390
Joint	\$5	\$39	\$152	\$668	\$26,288	\$27,152
Total	\$396	\$830	\$2,040	\$6,413	\$120,403	\$130,082

Table 36: Total Valuation by Size and Type of Firm (\$million)

Figure 43 and Table 37 display total valuation by primary ownership type and firm type. Architectural firms who work primarily for the private sector have been involved on projects accounting for about two-thirds of the valuation associated with architectural firms. For engineering and joint firms, those who work primarily for the private sector have worked on projects accounting for 80% or more of the valuation associated with the respective firm types.

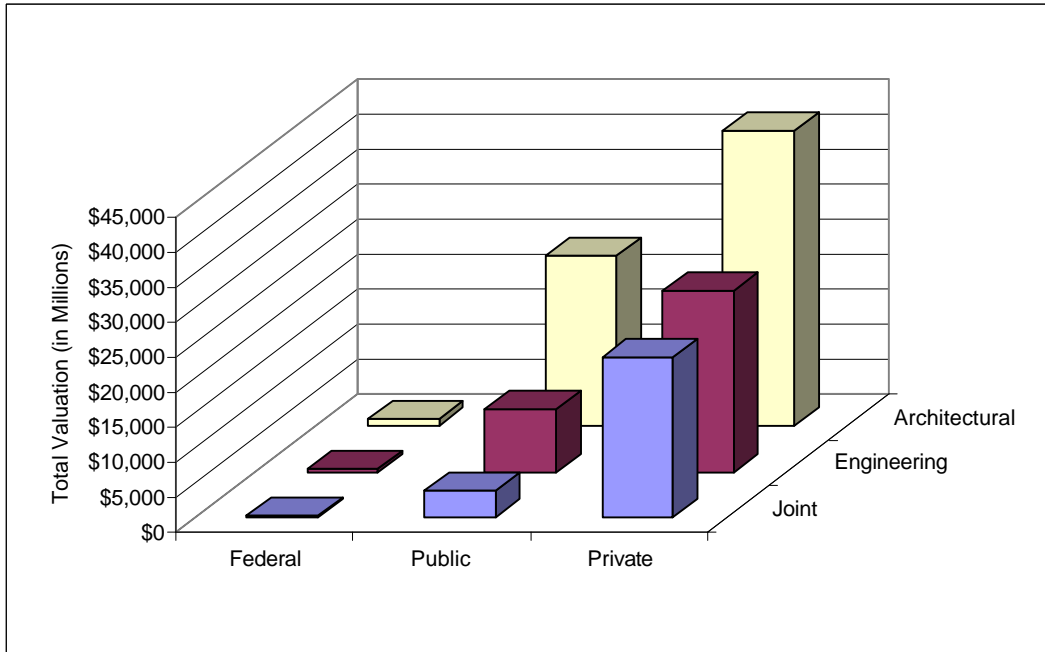


Figure 43: Total Valuation by Primary Ownership Type and Type of Firm

Firm Type	Primary Owner Type			Total
	Federal	Public	Private	
Architectural	\$982	\$24,370	\$42,189	\$67,540
Engineering	\$358	\$9,069	\$25,964	\$35,390
Joint	\$245	\$4,023	\$22,884	\$27,152
Total	\$1,584	\$37,461	\$91,037	\$130,082

Table 37: Total Valuation by Primary Ownership Type and Type of Firm (\$million)

Figure 44 and Table 38 show total valuation by primary project type and firm type. Within each firm type, those who work primarily on new projects have been involved on projects accounting for 80% or more of the valuation associated with that firm type.

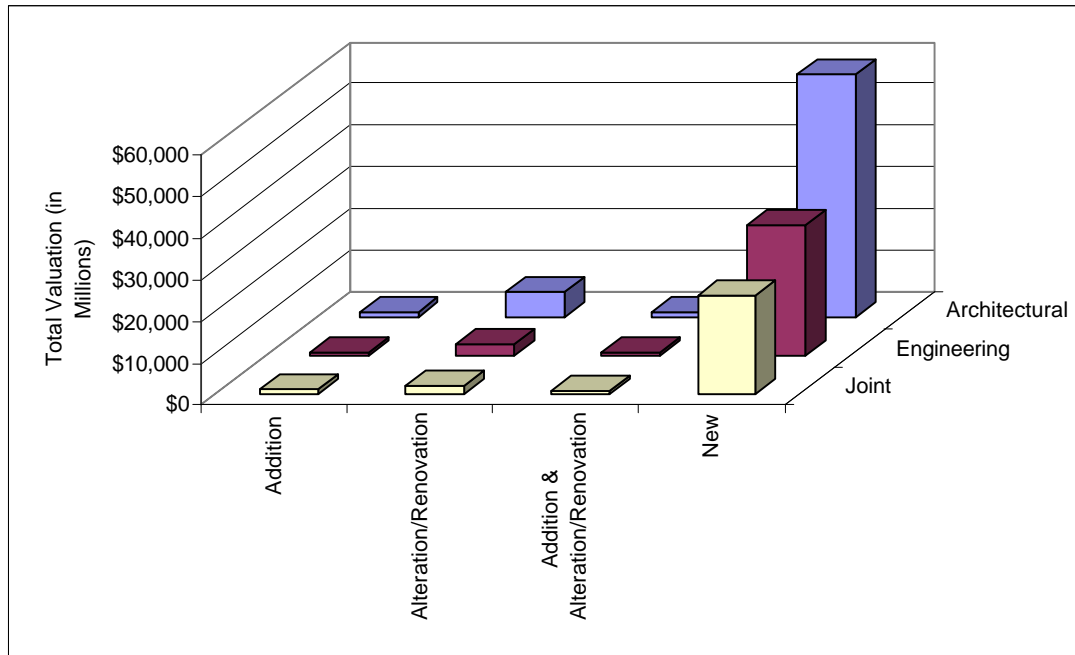


Figure 44: Total Valuation by Primary Project Type and Type of Firm

Firm Type	Primary Project Type				Total
	Addition	Alteration/ Renovation	Addition & Alteration/ Renovation	New	
Architectural	\$1,363	\$6,035	\$1,405	\$58,738	\$67,540
Engineering	\$711	\$2,657	\$779	\$31,244	\$35,390
Joint	\$997	\$1,983	\$510	\$23,661	\$27,152
Total	\$3,070	\$10,675	\$2,694	\$113,643	\$130,082

Table 38: Total Valuation by Primary Project Type and Type of Firm (\$million)

Figure 45 and Table 39 display total valuation by primary ownership type and size of firm. Within each primary ownership type, the amount of valuation increases with firm size. This is expected since firm size was determined based on the total valuation of projects in California on which they worked.

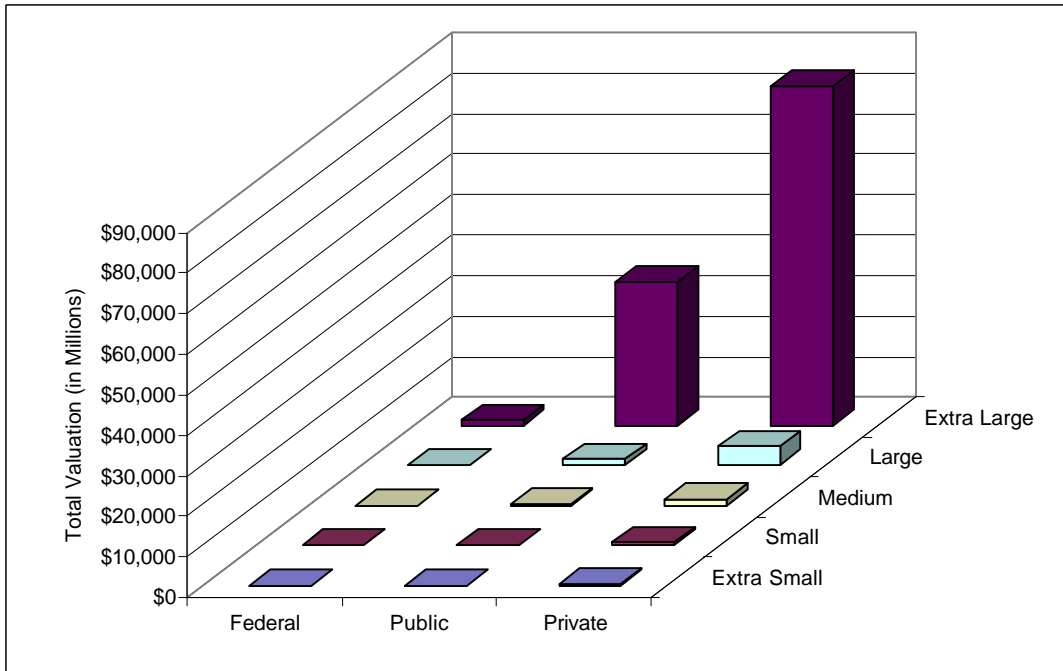


Figure 45: Total Valuation by Primary Ownership Type and Size of Firm

Firm Type	Primary Owner Type			Total
	Federal	Public	Private	
Architectural	\$982	\$24,370	\$42,189	\$67,540
Engineering	\$358	\$9,069	\$25,964	\$35,390
Joint	\$245	\$4,023	\$22,884	\$27,152
Total	\$1,584	\$37,461	\$91,037	\$130,082

Table 39: Total Valuation by Primary Ownership Type and Size of Firm (\$million)

Figure 46 and Table 40 present the total valuation by primary project type and size of firm. Again, within each project type, the amount of total valuation increases with firm size. Extra large firms who work primarily on new projects serve almost 85% of the total valuation in the NRNC market.

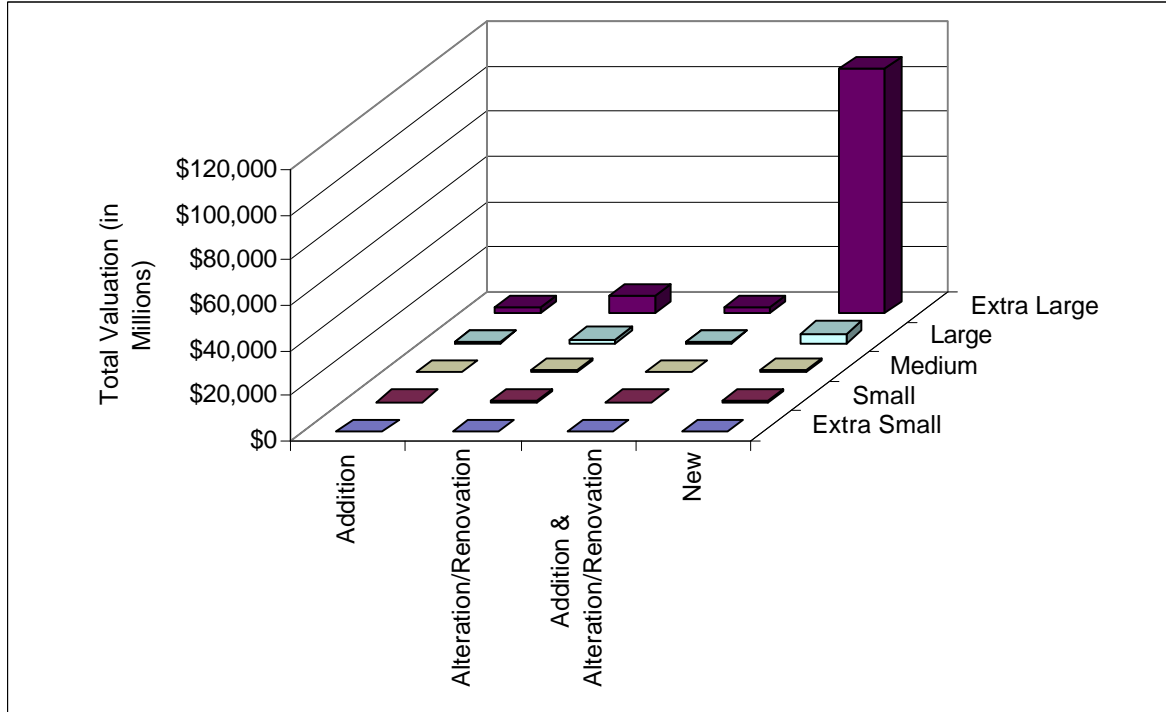


Figure 46: Total Valuation by Primary Project Type and Size of Firm

Firm Size	Primary Project Type				Total
	Addition	Alteration/ Renovation	Addition & Alteration/ Renovation	New	
Extra Small	\$24	\$224	\$18	\$131	\$396
Small	\$53	\$399	\$38	\$341	\$830
Medium	\$99	\$764	\$117	\$1,060	\$2,040
Large	\$281	\$1,707	\$289	\$4,136	\$6,413
Extra Large	\$2,614	\$7,582	\$2,232	\$107,975	\$120,403
Total	\$3,070	\$10,675	\$2,694	\$113,643	\$130,082

Table 40: Total Valuation by Primary Project Type and Size of Firm (\$million)

Total Square Footage

Figure 47 and Table 41 display the total square footage by firm type and firm size. Within each firm type, extra large firms have worked on projects accounting for more than 85% of square footage.

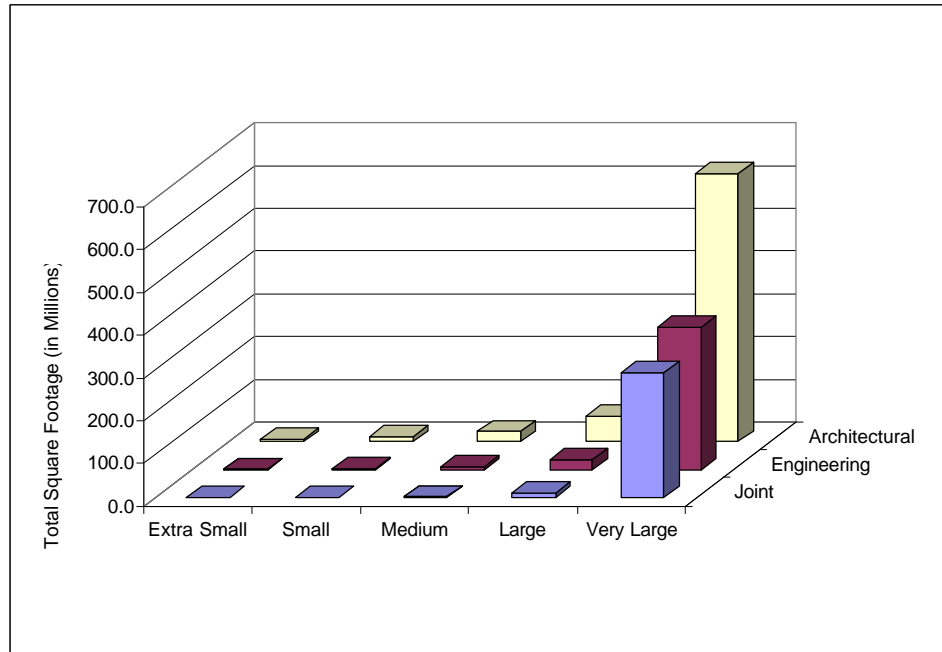


Figure 47: Total Square Footage by Size and Type of Firm

Firm Type	Firm Size					Total
	Extra Small	Small	Medium	Large	Very Large	
Architectural	5.6	11.0	23.7	58.8	628.3	727.4
Engineering	0.9	1.9	6.0	22.4	334.1	365.3
Joint	0.1	0.7	2.4	9.8	293.5	306.5
Total	6.5	13.6	32.1	91.0	1,255.9	1,399.2

Table 41: Total Square Footage by Size and Type of Firm (in Millions)

Figure 48 and Table 42 show total square footage by primary ownership type and firm type. Within each firm type, those who work primarily for the private sector have worked on the majority of the square footage. This is expected since, within each firm type, the majority of firms work primarily for the private sector.

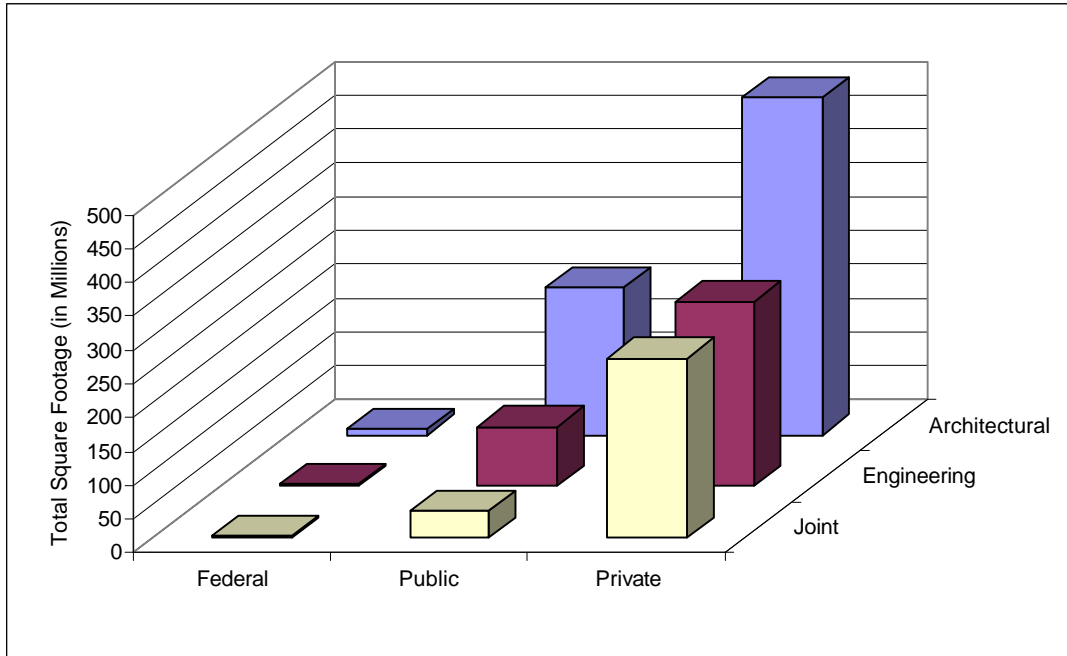


Figure 48: Total Square Footage by Primary Ownership Type and Type of Firm

Firm Type	Primary Owner Type			Total
	Federal	Public	Private	
Architectural	8	220	500	727
Engineering	4	88	273	365
Joint	2	39	265	306
Total	14	347	1,038	1,399

Table 42: Total Square Footage by Primary Ownership Type and Type of Firm (in Millions)

Figure 49 and Table 43 present total square footage by primary project type and type of firm. Within each firm type, those who work primarily on new projects have worked on projects accounting for about 88% of square footage. This is expected since the majority of firms within each firm type work primarily on new projects. Furthermore, new projects should include more square footage than alterations or additions.

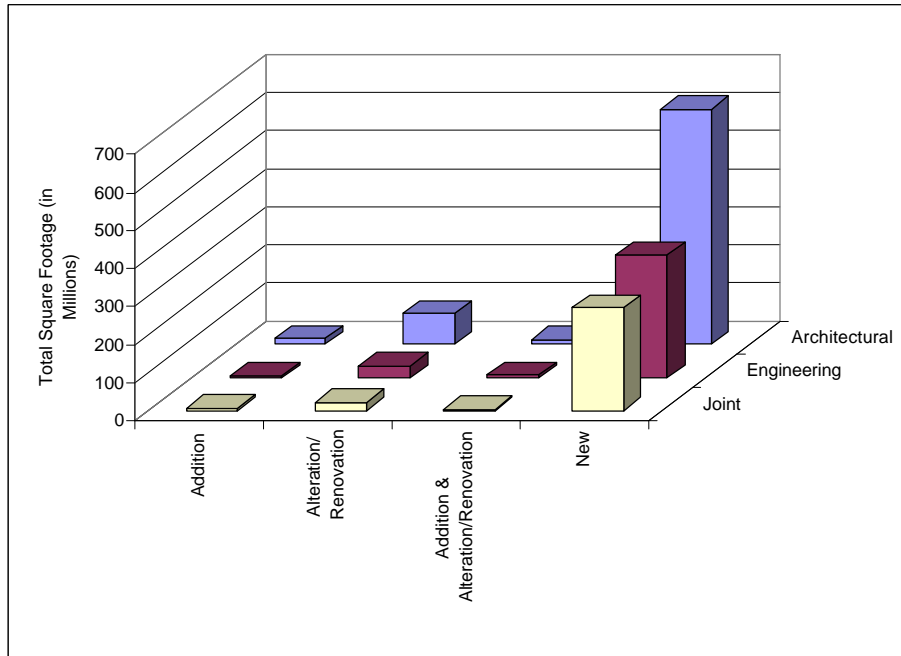


Figure 49: Total Square Footage by Primary Project Type and Type of Firm

Firm Type	Primary Project Type				Total
	Addition	Alteration/Renovation	Addition & Alteration/Renovation	New	
Architectural	15	81	13	619	727
Engineering	5	30	7	322	365
Joint	9	23	4	270	306
Total	29	134	24	1,211	1,399

Table 43: Total Square Footage by Primary Project Type and Type of Firm (in Millions)

Figure 50 and Table 44 display square footage by primary ownership type and firm size. Extra large firms who work primarily for the private sector have been involved on projects accounting for the majority of all square footage.

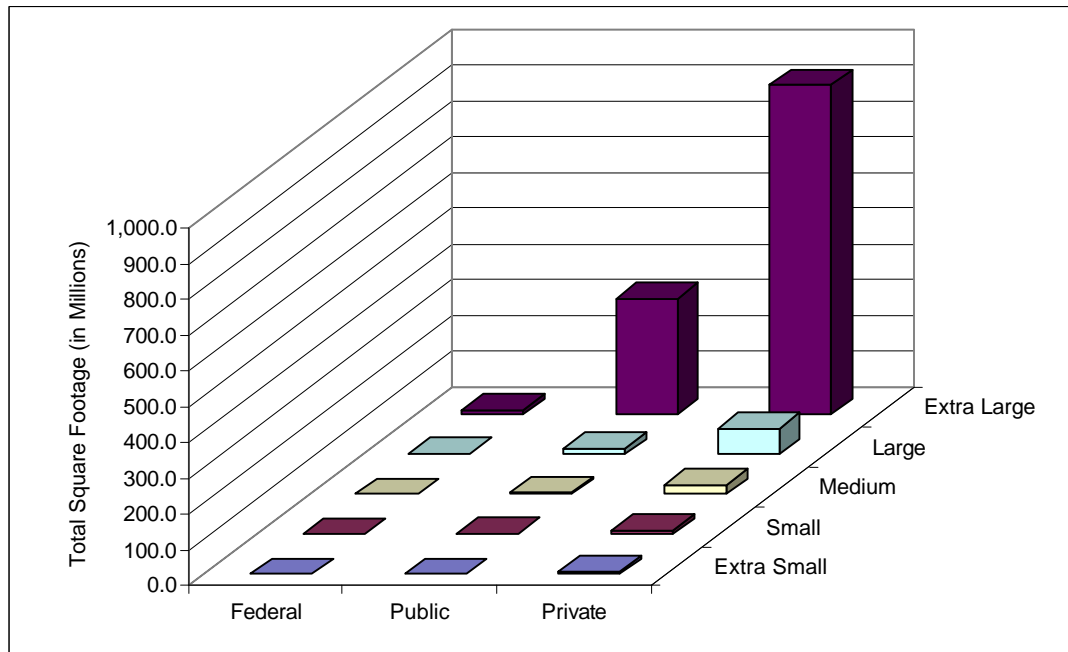


Figure 50: Total Square Footage by Primary Ownership Type and Size of Firm

Firm Size	Primary Owner Type			Total
	Federal	Public	Private	
Extra Small	0.2	0.8	5.7	6.6
Small	0.4	1.6	11.7	13.6
Medium	0.7	5.2	26.4	32.2
Large	1.9	16.1	73.0	91.0
Extra Large	11.6	323.0	921.3	1,255.9
Total	14.7	346.7	1,038.0	1,399.4

Table 44: Total Square Footage by Primary Ownership Type and Size of Firm (in Millions)

Figure 51 and Table 45 present total square footage by primary ownership type and firm size. Extra large firms who work primarily on new projects have been involved on projects accounting for almost 90% of the square footage.

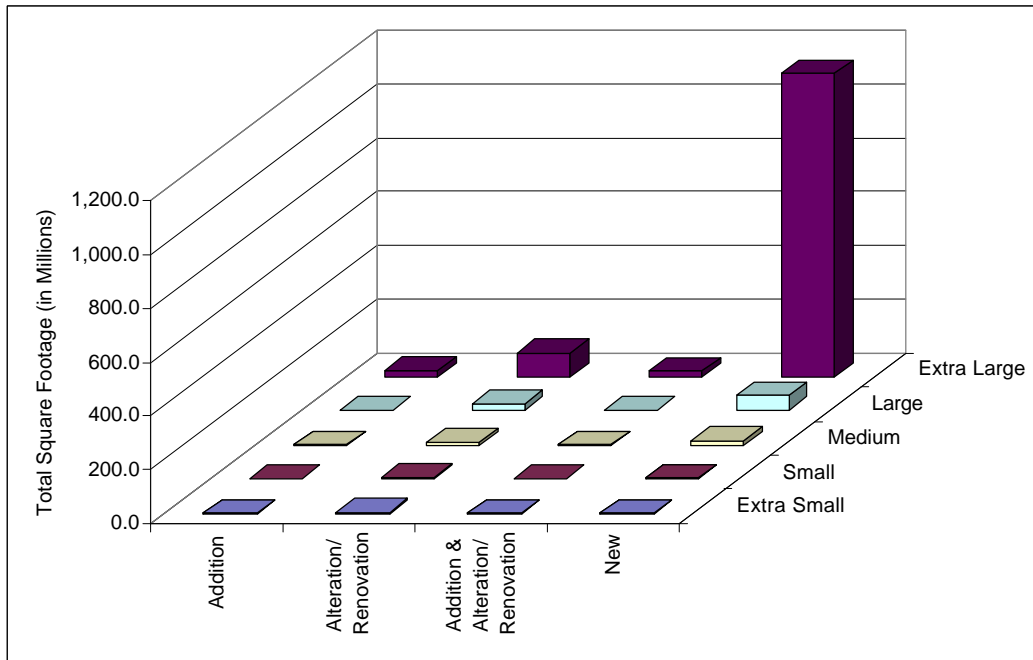


Figure 51: Total Square Footage by Primary Project Type and Size of Firm

Firm Size	Primary Project Type				Total
	Addition	Alteration/Renovation	Addition & Alteration/Renovation	New	
Extra Small	0.5	3.7	0.4	2.1	6.6
Small	1.0	6.8	0.6	5.4	13.8
Medium	1.5	12.1	1.5	17.0	32.1
Large	3.3	25.7	2.9	59.1	91.0
Extra Large	23.0	86.1	18.9	1,127.9	1,255.9
Total	29.2	134.4	24.4	1,211.5	1,399.4

Table 45: Total Square Footage by Primary Project Type and Size of Firm (in Millions)

Market Actors in the PG&E Area

This section of the report is specific to the PG&E Utility Service Territory. The number of architectural and engineering firms working within the utility territory, the number of projects on which each firm has worked, the valuation of those projects, and the total square footage of the projects are presented here. All of this data will be classified and cross classified by:

- Type of Firm (architecture, engineering, joint),
- Firm Size category based on total project valuation (very small, small, medium, large, very large),
- Primary market served by firm, and
- Primary market served based on owner code.

All projects outside of PG&E’s territory have been excluded from this section.

Number of Firms

Figure 52 and Table 46 display the number of architectural, engineering, and joint firms that worked on NRNC projects in the PG&E service territory from 1995 to 1998 by size and type of firm. In total, there were about 2,500 architectural firms, 800 engineering firms, and 300 joint forms that worked on projects in the PG&E service territory. In contrast to the number of firms statewide, the number of architectural firms within each size is distributed fairly evenly.

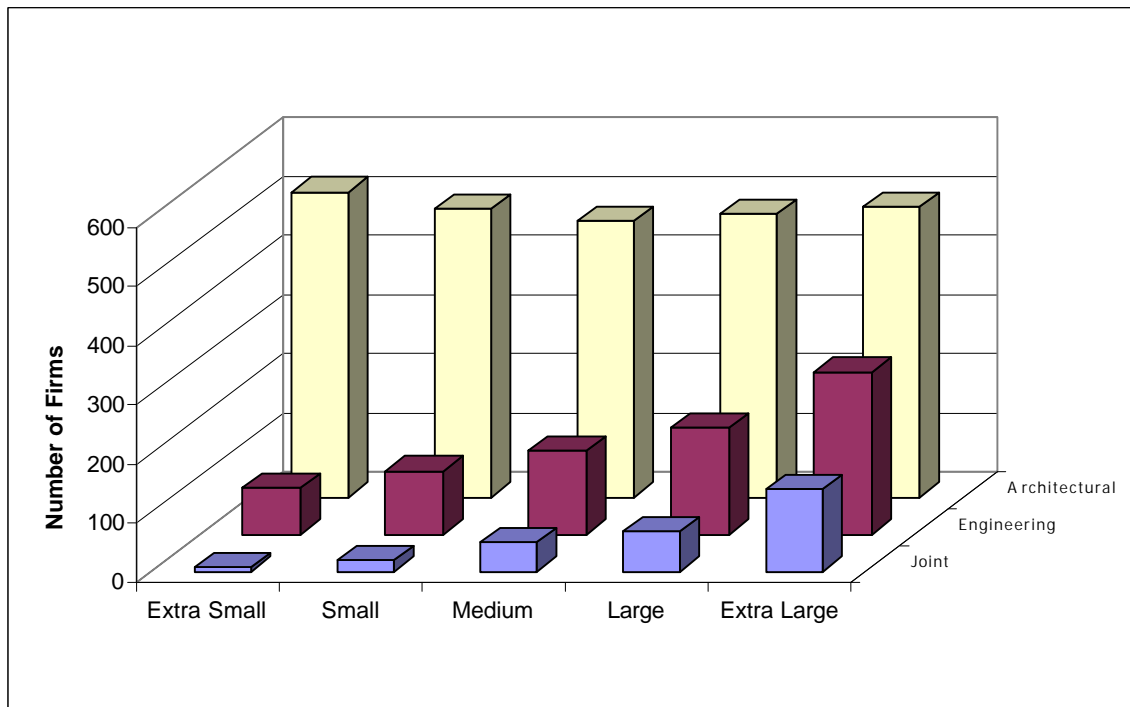


Figure 52: Number of Firms by Size and Type of Firm

Firm Type	Firm Size					Total
	Extra Small	Small	Medium	Large	Extra Large	
Architectural	517	489	468	479	492	2,445
Engineering	79	107	142	181	275	784
Joint	8	19	49	66	139	281
Total	604	615	659	726	906	3,510

Table 46: Number of Firms by Size and Type of Firm

Figure 53 and Table 47 present the number of architectural, engineering, and joint by primary ownership type. Similar to the statewide case, more than half of each type of firm work primarily for the private sector. More than 40% of engineering firms primarily serve public (non-federal) projects.

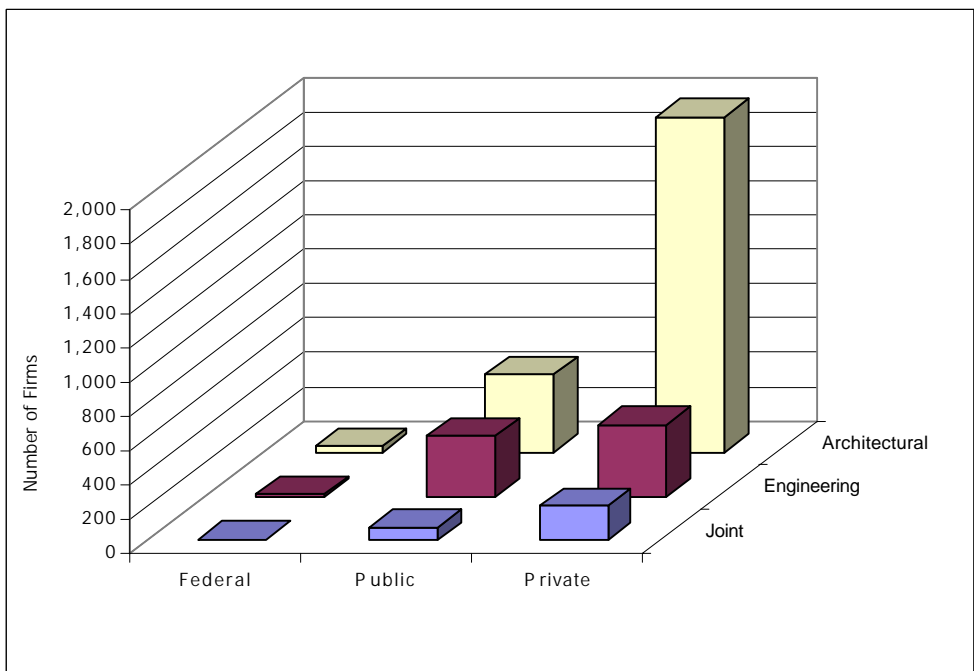


Figure 53: Number of Firms by Primary Ownership Type and Type of Firm

Firm Type	Primary Owner Type			Total
	Federal	Public	Private	
Architectural	37	456	1,952	2,445
Engineering	16	350	418	784
Joint	8	75	198	281
Total	61	881	2,568	3,510

Table 47: Number of Firms by Primary Ownership Type and Type of Firm

Figure 54 and Table 48 show the number of firms by primary project type and firm type. Approximately three-fifths of engineering and joint firms work primarily on new construction projects. About 40% of architectural firms work primarily on alterations/renovations.

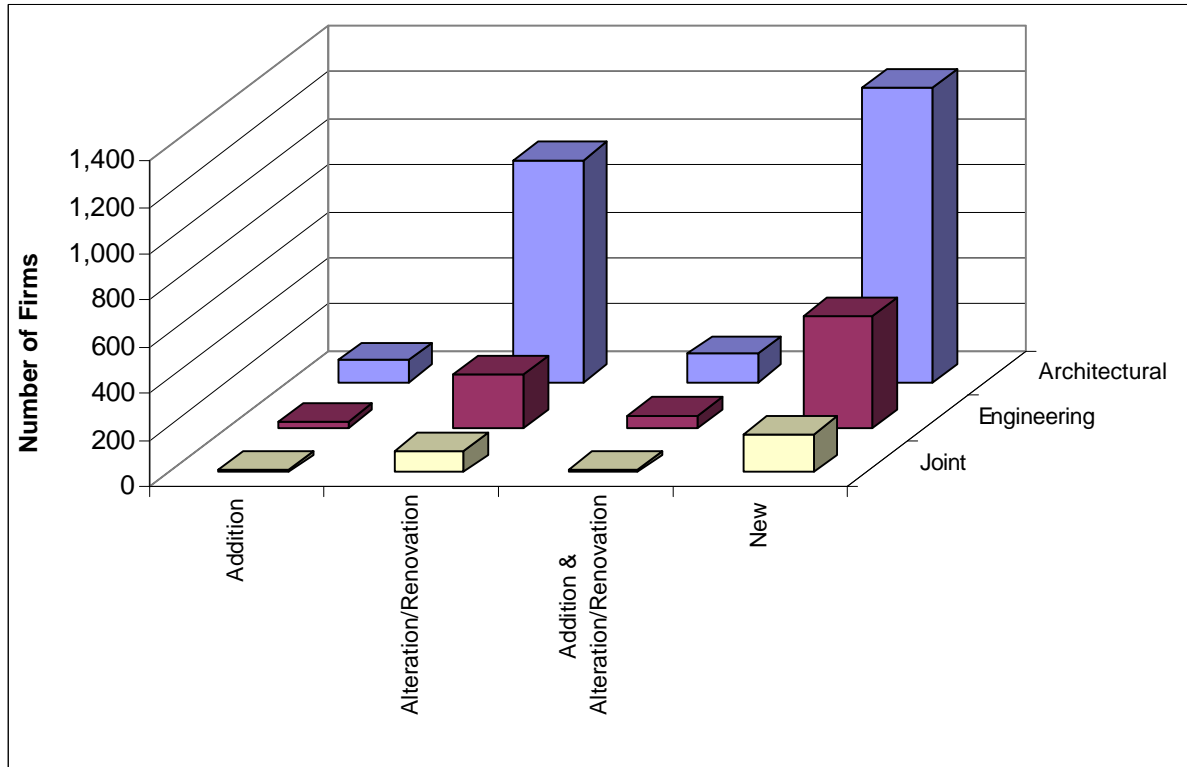


Figure 54: Number of Firms by Primary Project Type and Type of Firm

Firm Type	Primary Project Type				Total
	Addition	Alteration/ Renovation	Addition & Alteration/ Renovation	New	
Architectural	95	958	121	1,271	2,445
Engineering	23	228	50	483	784
Joint	12	92	12	165	281
Total	130	1,278	183	1,919	3,510

Table 48: Number of Firms by Primary Project Type and Type of Firm

Figure 55 and Table 49 display the number of firms by primary ownership type and firm size. The most common primary ownership type within each firm size is private. Note, however, that almost 40% of extra large firms work primarily for the public (non-federal) sector.

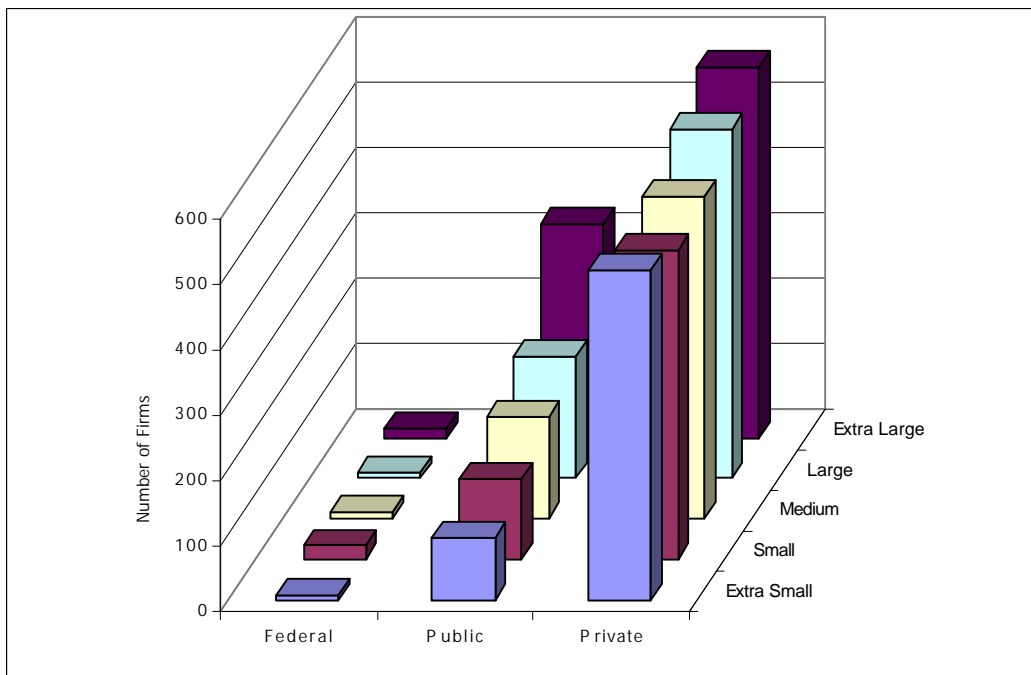


Figure 55: Number of Firms by Primary Ownership Type and Size of Firm

Firm Size	Primary Owner Type			Total
	Federal	Public	Private	
Extra Small	7	93	504	604
Small	21	122	472	615
Medium	11	155	493	659
Large	8	185	533	726
Extra Large	14	326	566	906
Total	61	881	2,568	3,510

Table 49: Number of Firms by Primary Ownership Type and Size of Firm

Figure 56 and Table 50 present the number of firms by primary project type and size of firm. The most common primary project type among medium, large, and extra large is new construction. The most common project type among small and medium firms is alteration/renovation. The proportion of firms primarily serving the Alteration/Renovation market has an inverse relationship with firm size.

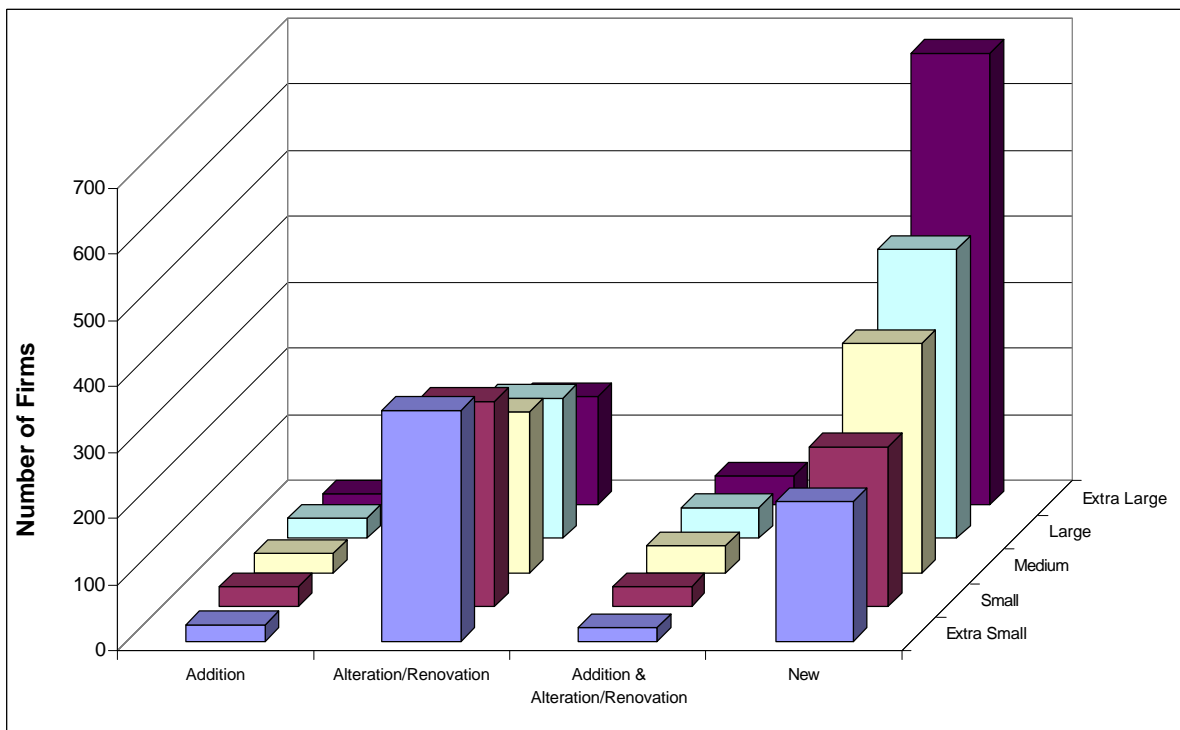


Figure 56: Number of Firms by Primary Project Type and Size of Firm

Firm Size	Primary Project Type				Total
	Addition	Alteration/Renovation	Addition & Alteration/Renovation	New	
Extra Small	25	349	20	210	604
Small	30	311	31	243	615
Medium	29	243	41	346	659
Large	30	212	47	437	726
Extra Large	16	163	44	683	906
Total	130	1,278	183	1,919	3,510

Table 50: Number of Firms by Primary Project Type and Size of Firm

Number of Permits

Figure 57 and Table 51 show the number of permits by size and type of firm. As may be expected, the number of permits drastically increases with the size of firm. Extra large firms, especially extra large engineering and joint firms, control an enormous portion of the NRNC market.

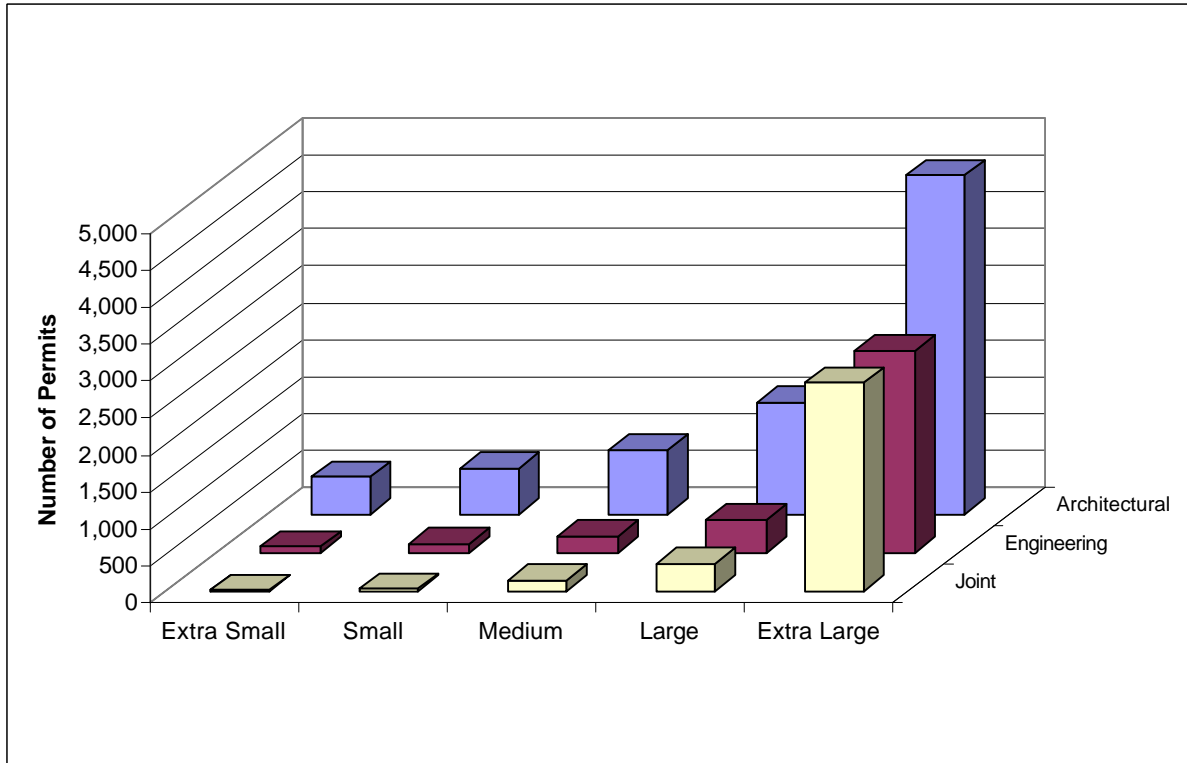


Figure 57: Number of Permits by Size and Type of Firm

Firm Type	Firm Size					Total
	Extra Small	Small	Medium	Large	Extra Large	
Architectural	517	622	867	1,520	4,598	8,124
Engineering	79	125	224	450	2,740	3,618
Joint	8	32	150	369	2,829	3,388
Total	604	779	1,241	2,339	10,167	15,130

Table 51: Number of Permits by Size and Type of Firm

Figure 58 and Table 52 present the number of permits by primary ownership type and type of firm. For architectural and joint firms, those that predominantly serve the private sector worked the majority of projects. The number of permits involving engineering firms were nearly equally divided among firms who primarily serve the private and public (non-federal) markets.

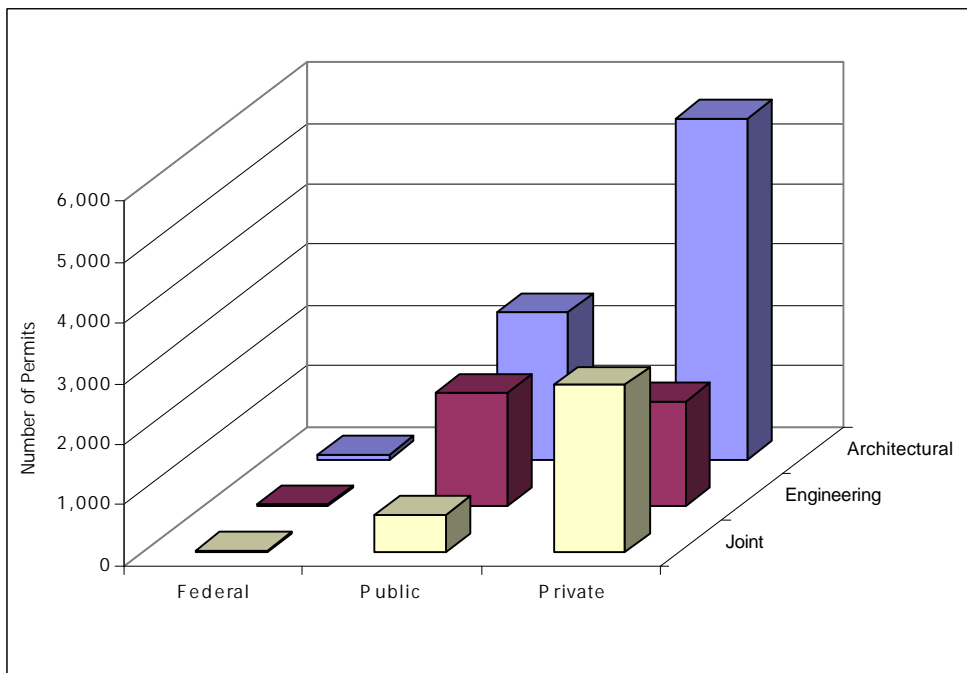


Figure 58: Number of Permits by Primary Ownership Type and Type of Firm

Firm Type	Primary Owner Type			Total
	Federal	Public	Private	
Architectural	90	2,416	5,618	8,124
Engineering	34	1,861	1,723	3,618
Joint	32	607	2,749	3,388
Total	156	4,884	10,090	15,130

Table 52: Number of Permits by Primary Ownership Type and Type of Firm

Figure 59 and Table 53 show the number of permits in the PG&E service territory by primary project type and firm type. Like the statewide results, most projects were served by firms who primarily work on new construction projects. Architectural firms concentrating on the alterations/renovations market worked on over 2,000 of the permits.

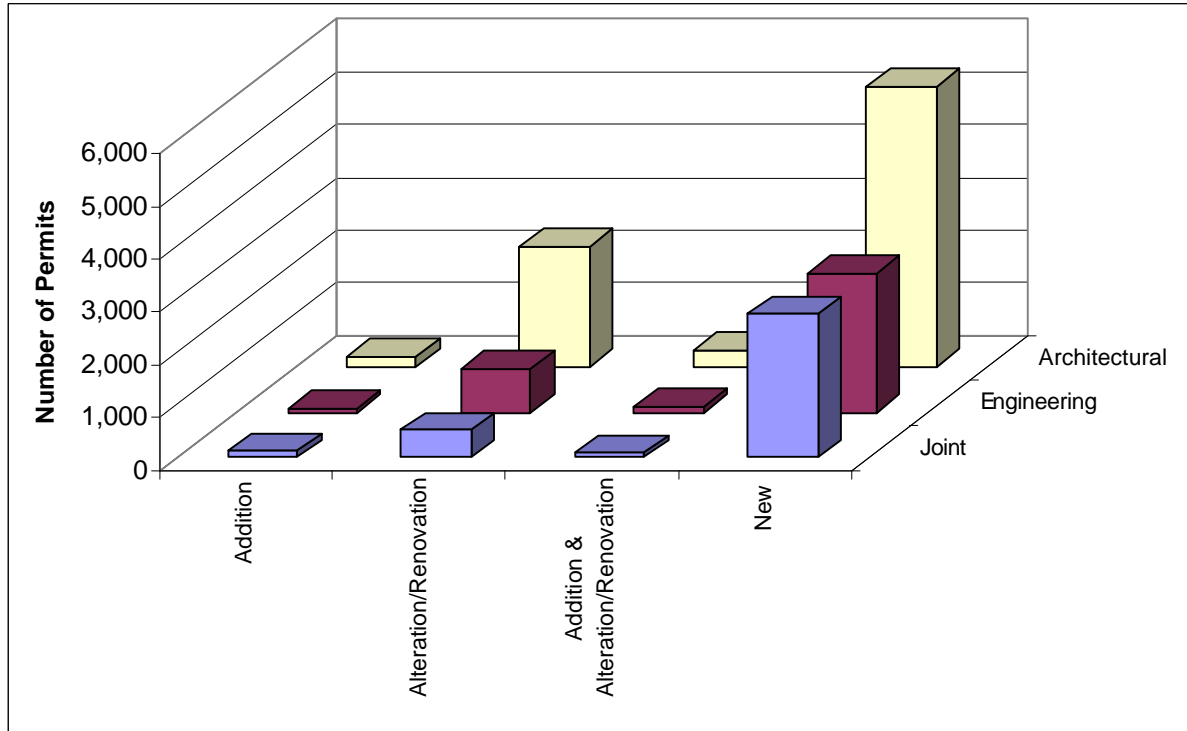


Figure 59: Number of Permits by Primary Project Type and Type of Firm

Firm Type	Primary Project Type				Total
	Addition	Alteration/ Renovation	Addition & Alteration/ Renovation	New	
Architectural	203	2,285	311	5,325	8,124
Engineering	68	814	115	2,621	3,618
Joint	111	504	72	2,701	3,388
Total	382	3,603	498	10,647	15,130

Table 53: Number of Permits by Primary Project Type and Type of Firm

Figure 60 and Table 54 present the number of permits by primary ownership type and firm size. Extra large firms primarily serving the private sector worked on over 40% of all projects in the PG&E service territory.

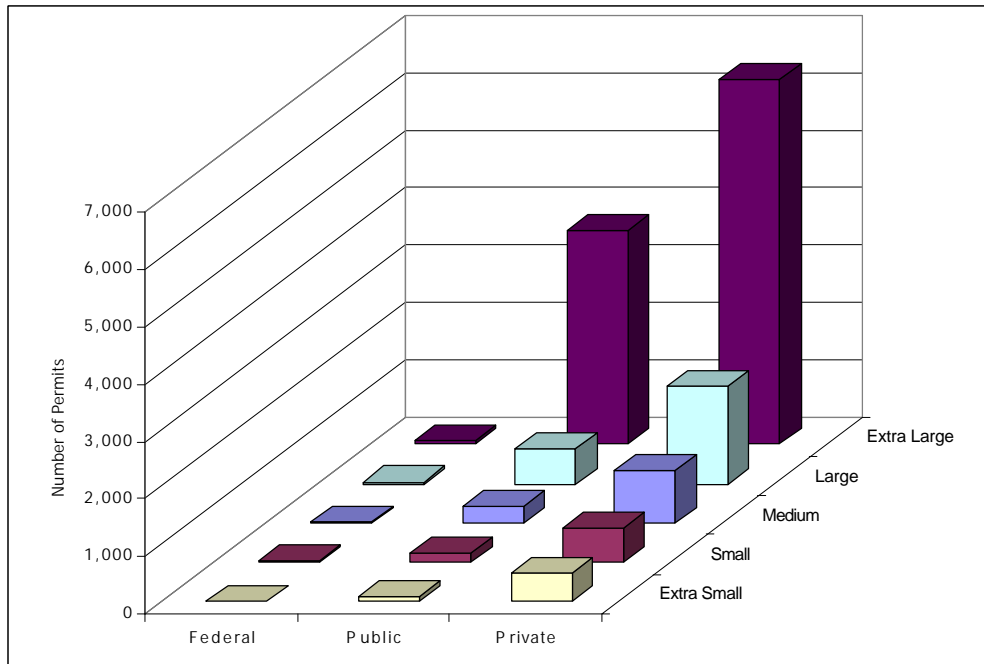


Figure 60: Number of Permits by Primary Ownership Type and Size of Firm

Firm Size	Primary Owner Type			Total
	Federal	Public	Private	
Extra Small	7	93	504	604
Small	23	161	595	779
Medium	24	299	918	1,241
Large	29	608	1,702	2,339
Extra Large	73	3,723	6,371	10,167
Total	156	4,884	10,090	15,130

Table 54: Number of Permits by Primary Ownership Type and Size of Firm

Figure 61 and Table 55 display the number of permits by primary project type and firm size. Extra large firms primarily serving the new construction market have worked on over half of all projects in the PG&E service territory..

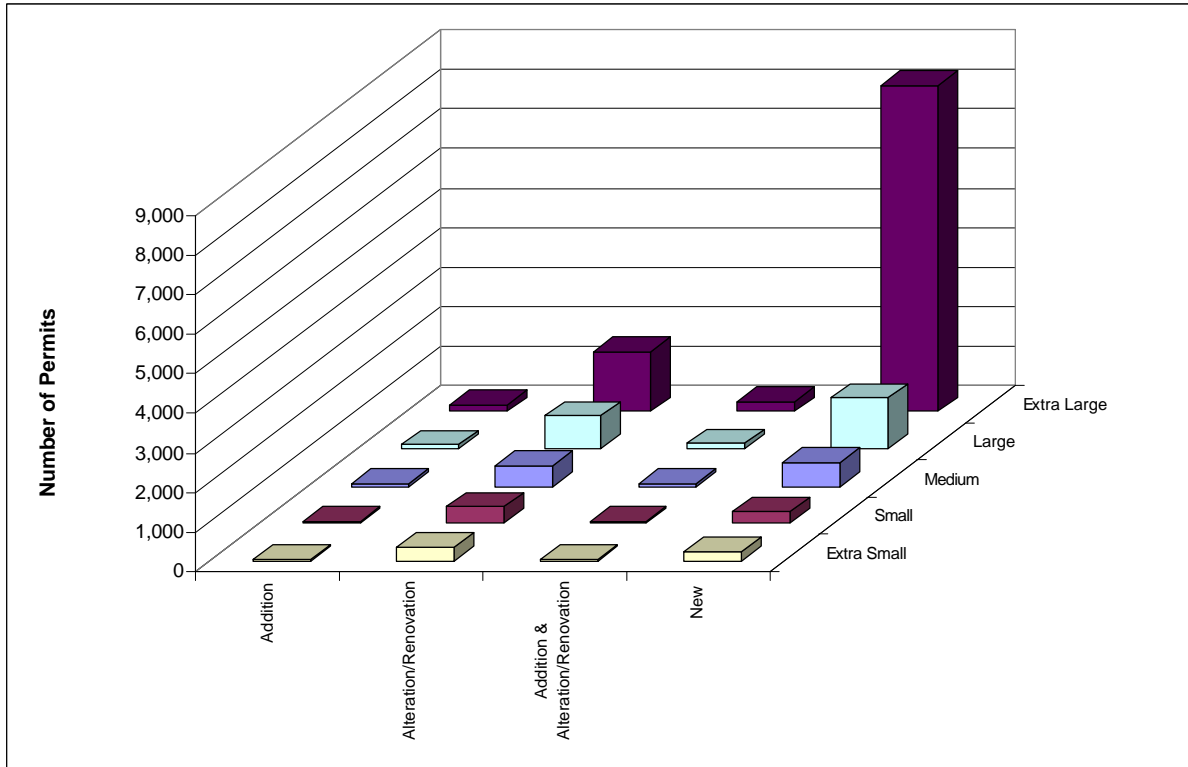


Figure 61: Number of Permits by Primary Project Type and Size of Firm

Firm Size	Primary Project Type				Total
	Addition	Alteration/ Renovation	Addition & Alteration/ Renovation	New	
Extra Small	25	349	20	210	604
Small	39	405	39	296	779
Medium	57	513	63	608	1,241
Large	95	824	136	1,284	2,339
Extra Large	166	1,512	240	8,249	10,167
Total	382	3,603	498	10,647	15,130

Table 55: Number of Permits by Primary Project Type and Size of Firm

Total Valuation

Figure 62 and Table 56 display total valuation by size and type of firm. Similar to the statewide results, within each firm type, the amount of total valuation increases with firm size. This is not surprising since firms were categorized into sizes based on the total valuation of all projects in California on which they worked. However, the extra large firms work on a very high proportion of all valuation. Specifically, the largest 20% of the firms worked on over 90% of all valuation.

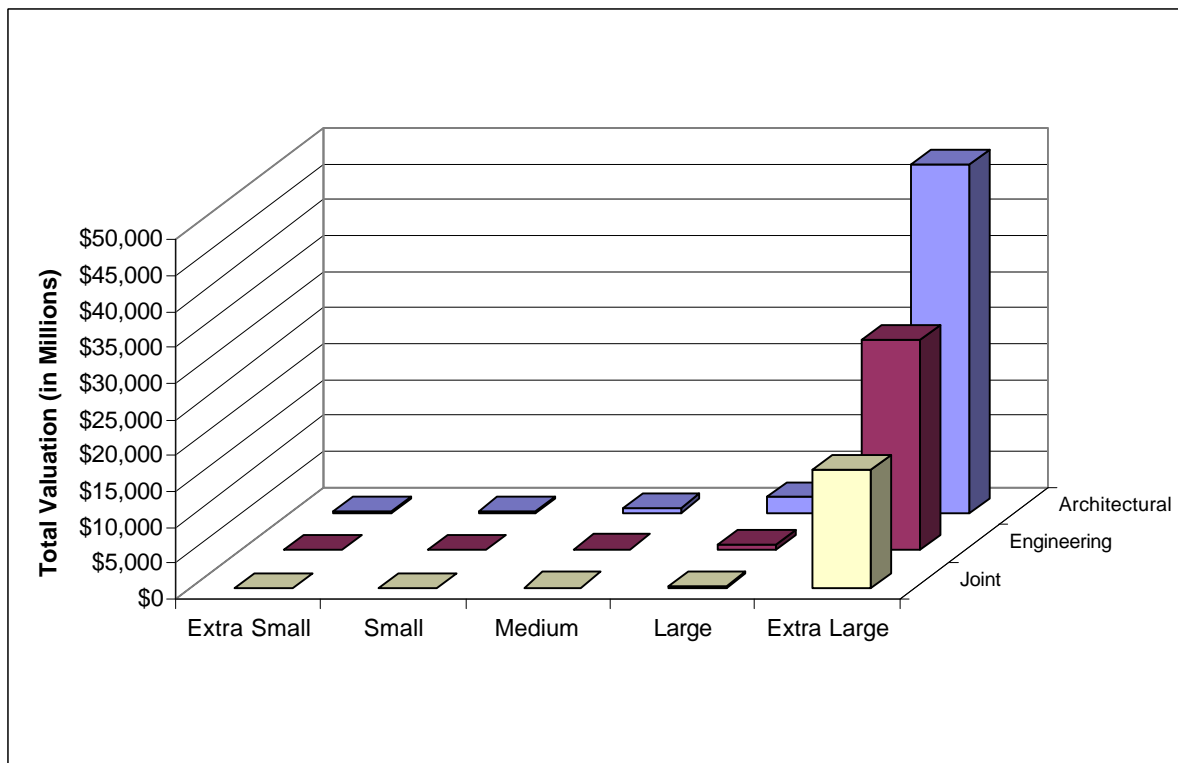


Figure 62: Total Valuation by Size and Type of Firm

Firm Type	Firm Size					Total
	Extra Small	Small	Medium	Large	Extra Large	
Architectural	\$140	\$284	\$665	\$2,156	\$48,422	\$51,667
Engineering	\$23	\$63	\$197	\$821	\$29,228	\$30,332
Joint	\$2	\$11	\$76	\$307	\$16,445	\$16,840
Total	\$165	\$358	\$937	\$3,283	\$94,095	\$98,839

Table 56: Total Valuation by Size and Type of Firm (\$million)

Figure 63 and Table 57 present total valuation by primary ownership type and firm type. Architectural firms who work primarily for the private sector have been involved on projects accounting for about three-fifths of the valuation associated with architectural firms. For engineering and joint firms, those who work primarily for the private sector have worked on projects accounting for approximately 80% of the valuation associated with the respective firm types.

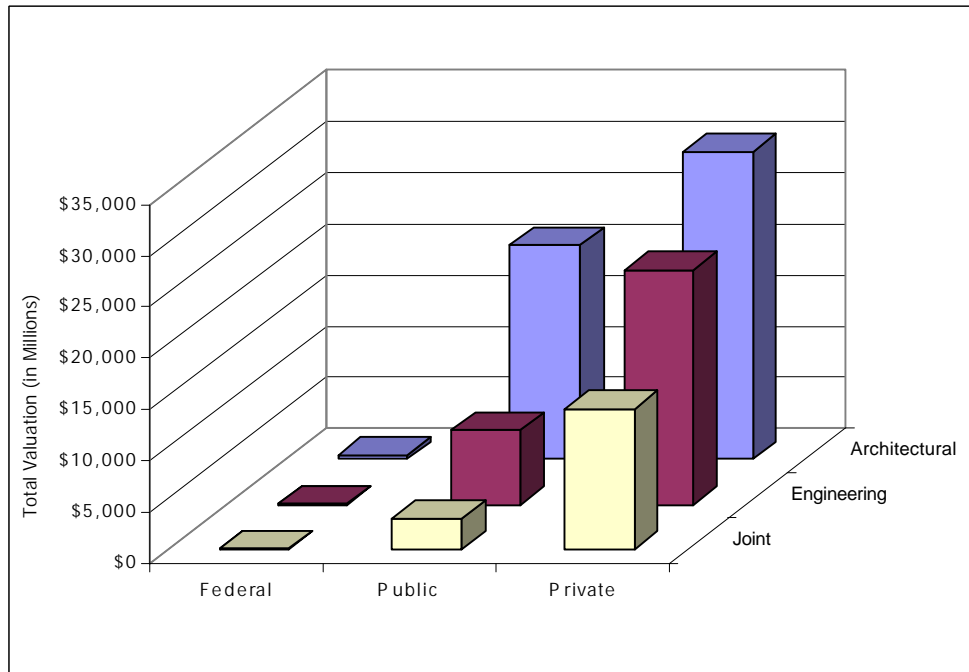


Figure 63: Total Valuation by Primary Ownership Type and Type of Firm

Firm Type	Primary Owner Type			Total
	Federal	Public	Private	
Architectural	\$462	\$21,039	\$30,166	\$51,667
Engineering	\$73	\$7,297	\$22,963	\$30,332
Joint	\$66	\$3,010	\$13,764	\$16,840
Total	\$601	\$31,345	\$66,893	\$98,839

Table 57: Total Valuation by Primary Ownership Type and Type of Firm (\$million)

Figure 64 and Table 58 show total valuation by primary project type and type of firm. Within each firm type, firms primarily serving the new construction market account for approximately 90% of the valuation associated with that firm type.

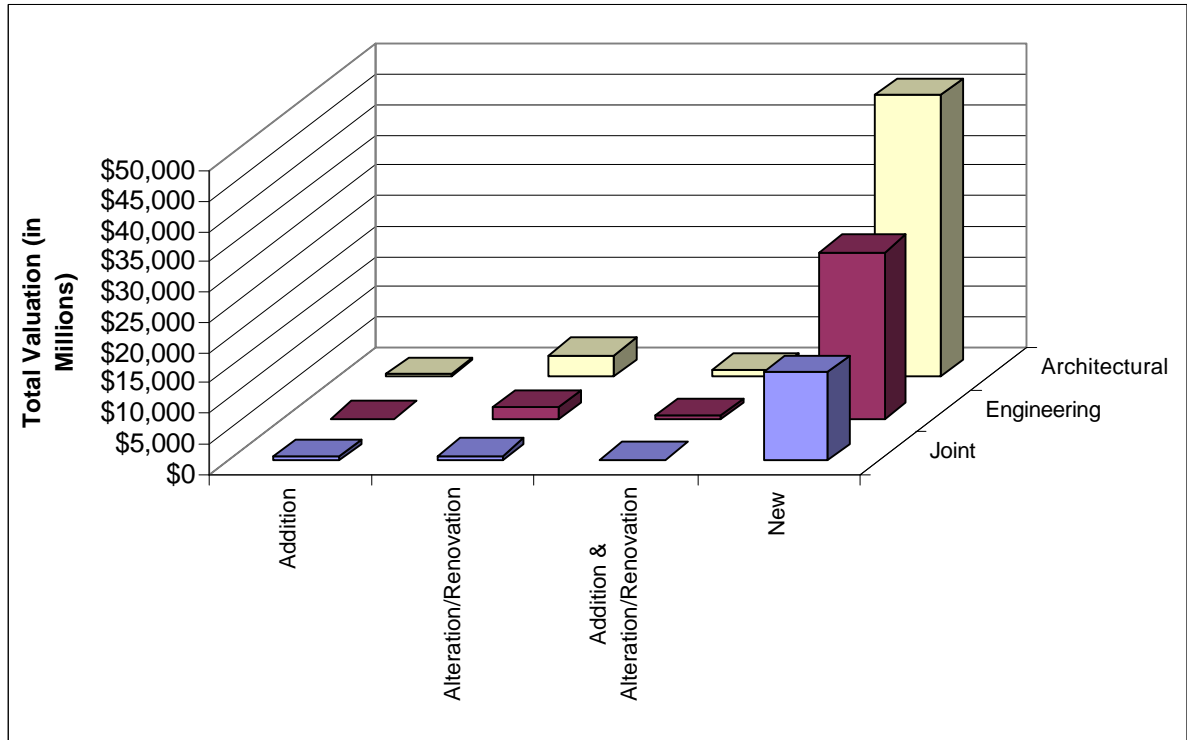


Figure 64: Total Valuation by Primary Project Type and Type of Firm

Firm Type	Primary Project Type				Total
	Addition	Alteration/ Renovation	Addition & Alteration/ Renovation	New	
Architectural	\$548	\$3,681	\$1,022	\$46,416	\$51,667
Engineering	\$121	\$2,067	\$624	\$27,520	\$30,332
Joint	\$852	\$959	\$261	\$14,767	\$16,840
Total	\$1,521	\$6,707	\$1,908	\$88,703	\$98,839

Table 58: Total Valuation by Primary Project Type and Type of Firm (\$million)

Figure 65 and Table 59 present total valuation by primary ownership type and firm size. Like the statewide case, the amount of valuation increases with firm size within each primary ownership type. This is expected since firm size was determined based on the total valuation of projects in California on which they worked.

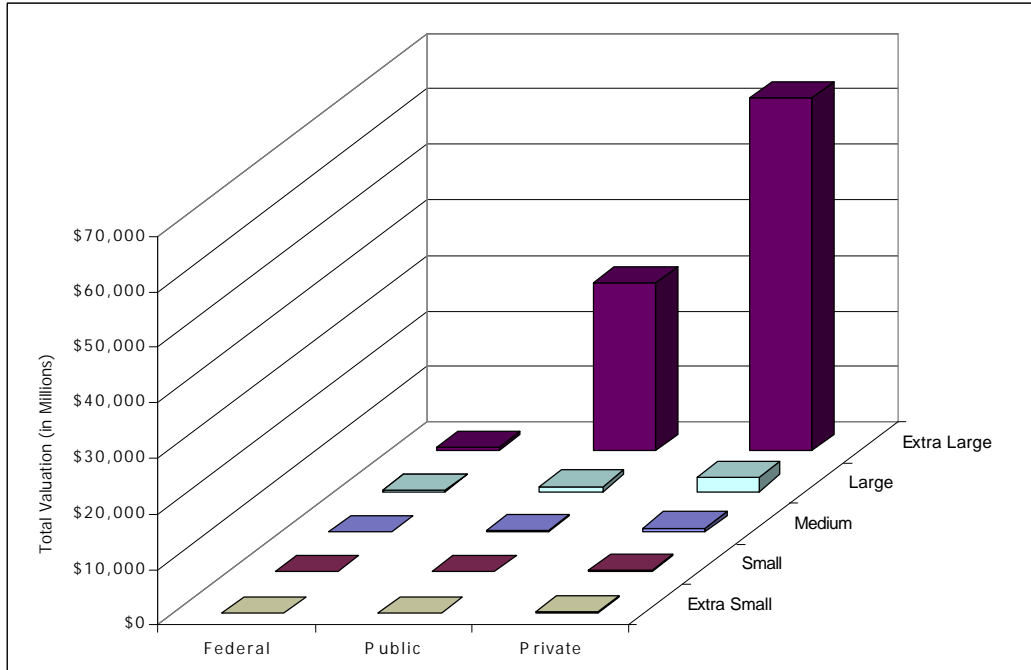


Figure 65: Total Valuation by Primary Ownership Type and Size of Firm

Firm Size	Primary Owner Type			Total
	Federal	Public	Private	
Extra Small	\$2	\$27	\$136	\$165
Small	\$13	\$71	\$275	\$358
Medium	\$17	\$234	\$686	\$937
Large	\$29	\$873	\$2,381	\$3,283
Extra Large	\$540	\$30,140	\$63,415	\$94,095
Total	\$601	\$31,345	\$66,893	\$98,839

Table 59: Total Valuation by Primary Ownership Type and Size of Firm (\$million)

Figure 66 and Table 60 show total valuation by primary project type and firm size. Again, within each project type, the amount of total valuation increases with firm size. Extra large firms who work primarily on new projects serve almost 90% of the total valuation in the NRNC market in the PG&E service territory.

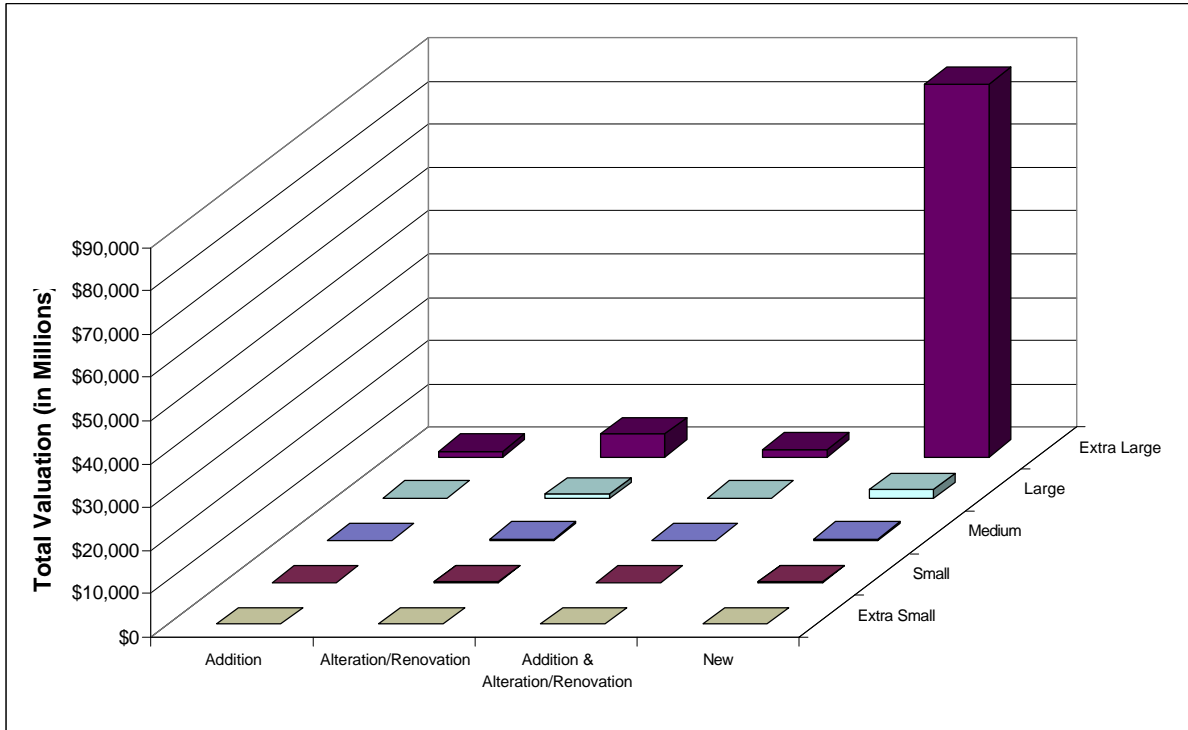


Figure 66: Total Valuation by Primary Project Type and Size of Firm

Firm Size	Primary Project Type				Total
	Addition	Alteration/ Renovation	Addition & Alteration/ Renovation	New	
Extra Small	\$6	\$94	\$6	\$59	\$165
Small	\$17	\$181	\$19	\$142	\$358
Medium	\$44	\$344	\$60	\$490	\$937
Large	\$128	\$960	\$222	\$1,974	\$3,283
Extra Large	\$1,326	\$5,129	\$1,602	\$86,039	\$94,095
Total	\$1,521	\$6,707	\$1,908	\$88,703	\$98,839

Table 60: Total Valuation by Primary Project Type and Size of Firm (\$million)

Total Square Footage

Figure 67 and Table 61 display total square footage by size and type of firm. Within each firm type, extra large firms have worked on projects accounting for more than 90% of total square footage within the PG&E service territory.

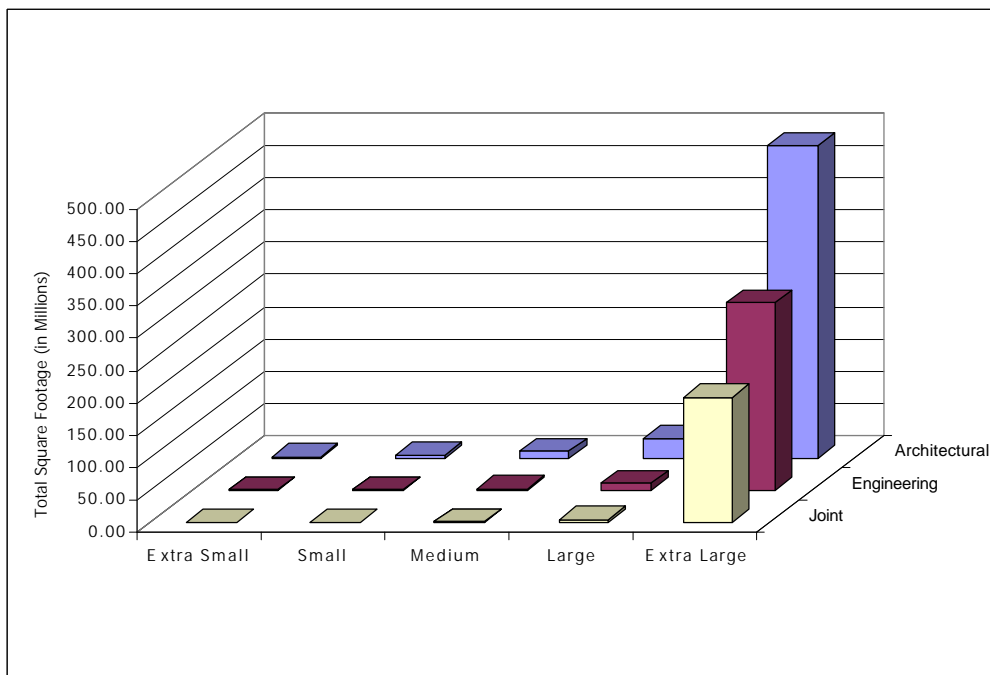


Figure 67: Total Square Footage by Size and Type of Firm

Firm Type	Firm Size					Total
	Extra Small	Small	Medium	Large	Extra Large	
Architectural	2.30	4.63	10.19	30.59	485.28	532.98
Engineering	0.48	0.97	2.58	10.60	290.12	304.75
Joint	0.02	0.24	1.10	4.58	194.34	200.29
Total	2.79	5.85	13.88	45.77	969.74	1,038.03

Table 61: Total Square Footage by Size and Type of Firm (in Millions)

Figure 68 and Table 62 present total square footage by primary ownership type and firm type. Within each firm type, those who work primarily for the private sector have worked on the majority of the square footage. This is expected since, within each firm type, the majority of firms work primarily for the private sector.

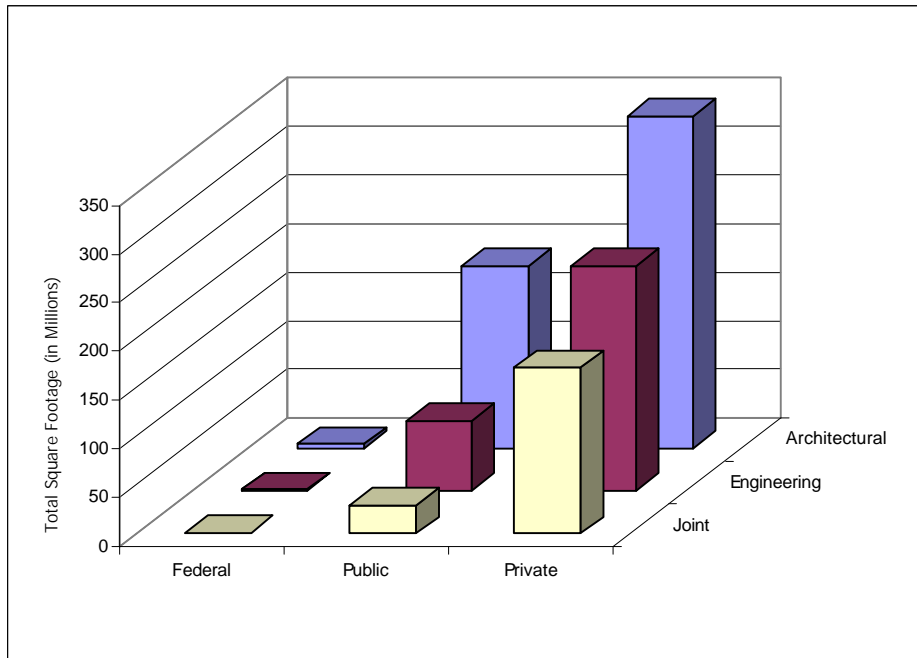


Figure 68: Total Square Footage by Primary Ownership Type and Type of Firm

Firm Type	Primary Owner Type			Total
	Federal	Public	Private	
Architectural	4	188	341	533
Engineering	1	72	231	305
Joint	1	29	170	200
Total	6	289	743	1,038

Table 62: Total Square Footage by Primary Ownership Type and Type of Firm (in Millions)

Figure 69 and Table 63 show total square footage by primary project type and firm type. Within each firm type, those who work primarily on new projects have worked on projects accounting for about 90% of square footage. This is expected since the majority of firms within each firm type work primarily on new projects. Additionally, new projects should include more square footage than alterations or additions.

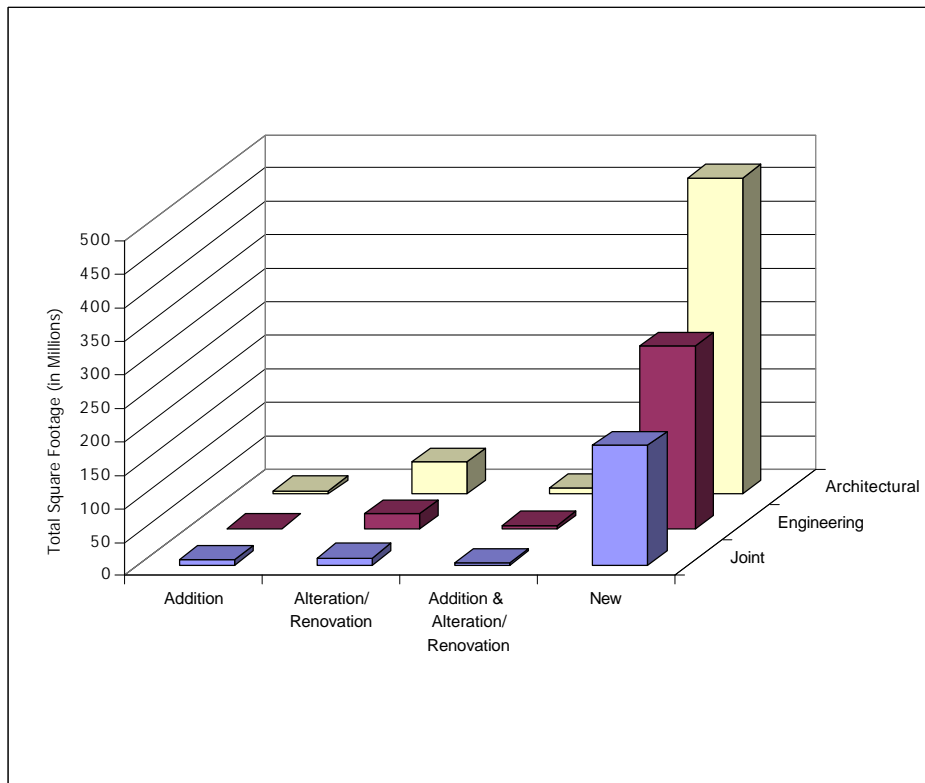


Figure 69: Total Square Footage by Primary Project Type and Type of Firm

Firm Type	Primary Project Type				Total
	Addition	Alteration/ Renovation	Addition & Alteration/ Renovation	New	
Architectural	5	47	9	472	533
Engineering	1	23	6	274	305
Joint	8	11	2	179	200
Total	14	81	17	926	1,038

Table 63: Total Square Footage by Primary Project Type and Type of Firm (in Millions)

Figure 70 and Table 64 present total square footage by primary ownership type and size of firm. Extra large firms who work primarily for the private sector have been involved on projects accounting for the majority of all square footage.

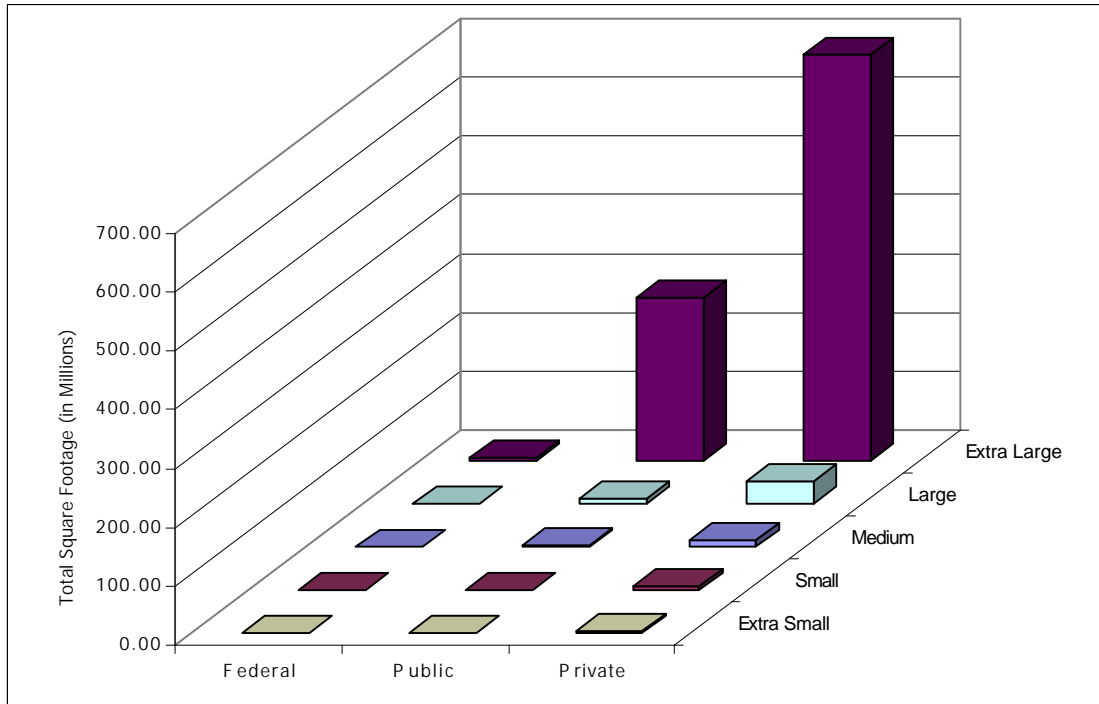


Figure 70: Total Square Footage by Primary Ownership Type and Size of Firm

Firm Size	Primary Owner Type			Total
	Federal	Public	Private	
Extra Small	0.04	0.47	2.28	2.79
Small	0.27	0.94	4.73	5.94
Medium	0.32	2.89	10.75	13.97
Large	0.51	9.08	36.28	45.87
Extra Large	5.19	275.93	688.63	969.75
Total	6.33	289.32	742.66	1,038.32

Table 64: Total Square Footage by Primary Ownership Type and Size of Firm (in Millions)

Figure 71 and Table 65 display total square footage by primary project type and firm size. Extra large firms who work primarily on new projects have been involved on projects accounting for greater than 80% of the square footage.

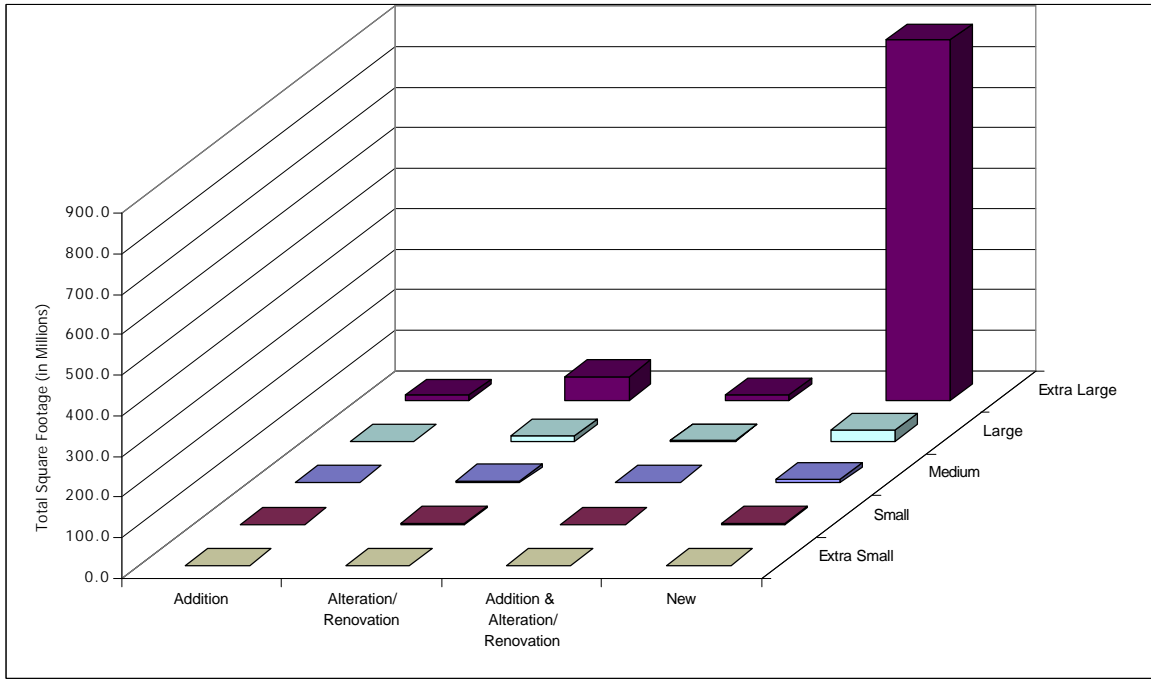


Figure 71: Total Square Footage by Primary Project Type and Size of Firm

Firm Size	Primary Project Type				Total
	Addition	Alteration/Renovation	Addition & Alteration/Renovation	New	
Extra Small	0.2	1.6	0.2	1.0	2.9
Small	0.4	3.0	0.4	2.2	5.9
Medium	0.7	4.9	0.9	7.5	14.1
Large	1.6	13.9	2.3	28.0	45.8
Extra Large	11.4	58.0	13.4	886.9	969.7
Total	14.3	81.3	17.2	925.6	1,038.4

Table 65: Total Square Footage by Primary Project Type and Size of Firm (in Millions)

Methodology

Data Assembly and Cleaning

Alternative Data Sources

Alternative sources of NRNC data were identified and assessed. In the end, the project team decided that the Dodge Database would be the sole source of information for this project. The great advantage of the Dodge data is that it lists firms that are actually active in the NRNC market in each service area. Moreover using the Dodge data we were able to characterize each firm according to the size and type of projects they have done. By contrast, we felt that none of the other sources provided as complete and useful information about architects and engineers actually serving the NRNC market. For example, one source provided names of individual architects but not the names of their firms. Another source could provide the name of firms, but no indicator as to how much work each firm did in California. Thus, the other sources that were identified were not used in this study.

The following six sources of information were considered for this project:

- The American Institute of Architecture
- The Association of Energy Engineers
- ASHRAE
- Professional Engineers and Professional Land Surveyors (a California organization)
- Architectural Examiner (a California organization)
- McGraw Hill

The following comments summarize our evaluation of each source:

- American Institute of Architecture – This source lists 1,568 firms throughout California. This is substantially smaller than the 2,866 architectural firms referenced in Dodge. The difference may be that firms providing design assistance may not be members of AIA.
- Association of Energy Engineers -The number of records is not listed but the membership is expected to exclude many mechanical and electrical engineers.
- ASHRAE – To use this source it would have been necessary to contact each California chapter president (approximately 15), and obtain the roster from him or her.
- Professional Engineers and Professional Land Surveyors – This California state agency licenses individual professional engineers and has a roster of its members but no phone numbers or company listings. Many of the individuals listed may not serve the NRNC market. This source will exclude individuals or firms providing engineering services that are not licensed professional engineers.
- Architectural Examiner – This California state agency licenses individual architects, but their directory does not have companies or phone numbers, only names of individuals.
- McGraw Hill - They have an on-line source of information that allows you to look up architects and engineers by area. This source lists approximately 200 architects and engineers in California. So this is far smaller than those found in the Dodge database.

As previously mentioned, none of these six sources met the needs of this study, thus the Dodge Database was used as the sole source of data.

Dodge NRNC Data

From other work for PG&E and SCE, RLW Analytics has the Dodge new construction data for all years from 1992 through 1998 except 1996. RLW acquired the 1996 file for this Market Actors study. We used the data for 1995 through 1998 since these data provide a good picture of market actors in recent years. These data gave us a list of 5,153 architectural firms, 1,700 firms providing mechanical and electrical engineering services, and 556 joint firms providing both architectural and engineering services to approximately 38,427 projects throughout California. The data include 2,445 architectural firms, 281 joint firms, and 784 firms providing mechanical and electrical engineering services to approximately 15,700 projects in the PG&E Utility Service Territory.

The Dodge projects that were included in this project had to meet the following requirements:

- Located in California
- Non-Residential New Construction
- Known project location (necessary to map the project into a utility territory)
- Able to classify project into one of the 17 building types used in the Title 24 California building code⁷,
- At the 'start stage' of the project (start work within 60 days of entry in the database)
- A Valuation of \$200,000 or higher

Clean up the Names of Architectural and Engineering Firms

Once the projects were screened for the aforementioned requirements of this study, the architect and engineer database was assembled. For each project record the Dodge database lists a set of firms that provided various services for the project, including architectural, mechanical engineering, and electrical engineering. Since the Dodge data does not reveal the primary business activity of the firms that are listed, firms were classified according to the type of services provided on projects. The firms were classified as architectural, electrical engineering, and mechanical engineering. Firms that provided both architectural and engineering services were labeled as 'joint' firms.

Unfortunately, the firms listed in the Dodge Database do not have a unique identifier. Therefore, a given firm may be listed in slightly different ways in the Dodge project records. For example, a firm with the name of 'XYZ' may also be listed as 'XYZ, Inc' in the database. Thus, it was necessary to clean all the firm names to make them uniform. This was necessary to calculate the total project valuation, total square footage, etc. for all the projects worked on by each firm. The firm names were combined if the firm name was very similar, the address was very similar, and the city was identical or near by. This task was one of the most time consuming tasks in assembling the databases since over 11,000 records had to be cleaned.

⁷ See Table 68 for mapping of Dodge Building Types into CEC Building Types.

Classify the Dodge projects by utility service area

All four years of Dodge data listed the City and State but not the zip code of the project location. The zip code is a new addition to the Dodge Database, thus our newly acquired 1996 and 1998 data contained zip codes, but our older 1995 and 1997 data did not.

Therefore, for all years, the city and state was used to map the project into the utility that serves the project location. RLW Analytics generated the city to utility mapping from utility billing data acquired in the course of other studies. To create a complete mapping, we visually mapped approximately 200 rather remote cities into utility territories using the 'Map of Electric Utility Districts in California' from the CEC website. To apply RLW's California geographical mapping, we manually corrected a large number of typographical errors and spelling variations found in the cities recorded in the Dodge database.

Square Footage

The Dodge database provides a field labeled square footage. The documentation describes this as 'a measure of size or capacity of a building project in terms of the number of floor area.' The intended meaning of this field seems clear in the case of a new project or an addition. But in the case of projects that involve both alteration/renovation and addition, the interpretation of square footage is ambiguous. Square footage could refer to the square footage of the addition alone or it could refer to the total square footage including both the alteration/renovation and addition. In other words, it is unclear whether the square footage refers to the amount of new space or the total space.

An added ambiguity is caused by the lack of a distinct code for 'unknown'. About 50% of the projects listed in the Dodge database have a zero in the square footage field. However, it is not clear whether a recorded zero means a missing value or whether it means a true zero. Consider a new building. In this case, a zero seems to imply a missing value since it is difficult to explain the zero literally. However, in the alterations/renovations category a zero could be taken literally to mean that the project added no new space to the building. In other words, the field could be interpreted to measure the amount of new space.

Table 66 shows the number of project with zero square footage by type of project. In the Alteration/Renovation category, over 80% of the projects had a zero recorded, whereas in the remaining three categories, only about one-third had a zero recorded. It seems plausible to interpret the zeros in these three categories as representing unknown square footage. It also is reasonable to assume that the proportion of projects with unknown square footage is approximately the same from category to category. Under this assumption, the high proportion of zeros in the Alteration/Renovation category suggests that many of the zero's in this category may represent valid zeros rather than missing information. This suggests that sometimes the field reflects new space. However, a large number of projects in the Alteration/Renovation category had a positive value of square footage recorded. In this case, the field seems to reflect the total space affected by the project.

Project Type	Missing Square Footage	Square Footage Present
Additions	230	463
Alteration/Renovation	6,508	1,358
Additions & Alteration/Renovation	280	406
New	1,734	3,364

Table 66: Number of Projects with Missing and Present Square Footage

In practice it is impossible to guess which interpretation is appropriate for a given project. Therefore we considered a zero to always indicate a missing value, i.e., indicating that the square footage was unknown or unavailable. When the square footage was zero, we calculated an estimate of the square footage from the reported project value, which was available for all projects. To estimate the square footage we classified the projects by type and according to whether the location was urban or rural. For each city in the database, we determined if that city belonged to either a Primary Metropolitan Statistical Area (PMSA) or a Metropolitan Statistical Area (MSA). If a project's city belonged to a PMSA or a MSA, that project was classified as urban. Those cities that did not belong to either a PMSA or a MSA were classified as rural.

In each of the eight categories, we calculated the average value per square foot among those projects with square footage greater than zero. Then we divided the value by the average value per square foot to estimate the square footage of the projects with zero square footage.

Table 67 shows the average value per square foot for each of the categories. Surprisingly, the value per square foot tended to be higher in the rural areas than in the urban areas. The cost was somewhat higher for additions than for new projects. The cost was substantially smaller for the alteration/renovation category. Surprisingly, the cost was highest in the alteration/renovation and new category. This is further evidence that the square footage often refers to the space of the addition alone while the value is the cost of the total project including the alteration/renovation.

The interpretation of square footage is altered by the substitution of estimated values for the recorded zeros found in the database. Table 67 shows our best guess at the appropriate interpretation of the square footage for each project type. In the case of alteration/renovation, for example, we used the projects with reported square footage to estimate the square footage of the sites with zeros. Thus it seems appropriate to interpret the final result as the square footage of the alteration/renovation. In the case of the addition and alteration/renovation category, the square footage is believed to primarily reflect the new space but it may include sometime of the renovated space.

Project Type	Rural	Urban	Interpretation
Addition	\$87	\$111	Added Square Footage
Alteration/Renovation	\$46	\$43	Altered Square Footage
Addition & Alteration/Renovation	\$106	\$131	Added Square Footage
New	\$72	\$90	New Square Footage

Table 67 : Average Value per Square Foot by Project Type and Location

Create the Market Actors Database

Once the Dodge project-level data were cleaned, the data were aggregated to create the Market Actors Database. In the Market Actors database, each architectural or engineering office in a separate city constitutes a unique market actor. Firms that have offices in two or more cities are listed separately in the database. All of the project-specific information that was included in the original Dodge database has been aggregated to the market actor level.

In order to create a list of market actors active in the service area of each utility, the projects were classified by utility area. The architectural and engineering firms (market actors) associated with a project in a utility area were assigned to that area. The activity of each market actor in the utility service area was assessed by calculating the total valuation of the projects in the corresponding area worked on by the market actor. We also calculated the number of projects and the total square footage worked on by the market actor.

The Market Actors data double counts the valuation of projects. Most projects in the Dodge database listed several market actors associated with the project. However, there was no way to allocate the valuation and square feet of the project among the associated market actors. Therefore, the total valuation and square feet of a given project was assigned to each of the associated market actors. Thus if more than one firm worked on a given project, then the value of the project was counted in the total valuation for each firm. This double counting also applies to the square footage and the total number of projects.

Database Products

The following database products will be delivered with the final report:

- A projects table,
- A project and actors table,
- A market actors table.

These data will be provided in two formats: (1) in a Microsoft Access database, and (2) as SAS transport files.

Please note that the information provided in these tables is limited by the information received in the original F.W. Dodge database. For example, many projects did not have a zip code in the original Dodge Database, so there is no zip code in the zip code field of the Projects table. However, if the most pertinent information was provided in the database, the project was kept in the Projects table and included in the cross tabulations for this project. In particular, when the square feet of the project was missing, it was estimated from the valuation of the project as previously described.

The following section of the report contains the description of each variable that will appear in each of the tables that will be provided with the final report. The format of the variables will be as follows:

1. **VARIABLE NAME:** Variable Description

Where '1' is the sequential order in which the variable will appear in the table.

Projects Table

This table contains the Dodge data as originally organized by F.W. Dodge. The data is at the project-level, with each record containing project-specific information such as type of project and location. This table was used to create the Construction Trends sections of the report.

The Projects Table has the following fields:

1. **REPNUM:** Dodge Project Report Number which identifies each individual project
2. **PDESCRIP:** Project Description (i.e. name of store, or name of school, etc.)
3. **P_ADDR1:** Project Address #1-main location of the project
4. **P_ADDR2:** Project Address #2-additional location information (i.e. Unit, floor, suite, etc.)
5. **P_CITY:** Project City
6. **P_STATE:** Project State
7. **P_ZIP:** Project Zip Code
8. **DATE:** Project Start Year
9. **P_VALUE:** The reported value of a project (\$), excluding land fees
10. **STORIES:** Height of Building
11. **BLDGS:** Number of Structures in a Project
12. **SQFT:** Square Footage of Floor
13. **P_TYPE:** Project Type (i.e. Addition, New, etc.)
14. **O_TYPE:** Owner Type (Public-not federal, private, federal)
15. **B_TYPE:** Building Type (based upon Dodge building types that were mapped into 17 Title 24 building types)

Table 68 shows the mapping that was used to classify the Dodge building descriptions into the 17 CEC Title 24 Building Types.

CEC Building Type Description	Dodge Building Type Description
C&I Storage	Other Whse
C&I Storage	Freight
C&I Storage	Whse-Other
Community Center	Recreation Bldgs
Community Center	Club/Lodge
Community Center	Other Rec
Community Center	YMCA
Fire/Police/Jails	Police & Fire Station
Fire/Police/Jails	Detention facilities
Fire/Police/Jails	Military Facilities
General C&I Work	Other Mfg
General C&I Work	Oth Service
General C&I Work	Food Mfg
General C&I Work	Chem-Outdr
General C&I Work	Refineries
General C&I Work	Chem-Indr
General C&I Work	Gas Plant
General C&I Work	Airplane maintenance
General C&I Work	Auto & Truck maintenance
General C&I Work	Refineries & Chemical
General C&I Work	Bus/Truck
General C&I Work	Car Sls/Svc
Grocery Store	Food Stores
Gymnasium	Gym & Field house
Hotels/Motels	Hotels & Motels
Libraries	Libraries
Medical/Clinical	Clinics
Medical/Clinical	Hospitals
Medical/Clinical	labs, test, R&D
Medical/Clinical	Clinics & Medical Office
Medical/Clinical	Nurs/Conv
Office	Office
Office	Financial Svc
Office	Whse-Refrg
Office	Govt Administration
Office	Ref Whse
Other	Airline Terminal
Other	Other Passanger terminal
Other	parking garage
Other	Bath/Beach
Other	Bowling
Other	Indoor Swimming pools
Other	Arenas
Other	Animal-Fish-Plant facilities
Other	Museums
Other	Stadiums
Other	Outdoor swimming pools
Other	Armories
Religious Worship, Auditorium, Convention	Worship Facilities
Religious Worship, Auditorium, Convention	Funeral facilities
Religious Worship, Auditorium, Convention	Sunday Schools
Religious Worship, Auditorium, Convention	Auditorium
Religious Worship, Auditorium, Convention	Arenas, Auditoriums, Exhibit halls
Religious Worship, Auditorium, Convention	Exhib Hall
Restaurant	restaurants
Retail and Wholesale Store	Post Office
Retail and Wholesale Store	Other Stores
Retail and Wholesale Store	Shopping Centers
School	Elementary Schools
School	Middle Schools
School	High Schools
School	College & University
School	Community College
School	Vocational School
School	Special School
Theater	Perfoming Arts Theaters
Theater	Theaters
Unknown	Missing

Table 68: Mapping from Dodge Building Type to Title 24 Building Type

Project and Actors Tables

This table lists all architect and engineer firms associated with all projects in the Project database. There is one record for each combination of project and market actor. If more than one firm worked on a specific project there will be one record for each firm. The Project and Actors database was not used directly in any cross tabulations that are presented in this report. However, the Project and Actors table provides a link between the Market Actors database and the Project database.

The Project and Actors database will have the following fields:

1. **REPNUM**: Dodge Project Report Number
2. **FIRMID**: ID of Market-Actor Firm

Market Actors Table

The Dodge data is originally organized by construction project. To construct the Market Actors Table, we have reorganized and aggregated the project-level data by firm and utility service territory as described in the preceding section. The Market Actors table lists the architectural firms and mechanical / electrical engineering firms involved in projects in each utility service area.

The Market Actors data has the following fields:

1. **FIRMID**: ID of Market-Actor Firm
2. **COMPNAME**: Name of Market-Actor Firm
3. **ADDR1**: Address #1 - main location of the project
4. **ADDR2**: Address #2 - additional location information (i.e. Unit, floor, suite, etc.)
5. **CITY**: City
6. **STATE**: State of Firm
7. **PHONE**: Phone number
8. **CONTACT**: Contact person at (if available)
9. **F_TYPE**: Type of firm: architecture, engineering, joint
10. **SIZE**: Size of firm: very small, small, medium, large, very large (based on the total valuation of all projects in California)
11. **PRIM_PRJ**: Primary market served based on project type of all projects in California
12. **PRIM_OWN**: Primary market served based on owner code of all projects in California
13. **TOT_NUM**: Number of Projects in Utility Service Area
14. **CADD**: Number of Addition Projects in Utility Service Area
15. **CALTER**: Number of Alteration Projects in Utility Service Area
16. **CADD_ALT**: Number of Addition/Alteration Projects in Utility Service Area
17. **CNEW**: Number of New Projects in Utility Service Area
18. **CPUB**: Number of Public-Sector Projects in Utility Service Area

19. **CFED**: Number of Federal Projects in Utility Service Area
20. **CPRIV**: Number of Private Projects in Utility Service Area
21. **TOT_VAL**: Value of All Projects in Utility Service Area
22. **VADD**: Value of Addition Projects in Utility Service Area
23. **VALTER**: Value of Alteration Projects in Utility Service Area
24. **VADD_ALT**: Value of Addition/Alteration Projects in Utility Service Area
25. **VNEW**: Value of New Projects in Utility Service Area
26. **VPUB**: Value of Public-Sector Projects in Utility Service Area
27. **VFED**: Value of Federal Projects in Utility Service Area
28. **VPRIV**: Value of Private Projects in Utility Service Area
29. **TOT_SF**: Estimated Square Footage of All Projects in Utility Service Area
30. **SADD**: Estimated Square Footage of Addition Projects in Utility Service Area
31. **SALTER**: Estimated Square Footage of Alteration Projects in Utility Service Area
32. **SADD_ALT**: Estimated Square Footage of Addition/Alteration Projects in Utility Service Area
33. **SNEW**: Estimated Square Footage of New Projects in Utility Service Area
34. **SPUB**: Estimated Square Footage of Public-Sector Projects in Utility Service Area
35. **SFED**: Estimated Square Footage of Federal Projects in Utility Service Area
36. **SPRIV**: Estimated Square Footage of Private Projects in Utility Service Area