

Proposal Information Template – Commercial Clothes Dryers

2008 Appliance Efficiency Standards

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CONTENTS

Purpose	1
Background	1
Methodology	4
Analysis and Results	4
Recommendations	5
Bibliography and Other Research	6
Appendices	6

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Purpose

This document is a report template to be used by researchers who are evaluating proposed changes to the California Energy Commission's (Commission) appliance efficiency regulations (Title 20, Cal. Code Regs., §§ 1601 – 1608) This report specifically covers commercial gas and electric clothes dryers.

Background

Commercial gas and electric clothes dryers which are tumble-type dryers are used at coin laundries and on-premises laundries. In California, annual energy consumption by this type of appliance is estimated to be 43 million therms of gas and 545 GWh of electricity. Currently, there are no federal or California standards that regulate the energy performance of commercial clothes dryers. This proposal recommends the CEC to adopt Title 20 test and performance standards to improve the average efficiency of commercial gas and electric clothes dryers sold in California.

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Overview

<p>Description of Standards Proposal</p>	<p>The proposed Title 20 standards for commercial gas and electric clothes dryers are in general following the framework of the DOE standards for residential clothes dryers. The proposed Title 20 standards include improved test procedures to define proper test loads for commercial applications and modifications to better address the energy efficiency characteristics of automatic termination technologies. The proposed tier one performance standards will be at least equivalent to the federal standards for residential clothes dryers. The tier two minimum standards would be equivalent to performance levels that are achieved with some of the well developed automatic termination control technologies.</p> <p>At a minimum, we suggest the adoption of a “test and list” type of measure which would encourage manufacturers to be more conscious of energy efficiency and enable consumers to choose the more efficient products.</p> <p>Residential and commercial dryers use very similar technologies. There should be little technical difficulty to adopt Title 20 test procedures that are similar to residential clothes dryer federal standards. Residential clothes dryer manufacturers have developed products that are in compliance with the federal standards for more than ten years. The industry is ready for more stringent performance standards.</p>
<p>California Stock and Sales</p>	<p>There are approximately 0.2 – 0.3 million commercial clothes dryers installed in California, mainly at coin operated laundries and on premise laundries. About 70% of the installed dryers are gas dryers and 30% of them are electric dryers. Annual sales of new commercial dryers are estimated to be about 17,000 units in California in 2007, with a growth rate of 3% per year.</p>
<p>Energy Savings and Demand Reduction</p>	<p>The proposed Title 20 standards could increase the average efficiency of new commercial gas and electric clothes dryers by 10% - 15%. For gas clothes dryers, the average annual energy savings would be about 31 therms/unit. For electric dryers, the average annual energy savings would be about 730 kWh /unit. First-year energy savings associated with annual new dryer sales in California are estimated to be 0.37 million therms and 4.6 GWh, as well as 0.46 MW demand reduction. After entire stock turnover, annual energy savings in California are estimated to be 5.5 million therms, 69 GWh, and 7.0 MW.</p>

<p>Economic Analysis</p>	<p>Price differences between manual (timer) controlled models are small and not directly correlated to product efficiencies. Models with electric controls, including automatic termination controls, are about \$100 more expensive. Dryers with automatic termination controls are 10% -15% more efficient than models with simple timer controls. For gas dryers, the associated reduction in energy bills is about \$20/year and for electric dryers it is about \$98/year. Therefore, the payback period for high efficiency gas dryers is about 5-6 years and less than 2 years for high efficiency electric dryers. The present values of net benefit for high efficiency commercial gas and electric dryers are estimated to be \$166 and \$1071, respectively.</p>
<p>Non-Energy Benefits</p>	<p>Automatic termination control technologies are also preferred for drying delicate fabric materials, because exposure times to high-temperature environments are reduced and over-drying can be avoided. Stringent Title 20 commercial clothes dryer standards can also reduce green house gas emissions in California.</p>
<p>Environmental Impacts</p>	<p>The proposed Title 20 standards have no adverse impacts to the environment nor indoor air quality.</p>
<p>Acceptance Issues</p>	<p>Energy efficient technologies, such as automatic termination control, have been widely used and accepted in residential applications for more than ten years. Most manufacturers have already incorporated these technologies into some of their commercial products. These technologies are reliable and readily available.</p> <p>Timer based termination control is still widely used for coin operated dryers, due to the belief that the time of operation should be determined based on what the customer pays; even though the required time for drying is independent of the time of operation and could be considerably shorter. What consumers really desire is the quality of service, having their clothes completely dried, not the time of service. Automatic termination control technologies can provide the quality of service with potentially shorter time and less waste of energy. The adoption of proper Title 20 standards could facilitate the market transition towards more energy efficient practices.</p>
<p>AB 1109 (California Lighting Efficiency and Topics Reduction Act) <i>[Not applicable]</i></p>	<p>The proposed Title 20 code changes are not related to AB 1109.</p>

<p>Federal Preemption or other Regulatory or Legislative Considerations</p>	<p>DOE is not regulating energy performance of commercial clothes dryers and has no plans to regulate this category of appliance in near future. The proposed standards are not at risk of federal preemption and will not interfere with other federal or local regulations or legislations. DOE is in the process of updating the federal standards for residential clothes dryers. The establishment of proper standards for commercial dryers could potentially contribute to the improvement of federal standards for residential dryers and to achieve more energy savings in California.</p>
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Methodology

The SoCalGas/ SDG&E/SCE codes and standards (C&S) program team conducted market and technical studies to develop the Title 20 code update proposal for commercial gas and electric clothes dryers.

Commercial gas or electric clothes dryers are cabinet-like appliances designed to dry fabric in a tumble-type drum with forced hot air circulation. Commercial gas clothes dryers are mainly used at coin operated laundries and on-premise laundries. The former is comprised of two segments, the coin-op laundries (also called laundromats) and coin operated laundries located in multi-family housings. According to Coin Laundry Association (CLA), these two segments have almost the same market size. On premise laundries include the ones at hotels and motels, restaurants, nursing homes, schools, fire departments, etc. It is estimated that there are about 0.2-0.3 million commercial dryers in service in California. About 70% of them are gas dryers and 30% are electric dryers. Useful life for a typical commercial dryer is about 15 years. Therefore, about 17,000 commercial dryers are replaced every year with new ones. In average, commercial dryers are operated with 3-4 cycles per day, which is much more frequent than that of residential clothes dryers. Average energy consumption is about 0.17 therms per cycle for gas dryers or 5.0 kWh per cycle for electric dryers.

Traditionally, drying cycle time is controlled by a timer, set by the user. Timer control is easy to implement, however, timers usually makes a user to operate the machine for longer time than necessary. Not only will it leads to extra energy consumption, but also cause over-drying of clothes. Automatic cycle termination control technologies can greatly improve cycle energy efficiency. Temperature sensing control determines termination time by monitoring exhaust temperature. Humidity sensing control determines termination time by monitoring humidity inside the drum. In average, they can provide 10% - 15% efficiency improvement, compared to the timer control. Both technologies have been widely used in residential, as well as commercial dryers. Other advanced proprietary technologies have also been developed. For example, one technology determines dry time based on automatic load estimation. Models with advance electronic controls are about \$100 more expensive than models with manual timer controls.

Analysis and Results

Based on the preliminary market study, commercial gas and electric dryers consume about 46 million therms of gas energy and 570 GWh of electricity per year in California. There is a wide belief that the variation in efficiency for commercial clothes dryers in the market is small

therefore, the actual performance statistics will be further assessed through product testing as part of the SoCalGas/ SDG&E/SCE C&S program. Automatic cycle termination control technologies could reduce 10% -15% energy consumption by eliminating unnecessary drying time. A DOE's study also indicated that about 10% energy savings can be achieved for residential clothes dryer by improving the current standards. Therefore, it is estimated that 10% -15% energy savings can be achieved with new Title 20 standards for commercial gas and electric clothes dryers. For gas dryers, the associated average annual energy savings would be about 31 therms/unit. For electric dryers, the average annual energy savings would be about 730 kWh /unit. The corresponding average energy bill reduction for gas dryers is \$20/year and \$98/year for electric dryers, assuming the cost of natural gas is \$0.65/therm and the cost of electricity is \$0.14/kWh. The payback time for high efficiency gas dryers is about 5-6 years and less than 2 years for high efficiency electric dryers. A life cycle cost analysis indicates that consumers would have positive net benefits for using high efficiency models (see the Appendix Life Cycle Costs Analysis Results).

First-year energy savings associated with annual new unit sales in California are estimated to be 0.37 million therms in gas energy, 4.6 GWh in electricity, and 0.46 MW in demand reduction. After entire stock turnover, annual energy savings in California are estimated to be 5.5 million therms, 69 GWh, and 7.0 MW.

Recommendations

The proposed Title 20 measures for commercial gas and electric clothes dryers include both the test procedures and minimum performance standards.

We recommend the adoption of the current federal test standards for residential clothes dryers as Title 20 commercial dryer test standards, with modifications to accommodate larger dryer capacities associated with commercial applications and to differentiate performance of different advanced control strategies. The federal test standards defines only two test loads, 3.0 lb for compact size dryer load and 7.0 lb for standards size test load. Commercial applications have a much larger capacity range, from smaller ones that are equivalent to standard residential dryers to larger ones of 400 lb capacity. We recommend that the test load for commercial dryers be same as the manufacturer specified nominal load. Federal test procedures used *field use factor* to differentiate the efficiency difference between timer control and sensor based automatic termination controls. As the same *field use factor* is defined for both temperature and humidity monitoring technologies, performance difference between the two cannot be differentiated. Benefits from other control technologies cannot be adequately addressed either. We recommend that the field use factors be estimated based on test results.

The federal standards measure residential clothes dryer efficiency in terms of energy factor, which is, pounds of clothing per kWh energy. For residential gas clothes dryers, consumed gas energy is converted from Btu to kWh. The minimum energy factor rating for gas dryers is 2.67 and for standard size electric dryer is 3.01. We recommend that Title 20 commercial gas and electric clothes dryers use the same performance metric. At a minimum, the federal performance requirements for standard size residential dryers should be adopted for commercial clothes dryers. The final standards will be developed and proposed based on results of further product testing.

Bibliography and Other Research

DOE report, *Rulemaking Framework Document for Residential Clothes Dryers and Room Air Conditioners*, DOE October 27, 2007

DOE report, *2002 Priority Setting for Standards and Test Procedure Rulemakings under Existing Legislation DOE*, October 30, 2001

[CLA] Coin Laundry Association 2008, Industry overview,
<http://www.coinlaundry.org/resources/industryoverview.cfm#dandb#dandb>

[CEE] Consortium for Energy Efficiency 2008, Commercial, family-sized clothes washer initiative, <http://www.cee1.org/com/cwsh/cwsh-main.php3>

[MLA] The Multi-housing Laundry Association 2008,
<http://www.laundrywise.com/AboutMLA.html>

Appendices

Life Cycle Costs Analysis Results

Appliance	Design Life (years)	Annual Energy Savings	Present Value of Energy Savings*	Incremental First Cost	Consumer Net Present Benefit**
High Efficiency Commercial Gas Dryers	15	31 therms	\$266	\$100	\$166
High Efficiency Commercial Electric Dryers	15	730 kWh	\$1171	\$100	\$1071

Discount rate is assumed to be 3%

* Present value of energy savings over the life of the appliance

** Consumer Net Present Benefit = Present Value of Energy Savings - Incremental First Cost.

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Attachments: CEC APPLIANCE MEASURE_Proposal_Commercial Clothes Dryers v1.doc

Please find the attached Title 20 proposal for Commercial Gas and Electric Clothes Dryers.

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