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**Docket On-Premesis Laundromat Dryers Market Survey Report**

*Additional submitted attachment is included below.*

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# On-Premises Laundromat Dryers Market Survey

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# TABLE OF CONTENTS

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- 1. EXECUTIVE SUMMARY ..... 4
- 2. INTRODUCTION & STUDY GOALS..... 5
- 3. SURVEY DESIGN ..... 6
  - 3.1 Survey Sample Development ..... 6
  - 3.2 Survey Questionnaires..... 8
- 4. SURVEY PROCESS ..... 9
- 5. SURVEY FINDINGS..... 11
  - 5.1 Overall OPL Market Sector Characteristics ..... 11
  - 5.2 OPL Market Sector Characteristics ..... 12
    - 5.2.1 *Hotels and Motels* .....12
    - 5.2.2 *Health Clubs* .....12
    - 5.2.3 *Nursing Homes*.....12
    - 5.2.4 *Prisons and Jails* .....12
    - 5.2.5 *Laundry Services Companies* .....13
    - 5.2.6 *Dry Cleaners* .....13
    - 5.2.7 *Universities and Colleges* .....13
    - 5.2.8 *Fire Stations* .....13
    - 5.2.9 *Law Enforcement* .....13
    - 5.2.10 *Hospitals* .....13
  - 5.3 Detailed OPL Dryer Distributions ..... 14
    - 5.3.1 *Installed OPL Dryers* .....14
    - 5.3.2 *Installed OPL Capacity*.....16
    - 5.3.3 *OPL Dryer Load Estimates* .....18
    - 5.3.4 *Annual OPL Dryer Shipment and Laundry Load* .....20

# TABLES

---

Table 1 Facility Data Sources for OPL Market Sector ..... 6

Table 2 Survey Process Summary ..... 9

Table 3 Survey Response Rate Summary ..... 10

Table 4 OPL Dryer Market Penetration and Load Type ..... 11

Table 5 Brand of OPL Dryers Found from Survey ..... 12

Table 6 Distribution of Installed OPL Dryers in each Market Sector..... 15

Table 7 Distribution of Installed OPL Dryer Capacity in each Market Sector..... 17

Table 8 Distribution of Daily Laundry Load in each Market Sector ..... 19

Table 9 Annual OPL Laundry Load ..... 20

Table 10 Annual OPL Dryer Shipment ..... 20

# TABLE OF FIGURES

---

Figure 1 Number of Installed OPL Dryers by Weight Capacity ..... 14

Figure 2 Distribution of Installed OPL Dryer Capacity ..... 16

Figure 3 Distribution of OPL Dryer Daily Load..... 18

# I. EXECUTIVE SUMMARY

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The goal of this study is to provide a detailed market characterization of on-premises laundry (OPL) applications, including large commercial and industrial applications. This study provides further exploration of OPL use not addressed in the Codes and Standards Enhancement (CASE) submitted to the California Energy Commission report in July 2013. Market sectors included in this follow-up study include hotels and motels, nursing homes, health clubs, state prisons, laundry service companies, dry cleaners, universities and colleges, fire stations, law enforcement facilities, hospitals, and restaurants. Market data collected through OPL phone surveys includes: dryer types used (capacity, heating fuel source, brand), number of dryers at each type of OPL facility, linen types most often dried based on market sector, and daily dryer cycles (lbs. per day). The collected market data will help the CEC and stakeholders make Title 20 development decisions.

The survey results of this study indicate that there are approximately 22,300 installed clothes dryers in California with an average dryer capacity of 88 pounds. There are two concentrations of dryer capacities, one is between 50 and 80 pounds (mostly in hotels and motels and health clubsFigure 1) and the other is between 400 and 650 pounds (laundry services facilities and prisons).

Dryers with a capacity between 50 to 70 pounds have the largest market share at 34%. Dryers with capacities equal to or greater than 400 pounds make up a small portion (about 7%) of the market and they are found in prisons and laundry service facilities. The market shares based on installed capacity for the two groups of dryers are 46% and 34%, respectively.

The estimated total daily load for the California OPL market is 30.4 million pounds. Hotels and motels have the largest share of OPL daily load (30%), followed the nursing homes (28%), and health clubs (15%). Dryers located in prisons and laundry services facilities, which are considered to be industrial scale dryers, represent 39% of the total installed OPL capacity, but represent 15% of total OPL daily load. The remaining market sectors referenced in this report represent less than 10% of the total OPL daily load.

Useful lives for OPL dryers are between 15-30 years. Because they are considered a large-equipment investment, large dryers tend to have longer useful life, likely because they are better maintained. Based on survey findings, the project team estimates dryers with capacities less than 120 pounds have a useful life of 15 years. While dryers with capacities of 120 to 400 pounds have a useful life of 20 years, those with capacities equal to or larger than 400 pounds have a useful life of 30 years. It is estimated 1,400 OPL dryers are sold per year in California.

## 2. INTRODUCTION & STUDY GOALS

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The California Investor Owner Utility (IOU) Codes and Standards (C&S) Program seeks to address energy efficiency opportunities through development of new and updated Title 20 standards. The IOU C&S team submitted a Codes and Standards Enhancement (CASE) report in July 2013 to the California Energy Commission (CEC) to advocate energy efficiency standards for commercial clothes dryers. The CASE report described market characteristics and estimated market sizes of multi-family laundromats (MFL), coin-operated laundromats (COL), and on-premises laundromats (OPL). In response to the CEC's inquiry about detailed market information for large commercial and industrial dryers, the IOU C&S team conducted further market study to provide detailed characterization of OPL applications, especially large commercial and industrial applications. Specifically, this study provides answers to the following questions:

- ◆ Types of dryers used in OPLs: capacity, heating fuel source, and brand;
- ◆ Number of dryers at each type of OPL facility;
- ◆ The inventory and annual sales of different types of OPL dryers;
- ◆ Fabric type and daily load for different OPL dryers;

The market data in the above areas will help the CEC and stakeholders to make development decisions for new Title 20 standards.

The study assessed information from the following OPL market sectors:

- ◆ Hotels and motels
- ◆ Nursing homes
- ◆ Health clubs
- ◆ State prisons and county jails
- ◆ Laundry services companies
- ◆ Dry Cleaners
- ◆ Universities and colleges
- ◆ Fire stations
- ◆ Law enforcement facilities
- ◆ Hospitals
- ◆ Restaurants

This study includes the following three tasks:

1. Develop survey samples and identify sample contact information
2. Develop a phone survey instrument and conduct phone surveys
3. Analyze market study results

### 3. SURVEY DESIGN

The TRC project team conducted phone interviews with selected facilities of each OPL type. Phone surveys allowed the project team to reach a large number of facilities over a short time period. The original research plan included follow-up field surveys at facilities that cannot provide detailed dryer information through the phone surveys. For the majority of cooperative facilities, the TRC team was able to find facility staff knowledgeable of dryer specifications and load conditions. Some facility staff, especially those in facilities with industrial-scale laundry applications, provided information based their detailed written facility records. Follow-up field visits are unlikely to provide additional information. Therefore, the project team decided to expand the number of phone interviews, so the survey results can be more statistically meaningful.

The TRC team used multiple approaches to reach OPL facilities. The team engaged with PG&E account managers to ensure the correct facility contacts for successful phone interviews. The team contacted the author of the Potential Best Management Practices Report<sup>1</sup>, to seek input on data sources and interview targets. In the end, the majority of phone surveys were through direct phone calls. While most of the facilities were cooperative, it usually took some effort to find the right facility staff to obtain the desired information.

#### 3.1 Survey Sample Development

The TRC team surveyed facilities in all eleven California OPL market sectors. Sample development was a two-phase process that included estimating the number of facilities in California, and identifying facilities for phone interviews. Table 1 lists the data sources for estimating the number of facilities and developing interview samples for different OPL market sectors. The US Census website provided an estimated number of facilities in California by the North American Industry Classification (NAICS) codes for the majority of OPL market sectors. The TRC team developed survey samples for each market sector through internet searches, trade associations, and corresponding state agency websites. The TRC team also used a contact at Sutter Health to survey 25 facilities within Sutter’s healthcare network.

*Table 1 Facility Data Sources for OPL Market Sector*

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<sup>1</sup> Koeller, John. A report on Potential Best Management Practices. 2006. <http://infohouse.p2ric.org/ref/50/49024.pdf>

Market Sector	Est. No. of Facilities	Data Source for Est. No. of Facilities	Data Source for Interview Samples
Hotels & Motels	5,274	US Census	Hotels.com
Nursing Homes	1,594	US Census	CA Assoc. of Health Facilities <sup>1</sup>
Health Clubs	3,203	US Census	Internet search
State Prison & County Jails	593	CA Dept. of Corrections	CA Dept. of Corrections <sup>2</sup>
Laundry Services Companies	171	US Census	Industry Trade Assoc. <sup>3</sup>
Dry Cleaners	4,274	US Census	Internet search
Universities & Colleges	664	US Census	CollegeCalc <sup>4</sup>
Fire Stations	835	CA Prof. Firefighters	CA Prof. Firefighters <sup>5</sup>
Law Enforcement	510	USACOPS	USACOPS <sup>6</sup>
Hospitals	485	US Census	State of CA <sup>7</sup> , TRC contact
Restaurants	27,697	US Census	Internet search

<sup>1</sup> <http://www.cahf.org/>

<sup>2</sup> <http://www.cdcr.ca.gov/>

<sup>3</sup> <http://www.trsa.org/>

<sup>4</sup> <http://www.collegecalc.org/>

<sup>5</sup> <http://www.cpf.org/go/cpf/>

<sup>6</sup> <http://www.usacops.com/>

<sup>7</sup> <http://gis.oshpd.ca.gov/atlas/places/list-of-hospitals>

## 3.2 Survey Questionnaires

The TRC team developed a survey guide to collect information from personnel operating OPL facilities. The project team developed the following interview questions based on the market study objectives presented in the prior section:

1. Does your business have on-site laundry facilities?
  - a. Yes [Proceed with survey]
  - b. No [Do you outsource your laundry services? If yes, can you share the name of the service?]
2. How many clothes dryers are on-site at your facility?
3. Do you have gas or electric dryers on-site?
4. Do you know the make and model of the dryers? Are they all the same? (record number of each different kind)
5. What size dryers are on-site? [If they cannot answer, ask if they can provide nameplate data (capacity, power(Btu/hr) or if they know the make and model we can likely look it up)
  - a. Capacity (lbs)?
  - b. Drum size (cubic feet)?
6. Can you estimate, on average, how many loads are done each day, or per week (if not used often)? (Probe: Is this per dryer, or for the whole facility? What type of items are laundered at your facility (e.g. bed linens, towels, table clothes, etc.)?
  - a. Are the dryers filled to capacity every load?
7. What are the laundry operating hours? (M-F, Sat & Sun)
8. What is the typical dryer cycle time?
9. What is the typical dryer setting (low heat, permanent press, high heat)?
10. What is the useful life of the dryers? How often are the dryers replaced?

After the correct facility staff was identified, each survey on average took approximately 15 minutes. Some businesses with multiple locations provided written responses to the above questions.

## 4. SURVEY PROCESS

TRC team conducted phone surveys of OPL facilities from October 2014 through January 2015. The TRC team conducted approximately 260 calls across 11 OPL market sectors. The project team contacted the author of the Potential Best Management Practices Report<sup>1</sup> to seek advice on reaching OPL facilities. No specific site information was obtained from this approach. The TRC team then proceeded with conducting direct calls of selected OPL facilities.

The level of data-collection efforts depended upon the nature of the market sector. For example, market sectors with small facilities such as law enforcement or restaurants were easier due to smaller staff sizes resulting in fewer personnel phone transfers during the survey. For other sectors, such as large hotels and health clubs, it was more time consuming to identify the proper facility staff to interview. Additionally, facilities with dedicated operations or maintenance staff familiar with the dyers on-site, provided data more quickly than those facilities with staff unfamiliar with their dryers. Table 2 summarizes the general survey experience, role of interviewees, and responsiveness of facility staff of each OPL market sector.

*Table 2 Survey Process Summary*

Market Sector	Difficulty Reaching Respondents	Survey Respondent Roles	Responsiveness Level	Knowledge Level
Hotels & Motels	Moderate	Operator, Head Engineer, Laundry Manager	Medium	Medium
Nursing Homes	Moderate	Administrator, Central Supply, Laundry Supervisor, Maintenance Manager	Medium	High
Health Clubs	Moderate	Maintenance	Moderate	High
State Prison & County Jails	High	Plant operations, PIA	Moderate	High
Laundry Services Companies	Moderate	Facilities, Operations Manager	High	High
Dry Cleaners	High	Owners, Customer Service	Low	High
Universities & Colleges	Moderate	Athletic director, Facility services, Custodian	High	Moderate
Fire Stations	Low	Fireman on duty, Facilities Support Services	High	Low
Law Enforcement	Low	On Duty Officer, Receptionist	High	Low
Hospitals	Moderate	Operator, Facilities, Operations, Laundry, Linen Office, Engineering, Hospitality	Medium	Low
Restaurants	Low	Receptionists, Owners	High	Low

<sup>1</sup> Koeller, John. A report on Potential Best Management Practices. 2006. <http://infohouse.p2ric.org/ref/50/49024.pdf>

Initial contact with survey respondents was through phone. In some instances, the survey instrument was sent to the facility via email to fill out and send back to the TRC team. This method was useful for two contacts, one in industrial laundry business and hospitals, both of whom manage multiple facilities. The hospital contact did not complete the survey, as they indicated they outsource laundry services for their 25 facilities. The industrial laundry contact manages 18 facilities across California. This contact supplied the TRC team with the data requested, including additional information on dryer temperature settings and cycle times through written responses.

Table 3 summarizes number of facilities contacted, interviewed, and completed survey responses for each OPL market sector. Out of the 260 facilities that the project team contacted, 203 facilities (78%) agreed to participate in a phone interview. Of the facilities interviewed, 98 facilities (48%) provided complete responses to survey questions, which were used in the quantitative market characteristics analysis. Data collected from surveys with incomplete responses were not used in the final analysis. However, this data helped to understand general characteristics of OPL dryers, e.g. market saturation, manufacturer, fuel source, operation patterns.

All interviewed hospitals outsourced their laundry services. Most interviewed restaurants outsourced their laundry services and less than 10% had residential dryers. For this reason, the number of facilities with complete survey responses for these two market sectors is considered zero. Laundry loads from these two market sectors are reflected in the load for laundry services companies. For laundry service companies, hospitals, and fire stations, the project team was able to obtain data for multiple facilities from one contact overseeing the operations of multiple sites. The number of facilities from which data was collected is found in.

*Table 3 Survey Response Rate Summary*

<b>Market Sector</b>	<b>No. of Facilities: Contacted</b>	<b>No. of Facilities: Interviewed</b>	<b>Percent of Facilities: Complete Survey Responses</b>
Hotels & Motels	56	27	48%
Nursing Homes	43	21	76%
Health Clubs	22	3	100%
State Prison & County Jails	15	5	100%
Laundry Services Companies	14	6	83%
Dry Cleaners	31	7	43%
Universities & Colleges	12	7	71%
Fire Stations	3	78 <sup>1</sup>	37%
Law Enforcement	19	14	7%
Hospitals	18	17	100%
Restaurants	27	18	70%
<b>Total</b>	<b>260</b>	<b>203</b>	<b>39%</b>

<sup>1</sup> The study team contacted fire station district maintenance supervisors who were able to provide data on multiple stations through several districts.

## 5. SURVEY FINDINGS

### 5.1 Overall OPL Market Sector Characteristics

Table 4 summarizes OPL dryer market penetration, laundry-outsourcing needs, and types of linens most commonly serviced for each OPL market sector. The TRC team found that universities, colleges, prisons, and fire stations all had OPL facilities and did not outsource their laundry services. Hotels, motels, and nursing homes have a high percentage of facilities with OPL dryers, with the rest outsourcing their laundry services. Hospitals and restaurants have a small percentage of facilities with OPL dryers, and outsource the majority of their laundry services.

*Table 4 OPL Dryer Market Penetration and Load Type*

Market Sector	% of Facilities with OPL Dryers	Average No. of Dryers per Facility <sup>1</sup>	Average Dryer Capacity (lb)	Average No. of Cycles per Day	Outsource Laundry Service?	Types of Linens
Hotels & Motels	70%	2.1	69	17	Yes	Towels, bedding, clothing
Nursing Homes	92%	2.4	77	31	Yes	Towels, blankets, bedding, clothing, table clothes
Health Clubs	50%	1.7	60	28		Towels, clothes
State Prison & County Jails	100%	2.8	369	4		Clothes, bedding, towels, bedding
Laundry Services Companies	100%	2.5	381	16		Uniforms, towels, mats, blankets, mops, coveralls, bedding, table linens
Dry Cleaners	57%	1.6	29	19		Clothes, bedding, towels
Universities & Colleges	100%	2.5	52	9		Uniforms, towels, clothing
Fire Stations	100%	1.0	30	3		Towels, bedding, clothing
Law Enforcement	13%	1.5	75	1	Yes	Towels, uniforms, bedding
Hospitals	0%	0	NA	NA	Yes	Bedding, towels
Restaurants	0%	0	NA	NA	Yes	Towels

1. The average is based on facilities with OPL dryers.

The useful life of large OPL dryers (capacity larger than 150 pounds) is between 15-30 years. Most laundry service facilities reported an average dryer useful life of about 30 years. OPL facilities in prisons reported an average dryer useful life of 20 years. Table 5 lists the brand of dryers reported by facility staff interviewed by the project team.

**Table 5 Brand of OPL Dryers Found from Survey**

Ajax	CLM	Huebsch
American Dryer	Consolidated Laundry Machinery	Milnor
American Dryer Corporation	Continental	Speed Queen
Braun	Grantham	Unimac
Challenge	Heubes	Wascomat
Cisell		

## 5.2 OPL Market Sector Characteristics

During phone interviews, facility staff provided general information about their facilities, which offers insight into the operation of OPLs. This information is summarized below.

### 5.2.1 Hotels and Motels

The project team surveyed both independent and chain hotel and motels and found no differences in laundry service arrangements between the two. It is common for hotels and motels to have both in-house and outsourced laundry services. The majority of facilities launder towels on-site and send bedding to a laundry service facility. Hotels and motels have clearly defined laundry service schedules, which are usually between 9 AM to 10 PM. They may also offer coin-operated or free residential style washers and dryers for guests (not included in the market characteristics analysis).

### 5.2.2 Health Clubs

The project team surveyed both independent and chain health clubs. All health clubs surveyed do all of their laundry on-site; that is, if they have laundry needs at all, usually providing towel service. A small fraction of health clubs also provided laundry services to customers for personal clothing.

### 5.2.3 Nursing Homes

Most nursing facilities reported high occupancy rates. The majority of nursing homes did most personal clothing on-site and outsourced linens to industrial facilities. On-site dryers were reported to be operated all day from early morning to late afternoon. Nursing home facilities have the oldest working dryers of all OPL market sectors.

### 5.2.4 Prisons and Jails

Prisons are the only market sector with steam dryers of large capacities (>400 pounds), perhaps for high-temperature sanitization purposes. Dryer operating hours depend on personnel staffing in these OPLs. In many cases, staff worked four ten-hour days per week. Certain OPLs in state prisons also provide laundry services for hospitals.

### 5.2.5 Laundry Services Companies

Laundry service companies have the largest capacity dryers of all market sectors. Because dryers, along with washers, are the primary production equipment for these businesses, laundry companies have the most frequent use of dryers compared to other OPL market sectors. For the same reason, facility staff of this market sector are the most knowledgeable of dryer type and operational status in their facilities. This market sector also had the largest variety of linens serviced, as shown in Table 4. Dryers are commonly operated following well-developed guidelines that provide temperature settings and cycle times according to linen type.

### 5.2.6 Dry Cleaners

Most dry cleaners use a wet press method, in which dampened clothes are pressed wet and dried without using a dryer. Dryers are only for certain linens and, therefore, used infrequently.

### 5.2.7 Universities and Colleges

Commonly, university and colleges provide laundry services within their respective departments. The project team contacted multiple departments in sampled universities and colleges, revealing clothes dryer use for campus catering, university housing, on-site hotel facilities, janitorial, health services, and athletics departments. Besides coin-operated dryers used in student dormitories, athletic facilities were the only places where commercial clothes dryers were used. Dryers in athletic facilities are heavily used only during sports seasons. Daily dryer operations varied from school to school based on student population and size of athletic programs. Coin-operated dryers used in student dormitories are classified as multi-family dryers, instead of OPL dryers.

### 5.2.8 Fire Stations

Fire stations commonly have residential dryers and are not heavily used. Some municipalities supply dryers to fire stations and others require the fire stations to purchase their own. Personal clothing, towels, and bedding are the most common types of linens washed and dried; uniforms are washed and then hung for drying.

### 5.2.9 Law Enforcement

The project team learned through phone surveys that the presence of a jail within the police station creates a greater need for laundry services than those without a jail. The majority of police stations without a jail do not have dryers.

### 5.2.10 Hospitals

Hospitals *may* have in-house linen services or laundry departments; however all surveyed hospitals outsource their laundry services. The majority of laundry in hospitals requires special handling and is outsourced to facilities specializing in healthcare laundry services. The project team learned through phone surveys that a California state law requires all state hospitals to outsource laundry services to nearby state prisons. The Prison Industry Authority (PIA) is the entity that oversees these services.

Laundry service companies and prison laundromats are considered industrial applications because they have large-scale laundry production operations which serve other businesses.

## 5.3 Detailed OPL Dryer Distributions

### 5.3.1 Installed OPL Dryers

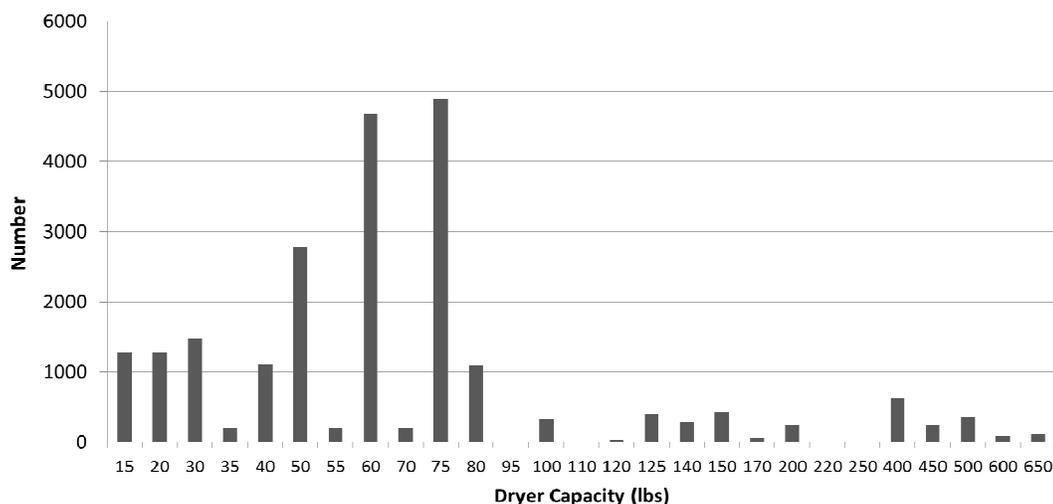
Based on the survey results, the TRC project team estimated the total number of dryers installed in California, for each dryer-capacity category, in each OPL market sector.

First, the project team estimated the number of installed dryers for each OPL market sector. For the facilities that provided complete survey responses, the team calculated the percentage of facilities having OPL dryers, as well as the average number of dryers installed at facilities with OPL dryers. The results for each OPL market sector are shown in Table 4. The project team calculated the total number of installed dryers in each OPL market sector by multiplying the number of facilities in California (Table 1) by the percentage of facilities with OPL dryers and the average number of dryers per facility. The results are shown in Table 6.

Second, project team estimated the distribution of dryers with different weight capacities for each market sector. The team calculated the percentage of installed dryers for each dryer capacity model based on the facilities that provided complete survey responses. With this information, along with the number of installed dryers calculated in the first step, the team calculated the total number of dryers for each weight capacity. The results are illustrated in Figure 1. Table 6 shows OPL dryer distribution in different capacity ranges.

The OPL market survey results indicate there are approximately 22,300 installed OPL dryers in California with an average dryer capacity of 88 pounds. Dryers with a capacity between 50 to 70 pounds have the largest market share of 34%. Dryers with capacities equal to or greater than 400 pounds make up a small portion (about 7%) of the market, and they are found in prisons and laundry service facilities.

Hotels and motels, health clubs, and nursing homes together represent 62% of OPL market in terms of installed dryers with most dryers, having 50, 60, or 75 pound drying capacity. Dry cleaners make up about 17% of OPLs; however, the majority of dryers have a capacity less than 30 pounds. Hospitals and restaurants reported no OPLs, all their laundry services are outsourced to laundry services providers. Of the laundry services companies surveyed, 72% of dryers have a capacity larger than 450 pounds. Additionally, dryers in state prisons make up 7% of installed dryers, 68% of them with a capacity equal to or larger than 400 pounds. The majority of OPL dryers found in prisons are steam dryers and have a capacity between 400 and 650 pounds.



**Figure 1** Number of Installed OPL Dryers by Weight Capacity

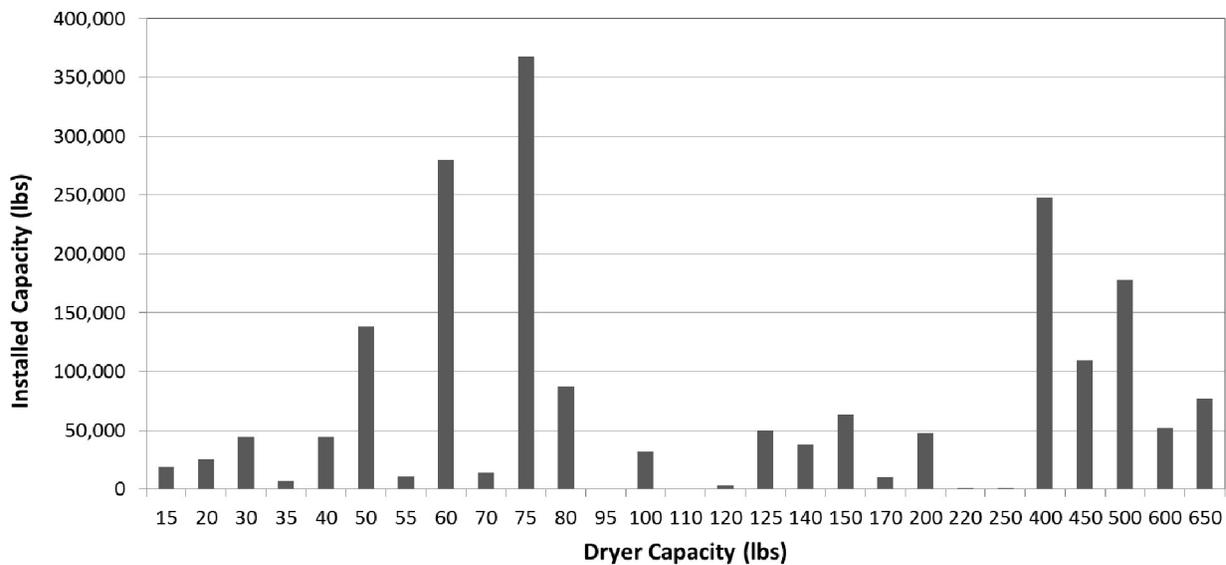
**Table 6 Distribution of Installed OPL Dryers in each Market Sector**

Market Sector	% of Total	No. of Dryers	Dryer Capacity Range (lbs.)								
			<30	≥30 to <50	≥50 to <70	≥70 to <120	≥120 to <220	≥220 to <400	≥400 to <450	≥450 to <600	≥600 to 650
Hotels & Motels	34%	7,614	0%	0%	54%	39%	7%	0%	0%	0%	0%
Nursing Homes	16%	3,587	0%	6%	25%	58%	11%	0%	0%	0%	0%
Health Clubs	12%	2,669	0%	0%	100%	0%	0%	0%	0%	0%	0%
State Prison & County Jails	7%	1,660	0%	0%	0%	7%	25%	0%	36%	21%	11%
Laundry Services Companies	2%	426	0%	0%	0%	6%	16%	2%	7%	62%	7%
Dry Cleaners	17%	3,838	67%	17%	0%	17%	0%	0%	0%	0%	0%
Universities & Colleges	7%	1,660	0%	67%	0%	33%	0%	0%	0%	0%	0%
Fire Stations	4%	835	0%	100%	0%	0%	0%	0%	0%	0%	0%
Law Enforcement	0%	102	0%	0%	0%	100%	0%	0%	0%	0%	0%
Hospitals	0%	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
Restaurants	0%	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>Total</b>		<b>22,391</b>	11%	12%	34%	29%	6%	0%	3%	3%	1%

### 5.3.2 Installed OPL Capacity

Dryer capacities include the consideration of capacity differences between dryer models, and provide a better representation of where and which types of OPL dryers are used in a given market. For each market sector and dryer capacity, the project team calculated the total installed dryer capacity by multiplying the number of installed dryers by the corresponding dryer weight capacity. The results are shown in Figure 2. Table 7 shows the distribution in different capacity ranges for each OPL market sector.

The total installed capacity of OPL dryers is about 2.0 million pounds. In comparison, the Commercial Clothes Dryer CASE study provided an estimated total installed OPL dryer capacity of 1.4 million pounds, which was estimated based on laundry needs assessment for different OPL facilities. There are two concentrations of dryer capacities, one is between 50 and 80 pounds (mostly in hotels and motels and health clubs) and the other is between 400 and 650 pounds (laundry services facilities and prisons). The market shares based on installed capacity for the two groups of dryers are 46% and 34%, respectively.



**Figure 2 Distribution of Installed OPL Dryer Capacity**

**Table 7 Distribution of Installed OPL Dryer Capacity in each Market Sector**

Market Sector	% of Total	Installed Capacity (lb)	Dryer Capacity Range (lbs.)								
			<30	≥30 to <50	≥50 to <70	≥70 to <120	≥120 to <220	≥220 to <400	≥400 to <450	≥450 to <600	≥600 to 650
Hotels & Motels	27%	524,845	0%	0%	42%	44%	14%	0%	0%	0%	0%
Nursing Homes	14%	274,467	0%	3%	17%	59%	22%	0%	0%	0%	0%
Health Clubs	8%	160,150	0%	0%	100%	0%	0%	0%	0%	0%	0%
State Prison & County Jails	31%	611,976	0%	0%	0%	2%	12%	0%	39%	29%	18%
Laundry Services Companies	8%	161,907	0%	0%	0%	1%	6%	1%	7%	73%	11%
Dry Cleaners	6%	111,938	40%	17%	0%	43%	0%	0%	0%	0%	0%
Universities & Colleges	4%	85,767	0%	52%	0%	48%	0%	0%	0%	0%	0%
Fire Stations	1%	25,050	0%	100%	0%	0%	0%	0%	0%	0%	0%
Law Enforcement	0.4%	7,650	0%	0%	0%	100%	0%	0%	0%	0%	0%
Hospitals	0%	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
Restaurants	0%	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>Total</b>		<b>1,963,750</b>	2%	5%	22%	26%	11%	0%	13%	15%	7%

### 5.3.3 OPL Dryer Load Estimates

Dryer energy consumption depends on dryer load size, dryer settings, and daily cycles completed. The project team estimated the daily laundry load of each dryer found at surveyed facilities by multiplying the dryer capacity by the estimated number of daily cycles provided by facility staff. The results were then extrapolated to all OPL dryer populations described in the prior two sections. This approach includes an assumption that dryers are loaded to their capacity during all cycles. Laundry service and prison OPL facilities have well-organized laundry production processes; staff in these facilities informed the project team that their dryers were loaded to capacity. Information on load amount at other facilities was not readily available. Table 4 shows that dryers in hotels and motels, nursing homes, and health clubs have a high number of daily cycles, suggesting that dryers in these market sectors need to have fully loaded cycles to accommodate the busy operation schedules. The analysis results indicate that laundry loads in other market sectors present a small fraction of total OPL market load (with the assumption that all cycles have full loads). These market sectors would have smaller impact to the overall OPL market if average cycle loads are less than capacity.

Figure 3 shows the distribution of total daily load in California in each OPL market sector. Table 8 provides detailed breakdowns of daily loads for different dryer capacity ranges in each market sector and for the entire OPL market.

The estimated total daily load for the OPL market is 30.4 million pounds. Hotels and motels have the largest share of OPL daily load, about 30%, followed by the nursing homes (28%), and health clubs (15%). Dryers located in prisons and laundry services facilities, which are considered to be industrial scale dryers, represent 39% of the total installed OPL capacity (Table 7), but represent 15% of total OPL daily load. This is because they have less average daily operation hours than dryers in hotels and motels, nursing homes, and health clubs. The rest of the market sectors represent less than 10% of the total OPL market daily load.

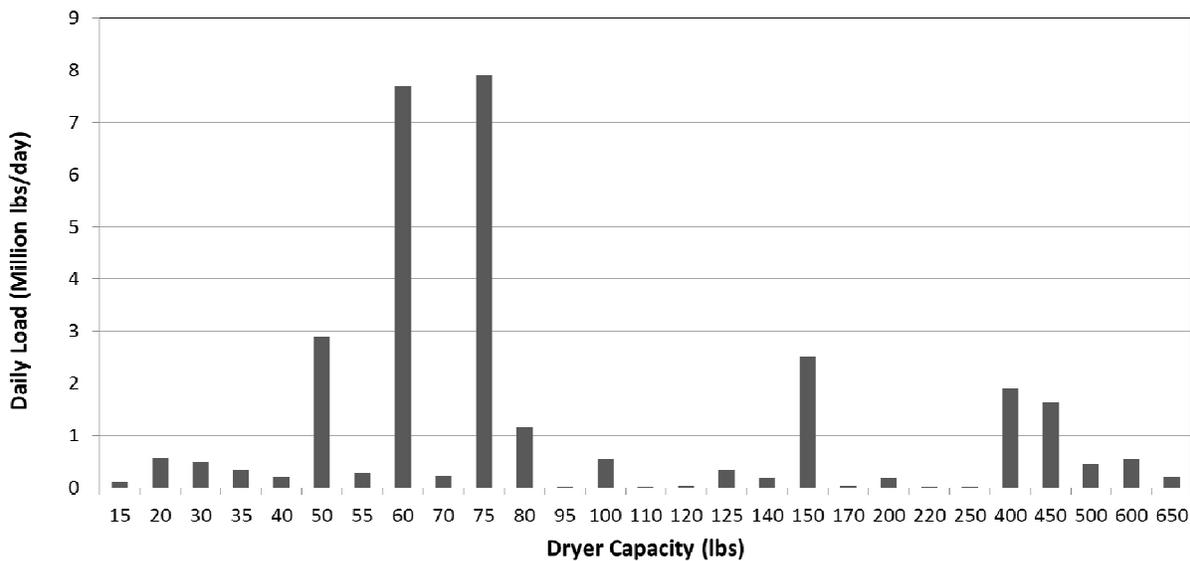


Figure 3 Distribution of OPL Dryer Daily Load

**Table 8 Distribution of Daily Laundry Load in each Market Sector**

Market Sector	% of Total	Daily Load (million lb)	Dryer Capacity Range (lbs.)								
			<30	≥30 to <50	≥50 to <70	≥70 to <120	≥120 to <220	≥220 to <400	≥400 to <450	≥450 to <600	≥600 to 650
Hotels & Motels	30%	9.11	0%	0%	53%	42%	5%	0%	0%	0%	0%
Nursing Homes	28%	8.64	0%	4%	17%	51%	28%	0%	0%	0%	0%
Health Clubs	15%	4.52	0%	0%	100%	0%	0%	0%	0%	0%	0%
State Prison & County Jails	9%	2.65	0%	0%	0%	2%	9%	0%	62%	17%	11%
Laundry Services Companies	8%	2.53	0%	0%	0%	1%	5%	1%	11%	65%	18%
Dry Cleaners	7%	2.14	31%	20%	0%	49%	0%	0%	0%	0%	0%
Universities & Colleges	2%	0.73	0%	27%	0%	73%	0%	0%	0%	0%	0%
Fire Stations	0.2%	0.075	0%	100%	0%	0%	0%	0%	0%	0%	0%
Law Enforcement	0.03%	0.0077	0%	0%	0%	100%	0%	0%	0%	0%	0%
Hospitals	0%	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
Restaurants	0%	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>Total</b>		<b>30.4</b>	2%	3%	36%	32%	11%	0%	6%	7%	2%

Annual laundry loads were estimated by considering the daily loads and days of operation per year. It is assumed OPLs in hotels and motels and nursing homes operate year round. Additionally, OPLs in health clubs operate year round, excluding the ten federal holidays. OPLs in all other OPLs are assumed to operate on weekdays excluding ten federal holidays. The estimated total OPL annual laundry load is 10,100 million pounds as shown Table 9.

**Table 9 Annual OPL Laundry Load**

Market Sector	Operation Days per Year	Annual Laundry Load (Million lbs.)	% of Total
Hotels & Motels	365	3,324	33%
Nursing Homes	365	3,154	31%
Health Clubs	355	1,606	16%
State prison & County Jails	251	665	7%
Laundry Services Companies	251	635	6%
Dry Cleaners	251	536	5%
Universities & Colleges	251	184	2%
Fire Stations	251	19	0.2%
Law Enforcement	251	2	0.02%
Hospitals	NA	0	0%
Restaurants	NA	0	0%
<b>Total</b>		<b>10,125</b>	

### 5.3.4 Annual OPL Dryer Shipment and Laundry Load

Estimation of annual OPL dryer shipment is based on total OPL dryer stock and dryer useful life. As explained in section 4.1, the market survey indicated that useful lives for OPL dryers are between 15-30 years. Large dryers tend to have longer useful life likely because they are considered to be a large equipment investment and, therefore, are better maintained. Based on survey findings, the project team assumed dryers with capacities less than 120 pounds have a useful life of 15 years. While dryers with capacities equal to or larger than 120 pounds, but less than 400 pounds, have a useful life of 20 years; dryers with capacities equal to or larger than 400 pounds have a useful life of 30 years. Along with the dryer stock estimates presented in Figure 1, it is estimated that 1400 OPL dryers are sold per year in California. The breakdown of annual shipments into different dryer capacity range is shown in Table 10.

**Table 10 Annual OPL Dryer Shipment**

Total Annual Shipment	Dryer Capacity Range (lbs.)								
	<30	≥30 to <50	≥50 to <70	≥70 to <120	≥120 to <220	≥220 to <400	≥400 to <450	≥450 to <600	≥600 to 650
<b>1400</b>	171	185	510	435	71	0	21	21	7