# APPLIANCE STANDARDS ENFORCEMENT TESTING AND INTERVENTION STRATEGIES

## Final Report on Appliance Standards Compliance Enforcement Strategies

CONSULTANT REPORT

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# Table of Contents

**Acknowledgements** ..... i

**Table of Contents** ..... iii

**Table of Figures** ..... iv

**Abstract** ..... vii

**Executive Summary** ..... 1

**CHAPTER 1: Market Survey Summaries** ..... 3

Workplan ..... 3

Summary of Findings ..... 4

**CHAPTER 2: International Appliance Standards Enforcement Summary** ..... 13

Workplan ..... 13

General Findings ..... 13

Enforcement Mechanisms ..... 18

**CHAPTER 3: California Appliance Standards Enforcement Recommendations** ..... 53

Workplan ..... 53

Summary of Title 20 regulations ..... 54

Current Enforcement Efforts ..... 55

Alternative Appliance Standards Enforcement Strategies ..... 57

**CHAPTER 4: Prioritized Enforcement Efforts** ..... 71

Tipping Point Concept ..... 71

Agents of Change for Compliance ..... 72

Prioritized Compliance Enforcement Recommendations ..... 73

Short-Term (Immediate) ..... 73

Medium-Term ..... 75

Long-Term ..... 77

Enforcement Strategy Matrix ..... 78

**Glossary** ..... 79

## Table of Figures

Figure 1: Survey List of Noncompliant Torchieres ..... 5
Figure 2: Summary of On-line Survey Effort - Commercial hot food holding cabinets ..... 9
Figure 3: Summary of Catalog Survey Effort - Commercial hot food holding cabinets ..... 9
Figure 4: Summary of On-line Survey Effort - Commercial range tops ..... 10
Figure 5: Summary of Catalog Survey Effort - Commercial range tops ..... 10
Figure 6: Summary of On-line Survey Effort - Commercial convection ovens ..... 11
Figure 7: Summary of Catalog Survey Effort - Commercial convection ovens ..... 11
Figure 8: Summary of On-line Survey Effort - Refrigerated canned/bottled beverage vending machines 12
Figure 9: Summary of Catalog Survey Effort - Refrigerated canned/bottled beverage vending machines 12
Figure 10: Summary of On-line Survey Effort - Refrigerators without doors ..... 12
Figure 11: Summary of Catalog Survey Effort - Refrigerators without doors ..... 12
Figure 12: Appliances Covered by MEPS Australia ..... 22
Figure 13: Appliances under Consideration for MEPS (Australia) ..... 22
Figure 14: Appliances requiring Energy Label (Australia) ..... 22
Figure 15: Australian White Goods Audit Findings (2004) ..... 25
Figure 16: Australian White Goods Audit Findings for Air Conditioners (2005) ..... 26
Figure 17: List of Equipment Requiring Registration ..... 27
Figure 18: List of Equipment Test Standards ..... 27
Figure 19: Australia Checktest Results 2005-2006 ..... 29
Figure 20: Top Runner Program Target Value Schematic (courtesy ECCJ Website) ..... 31
Figure 21: Top Runner Program Target Value Rationale (courtesy ECCJ Website) ..... 32
Figure 22: Original Top Runner Program Targets (2000) (courtesy ACEEE 2006 paper) ..... 32
Figure 23: Sample Voluntary Energy Savings Label (courtesy ECCJ Japan) ..... 34
Figure 24: Products Covered by EnerGuide Label in Canada ..... 37
Figure 25: Sample EU Energy Efficiency Label ..... 40
Figure 26: Stand-by Consumption Reduction in TVs and VCRs through NAs in EU ..... 42
Figure 27: Reduction in Low Efficiency Motors in EU through NAs ..... 43
Figure 28: Energy Consumption by Appliances in Europe 1990-2004 ..... 49
Figure 29: Current Saturation of A and A+ Appliances by Country in EU-15 ..... 50
Figure 30: Share of EU Freezer Sales by Class in 2004 ..... 51

# Abstract

This report summarizes work done under Contract Agreement No. 400-05-021 between the Energy Commission and the Heschong Mahone Group, Inc (HMG). The report summarizes the results of several appliance market surveys and provides recommendations for appliance standards compliance enforcement to the Energy Commission Appliance Program.

The standards enforcement recommendations are based on reviews of appliance standards enforcement strategies used by other regulatory agencies around the world, and market surveys of selected appliances sold in California.

The report prioritizes recommendations based on their immediate need, and the amount of time and effort needed to implement the recommendations.



**Keywords:** Appliance, standards, enforcement, recommendations, Title 20

# Executive Summary

The California Energy Commission Appliance Efficiency Regulations[1], since 1977, have required manufacturers of specified types of appliances to certify the performance of their products to indicate that they comply with minimum performance standards. The Energy Commission undertakes enforcement efforts to verify whether the manufacturers and retailers are meeting the requirements of the standards and labeling requirements. These efforts include surveys of appliances that are being offered for sale to identify appliances being sold illegally, and tests of appliances to determine whether manufacturers' claims of performance are correct.

This report summarizes work done under Contract Agreement No. 400-05-021 between the Energy Commission and the Heschong Mahone Group, Inc (HMG) through seven separate but related work authorizations (WA):

- WA#1: Kick-off meeting.
- WA#2: Survey of appliances sold on-line or through catalogs, and, in retail/wholesale outlets.
- WA#3: Survey of other standards and labeling programs.
- WA#4: Survey of other standards and labeling programs.
- WA#5: Survey of appliances sold on-line or through catalogs, and, in retail/wholesale outlets.
- WA#6: Analysis of intervention strategies best suited for California Appliance Program.
- WA#7: Final Report - This report is the deliverable for WA#7.

Findings from WA#2 and WA#5 are summarized in Chapter 1 of this report. Findings from WA#3 and WA#4 are summarized in Chapter 2. Findings from WA#6 are summarized in Chapter 3, while Chapter 4 provides summary recommendations.

[1] California Code of Regulations, Title 20, Sections 1601 – 1608.

# CHAPTER 1:
# Market Survey Summaries

## Workplan

The Heschong Mahone Group, Inc. (HMG) conducted surveys on a prioritized list of appliances regulated by the Appliance Efficiency Standards, as part of the Contract. These surveys covered the following tasks:

- Conduct survey of appliances sold on-line or through catalogs.
- Conduct survey of appliances sold in retail/wholesale outlets.

The purpose of the surveys was to determine characteristics of appliances offered in their respective markets and the extent of "noncompliant" appliances sold in the marketplace. The term "noncompliant" includes models whose performance fails to comply with performance standards, design standards, labeling requirements, and listing requirements.

Prioritized appliances studied for the surveys included:

- Torchieres
- Residential exhaust fans
- Whole-house Fans
- Under-Cabinet Luminaires
- Metal Halide Luminaires
- Residential Pool Pumps
- Residential Portable Spas
- Commercial Hot Food Holding Cabinets
- Commercial Range Tops
- Commercial Convection Ovens
- Refrigerated Canned/Bottled Beverage Vending Machines
- Refrigerators Without Doors (for beverages)

For each appliance, the following items were presented in the reports:

- A market overview explaining the supply delivery chain for each appliance from manufacturer to consumer.
- Summary of survey results and overall findings.

# Summary of Findings

The project deliverables for the surveys included the following documents:

- "Draft Appliance Enforcement Market Report 040207.doc"
- "VentilationFans.xls"
- "UnderCabinetLuminaires.xls"
- "WA5 Retail Wholesale Report 03172008.doc"
- "WA5 Internet and Catalog Report 03172008.doc"
- "WA5_Online_Surveys.xls"
- "WA5_Catalog_Surveys.xls"

These survey documents have already been provided to the California Energy Commission.

### *Torchieres*

Torchieres not meeting the design efficiency standards listed in the Code of Federal Regulations were found in both retails store locations and on-line websites. There were two lamp design types among the noncompliant torchieres:

- Lamps requiring a 300 W halogen bulb.
- Lamps requiring more than one bulb in the reflector.

The survey results indicated a lack of knowledge of and/or compliance with the regulated federal design standard and a failure to comply with the labeling requirement. None of the lamp floor models examined contained the necessary labeling.

Due to the continued availability of noncompliant torchieres, the Energy Commission should contact major retailers and manufacturers informing them of the regulations for lamp products sold in California. In addition, collaboration with manufacturers should occur to determine if the labeling requirement is necessary and, if so, the most efficient means in including the labeling requirement on all their products.

The following table provides the survey results of noncompliant torchieres. The blank cells in the table indicate no information was available on the surveyed units.

## Figure 1: Survey List of Noncompliant Torchieres

| Product Name | Model No. | Listed Max. Wattage | Design Max. Wattage | Unit Label (Y/N) | Package Label (Y/N) | If Target, DPSI | SKU |
|---|---|---|---|---|---|---|---|
| Home Floor Lamp - Antique Rust | | 1-300 | | N | N | 071-02-2165 | |
| Home Floor Lamp - Walnut Finish | | 1-300 | | N | N | 071-02-2164 | |
| Home Floor Lamp - White | | 1-300 | | N | N | 071-02-2166 | |
| Lamp with Reading Light | 7504-22 | 2-150, 1-60 | | N | N | | 79891975 |
| Piedmont Combo Torchiere | 7202 | 2-150, 1-60 | | | | | |
| Brushed Steel and Chrome Twist Torchiere Floor Lamp | 31992 | 1-300, 1-35 | | | | | |
| 3-in-1™ Design Contemporary Torchiere Floor Lamp | 18028 | 2-100, 2-40 | | | | | |
| 3-in-1™ Design Contemporary Bronze Torchiere Floor Lamp | 87903 | 2-100, 2-40 | | | | | |
| Halogen Torchiere Floor Lamp with Adjustable Side Light | 93712 | 1-300, 1-50 | | | | | |

### *Residential Exhaust Fans*

Surveys conducted by the authors indicates that the data the Energy Commission needs for the certification of exhaust fans is readily available in a format that can be readily imported into the Energy Commission's appliance database.

Due to the large amount of data gathered, the compiled directory is provided as a MS Excel document, accompanying the report. The file name for the document is "VentilationFans.xls". There are two worksheets in the document: "Manufacturers," which provides the manufacturer contact data, and "Ventilation Fans," which is the compiled directory.

Although no official testing or standards are in place, many large companies voluntarily go through Home Ventilating Institute (HVI) testing for market recognition. Their testing is done in an independent lab, and they offer their own certification program. The following is a list of government agencies or organizations that have adopted HVI testing:

- U.S. Department of Housing and Urban Development
- U.S. Department of Energy - Bonneville Power Administration
- National Building Code of Canada
- R2000 Housing Program – Canada
- Washington State Building Code
- Minnesota State Building Code
- Building Officials and Code Administrators International (BOCA)
- International Conference of Building Officials (ICBO)
- National Electrical Manufacturers Association

The authors recommend the Energy Commission adopt HVI testing. Collaborations with HVI should be completed to collect the required product data and establish a mechanism in which the certified product directory is entered into the Energy Commission appliance database.

The market for residential exhaust fans are established and mature enough to warrant a set of standards within the state. Although electrical specifications do not exist for all of the products

listed in the results, enough technical information is released by manufacturers to at least begin development of a standard, similar to the EnergyStar® product rating for ventilating fans.

### *Whole-House Fans*

Survey results showed that whole-house fan energy consumption data is also available through the Home Ventilating Institute, and this information is generated by testing in independent testing laboratories.

The market for whole-house fans is relatively small. Large manufacturers and retailers do not support whole-house fans, leading to poor mainstream availability. The niche market for whole-house fans is more active, but the volume of fans sold is not high enough for larger corporations to invest in. Big box retailers treat whole-house fans as a commodity, but smaller companies are starting to differentiate their products with multiple fans, temperature controls, ducting and other features.

Due to these market factors, large manufacturers have no incentive to release more information on their products. Whole-house fans are advertised as an energy efficient alternative, but their efficiency relative to each other is unknown.

The authors recommend the Energy Commission adopt HVI testing as the whole-house fan market grows. Collaborations with HVI should be completed to collect the required product data and establish a mechanism in which the certified product directory is entered into the Energy Commission appliance database.

### *Under-Cabinet Luminaires*

Due to the large amount of data gathered, the compiled directory is provided as a MS Excel document, accompanying the report. The file name for the document is "UnderCabinetLuminaires.xls".

Few manufacturers consistently use one specific ballast in a fixture, and many manufacturers use a number of different ballast manufacturers at any one time. For this reason, it is very difficult to determine which under-cabinet luminaire products are non-compliant.

The authors have identified four companies that provide the majority of ballasts that are installed in under-cabinet luminaires. These include:

- Advance Transformer Company (Advance)
- General Electric Company (GE)
- Universal Lighting Technologies (Universal)
- Fulham Inc. (Fulham)

There is low awareness of Title 20 Appliance Efficiency Regulations. All manufacturers and distributors involved in the study confused the Title 20 Appliance Efficiency Regulation with the lighting requirements in Title 24 Standards. Many manufacturer websites have information

on Title 24 and even contain hyperlinks to Title 24 section on the Energy Commission website. Alternatively, information about Title 20 was nonexistent. There was little awareness of specific code requirements for lighting, let alone under-cabinet luminaires. Few representatives expressed concern that that their fixtures may not comply.

There seems to be a degree of "passing the buck" about Title 20 compliance of under-cabinet light fixtures in California. Every individual had a different opinion of who should be aware of or should enforce the California standards. The manufacturers do not provide support to keep their California lighting representatives informed about the state's regulation.

Specifiers, contractors, and purchasers of under-cabinet luminaires do not request ballast information for the products they buy. Most individuals (on all levels of the supply chain) do not seem to think it is important to keep ballast information for under-cabinet luminaires on file.

A large number of non-compliant ballasts are available in the international and national market. Of these non-compliant ballasts, a large number are those with the highest ballast wattage. There is no mention of any form of labeling of under-cabinet luminaires that do not comply, but could be adversely affected by "electronic lamp ballast electromagnetic radiation." None of the individuals interviewed knew the details of the under-cabinet luminaire requirements for California code, thus, no individual had heard about the labeling of sensitive products.

The Title 20 requirement in its current form is difficult to enforce for the reasons discussed above, that is, distributors do not know what ballast is installed in the under-cabinet luminaires they sell.

### *Metal Halide Luminaires*

At first glance, the Title 20 Appliance Regulations for metal halide luminaires seem straightforward. However, there is still a great deal of confusion in the market as to what this really implies, especially at the distributor level.

Many of the people interviewed at distributors had never heard the word "probe" in reference to a metal halide fixture or metal halide lamp. In most cases, people referred to "standard" (that is, probe start) and "pulse-start" metal halides. Some individuals had not even heard the term "pulse-start" before participating in the interviews.

Many expressed the view that pulse-start lamps and fixtures are "the future," and some understood that pulse start fixtures are the only type of vertical fixtures that should be sold in the state of California between 150 and 500 W. The majority of the people surveyed, however, were not aware that probe start (standard) fixtures between 150 and 500 W are no longer standard and should not be sold.

Those who were aware that probe start fixtures were no longer code-compliant were often confused about under what circumstances probe start *lamps* were compliant (in reality, only for replacement in existing metal halide probe start fixtures, not for "retrofit").

The main finding of this study is that probe-start luminaires are still commonly being sold by distributors in California, and there is a very low level of awareness in the market (especially among distributors) of the changes to Title 20.

### *Pool Pumps*

Pool pump motors not meeting the design efficiency standards listed in the California's Appliance Efficiency Regulations are still available for use in pool pumps. Interviews with pool pump manufacturers revealed that their companies do not specify whether the pool pump motors, which they purchase from U.S. Electric Motor, meet the California Appliance Efficiency Regulation. However, they indicated that their current pool pump product lines and future pool pump product lines rarely use the specific noncompliant motor types and are focusing on more efficient motor designs, such as switchless products. Noncompliant motor types seem to be used mostly for replacement issues. In addition, the regulation on pool pump motor type was not widely known. In comparison, the 2008 requirement for two-speed capability was mentioned by all respondents.

Similar to issues found with the luminaire appliances discussed in this report, the pool pump motor requirement deals with both pool pump and motor manufacturers, and responsibility for compliance requires cooperation from both parties. Collaboration with market actors should occur to determine the most efficient means in insuring compliance.

### *Portable Electric Spas*

The study initially focused on finding spas with non-compliant wattage ratings. During the interview and research process, the authors have found manufacturers to be reluctant in releasing technical details. A rule of thumb found within the industry states that if the spa is greater than 500 gallons, it will be exceedingly difficult to comply.

Many manufacturers do not publicly state whether their products comply with the code outlined by the state. Market pressure and stimulus from the regulatory commission may be necessary to start the portable electric spa industry toward uniform compliance. The authors conducted an interview with a representative from the Association of Pool & Spa Professionals. This representative informed the authors that his association has provided data on stand-by power consumption to the Energy Commission and Pacific Gas and Electric, although this data does not identify specific makes and model numbers.

The authors conducted an initial market survey of portable spas sold in California. However, due to lack of manufacturer data on performance, the authors could not determine whether the products sold in the state comply with the appliance regulations. A consensus of whether portable electric spas comply with California's Appliance Efficiency Regulations could not be determined at this time. The reluctance of manufacturers to release technical information to the public along with the current distribution channels makes obtaining pertinent material difficult for the end user. Most end users will have a contractor install their spas, and it is questionable whether the efficiency of these products is taken into account. The portable spa market may not

be mature enough to support energy-efficient portable electric spas. Lack of demand is reflected in the market by a lack of larger companies producing this niche product.

### *Commercial Hot Food Holding Cabinets*

California's Appliance Efficiency Regulations requirements are identical to U.S. EPA Energy Star requirements for hot food holding cabinets. Identifying compliant models was straightforward by looking for an Energy Star label. Although compliant models were easily found, no labels were found specifically expounding California requirements.

The survey results indicated a lack of knowledge of and/or compliance with the state data submittal requirements. Idle energy consumption rates were not found from any manufacturers surveyed. Measured internal volumes were listed by a few manufacturers, but the industry standard is to measure volume by rack capacity. For the average consumer, calculating energy efficiency based on the information provided would be difficult.

While several retail outlets had hot food holding cabinets in their catalogs and websites, only a few had them on display in showrooms. In the 10 retail locations surveyed, the authors found seven units. Of those that did have them on display, very little information was available on the appliances. In one case where an item was unmarked, the salesman claimed that he had no record of it being in the store. Below are summary tables of the authors' on-line and catalog survey efforts.

**Figure 2: Summary of On-Line Survey Effort – Commercial Hot Food Holding Cabinets**

| | |
|---|---|
| Units Surveyed | 367 |
| Manufacturers Surveyed | 10 |
| Sources Surveyed | 10 |

**Figure 3: Summary of Catalog Survey Effort – Commercial Hot Food Holding Cabinets**

| | |
|---|---|
| Units Surveyed | 129 |
| Manufacturers Surveyed | 12 |
| Sources Surveyed | 3 |

### *Commercial Range Tops*

The survey results indicated a lack of knowledge of and/or compliance with the state data submittal requirements. Cooking energy efficiency and test cooking vessel dimensions were not

found from any manufacturers surveyed. For the average purchaser of commercial range tops, calculating energy efficiency based on the information provided would be difficult.

Based on the information gathered, for the average gas burner, energy use would depend more on customer behavior than the range top chosen. Manufacturers design most burners to consume the same amount of fuel. The various selling points for range tops currently on the market are based on functionality and quality and leave little room for energy efficiency. Newer technology such as induction ranges may be able to change the market through cooking functionality and energy efficiency.

There was a wide variety of ranges found at many outlets with a few brand names dominating the market. In the 10 retail location surveyed, the authors found 85 units. The ranges on display usually indicated the rate of energy used. However, model numbers rarely matched, that is, a certain model number found on the manufacturer's nameplate would have small variations in the store's catalog. Surveyors excluded griddles, grills, and char-broilers because they generally were not used to transfer heat to a vessel. Below are summary tables of the on-line and catalog survey efforts.

**Figure 4: Summary of On-Line Survey Effort – Commercial Range Tops**

| | |
|---|---|
| Units Surveyed | 269 |
| Manufacturers Surveyed | 11 |
| Sources Surveyed | 10 |

**Figure 5: Summary of Catalog Survey Effort – Commercial Range Tops**

| | |
|---|---|
| Units Surveyed | 480 |
| Manufacturers Surveyed | 26 |
| Sources Surveyed | 3 |

### *Commercial Convection Ovens*

The survey results indicated a lack of knowledge of and/or compliance with the state data submittal requirements. Of all the manufacturers surveyed, only Garland submitted required data to the California Energy Commission's Appliance Database. Idle energy consumption rates were not found from any manufacturers surveyed.

It is likely that advanced controls and moisture sensors save some energy compared to base models, but more research is needed to quantify the energy savings. Although gains in yield for rated capacity are claimed by some manufacturers, information regarding these claims is hard to verify.

Energy efficiency concerns for convection ovens are starting to increase and at least one manufacturer has created its own brand for energy efficiency. Garland's Enerlogic label, a manufacturer specification for its energy efficiency units, is based on various energy standards in use (such as Energy Star), and an appliance designated with this label will meet one of the standards.

Surveyors found convection ovens in several retail outlets with a broad range of brand names. In the 10 retail locations surveyed, the authors found 45 units. Some stores clearly displayed model numbers and the rate of energy usage, but none showed capacity. However, surveyors could often determine interior volume using information from specification sheets. Below are summary tables of the on-line and catalog survey efforts.

**Figure 6: Summary of On-Line Survey Effort – Commercial Convection Ovens**

| | |
|---|---|
| Units Surveyed | 141 |
| Manufacturers Surveyed | 4 |
| Sources Surveyed | 10 |

**Figure 7: Summary of Catalog Survey Effort – Commercial Convection Ovens**

| | |
|---|---|
| Units Surveyed | 60 |
| Manufacturers Surveyed | 12 |
| Sources Surveyed | 3 |

### *Refrigerated Canned/Bottled Beverage Vending Machines*

An on-line survey reveals a large variety of vending machines, but few significant differences between models; many models differ only in the sign on the front of the machine (Pepsi, Coca-Cola, and others). Specification sheets usually indicate a machine's dimensions, weight, and capacity (number of bottles or number of cans). However, they rarely clearly address energy usage; thus the authors believe that manufacturers and customers do not consider this relevant information.

Surveyors found only one vending machine outlet with a warehouse open to the public. At this location, the authors found 19 units. The nameplates on the machines had little more than model numbers, but the store had an on-line catalog listing its products and explaining how they were refurbished. Specifications indicated can or bottle capacity, which varied even by units with the same model number. There were some other specifications included, but nothing that addressed California regulations. Below are summary tables of the on-line and catalog survey efforts.

**Figure 8: Summary of On-Line Survey Effort – Refrigerated Canned/Bottled Beverage Vending Machines**

| | |
|---|---|
| Units Surveyed | 51 |
| Manufacturers Surveyed | 7 |
| Sources Surveyed | 7 |

**Figure 9: Summary of Catalog Survey Effort – Refrigerated Canned/Bottled Beverage Vending Machines**

| | |
|---|---|
| Units Surveyed | 1 |
| Manufacturers Surveyed | 1 |
| Sources Surveyed | 1 |

### *Refrigerators Without Doors (for Beverages)*

The on-line survey revealed a wide variety of refrigerators without doors. The majority of surveyed units did not provide information about the type of lighting used. However, those that did provide the information clearly state that a certain model uses T-8 fluorescent lamps. The Internet survey found only one small reference to a model that did not comply with California code.

Surveyors found only one refrigerator without a door at a retail outlet as noted in "WA5_Store_Surveys.xls". Other than the model number, there was no information on this appliance. Below are summary tables of the on-line and catalog survey efforts.

**Figure 10: Summary of On-Line Survey Effort – Refrigerators Without Doors**

| | |
|---|---|
| Units Surveyed | 112 |
| Manufacturers Surveyed | 10 |
| Sources Surveyed | 10 |

**Figure 11: Summary of Catalog Survey Effort – Refrigerators Without Doors**

| | |
|---|---|
| Units Surveyed | 24 |
| Manufacturers Surveyed | 3 |
| Sources Surveyed | 3 |

# CHAPTER 2:
# International Appliance Standards Enforcement Summary

## Workplan

This chapter summarizes work done under Contract Agreement No. 400-05-021 between the Energy Commission and the Heschong Mahone Group, Inc. (HMG) on surveys of other standards and labeling programs. This task was to conduct an Internet/e-mail and/or telephone survey of other entities (worldwide) with requirements for appliance testing, certification, and compliance with specific efficiency standards as a condition of selling their appliances within certain geographic areas. The intent was to report on how manufacturers, distributors, and other sellers are notified of the requirement for testing and certification, proper labeling and marketing of the certified efficiency, and proper withholding of non-complying models from the entity's area of jurisdiction; and to provide a summary of each entity's analysis (if available) of the success or failure of manufacturer and/or distributor cooperation.

## General Findings

Regulatory agencies around the world are getting more aggressive with their energy efficiency goals and thus increasing the stringency of regulations on energy performance and labeling of appliances. The most commonly used regulatory instrument for all the entities studied for this report are appliance labeling, followed by minimum performance standards for appliances. Labeling requirements are often used as a "foot in the door" for more stringent performance requirements later on. Each jurisdiction/country has its unique set of business environment, consumer awareness of energy efficiency, and regulatory environment.

This section first discusses some overarching issues that were repeatedly brought up during the telephone conversations and e-mails, and in the reports and papers mentioned in this document. After discussion of the general findings, the authors explain findings by each country where they could get significant data or where interviews were completed.

In writing these findings, the authors have assumed the reader is familiar with types of appliance standards regulations such as labeling, testing, mandatory requirements vs. voluntary requirements; enforcement strategies such as market studies, independent product testing, fines and other civil penalties. However, the authors include a quick overview of these in the text below.

### *Types of Appliance Regulations*

There are two major types of appliance efficiency regulations used in most of the countries around the world – performance standards and product labeling. Within each there are several

variations and supporting regulations that enable the implementation and enforcement of these regulations. Below is a quick introduction to some of these regulations.

**Minimum Energy Performance Standards (MEPS)**

In this type of a regulation, the regulatory entity sets a minimum energy performance threshold for each appliance category that is manufactured or sold in its territory. The minimum performance threshold is based on metrics of energy performance developed through careful analysis of existing market technologies, stakeholder participation, and regulatory goals for improvements in energy efficiency.

**Product Certification Requirements**

Under these regulations, manufacturers are required to certify that the appliance(s) they manufacture, assemble or sell within the jurisdiction of the regulatory agency meets the appliance performance regulations.

These certification requirements often work as a subset of and in support of MEPS.

**Product Testing and Verification**

For products that have MEPS or labeling requirements and where manufacturers are required to certify their products, the regulatory authority often requires testing of products in certified, independent testing laboratories. This is to ensure the accuracy of manufacturer claims and to provide a level playing field and common test procedures for all manufacturers' products.

**Product Labeling**

In this type of regulation, the manufacturer and retailer is required to attach a label and supporting documentation with each appliance covered by the labeling requirement. This label provides information on the energy efficiency of the appliance.

Often, these labels also indicate how the given appliance rates against other appliances in the market, or against some common performance thresholds established by the regulatory entity. An example of this is the U.S. EnergyGuide label that provides the energy use of the equipment on scale from least efficient to most efficient. The European Union (EU) label is in the form of an energy rating between A (most efficient) to G (least efficient) along with a kWh/yr consumption number for the appliance. Such labeling requirements do not eliminate the manufacturing and sale of the least efficient appliances, but hope to achieve that goal through education of the customers and through the loss of competitive advantage for the manufacturers and retailers of these least efficient appliances.

As with MEPS, products that are required to meet the labeling requirements can have certification and testing requirements.

### *Mandatory vs. Voluntary Regulations*

Both the labeling requirements as well as the requirements for minimum energy performance standards can be mandatory (required by law) or voluntary (commitment by industry or negotiated agreement between industry and regulatory agency).

Manufacturers and retailers often support the voluntary approach of setting goals for themselves or negotiating an agreement with the regulatory agency on performance thresholds to be met voluntarily.

For the regulatory agencies, the option of creating voluntary vs. mandatory standards is often dictated by the regulatory powers available to the agency, its relationship with manufacturers/retailers, the strength and inclination of the industry groups toward energy efficiency, and the legislative goals set by the government in charge.

While voluntary regulations are easier to negotiate due to agreement of all parties, there is the concern of manufacturers/retailers not meeting their commitments due to various business reasons other than lack of technology improvement.

Mandatory regulations require a lot more rigor and analysis to establish so that the requirements meet the goals of the government, and at the same time ensure that industry groups cooperate with the setting of the regulations and their enforcement.

In either scenario (voluntary or mandatory) effective monitoring is critical to finding out how well the regulations are being complied with.

### *Enforcement Strategies*

There are numerous strategies used by agencies around the world to ensure compliance with appliance efficiency regulations, but these can be roughly divided into positive reinforcement (carrot approach) or negative consequences (stick approach). There are also informational resources that support both these approaches.

Informational resources usually include:

- Publications of standards and supporting documents (getting the word out).
- Appliance database(s).
- Basic performance labeling requirements.
- Reporting forms and procedures for manufacturers and retailers.

The carrot approach usually involves:

- Positive publicity in government websites, newsletters .
- Labels touting good performance that manufacturers or retailers can use to promote their efficient products (e.g. Energy Allstars, Energy Star).
- Compliance credits in code – this is often used for emerging efficient technologies to promote their market adoption.
- Financial incentives for efficiency improvements such as tax credits.
- Procurement policies by government agencies.

The stick approach usually involves:

- Negative publicity through government newsletters (e.g. Australia and Japan).

- Market studies to understand nature and extent of non-compliance.
- Targeted inspections of retailers/manufacturer facilities.
- On-the-spot fines for small infractions found during inspections.
- Third-party product testing to verify manufacturer/retailer stated energy performance of appliances.
- Inspection of energy efficiency documentation by customs officials during import checks.
- Formal notices of non-compliance to manufacturer/retailer.
- Civil lawsuits if the manufacturer/retailer does not respond to formal notices.
- Impounding non-compliant appliances.
- Financial penalties through civil lawsuits or negotiated settlements, or mandatory penalties.

### *How Implementation Strategies Affect Enforcement of Regulations*

A number of people interviewed during the study emphasized that good enforcement cannot be done without a good process of standards development and implementation that is inclusive and transparent and has backing from all stakeholders. Having all stakeholders – especially manufacturers – participate in the standards development and implementation process is seen by the interviewees to be the key to ensuring higher compliance. It is the contention of these interviewees that when a level playing field is created through appropriate test standards and incentives for better performance, manufacturers will often police each other. As one of the interviewees noted, there should not be a hard separation between implementation and enforcement efforts, and often a good implementation plan that is developed through stakeholder participation and commitment wins half the enforcement battle.

An example of this is the United Kingdom (UK), where the appliance labeling requirements are being implemented and enforced through a partnership with industry and publicly funded independent agencies such as the UK Market Transformation Program and the UK Energy Trust.

Like in the case of Australia and Canada (similar to California), having a robust central database of appliances including make and model numbers available to the public and the retailers helps keep all stakeholders informed about compliant products. The same database can also be used by customs and border agents (such as in Canada) to keep non-approved equipment out of the market by denying entry.

### *Role of International and Inter-State Cooperation on Enforcement*

The rapidly changing nature of the commodity market and the supply chains of most appliance manufacturers mean that, for almost all countries, a majority of their appliances are imported and not domestically manufactured. China, Japan, and to some extent Korea are the exceptions in that they are increasingly becoming bases for manufacturing. One of the theories for

standards development and enforcement, as seen through the experience of European Union (EU) and the Asia-Pacific Economic Cooperation (APEC) countries, encourages joint standards development across international borders to create sufficient market force for change in appliance efficiency. Australia, for example, often works with other countries in Asia to improve the energy standards in these Asian countries that are often the manufacturing base for appliances sold in Australia. The Asian countries follow Australia's lead in promoting efficiency as part of their standards implementation and enforcement strategy due to the active role played by Australia in negotiating international cooperation on Australia's own energy efficiency standards and labeling programs. If more countries share similar requirements, there is greater incentive for manufacturers to follow the law. In some cases like China, which is emerging as a manufacturing hub, greater energy efficiency inside the country can have an equally big impact on energy efficiency in other countries that import equipment manufactured in China.

On the U.S. national level, due to weak federal standards, many other states are emulating California's appliance regulations. As mentioned later in this report, several states have set up a mechanism to piggyback on California's certification requirements. Thus, standards development in California helps develop standards for several other states. While this may seem like a disadvantage in terms of resource allocation for California, having a larger market where the same labeling requirements are in effect increases the incentive for manufacturers to follow the standards. The possibility of being penalized in multiple states for non-compliance in California is sure to influence decisions by manufacturers (and even retailers who sell in multiple states).

### *Role of Test Standards on Enforcement*

To enforce appliance standards and labeling requirements, it is critical that the testing procedures used in developing these standards and labels are continually updated to account for newer technologies and improved understanding of equipment operation. If the test standards are viewed as being cumbersome (too onerous) or irrelevant (too old to account for technological improvements), then there is more incentive for manufacturers and retailers to sell non-compliant equipment.

On the other hand, there can be technological improvements that can allow equipment to circumvent the intent of the test procedures and thus the standards/labeling requirements. If the test standards are not updated regularly, then the chance of equipment that meets the letter of the law but in practice uses more energy than allowed increases. An example as seen in Australia and explained in more detail in this report, one manufacturer was found to have exploited a loophole in the existing test standards for refrigerators that allowed it to claim lower energy consumption than what the product actually consumed.

Another aspect to the test standards is the metric used to define compliance with the underlying standard/labeling requirement. In the case of Japan, the test standards are indexed to the size of equipment and generally allow greater energy consumption for larger equipment. Basing the

test standards on energy use intensity (such as kWh/sf of screen size of monitors, or kWh/ton of air conditioning) instead would not allow higher power consumption in this larger equipment.

Developing and continually monitoring test standards against appliance efficiency improvements are a key measure to ensure a level playing field for all manufacturers and to keep the test standards relevant as technology improves. Surely, this process is neither a simple nor a fast method of ensuring compliance. However, in the absence of updating test procedures in response to technology development, incentives to find loopholes in the test procedures increase.

### *Role of Continuous Proactive Market Studies/Surveys in Enforcement*

This finding dovetails with the previous finding about test standards. Without an active enforcement effort that includes proactive market-level studies (market intelligence) and targeted inspections, it is often not possible to catch loopholes in the appliance standards or systemic abuse of the standards. In the case of Australia, for example, the offending refrigerators were independently tested (testing was commissioned by the government, but carried out by an independent testing facility) and found to be non-compliant as a result of their ongoing enforcement efforts.

Continuous and methodical market studies and third-party product testing greatly improve compliance rates as evidenced by Australia in its aptly titled policy report "When You Keep Measuring It, You Know Even More about It!." Third parties are often independent testing laboratories such as Underwriters Laboratories (UL), consumer advocacy groups, and other government-approved testing laboratories that are not affiliated with any particular manufacturer or manufacturer association. In Canada and Australia, government approved laboratories conduct third-party testing.

Most enforcement agencies have limited budgets to conduct enforcement activities, and the number of products to be regulated increases every year. The Australian example, discussed later in this report shows that the key to a good enforcement mechanism is to target the enforcement efforts by collecting information from various sources (retailer surveys, selective product testing, manufacturer data) about those appliances and retailers/manufacturers that are suspected of non-compliance. Developing such market intelligence involves cooperation from manufacturers associations, retailers, and consumer groups. In the case of Germany, for example, one of the interviewees noted that the consumer magazines such as *TEST* are often the most active supporters of standards enforcement and conduct independent testing as part of their consumer awareness efforts.

## Enforcement Mechanisms

### *United States*

California plays a pivotal role in developing appliance standards and testing requirements in the United States. In the absence of federal initiatives for greater appliance regulation and

increased efficiency levels, California requirements play the role of setting reference standards for other U.S. states, and often for the federal government as well.

**Multi-State Standards Adoption and Certification**

The Appliance Standards Awareness Project (ASAP) is working with a coalition of several states (Massachusetts, Rhode Island, New York, Washington, Oregon and Connecticut are among the first to participate) to accept California's certification requirements for appliances as meeting their state mandates for equipment certification.

These states are required by their respective state laws to gather certification data from manufacturers and generate a list of qualifying equipment that is publicly available. Through the ASAP coordinated effort, these states plan to use California's equipment database as reference for their own list. Oregon, for example, plans to use California's database and certification requirements as meeting its state law. Thus a product certified for California will be deemed to be certified for use in Oregon as well. Others such as Connecticut require a letter from the manufacturer stating that the equipment meets the California standards and certification requirements and that these in effect meet the requirements of the state law in Connecticut. It is important to note that this letter does not need to have the actual performance data and is merely a legal declaration by the manufacturer that they meet the state law.

Most of these six states are required to have their own test protocols, but they have agreed to keep these coordinated with California's protocols for this coalition effort to succeed.

Some states have statutory powers to levy a penalty of about $100-200 per incident where non-complying products are sold in the state. However, most states are resource constrained and therefore tend to have limited resources assigned to active enforcement efforts.

A central database of compliant equipment (similar to that maintained by California) is being shared with these states in their efforts to improve compliance. This gives great leverage for ensuring compliance with California's requirements, since non-compliance in California could trigger fines and penalties in multiple states. Manufacturers actually like this arrangement, since they do certification in only one state (California), and don't have to certify in each state.

There are six other states that have recent appliance labeling and certification requirements, and ASAP is hopeful of getting these other states also involved in this multi-state coalition effort.

**Energy Performance Labeling**

On the federal level, the U.S. Department of Energy (DOE) is in charge of development and implementation of national standards. DOE's program carries out activities in three areas: Labeling, test procedures, and mandatory energy conservation standards.

The Federal Trade Commission (FTC) is required to prescribe labeling rules (Energy Guide) for residential appliances. The DOE and the FTC share responsibility for labeling commercial equipment.

The DOE adopts the test procedures that manufacturers must use to certify that their appliances meet the standards. The test procedures measure the energy efficiency and energy use and

provide an estimate of the annual operating cost of each appliance. Test procedures are typically maintained by industry associations (such as AHRI[2], ASHRAE[3], AHAM[4], CSA America, NEMA[5]) and incorporated by reference into the rules set by the DOE.

The DOE also establishes mandatory federal energy conservation standards to maintain consistent, national energy efficiency requirements for covered appliances and equipment. By law, the DOE must upgrade standards to the maximum level of energy efficiency that is technically feasible and economically justified.

The FTC is largely responsible for initiating legal actions and enquiries into non-compliant equipment and manufacturers. Conversations with an FTC official revealed that the agency prefers to conduct investigations in private and that there is no formal enforcement document. The FTC does have at its disposal means such as warning letters, formal investigations, and in rare cases threats of lawsuits or actual lawsuits. However, in practice, enforcement has been carried out almost exclusively through complaints filed by competing manufacturers who often test each other's equipment to ensure a level playing field. In the personal opinion of the FTC official, the best enforcement strategy is to develop good relations with the industry and follow-up diligently on complaints.

## *Australia*

Australia has aggressive goals for reducing their greenhouse gas emissions, and energy efficiency has been identified as one of the key strategies to achieve this goal.

### Australian Appliance Regulatory Process

Energy efficiency standards for appliances are a joint federal-state effort in Australia. In 1999 federal and state governments adopted the "world's best practices" approach. This policy was aimed at reducing time spent on organic development of the standards over several years. Instead it allowed the federal and state governments to adapt regulations that exist around the world that the governments feel are appropriate for Australia and that they feel would assure highest energy efficiency of equipment in Australia.

Since this 1999 commitment there has been a concerted effort to collaborate on state and national energy efficiency efforts. Australia has both labeling requirements (Energy Rating) as well as Mandatory Energy Performance Standards (MEPS) that are developed through a joint effort of the federal and state governments. This is enabled on the regulatory front through the Ministerial Council on Energy (MCE).

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[2] AHRI: The Air-Conditioning, Heating, and Refrigeration Institute

[3] ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers

[4] AHAM: Association of Home Appliance Manufacturers

[5] NEMA: The Association of Electrical and Medical Imaging Equipment Manufacturers

The Australian constitution gives Australian states clear responsibility for resource management issues, including energy usage and efficiency. Thus the responsibility for ensuring compliance with standards is with individual states. The standards development process, however, is centralized.

The federal government coordinates with the individual states and territories to develop uniform appliance standards and labeling requirements across the country. Following are the key agencies involved in the development and implementation of standards.

- The Ministerial Council on Energy (MCE) was established by the Council of Australian Governments (COAG) in 2001 to deliver the economic and environmental benefits for Australia from implementation of the COAG national energy policy framework.
  The MCE is the national policy and governance body for the Australian energy market, including for electricity and gas, as outlined in the COAG Australian Energy Market Agreement (AEMA) of June 30, 2004.
  The MCE provides the regulatory authority for the activities undertaken by the National Equipment Energy Efficiency (E3) Committee of Australia.
- Australian Greenhouse Office (AGO): The Australian Greenhouse Office (AGO) within the Department of the Environment and Water Resources is the central agency responsible for coordinating the development and implementation of appliance standards and labeling requirements through its chairmanship of the E3 committee.
- National Equipment Energy Efficiency (E3) Committee of Australia: The AGO chairs the E3 Committee. The E3 Committee, consisting of officials from the Commonwealth (Australian federal government), State and Territory government agencies and representatives from New Zealand, is responsible for managing the Australian end-use energy efficiency program. The E3 committee is the venue for collaboration between these agencies and oversees development of energy standards on a national basis. Implementation and enforcement is still the domain of the states, since the Federal government lacks implementation powers in the states. However, enforcement and evaluation efforts between states are coordinated by the E3 committee to ensure uniformity of standards across the country.
- State Governments: The regulations developed through the E3 Committee do not take force unless these are adopted by each of the states and territories through legislation in their respective territories. These individual state legislations reference the national standard developed through the E3 Committee structure.

More details on the regulatory structure are explained on this website: http://www.energyrating.gov.au/admin-guidelines.html. The process for dealing with failures is set out to some degree in the relevant standards but also in these Administrative Guidelines. These guidelines spell out the process and also provide the verification criteria and limits for regulated products. This version is almost four years old and as of the date of this report, the E3 is currently updating these guidelines.

**Current Australian Appliance Regulations**

Australia has both Minimum Energy Performance Standards (MEPS) and labeling requirements.

The Energy Rating website (http://www.energyrating.gov.au) is the official equipment database and information source that lists labeling and MEPS requirements. Currently, there are MEPS for the following appliances:

**Figure 12: Appliances Covered by MEPS Australia**

| | | |
|---|---|---|
| Refrigerators and Freezers | Single and Three Phase Air Conditioners | Linear Fluorescent Lamps and Ballasts |
| Mains Pressure Electric Storage Water Heaters | Distribution Transformers | Commercial Refrigeration |
| Three Phase Motors | | |

Source: http://www.energyrating.gov.au

Products currently being evaluated for revised MEPS and under various stages of regulatory review include:

**Figure 13: Appliances Under Consideration for MEPS (Australia)**

| | | |
|---|---|---|
| Air compressors | Air Conditioners | Electric motors |
| Gas products | Home Electronics and Office Equipment | Lighting (ballasts and lamps) |
| Packaged boilers | Refrigeration (domestic and commercial) | Standby Power |
| Stoves and cooktops | Transformers (distribution) | Water heaters |

Source: http://www.energyrating.gov.au

In addition to the MEPS requirements, there are separate labeling requirements for appliances. Products currently governed by labeling requirements include clothes dryers, clothes washers and dishwashers.

**Figure 14: Appliances Requiring Energy Label (Australia)**

| | | |
|---|---|---|
| Air Conditioners | Clothes Dryers | Clothes Washers |
| Dishwashers | Refrigerators | Freezers |

Source: http://www.energyrating.gov.au

In few cases, both MEPS and labeling requirements apply to a given appliance category such as household refrigerators and freezers and air conditioners.

Australian Standards for products that carry an energy label or that are regulated for MEPS generally have two parts:

- "Part 1" covers the test procedure and ambient conditions such as the test method, performance measures, and test materials.
- "Part 2" contains the detailed technical requirements for energy labeling and Minimum Energy Performance Standards (MEPS) (where applicable), Labeling and MEPS Enforcement.

The process of standards enforcement in Australia is the domain of the state governments, but policies and procedures are developed through national consensus. The E3 committee, federal and state governments coordinate actions on enforcement.

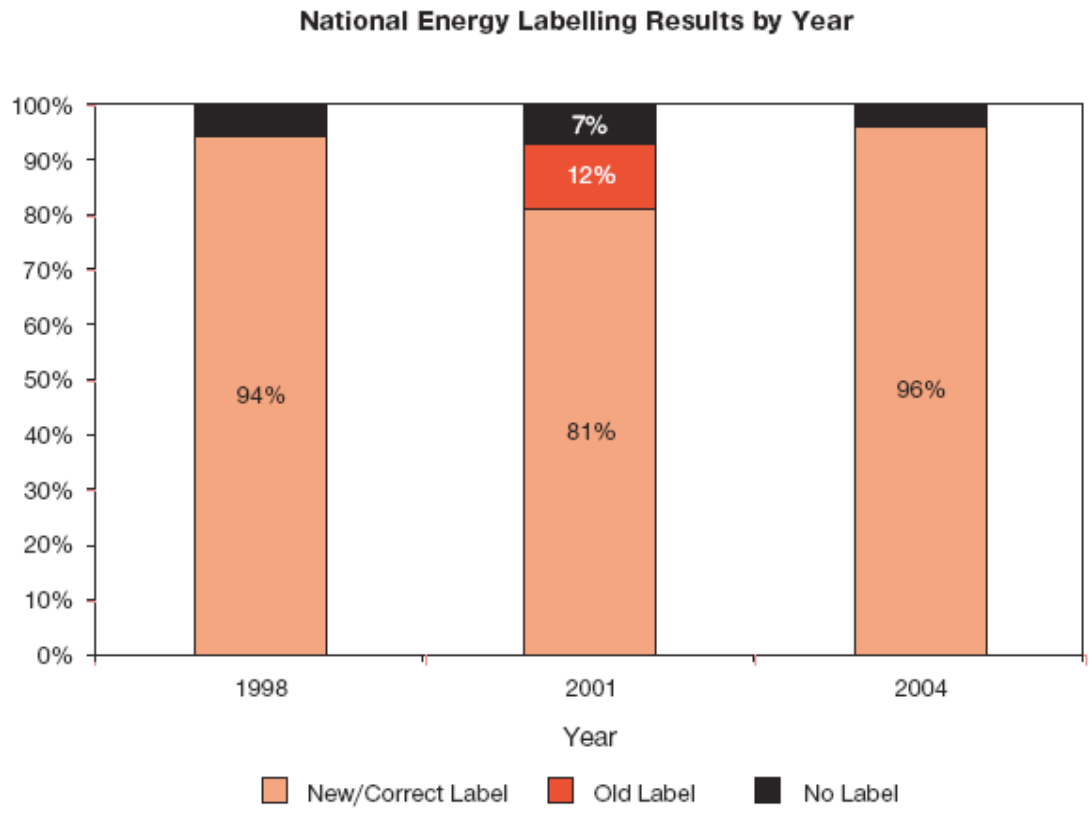
These actions take two forms: Encouragement for highly efficient products (the carrot) and civil actions on non-compliance (the stick). The following is a brief summary of these efforts.

- Encouragement of Compliant Products: The encouragement comes in two forms: Recognition of highly efficient products and engagement of the appliance manufacturers in the standard setting and enforcement process.
    - Energy Allstars Website and Product Database http://www.energyallstars.gov.au
      Energy Allstars is a database and website initiated by state, territory and federal governments and lists the most energy efficient appliances and equipment sold in Australia. It identifies the top 10-25 percent of products in a range of categories including Office Equipment, Household Appliances, Consumer Electronics, Lighting and Commercial Equipment.
      Energy Allstars' eligibility criteria vary by product category and are drawn from several sources including Australia's Minimum Energy Performance Standards (MEPS), U.S. Energy Star criteria, or other thresholds developed through discussions with industry.
    - Partnership With the Industry and Stakeholders: The AGO works in partnership with stakeholder groups to introduce programs that encourage market transformation by promoting highly efficient equipment (see above) or by identifying selected energy efficient products through appliance labeling. Apart from the direct recognition provided by Energy Allstars, the AGO and the E3 committees regularly consult the stakeholder groups including manufacturers, retailers, and other industry experts in developing standards as well as gaining market intelligence on compliance. Often, the manufacturers are allies to the enforcement agencies as the manufacturers police each other's products to maintain a level playing field.
- Enforcement Actions
    - White Goods Audits: National Equipment Energy Efficiency (E3) Committee of Australia has commissioned a series of studies on the national compliance levels of energy labeling in 1998, 2001, 2004, and 2005. A private consulting group (Millward

Brown Asia Pacific) was hired to conduct the studies.
The studies are in the form of a survey of retail outlets selling refrigerators, freezers, air conditioners, dishwashers, clothes washers, and dryers in each of the eight state and territory capital cities and regional areas. The method was to survey all stock on display for sale and to record the number of labeled and unlabeled appliances.
These studies provide an ongoing accurate quantitative assessment of labeling levels for Australia's appliance energy efficiency program. This project was to determine labeling levels with regard to the display of energy labels and to aid government jurisdictions in identifying suppliers at all levels of the distribution chain requiring assistance with their labeling responsibilities.
The latest studies available for review are the 2004 report that covers refrigerators, freezers, dishwashers, clothes washers, and dryers, and a follow-on study in 2005 concentrating on air conditioners.

- Here are key highlights of the 2004 report on refrigerators, freezers, dishwashers, clothes washers, and dryers:
  - Some 373 retailers displaying 35,373 applicable electrical appliances were surveyed.
  - Ninety-six percent of all appliances examined bore the correct energy label, while 4 percent were either unlabelled or displayed a redundant label.
  - The results show an improvement from the levels reached in 1998 (94 percent), and in 2001 (arguably 93 percent, as it measured the transition between two energy labels – 81 percent displaying the new label plus 12 percent still displaying the older style label).

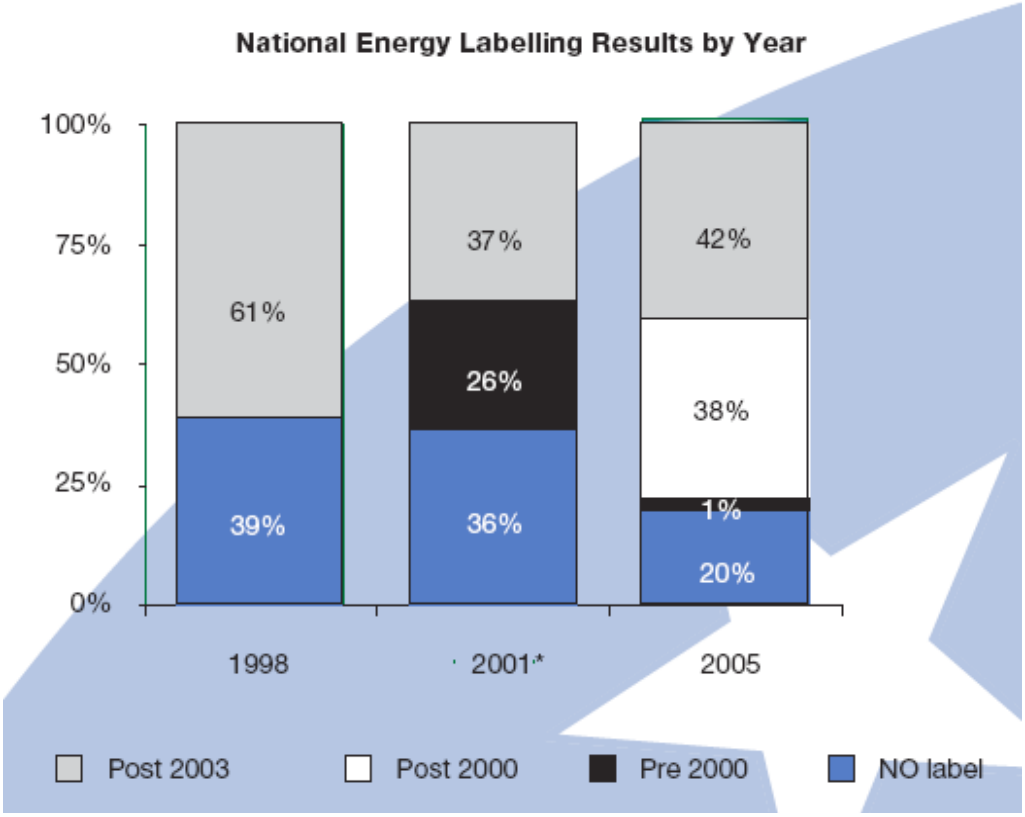
**Figure 15: Australian White Goods Audit Findings (2004)**




Source: http://www.energyrating.gov.au/library/details2005-labelaudit.html

- The 2005 follow-up study concentrated on air conditioner labeling compliance. Key highlights of the audit study are (specific to single phase air conditioners only):
  - One hundred retailers offering for sale 1,554 applicable single phase air conditioners were surveyed.
  - Eighty percent of all appliances examined bore an appropriate energy label, while 20 percent were either unlabeled or displayed a redundant label (an older label no longer considered valid by regulators).
  - The results show an improvement from the levels reached in 1998 (61 percent), and in 2001 (arguably 63 percent, as it measured the transition between two energy labels).
  - The results compare unfavorably with the 96 percent labeling result gained for other major electrical appliances surveyed in 2004, suggesting remedial action is warranted.

**Figure 16: Australian White Goods Audit Findings for Air Conditioners (2005)**




Source: http://www.energyrating.gov.au/library/details2005-labelaudit.html

- These reports are available on the Energy Rating website at - http://www.energyrating.gov.au/library/details2005-labelaudit.html

- Mandatory National Equipment Registration: A range of products are required by law to be registered for energy labeling or MEPS in Australia. Registration applications must be made in the format as prescribed in the applicable Australian Standard (see Figure 7). Such applications must be lodged with any one of four regulators in Australia.
  - Registration is currently available for the following products:

**Figure 17: List of Equipment Requiring Registration**

| | | |
|---|---|---|
| Refrigerators and Freezers (MEPS and Labeling) | Clothes Washers and Dryers (Labeling) | Dishwashers (Labeling) |
| Air Conditioners – Single Phase (MEPS and Labeling) | Air Conditioners – Three Phase (MEPS & Voluntary Labeling) | Ballasts for Linear Fluorescent Lamps (MEPS) |
| Three Phase Motors (MEPS) | Commercial Refrigeration (MEPS) | Linear Fluorescent Lamps (MEPS) |
| Electric Water Heaters (MEPS) | Distribution Transformers (MEPS) | |

**Figure 18: List of Equipment Test Standards**

| | | |
|---|---|---|
| AS/NZS 4474: refrigerator and freezers | AS/NZS 2040: clothes washers | AS/NZS 2442: clothes dryers |
| AS/NZS 2007: dishwashers | AS/NZS 3823: room air conditioners (single phase) | AS/NZS 3823: packaged air conditioners (three phase) |
| AS 1056: electric water heaters | AS/NZS 1359: three phase electric motors | AS/NZS 4783: fluorescent lamp ballasts |
| AS/NZS 4782: fluorescent lamps | AS 2374 & AS 2735: distribution transformers | AS 1731: commercial refrigeration |

- Registration is available on-line through the Energy Rating website, and products registered with and approved by any of the four regulators are considered to be approved for the rest of the country. All the regulators share the same registration system and the on-line registration system is centralized so all application data is in one electronic database.

- Tracking Efficiency Trends Through Sales Data: Since 1993, market data on total sales for refrigerators, freezers, clothes washers, clothes dryers, and dishwashers are purchased by the E3 from a commercial data collection agency (GfK Market Analysis). This commercial sales data records sales volume and price for each model number sold in the market. Every year, a consultant selected by the E3 Committee conducts an analysis of this sales data, which is cross-matched with detailed energy attribute data that is contained in the mandatory government registration system. A report is prepared based on this analysis on the sales weighted energy consumption of equipment which is updated every year. All attributes quoted in this report (such as energy use, rating, capacity and so on) are "sales-weighted" values (that is individual appliance attributes by model weighed in accordance with the sales of the model).

- The latest report is called *"GREENING WHITEGOODS - A report into the energy efficiency trends of Major Household Appliances in Australia From 1993 to 2005"*. It shows an overall decrease in sales-weighted energy consumption of equipment covered by the MEPS and labeling requirements despite increases in the sizes of individual equipment and increase in the size of the market. The report can be accessed at this website: http://www.energyrating.gov.au/library/details200606-greening.html

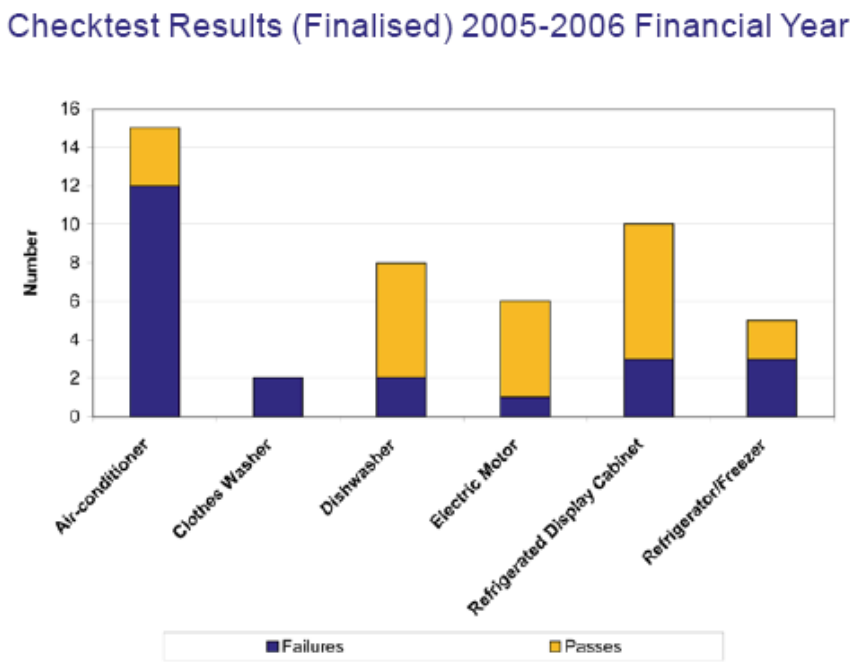
- Australian Competition and Consumer Commission: A memorandum of understanding (MOU) exists between the AGO and the Australian Competition and Consumer Commission (ACCC) to deal with multinational marketers making misleading or false claims. The ACCC is the Australian equivalent of the U.S. Federal Trade Commission (FTC).
  Under this MOU, the AGO can refer to the ACCC any cases of non-compliance by international manufacturers it finds through the various enforcement efforts by the E3 committee and the state agencies.
  One recent example is that of LG, whose equipment was found to be mislabeled and not meeting the MEPS requirements through the Checktesting program explained in the following section. The ACCC investigation found LG to be in breach of the standards, and a settlement was reached with LG for $3 million in addition to corrective actions to be taken by LG to prevent such non-compliance in the future. Details can be viewed in this ACCC newsletter -
  http://www.accc.gov.au/content/index.phtml/itemId/763524/fromItemId/142
- "Checktesting" Program: Australia conducts independent equipment tests through a program called Checktesting run by the E3 committee to provide the community and stakeholders with data on accuracy of the labeling scheme and compliance by suppliers. Appliances are purchased from retail outlets or obtained anonymously and tested in National Association of Testing Authorities (NATA) accredited independent laboratories to verify the claims associated with the energy label for six appliance types and minimum energy performance standards where applicable.
  - The Checktesting process is set out in:
    http://www.energyrating.gov.au/checktest.html

    The criteria for selection of products are also provided here. The following is an excerpt from the website: *E3 has included a check testing program since 1991. From modest beginnings, the national program now tests as many as 100 products per year. As part of the National Greenhouse Strategy, the E3 Committee allocates around a quarter of its budget (in excess of $300,000 in 2002) to conduct checktesting in laboratories and related testing used for standards development and round robins. The E3 Committee measures compliance on a regular basis and benchmarks against overseas results*.

  - As the relatively small budget implies, this is a carefully targeted program. A consultant to E3 interviewed for this report was at pains to point that E3 does not check products unless it has a reasonable suspicion that there may be a failure. E3 uses a wide range of intelligence including a review of registration data and advice

from specialists and competitors. E3 encourages competitor testing and has a close liaison with the Australian Consumers' Association, which tests many products and provide E3 with test reports. In some cases, the E3 committee commissions individual project testing through the consumer association to ensure objective third-party analysis of the tested products.

**Figure 19: Australia Checktest Results 2005-2006**




- State-Level Enforcement and Legislative Powers: States have the legislative authority to launch court actions against store keepers for selling unlabeled whitegood product. Most states have infringement notice powers through state legislations where inspectors can place on-the-spot fines on retailers for unlabeled product. The level of usage of this power varies by state. In the state of West Australia, three such cases resulted in fines between $7,000-10,000 on the storekeeper for selling unlabelled appliances.
  - Links to individual state legislations is provided on the Energy Rating website here: http://www.energyrating.gov.au/reg.html
- Negative Publicity: Negative publicity through government newsletters is probably the best tool the Australian governments have to deal with companies who do not comply. This mirrors similar sentiments expressed about the Japanese appliance standards enforcement by other experts interviewed for this project.
  - Some press releases regarding enforcement actions in recent years are found at http://www.energyrating.gov.au/whatsnew.html#news.
  - E3 Newsletters are periodically prepared by the Australian Greenhouse Office (on behalf of the E3 Committee), and they provide the latest news and information on

energy-efficient appliances and electrical equipment. Current and past newsletters are available here – http://www.energyrating.gov.au/newsletters.html.

- The Energy Rating website's electronic library has a catalog of all reports released over the years (nearly 500) including a wide range of technical studies, regulatory impact statements, and public consultation documents. Some of these documents are included in the companion electronic document database sent with this report. The website is accessible at http://www.energyrating.gov.au/library/index.html.

- Positive Publicity: The same newsletters described above also contrast the non-compliance of certain manufacturers with the good compliance or self-reporting of non-compliance by other manufacturers. For example, the November 2006 issue of the E3 compliance newsletter hails the commitment to appliance standards enforcement by Carrier and Electrolux, while giving front-page publicity to the non-compliance by LG and its subsequent settlement with the ACCC.

### *Japan*

One of the main instruments for encouraging appliance energy efficiency in Japan is the Top Runner Program, which is a sales volume weighted mandatory performance standards process that is explained later in this report.

Japan also has mandatory and voluntary appliance labeling programs as well as initiatives to engage and reward retailers and industries that are most active in appliance energy conservation. The authors will discuss each of the three briefly in the following pages, but first it is important to note the social context of these regulations.

**The "Social Shame" Factor**

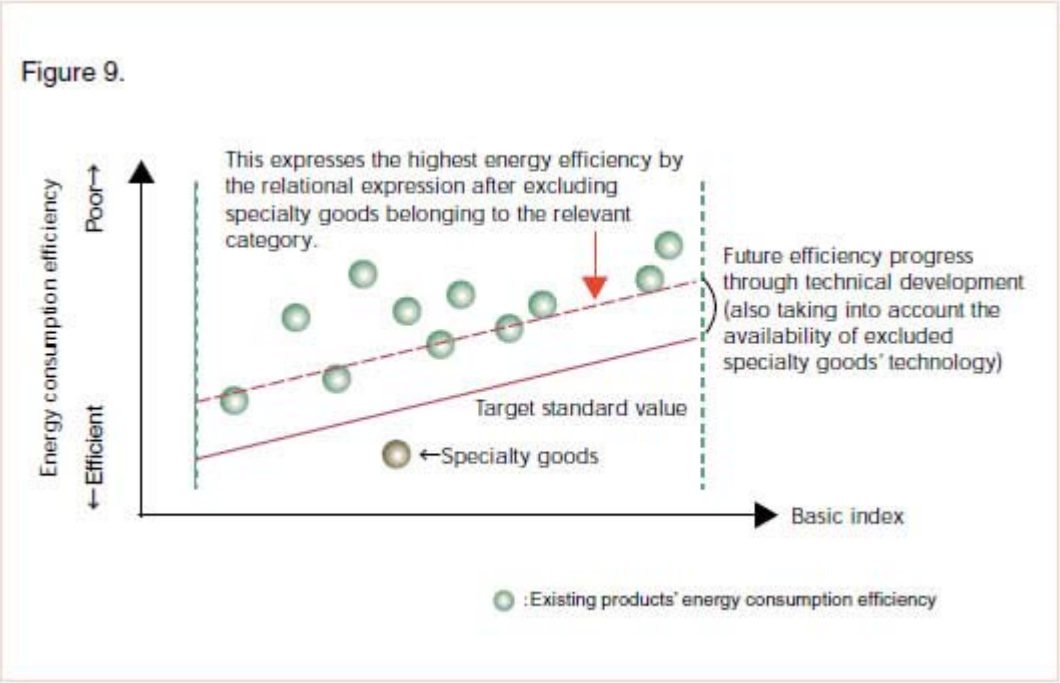
As reviewed through papers and through conversations with the interviewees, one of the main instruments in the hand of policy makers to improve enforcement is to publicly declare names of those manufacturers and retailers that are non-compliant. In Japan, manufacturers place a high value on being or appearing socially responsible and are often competing to maintain that status. Thus, being exposed as non-compliant carries a major sense of "social shame." Since most of Japan's appliances are manufactured in the country, public exposure of non-compliance is a better strategy than penalties or lawsuits for enforcement efforts. It is in this context that programs like the Top Runner program operate and succeed.

**Top Runner Program**

In April 1999, the "Top-Runner Approach" to appliance energy efficiency was mandated by the Japanese government for manufacturers of electric appliances and automobiles. This approach is, in effect, a mandatory minimum energy performance standard that all manufacturers must meet for all covered products, whose annual production and import volumes exceed above a specified amount (for example, 2,000 for passenger vehicles and refrigerators). The standards were determined by a subcommittee that includes academic and research experts, industry associations, and consumer associations by each appliance.

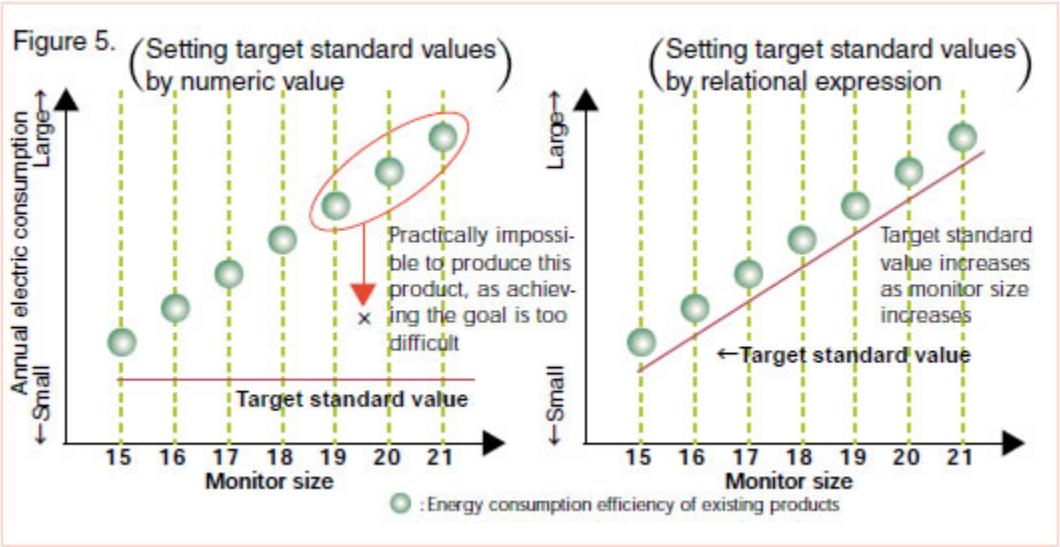
- Setting the Standard:
  The Top Runner Program uses, as a base value, the value of the product with the highest energy efficiency on the market at the time of the standard establishment process. All manufacturers are required to meet the target efficiency value by a certain date (usually 2-4 years from the adoption date) by appliance.
  - While setting the energy efficiency target, potential technological improvements over that 2-4 year period are accounted for. In order to ensure that the requirements are fair and achieve industry support, various criteria are used. First, a base index or metric for efficiency is determined for each product type. In many cases this is the size of the appliance such as monitors and refrigerators. For a given product category energy use for all commercially available equipment is plotted against this base index to define a distribution of energy use by base index (size in this example).
  - The "Top Runner" standard is then determined as the efficiency of equipment that has the lowest energy consumption in each category of the base index, barring specialty or niche products. The concept is illustrated below from charts copied from the Energy Conservation Center of Japan (ECCJ) website.

**Figure 20: Top Runner Program Target Value Schematic (Courtesy ECCJ Website)**




- In most, cases the target value is a sliding scale that changes with the base index as illustrated in the figure below to ensure that it is practically possible for the manufacturers to meet these requirements.

**Figure 21: Top Runner Program Target Value Rationale (Courtesy ECCJ Website)**




- Following is a summary chart from an ACEEE 2006 paper titled "Energy Efficiency Standards for Japanese Appliances" that provides an overview of the program and an evaluation of its success after five years of implementation.

**Figure 22: Original Top Runner Program Targets (2000) (courtesy ACEEE 2006 paper)**

| Product | Standard Levels | Units | Improvement Rate of Energy Efficiency (%) | Target Deadline (Fiscal Year) |
|---|---|---|---|---|
| Automobiles | | | | |
| Gasoline, Passenger Cars | 6.4 – 21.2 | km / l | 22.8 (vs. FY1995) | 2010 |
| Gasoline, Trucks (<2.5t) | 9.3 – 20.2 | km / l | 13.2 (vs. FY1995) | 2010 |
| Diesel, Passenger Cars | 8.7 – 18.9 | km / l | 14.9 (vs. FY1995) | 2005 |
| Diesel, Trucks (<2.5t) | 9.9 – 17.7 | km / l | 6.5 (vs. FY1995) | 2005 |
| Refrigerators | Varies by Volume | kWh / year | 30.4 (vs. FY1998) | 2004 |
| Air Conditioners | | | | |
| Heat Pump | 2.85 – 5.27 | COP* | 62.8 (vs. FY1997) | 2004 (cooling year)** |
| Cooling-only | 2.47 – 3.64 | COP* | 14.6 (vs. FY1997) | 2007 (cooling year) |
| Fluorescent Lights | 49.0 – 86.5 | lm / W | 16.6 (vs. FY1997) | 2005 |
| Televisions | Varies by Screen Size | kWh / year | 16.4 (vs. FY1997) | 2003 |
| VCRs (stand-by power use) | 1.7 – 4.0 | W | 58.7 (vs. FY1997) | 2003 |
| Photocopiers | Varies by Copy rate | Wh / h | 30.1 (vs. FY1997) | 2006 |
| Computers | 0.0065 – 21 | W / MTOPS*** | 82.6 (vs. FY1997) | 2005 |
| Magnetic Hard-disk Drivers | Varies by rpm | W / GB | 78.0 (vs. FY1997) | 2005 |

Source: IEA. 2000. Energy Labels & Standards.
* Coefficient of Performance (COP) = cooling or heating capacity divided by input power.
** The target year of heat pumps except direct blow/wall mounted type (<4 kW) is the 2007 cooling year.
*** Mega operations per second (MTOPS).

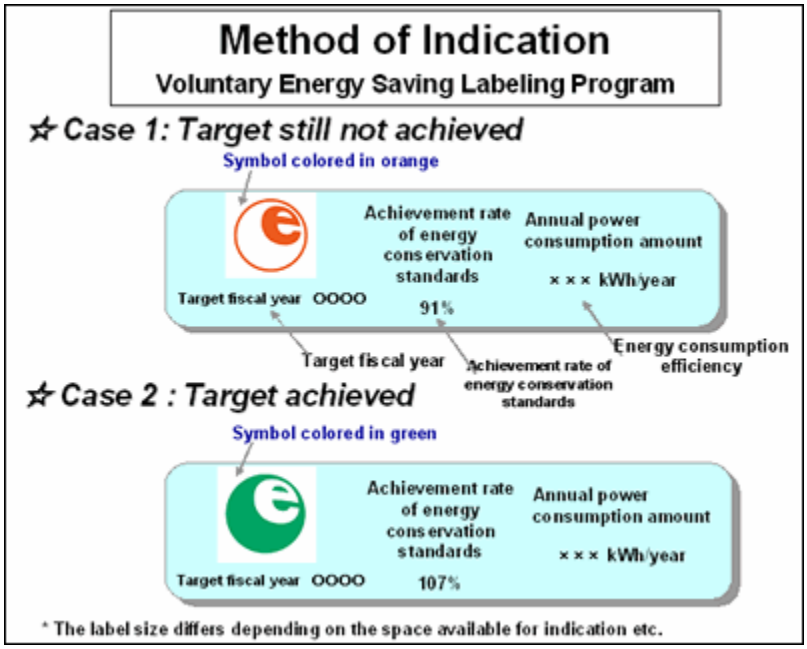
- Enforcement and Tracking Compliance: Manufacturer compliance with the requirements is tracked on the basis of sales volume by appliance.
  - For a given appliance, energy efficiency values for individual appliance models are averaged by sales volumes over a specified period, and the overall sales volume weighted energy efficiency average value is used to compare against the Top Runner target. The idea behind the approach is that, over time, manufacturers will spend more efforts on the manufacturing and marketing of the more efficient models instead of the less-efficient models to meet the Top Runner goals.
  - If a manufacturer is found not to have achieved the target standard values by the target year, the Minister of Economy, Trade and Industry (METI) makes the results public and orders the manufacturer to adopt corrective measures to meet the standard. If such an order is not followed, penalties of a fine usually less than 1 million yen (~$1,000 U.S.) or one-year penal servitude can be imposed. As mentioned in the ACEEE 2006 paper, "Actually, these penalties are quite weak, however, being punished by the government will cause serious damage to a manufacturers' reputation and it will have a bad influence on their business."
  - As explained earlier in this section, bad publicity and being called out as an offender (and thus not a socially responsible company) carries a strong stigma for Japanese manufacturers. So manufacturers have a strong incentive to meet the program goals.
  - Evaluations for the program presented in the same ACEEE paper mentioned above, show as expected or better than expected compliance rates and efficiency improvements in most products.
  - However, the same study also brings up two issues that need to be resolved with the program. The first one according to this paper is the issue of the market moving to larger appliances such as bigger monitors and larger refrigerators. Since the Top Runner program targets are set based on equipment size, there is no incentive for the manufacturer to produce smaller, more efficient units.
  - The second issue is that of trade-off between high efficiency and production cost. It is natural that the manufacturers will expend more resources on appliance sizes and types that have greatest market demand and greatest chance of meeting targets. As the paper notes, in some cases such as for air conditioners, this has helped eliminate less efficient models, since it does not cost much more to produce a more efficient air conditioner. In the case of refrigerators, however, higher efficiency technologies such as inverter control systems and/or evacuated insulation are being applied only to the larger refrigerators, which are more popular and have higher sales volumes. As a result it is not surprising to find some smaller refrigerators using more energy than larger refrigerators. The paper's author is hopeful that these efficient technologies will eventually find their way into the smaller appliances due to the shrinking cost burden to add these measures.

**Energy Saving Program (Labeling Requirements)**

Under the Energy Conservation Law of Japan, labeling of product name, model, energy consumption efficiency, and power/fuel consumption of each designated product is mandatory. But that labeling does not require energy consumption performance of a product to be labeled in terms of a relative comparison with that of other products (or standards such as Top Runner goals).

To provide consumers with information on energy consumption efficiency that is easier to understand, the voluntary Energy Saving Labeling Program was launched on August 21, 2000. The hope was to lead consumers to compare energy efficiencies so that they can select products with higher energy efficiency when making a purchase.

**Figure 23: Sample Voluntary Energy Savings Label (Courtesy ECCJ Japan)**




As of August 2004 (last published list on the source website) there are 13 target products for the voluntary labeling program. Originally, five products (air conditioners, florescent lights, TVs, refrigerators, and freezers) were designated in August 2000, and five more products including space heaters, gas-cooking appliances, gas-burning heaters, oil-burning water heaters, and electric toilet seats were additionally designated in June 2003, and then three more products including computers, magnetic disk units, and transformers were additionally designated in May 2004.

An energy conservation label typically consists of the energy conservation logo in combination with information on target year, achievement rate of energy efficiency standards, and energy consumption efficiency.

The energy conservation logo is orange for a product that doesn't achieve the target standards of energy efficiency, and green for a product that achieves over 100 percent of the target standards.

The "achievement rate of energy efficiency standards" is given as a percentage, indicating how far the product's energy efficiency is improved from the target value. The Ministry of Economy, Trade and Industry (METI) designs the criteria for the voluntary label and is in charge of tracking success of the labeling effort.

**Energy-Efficient Product Retailer Assessment System**

The energy-efficient product retailer assessment system was introduced in FY2003 (the Japanese fiscal year: April 1 – March 31) as a companion to appliance efficiency regulations. This program targeted at retailers, aims to recognize the efforts of those retailers who actively promote energy-efficient products and have high compliance rates with labeling requirements.

As mentioned on the ECCJ website, top "energy-efficient product promotion stores" are selected each year and publicized along with their rankings. Stores selected as top retailers are authorized to carry a special logo.

### *Canada*

A detailed report comparing appliance standards for Canada and California was commissioned by Natural Resources Canada (NRCan) in 2007-2008. The Standards and Labeling office at Natural Resources Canada is reviewing the report. HMG recommends that the Energy Commission staff maintain correspondence with NRCan regarding the findings of the NRCan study.

The following is general information on Canadian appliance standards regulations. The Energy Efficiency Act of Canada specifies energy efficiency requirements for appliances and also specifies responsibilities of manufacturers, retailers and customs officials in enforcing the appliance standards. The Energy Efficiency Act is modified periodically through amendments, and the latest amendments were tabled by the Canadian Government to the Parliament (central legislative body) in October 2006. If approved by the Parliament, these amendments will start taking effect during 2007-2010.

A background document on the standards amendment is available on Natural Resources Canada (NRCan) website at:

http://www.nrcan-rncan.gc.ca/media/newsreleases/2007/200704b_e.htm

Details on existing legislation on appliance energy efficiency are available on-line at:

http://oee.nrcan.gc.ca/regulations/html/EERGuide_Part1.cfm?text=N&printview=N

The primary mode of regulation is the imposition of energy efficiency standards and labeling for equipment imported into Canada or equipment that is transported between the various provinces in Canada. The regulations place primary responsibility of meeting the regulations on

'Dealers' and sets up a national infrastructure to track compliance by the dealers with the regulations.

**Responsibility of Dealers**

A dealer is defined in the Energy Efficiency Act as a "person engaged in the business of (a) manufacturing energy-using products in Canada; (b)importing energy-using products into Canada; or (c) selling or leasing energy-using products obtained directly or indirectly from a person engaged in a business described in a) or b) or an agent thereof."

Dealers are responsible for ensuring that each model of a regulated product that they "manufacture for sale in another province, import into Canada, or sell or lease after the product has been imported or shipped interprovincially" meets the energy efficiency standard set out in the Regulations. Depending on the product, dealers may also be responsible for ensuring that an EnerGuide label is affixed to each unit. As well, all energy-using products must carry an energy efficiency verification mark.

The following are the responsibilities of the dealer per the NRCan website:

- Ensure the product meets the energy efficiency standard specified in the Regulations.
- Ensure an energy efficiency report has been filed with NRCan.
  - Product information contained in the energy efficiency report is entered into a database at NRCan to determine compliance with the Energy Efficiency Regulations. Products that are compliant may be imported into Canada or shipped between provinces.
- Provide the necessary information to Revenue Canada, Customs Excise and Taxation, when importing products.
  - If the customs release document is not complete or if the product does not meet energy efficiency standards, the customs officer can refuse to allow the product to clear customs.
- Ensure the product bears an energy efficiency verification mark.
- Ensure an EnerGuide label is affixed to the product (if prescribed by the regulations.)

**Energy Efficiency Verification Mark**

All regulated energy-using products imported into Canada or shipped between provinces must carry an energy efficiency verification mark from a recognized certification organization.

To authorize an energy efficiency verification mark, a certification organization must be accredited by the Standards Council of Canada (SCC) and must administer an acceptable energy performance verification program for the product. The following organizations are currently accredited by SCC to certify electrical and electronic products, fuel-burning equipment, or gas-fired appliances and equipment. They have been recognized by NRCan as administrators of an energy performance verification program:

- Air-Conditioning and Refrigeration Institute (ARI)

- Canadian Standards Association International (CSA)
- Intertek Testing Services NA Inc.
- Intertek Testing Services NA Ltd.
- Underwriters Laboratories Inc. (ULI)

The energy efficiency verification mark can be placed on a product as soon as the product has met the terms of the applicable energy performance verification program. At the latest, the dealer must ensure that the verification mark is on the product before the product leaves the dealer's possession or, if the product has been passed on to a consignee, before it leaves the consignee's possession.

An energy efficiency verification mark indicates only that the energy performance of the product has been verified. The verification mark must be put on the exterior of the product.

**Labeling Requirements**

The Energy Efficiency Act and Regulations require dealers to attach an EnerGuide label to the following energy-using products:

**Figure 24: Products Covered by EnerGuide Label in Canada**

| | | |
|---|---|---|
| Clothes Dryers | Clothes Washers | Integrated Over/Under Washer-Dryers |
| Dishwashers | Electric Ranges | Freezers |
| Refrigerators And Combination Refrigerator-Freezers | Room Air Conditioners | |

**Enforcement Strategy**

The primary responsibility for ensuring compliance with the standards is vested with NRCan.

NRCan, through a memorandum of understanding with the Canada Customs and Revenue Agency (CCRA), set up an Administrative Monetary Penalty System (AMPS) effective October 7, 2002. This new penalty system is designed to address non-compliance with customs legislative, regulatory and program requirements. Through the memorandum of understanding, CCRA administers the Energy Efficiency Regulations Program on NRCan's behalf at all border crossings.

AMPS penalties were developed to penalize dealers if they fail to provide necessary documentation required at the time of release as stipulated in Section 7.1 of the Customs Act. More specifically, for the Energy Efficiency Regulations Program, if the required information and shipping documents are incomplete or not presented at the time of release, the penalty will start at $100 for the first occurrence, $500 for the second occurrence, and escalating to $1,000 for third and subsequent occurrences.

It is important to note that AMPS was not developed to replace the penalties that are currently provided for in the Energy Efficiency Act, 1992.

The Canada Border Service Agency (CBSA) maintains an electronic database of imported equipment called Electronic Data Interchange (EDI) system. This system is coordinated with NRCan and CCRA so that all imported equipment needs to have an electronic declaration of compliance with the Energy Efficiency standards through a Minimum Documentation (RMD) and Pre-Arrival Review System (PARS) declarations as mandated.

### *China*

China's energy efficiency regulation infrastructure is changing rapidly as it undergoes massive development and energy needs increase rapidly. Listed below is preliminary data from a report done by Lawrence Berkeley National Laboratory's (LBNL) China group on energy policy options for China in 2005:

"*China has long recognized the importance of reducing energy demand as well as increasing energy supply. Between 1980 and 2000, the government added 22 administrative measures, seven standards, eight plans and 14 policies designed to promote energy-saving technology, and recently released its first long-range goals for efficiency. However, energy efficiency is seriously underfunded. In 2004, China had power shortages in 24 of 31 provinces. To date, China has met this oncoming energy crisis by expanding power plant construction, adding over 40 GW of capacity per year. Yet increasing capacity is insufficient without improvements in energy efficiency.*

*Despite many years of economic-system reforms, China still lacks market-oriented tools to promote efficiency. The current version of the Energy Conservation Law, while an important step, is undergoing revisions to help it fill this gap. Still, the most effective incentives (e.g., reflecting full environmental and social costs in energy prices, restructuring tax and fiscal policy to favor efficiency, moderation perceived risk) involve coordination across powerful functional and geographic divisions in government.*"

At this time China is actively developing voluntary and mandatory appliance regulations. Little is known about enforcement strategies or mechanisms as these are still under development.

### *European Union*

The energy demand in households accounts for 25 percent of the final energy needs in the European Union (EU). Electricity used for domestic appliances in households show the sharpest increase. Higher standards of living and comfort, multiple purchases of electric appliances, and the growing need for air conditioning are main reasons for this trend to prevail. Energy consumption by consumer electronics and new media such as the Internet is also steadily growing.

The response of the EU is to act in two complementary ways:

- Energy labeling of household appliances: Since the market of household appliances such as washing machines, dishwashers, ovens, air-conditioning systems, are highly visible to the consumer, the intention is to increase consumer's awareness on the real energy use

of household appliances through labeling of their energy performance at their point of sale.

- Minimum Efficiency Requirements: Compulsory minimum efficiency requirements will encourage producers of household appliances to improve the product design to lower the energy consumption of the appliances.

At the end of 2006, the European Union (EU) pledged to cut its annual consumption of primary energy by 20 percent by 2020. To achieve this goal, it is working to mobilize public opinion, decision-makers and market operators and to set minimum energy efficiency standards and rules on labeling for products, services and infrastructure.

A summary of energy efficiency regulation in buildings and for appliances is on the EU website at: http://europa.eu/scadplus/leg/en/s14003.htm

The EU charter provides the European parliament and Commission regulatory authority for developing common energy efficiency framework and legislative agenda across Europe. The EU develops the criteria, principles and goals for achieving energy efficiency through directives. These directives are aimed at individual European countries whose governments are directed to adopt energy efficiency legislation in their respective countries that will follow the intent of the EU directives and provide the legal framework for implementation and enforcement of the appliance standards and labeling requirements.

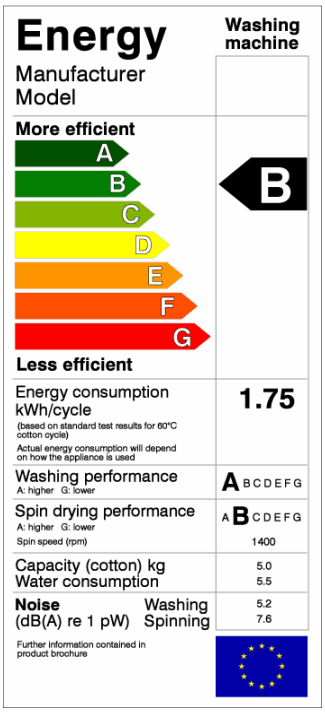
It is the responsibility of the individual countries to set legislations with exact specifications for equipment efficiency and to ensure compliance with the regulations. Each country is also responsible for setting these legislations within a time frame specified in the EU directives.

**Labeling Requirements for Domestic Appliances**

Council Directive 92/75/EEC of September 22, 1992, set the framework for labeling and standard product information of the consumption of energy and other resources by household appliances. Since 1992 there have been several amendments to the directive to increase the number of appliances covered by the labeling and improve the labeling requirements. The directives and the amendments together apply to the following types of household appliances, even where these are sold for non-household uses:

- Refrigerators, freezers and their combinations.
- Washing machines, dryers and their combinations.
- Dishwashers.
- Ovens.
- Water heaters and hot-water storage appliances.
- Lighting sources.
- Air-conditioning appliances.

**Figure 25: Sample EU Energy Efficiency Label**




The requirement states that household appliances offered for sale, hire, or hire-purchase must be accompanied by a fiche and a label providing information relating to their consumption of energy (electrical or other) or of other essential resources.

The energy efficiency of the appliance is rated in terms of a set of energy efficiency classes from A to G on the label, A being the most energy-efficient, G the least efficient. The labels also give other useful information to the customer as they choose between various models.

The information is also required to be provided in manufacturer and retailer catalogues and included by Internet retailers on their websites.

In an attempt to keep up with advances in energy efficiency, A+ and A++ grades have been introduced since 2003 on select appliance categories.

**Eco-design Directive**

The  Directive 2005/32/EC on the eco-design of Energy-using Products (EuP), such as electrical and electronic devices or heating equipment, provides coherent EU-wide rules for eco-design and ensure that disparities among national regulations do not become obstacles to intra-EU trade.

The directive does not introduce directly binding requirements for specific products, but does define conditions and criteria for setting, through subsequent implementing measures, requirements regarding environmentally relevant product characteristics and allows them to be improved quickly and efficiently.

Products that fulfill the requirements will benefit both businesses and consumers by facilitating free movement of goods across the EU and by enhancing product quality and environmental protection. The directive constitutes a breakthrough in EU product policy that until this framework, required that each product regulated had to be specifically approved by the European parliament through an enabling directive.

The eco-design directive establishes a process that each member country must follow to establish minimum performance standards for appliances. The directive also sets the goals and timelines for each member country to adopt enabling national legislations to formally adopt the energy efficiency legislations.

**Role of Voluntary Regulations and Agreements for Appliance Efficiency**

The European Union countries have made extensive use of voluntary commitments by manufacturers to improve energy efficiency and negotiated agreements with industry partners to further energy efficiency of appliances. The EU itself at the Union level has negotiated agreements with manufacturers of appliances and supported voluntary commitments starting in the early 1990s.

A paper presented by Paolo Bertoldi of the Joint Research Center within the EU Institute for Environment and Sustainability at the ACEEE 2005 Summer Study presents an overview of these voluntary agreements.

The paper presents the highlights of the debate on voluntary agreements, reviews and analyzes voluntary agreements in the industrial sectors of selected European countries, and focuses on some successful European experiences with negotiated agreements for improved energy efficiency of equipment and in the industrial sector, such as the European agreement on consumption of washing machines, the European agreement on power consumption in standby mode of televisions and video cassette recorders (VCRs), the European GreenLight and Motor Challenge Programs. The paper concludes that, if set up under the right institutional framework, voluntary agreements can deliver energy savings cost-effectively and could represent an important instrument for climate change mitigation.

The paper presents the view that the European Commission considers that negotiated agreements (NAs) can be a valid alternative to the introduction of legislation for mandatory minimum energy performance standards (MEPS) for equipment, if they include the four essential elements.

- First, quantified commitments/targets by manufacturers for significant improvements in the energy efficiencies of the equipment produced over a reasonable timescale.
- Second, commitments by manufacturers accounting for most of the equipment sold at the EU market (80 percent at least).
- Third, an effective monitoring scheme with some degree of independence to monitor the energy efficiency improvements achieved.
- Finally, sanctions or mechanisms to discourage non-compliance, such as mechanisms to ensure loss of public image for the non-compliant company (for example, press

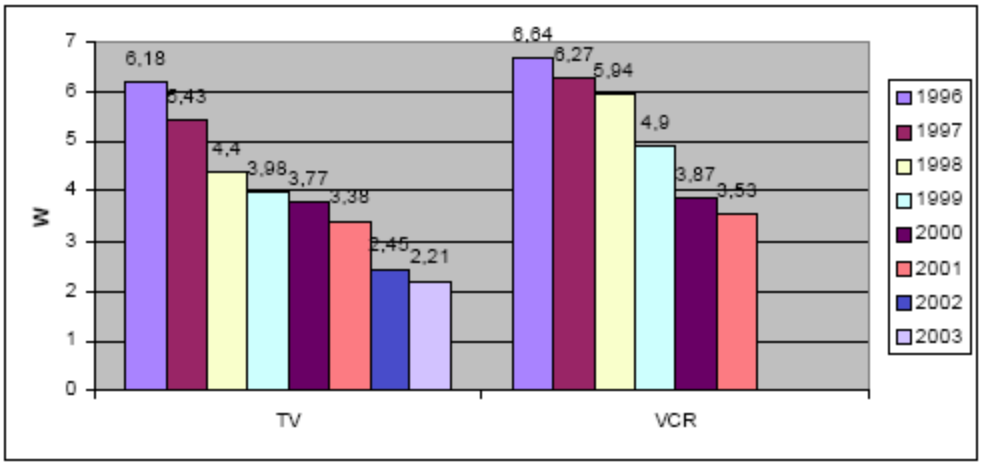
announcement by public authority), loss of tax benefits, or credible threat to introduce legislation.

- It also is essential that NAs conform with the rules of the EU treaties. The risk of "free-riding" must be carefully assessed. In particular, the number of appliances imported into the EU must be assessed as usually only EU-based manufacturer members of the EU trade association are likely to enter into the NA process.

The paper adds that a number of NAs have been concluded between the Commission and EU manufacturers associations, which have pre-empted the need to propose or introduce specific legislation for efficiency requirements for this equipment. Recently, agreements have been implemented as unilateral commitments by industry on stand-by losses of TVs and VCRs, clothes washers, dishwashers, electric motors, and electric water heaters.

The TVs and VCRs agreement was signed in 1997 by 16 companies and notified to the competition authorities. Manufacturers agreed that the company sales-weighted average would be progressively reduced towards 3 W by 2009. The target refers to the company sales-weighted TVs and VCRs stand-by consumption. During 2003, sales-weighted average power consumption of 2.21 W and 3.53 W was achieved for TVs and VCRs respectively. The figure below shows evolution in stand-by consumption.

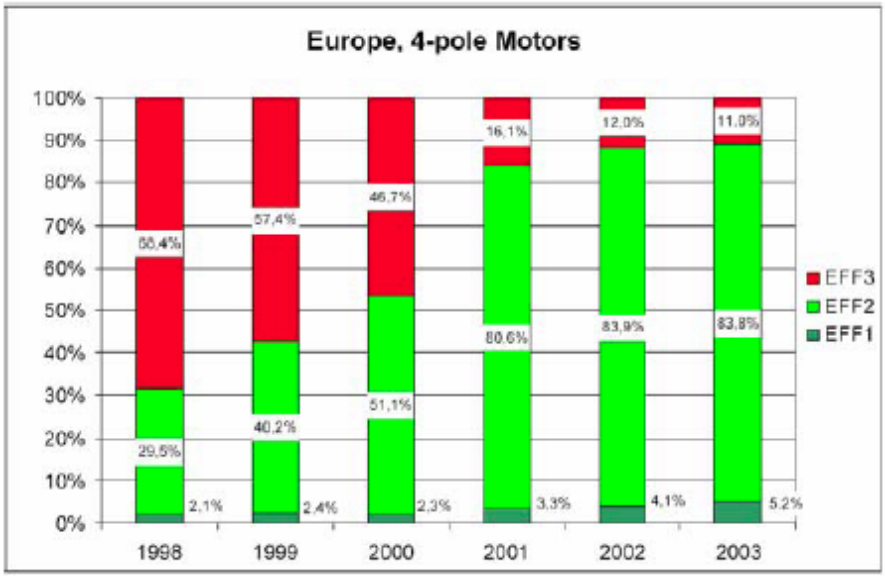
**Figure 26: Stand-by Consumption Reduction in TVs and VCRs Through NAs in EU**




The Clothes Washer NA was concluded in 1998; it included the phasing out of low efficiency models as well a 20 percent overall efficiency improvement. It is important to note that, unlike in the case of TVs and VCRs, there is no company-specific energy efficiency target. As a result of the NA, the energy efficiency index (measured in kWh/kg) has dropped from 0.249 in 1996 to 0.208 in 2002.

Figure 27 below summarizes the results of the electric motor agreement coupled with the voluntary labeling scheme. The motor agreement was based on a new system of efficiency designation for electric motors developed by the motor manufacturers' association. The agreement was to reduce the market share of motors in the lower efficiency class. By 2003 this lower efficiency class represented only 11 percent of the market.

**Figure 27: Reduction in Low Efficiency Motors in EU through NAs**




Given the results of the NAs described above, new self-commitments have been implemented on improving the energy efficiency of TVs in on-mode and a new agreement on refrigerators in 2004. The new draft European Framework Directive on Eco-Design foresees the use of agreements as a valid alternative to legislation.

**Enforcement Regimes for Mandatory Standards**

The enforcement of the appliance standards and labeling requirements are the domain of the member countries of the EU. Each country has a different regulatory environment and the ultimate responsibilities for implementation and enforcement are decided in each country through legislation. The authors will discuss enforcement regimes in key EU countries in the following section.

**United Kingdom**

In the UK, the latest standard for energy efficiency of appliances was adopted through the Statutory Instrument 2007 No. 2037 titled "The Ecodesign for Energy-Using Products Regulations 2007." This document is available for download here:

http://www.opsi.gov.uk/si/si2007/20072037.htm

Part 5 (regulations 18 – 22) and Schedule 9 of this document set out provisions relating to the enforcement of this statutory instrument. Pending the outcome of a fundamental review that DEFRA (Department for Environment, Food and Rural Affairs) is conducting, the responsibility for enforcing the requirements of the EuP statutory instrument falls to local authority trading standard departments (referred to as local weights and measures authorities in the Regulations) in England, Wales, and Scotland, and to the Department of Enterprise, Trade and Investment in Northern Ireland. These agencies are part of the local governments at city, town or county levels depending on the location in the UK.

Part 6 (regulations 23 – 27) sets out the penalties that can be levied by the enforcing authorities. The limits of fines not exceeding the statutory maximum is currently set at £5,000.

The enforcement agency is given powers to inspect premises such as manufacturing plants, retail stores, and other locations within the physical boundary of its jurisdiction authority. In some instances prior warrants are needed for such inspections. Upon entry, they have the power to inspect equipment, take photographs, test equipment, or detain/seize equipment for later studies if there are reasonable grounds for suspicion of non-compliance.

The enforcing authority may purchase equipment for testing by independent testing labs to verify energy savings claims made by manufacturers/retailers. If the enforcing authority feels that the manufacturer/retailer is withholding key information, they can serve a notice for such information to be produced under the force of law.

If a product is deemed to be non-compliant, the enforcing authority can issue an "enforcement notice" asking for remedial actions to be taken. If the notice is not acted upon, the authority can levy fines, seize and dispose of the offending equipment, and recover all costs for the enforcement effort from the offenders.

**Germany and France**

For both of these countries, historically, the enforcement activities have been championed by consumer advocacy groups and consumer magazines. In both countries consumer advocacy magazines conduct independent product testing and publish results to serve consumer interests.

In Germany, product tests conducted by the *Warentest* Institute and published in its monthly magazine *TEST*, influences both consumers and producers. With an estimated 5 million readers, Warentest is the second-most-trusted institution in Germany, behind only the Red Cross.

Results published in *TEST* appear to have a dramatic impact on product choice. About half of German companies incorporate the testing criteria employed by *Warentest* into their new product designs; two-thirds of German retailers report favoring products that receive good test scores.

In France, the consumer non-profit organization called *Que Choisir* plays a similar role in product testing, information dissemination and safeguarding consumer interests.

**Denmark**

Denmark has a National Energy policy, a part of which is the National Energy Savings Policy. The Danish Energy Authority is the agency responsible for implementing and verifying the building and appliance regulations. For appliances, the Authority administers the labeling program for major household appliances and light bulbs through a directorate called Energy Labelling Denmark.

- Verification Activities:
  Energy Labelling Denmark (ELD) is responsible for checking whether the retailers display the energy label correctly. It is also responsible for checking whether the

manufacturer-specified information on the labels is accurate. It is also responsible for checking whether product advertisements are accurate.
Per Danish Energy Policy, the responsibility for the complying with the labeling requirements rests with different entities. Here is a summary of who is responsible for what :

- Energy label
  - Are labels placed correctly? (retail shops)
  - Is data on the label accurate? (manufacturer/supplier)
- Sales brochures and advertisements
- Are the product fiches in the brochures? (supplier)
- Is the product fiche correctly worked out? (supplier)
- Is advertisements worked out correctly? (supplier/retail)

- Retailer Surveys:
  Since 1995, ELD has surveyed a total of 800-1000 retail stores around the country for compliance with labeling requirements. Initial efforts started in 1995 with 20 shops in two major cities and were rapidly expanded to 200 shops per year in 1996-98 as the scope increased to all regions of Denmark. Since 1999, concentration has been on shops that were found to have unsatisfactory compliance rates in previous surveys, as well as those shops not previously surveyed. As of 2001, ELD has been surveying about 75-100 shops per year using the approach developed since 1999.
  - ELD judges the energy labeling as "insufficient" when 0-50 percent of regulated stock displays correct labels, "Not ok" when 51-90 percent of stock is correctly labeled, "Almost ok" when 91-99 percent is correctly labeled, and "Ok" when 99-100 percent is correctly labeled.
  - These surveys are carried out by temporary office staff trained to conduct these surveys. Each inspector visits about 8-10 stores and is responsible for doing a complete inventory of regulated appliances in those stores.
  - ELD compiles all labeling results by store, and a report is sent to each store on their compliance level with the labeling requirements. Those stores that are not rated "Ok" are then asked to improve their compliance level through formal letters. These non-compliant stores are then made a priority target for follow-up surveys the next year.
  - Limited information is available on the regulatory options available to ELD to force non-compliant stores to achieve the "Ok" status, but from literature reviewed for this study, the emphasis seems to be more on dialogue and information dissemination rather than disciplinary actions.

- The ELD conducts special audits for lighting products that are required to not only display a label, but to have that label of a specific size and shape. ELD staff conducts these audits, and each staff member visits about 10-12 stores. Information from these lighting-only audits is provided to the distributors and suppliers of the lighting products (instead of retailers – since it is the responsibility of distributors to have correct packaging and labeling information on lighting products).

- Product Testing:
  In addition to verifying the level of compliance with labeling requirements, ELD also conducts independent product testing to verify information presented on the labels – Two laboratories are currently certified to conduct independent product testing – FI Lab (The Danish Consumer Information Centre) and DELTA Light & Optics.
  - The labeling requirements and test procedures are different for lighting than for the rest of the household appliances, and are thus considered a distinct testing activity than household appliances.
  - The sampling procedures for the selection of appliances or lighting products is not documented, however this process is targeted at those appliances and manufacturers where there is a reasonable doubt of inaccurate label information.
  - According to EU laws, the initial product testing is done on one appliance bought by the testing lab from the normal supply chain for that appliance. ELD authorizes the testing based on testing standards developed at the EU level; the testing lab conducts the test and then submits the results to ELD. ELD then verifies that the testing results match or support information provided by the manufacturer on the label. ELD can also ask for other supporting technical documentation on the product from the manufacturer or distributor. In case of inconsistencies, ELD can ask the manufacturer/distributor to correct the label information. If the manufacturer/distributor agrees to this change, ELD asks them to submit a revised label. If the manufacturer/distributor does not agree with the change in label information, further testing is done on three additional appliances of the same make and model as the initial test. The combined results of the 3-appliance test, 1-appliance test and technical documentation review are then used to verify label accuracy. Any corrective measures to the label information are conveyed to the manufacturer/distributor, and when the response is not positive, ELD refers the case to the Danish Energy Authority for further disciplinary action.

- Information Dissemination:
  The Danish Electricity Saving Trust (Elsparefonden) is an independent trust under the auspices of the Danish Ministry of Transport and Energy. The trust works to promote energy savings and a more efficient use of electricity.
  - The trust is financed by a special electricity savings charge of DKK 0.006/kWh payable by households and the public sector. Total annual proceeds amount to approximately DKK 96 million.

- The trust has administered several initiatives aimed at increasing penetration of the most efficient appliances through public awareness campaigns, rebates, and Web-based product selection resources.
- The Elsparefonden website contains lists of all categories of appliances on the Danish market showing the energy performance of each model, as well as its full product information. For each category only the most efficient models on the Danish market are shown. Initially this included the A-rated models only. Later, in 2004, A+ and A++ were added. But the information does not stop there. For these most efficient models, the website also shows the lowest prices in the country as reported to the trust. By clicking on the price, a list of retailers where the lowest priced units are available, including the retail shops' names, addresses, and telephone numbers, is available for all consumers.

The combination of labeling requirements, verification activities and the web-based information about where consumers can buy the most efficient appliances along with prices for each model sold in the country has played a significant role in why Denmark has among the highest penetration of the highest efficiency appliances in the European Union.

**EU wide appliance sales tracking**

Since 1993, the European Union has been tracking indicators for energy efficiency in industry, residential (including appliances), transportation, and commercial buildings through a project called *ODYSSEE*.

The *ODYSSEE* project was set up in 1993 through a joint collaboration between ADEME (the French Agency for Environment and Energy Management), the *SAVE* program of the General Directorate of the European Commission in charge of energy, and all energy efficiency agencies in the EU-15 and Norway.

Since then, the *ODYSSEE* project has been regularly extended within the *SAVE* program and since 2005 with co-financing of all national agencies. Since 2001, *ODYSSEE* is combined with a database on policy measures, called *MURE* (www.mure2.com) in the same project.

Since 1995, it includes the new EU member countries plus Cyprus, the Czech Republic, Hungary, Lithuania, Latvia, Poland, Slovakia, Malta, Bulgaria, Romania and Croatia, Slovenia and Estonia.

The *ODYSSEE* project is coordinated by ADEME with the technical support of ENERDATA and the Fraunhofer institute in Germany. The projects rely on comprehensive databases that contain, on one hand, detailed data on the energy consumption drivers by end-user and sub-sector and, on the other hand, energy efficiency and CO2-related indicators. The network of national teams updates the data regularly. The *ODYSSEE* database is managed by ENERDATA and updated twice a year.

The ODYSSEE website (http://www.odyssee-indicators.org/) maintains an on-line library of reports by country, sector (industry, households, service sector, and transportation), energy end uses and policies. For each of these classifications, indices have been developed based on sales

data collected by each contributor. *ODYSSEE* indicators are macro-indicators, defined at the level of the economy as a whole, of a sector, of an end use.

Six types of indicators are considered to monitor energy efficiency trends or to compare energy efficiency performances:

- Energy intensities relating energy consumption to macro-economic variables.
- Unit consumption or specific consumption relating energy consumption to a physical indicator of activity.
- "Bottom-up" energy efficiency index to provide a summary of energy efficiency trends broken down by the major energy use categories.
- Adjusted indicators to make cross-country comparisons that attempt, as far as possible, to adjust for structural differences between countries (climatic, economic or technical).
- Diffusions indicators for monitoring the diffusion of energy efficient equipment and practices.
- Target indicators to set up for each country targets or benchmarks in comparison to countries with better performance.
- CO2 indicators complement the energy efficiency indicators. All previous types of indicators are also expressed in terms of CO2.

A report of particular interest evaluates trends in energy efficiency and discusses the pattern and the impact of policy measures in the EU-15. This report is titled "*Evaluation of Energy Efficiency in the EU-15: Indicators and Measures*" [6].

Key highlights of this report include:

- Between 1990 and 2004, the energy efficiency progress in households was assessed as 0.9 percent/year in the EU-15 (12 percent over the period). This is partly the result of the policy measures implemented (EU directives and national measures such as building standards and financial incentives) that have raised the energy performance of new buildings and electrical appliances.
- In 2004, the amount of energy consumed by households was only slightly below the 1990 level. The main reasons for this rather surprising trend are that, at the same time as energy efficiency improved, increased income and/or lifestyle changes resulted in larger homes, greater heating comfort, and more appliances, even if the numbers of the larger appliances have now reached saturation levels. Larger homes and a growing number of appliances each contributed to increasing the consumption per household by about 0.4 percent/year (or 5 percent over the period 1990-2004). These two factors together almost completely offset any energy efficiency progress achieved.

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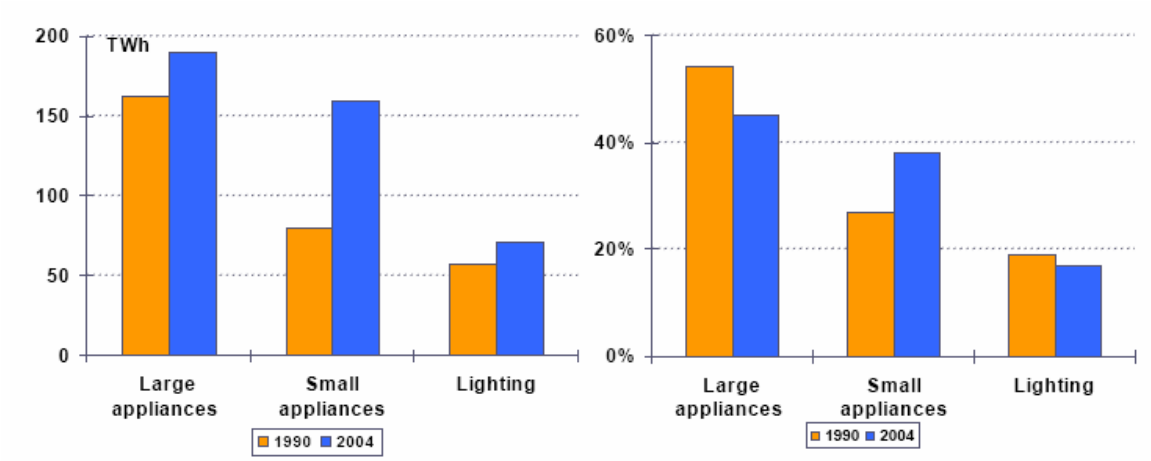
[6] Download at http://www.odyssee-indicators.org/publications/chapters.php. A copy of the report has also been submitted to the Energy Commission. See document titled "*Evaluation of Energy Efficiency in the EU-15 - Indicators and Measures.pdf*"

- In the medium- and long-term, these lifestyle factors should play a less determining role because of saturation effects for some equipment (such as central heating, most of the large electrical appliances), a slowdown in the progression of the average size of dwellings, and the increasing impact of new efficient buildings and appliances on the existing stock.
- Denmark and the Netherlands are among the countries with the best results in the household sector and should be considered as benchmarks by other countries (lowest heating requirement per square-meter, large diffusion of A and A+ appliances and of condensing boilers).

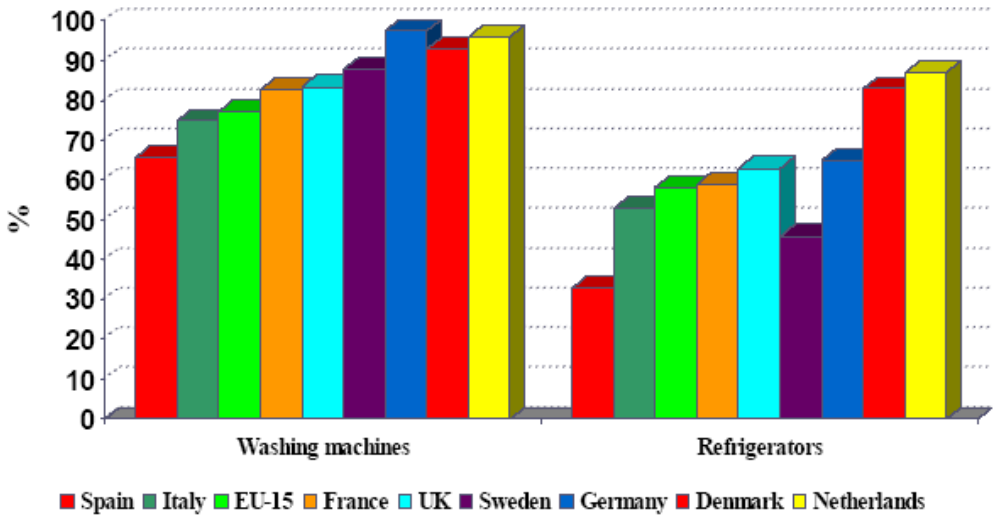
A quick snapshot of improvement in energy efficiency of equipment in the EU-15 (original members of the EU including UK, Germany, and France) is provided below:

**Figure 28: Energy Consumption by Appliances in Europe 1990-2004**




The following graph provides a breakdown by two appliances (washing machines and refrigerators) for the individual countries and shows the percentage of the total sales of this equipment in each country that is the top-tier energy grade (A or A+).

**Figure 29: Current Saturation of A and A+ Appliances by Country in EU-15**

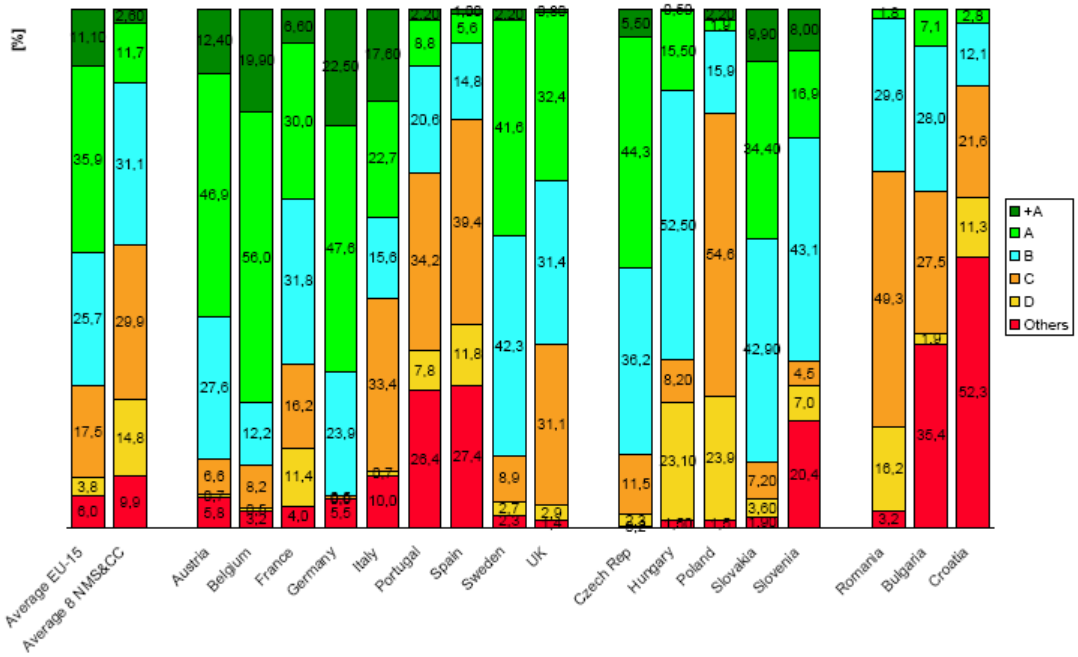



The Renewable Energy Unit of Institute for Environment & Sustainability of the European Commission Joint Research Centre (JRC) provides technical and scientific advice to the Commission services (DG.TREN, DG ENV) for the design, implementation, and monitoring of EU energy efficiency policies and programs. Moreover a number of EU programs are directly managed by JRC on behalf of DG.TREN. The JRC website is the portal for all these activities:

http://energyefficiency.jrc.cec.eu.int/

The JRC compiles an annual report of the electricity consumption and efficiency trends in Europe that includes not only the EU-15 but all the newer members of the EU. The latest report is titled – "*Electricity Consumption and Efficiency Trends in the Enlarged European Union – Status Report 2006*"

**Figure 30: Share of EU Freezer Sales by Class in 2004**




This report highlights the marked differences in levels of compliance with the EU directives among the various countries. The full report can be downloaded from the JRC website, but Figure 19 is a sample graph showing the relative percentages of Class A, B, C, D and unrated freezers sold across Europe. As seen in the figure, the percentage of appliances by class varies significantly by country. Further, in some countries the percentage of unrated appliances seems to be on the rise, despite newer tougher appliance standards and labeling requirements.

This brings into focus the challenges of implementing an EU-wide mandatory appliance standard. This finding is echoed in several papers reviewed from the ECEEE conference proceedings.

Some members of the European Parliament (MEPs) have been vocal in their criticism of the uneven performance by different member states in the implementation of the EU energy efficiency directives. The European Parliament's Committee on Industry has backed a report by MEP Fiona Hall, which charges that Commission and EU member states have largely failed to realize their own commitments to reduce energy consumption.

**Top-Runner Type Approach to Energy Efficiency**

The "Top-Runner" program concept used by Japan has been getting renewed attention in the EU due to the Top Runner program's underlying concept of setting the standard based on the "best possible" efficiency rather than just "remove the worst" philosophy currently used in the EU.

Following a mission statement by the Bundestag (Germany's federal Parliament) in June 2005, the new federal government of Germany declared, in its coalition treaty of November the same

year, as one of its targets the promotion of a European "Top Runner program." This was due to increased influence of the Greenpeace movement and its role in drafting a comprehensive legislation for the EU to be promoted by Germany that mirrors the Top Runner approach taken by Japan.

Recent ECEEE papers often provide contrasting views on the validity, benefits, and pitfalls of such a strategy.

On the plus side P.J. S. Siderius[7] of the Netherlands argues, "The appeal of the Top Runner approach is embedded in its clear and simple goal: go for the best; the product on the market with the highest energy efficiency (the Top Runner) sets the standard. Moreover the scheme is dynamic: once the date is reached by which time the standard should be implemented, market data is analyzed to select the next Top Runner."

On the flip side, Joakim Nordqvist[8] of Lund University argues that many in the EU are ambivalent about the success of a Top Runner approach in the EU due to perceived differences in that approach versus the current EU labeling approach. The current approach is more demand-side (consumer-oriented), while the Top Runner approach is supply-side (manufacturer-oriented).

Both papers agree however that the Japanese Top Runner program would not be successful in the EU as-is due to the very different consumer and manufacturer cultures in the two areas. Siderius argues that there may be ways to combine the Top Runner approach within the current EU directives to achieve rapid change in efficiency without the need for a separate Top Runner directive for EU.

Both agree that a lot would need to change about the European business environment to get the manufacturers on-board with a Top Runner approach. While it may be in the interest of the individual member states to have a Top Runner-type approach to regulation, it may prove to be not feasible due to lack of industry cooperation, and lack of sales volume data by make and model, which is critical for evaluation of a Top Runner type program. Nevertheless, it remains as an option on the table for EU regulators to consider.

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[7] P.J.S. (Hans-Paul) Siderius, H. Nakagami, 2007, *Top Runner in Europe? Inspiration From Japan for EU ecoDesign Implementing Measures*, ECEEE 2007 Summer Study

[8] Joakim Nordqvist, 2007, *The Top Runner Policy Concept: Pass It Down?"* ECEEE 2007 Summer Study

# CHAPTER 3:
# California Appliance Standards Enforcement Recommendations

## Workplan

The authors were asked to provide an analysis of intervention strategies best suited for the California Energy Commission's Appliance Efficiency Program. The task was to identify alternative enforcement intervention strategies for the Energy Commission for appliance standards and labeling requirements. This was to be done based on the summary findings described in Chapter 1 and Chapter 2 of this report.

To guide work done on this task, the authors ought to answer the following questions:

- How should the Energy Commission identify the correct persons in the supply chain who are responsible for compliance, and how should the Energy Commission communicate regulatory requirements to them?
- Which products and responsible persons should be the primary focus of the Energy Commission's compliance and enforcement efforts?
- Can the Energy Commission get more compliance with its Appliance Efficiency Regulations if the regulations are set or written in a different way?
- What intervention strategies would help the Energy Commission achieve the greatest success in compliance enforcement? How do those strategies vary by market actor? How do they vary by type of product?
- Can the Energy Commission ensure higher compliance using encouragement and recognition of good performers?
- How can the Energy Commission ensure that those who do not wish to follow the regulations are forced to meet the standards contained therein? What means and what methods may be successful?
- Who are the potential partners in the enforcement efforts? How should enforcement efforts by the Energy Commission be integrated with parallel or supportive efforts by other entities?
- What compliance and enforcement methods have been used effectively by other standards and labeling programs throughout the world? Would these compliance and enforcement efforts be transferable to California? What steps would need to be taken to extend these methods to California?

## Summary of Title 20 regulations

The current Title 20 Appliance Efficiency Regulations are divided into the following categories:

- Appliance Testing Standards and Protocols
- Federal Standards referenced in Title 20
- State Standards for Appliances regulated by Federal Standards
- State Standards for Appliances not regulated by Federal Standards
- Labeling Requirements
- Appliance Database and Data Submittal Requirements
- Appliance Efficiency Regulations Enforcement Provisions

The list of regulated appliance types include:

- Refrigerators, Refrigerator-Freezers, and Freezers
- Air Conditioners and Heat Pumps
- Ceiling Fans, Whole-house Fans, and Residential Exhaust Fans
- Space Heaters and Boilers
- Water Heaters
- Pool Heaters, Portable Electric Spas, and Residential Pool Pumps
- Plumbing Fittings and Fixtures
- Lamps and Ballasts
- Luminaires
- Dishwashers, Clothes Washers, and Clothes Dryers
- Cooking Products and Food Service Equipment
- Electric Motors
- Distribution Transformers
- Power Supplies and Consumer Audio and Video Equipment

As this list indicates, Title 20 regulates a wide variety of appliances. Further, the type of appliance regulations changes by type of product. HMG has developed a matrix of the current regulations that forms the basis for future analysis. This matrix allows one to review all appliance regulations by product, or all products regulated by given appliance regulation. An electronic copy of the matrix is attached with this report.

# Current Enforcement Efforts

Section 1608 of the Title 20 standards include specific authorities given to the Energy Commission for ensuring compliance with the regulations.

The primary mode for the Energy Commission to ensure that appliances sold in California meet the regulations is through the appliance database listings. All manufacturers of regulated appliances within the scope of Section 1601 of the Title 20 Standards are required to submit appliance energy performance data to the Energy Commission to be eligible to legally sell, or offer for sale, regulated appliances in the state.

The Energy Commission has the authority to verify information provided by the manufacturer through independent third-party testing of appliances. This testing can be based on specific complaints about non-compliance or through targeted surveys of appliances. Section 1608(e) provides the legal framework and specific procedures that the Energy Commission and appliance manufacturer must follow to verify that the product meets or exceeds the relevant Title 20 regulations.

If the product is found to have energy and water performance worse than the manufacturer's claims, but still meeting the Title 20 regulations, the Energy Commission has the authority to modify the information in the appliance database to reflect the correct energy and water performance of the tested appliance.

If the product is found to be non-compliant with Title 20 regulations, the Energy Commission has the authority to delist the appliance from the Energy Commission database of Title 20 compliant equipment. This is usually a last resort and is done after the manufacturer has not responded to compliance enforcement letters sent by the Energy Commission, and after the independent product testing has found the appliance to be non-compliant.

## *Challenges and Drawbacks of Current Approach*

Through its survey work, the authors identified the supply chain networks for specific appliances, compliance rates and challenges to compliance enforcement. While the reports for these surveys have specific details by appliance, the following are key lessons learned about the appliance enforcement challenges.

### Reactive Nature of Appliance Enforcement

Appliance enforcement has been viewed as a reactive process that is based on compliance actions or non-actions by manufacturers, retailers, and distributors who are responsible for the sale of appliances.

The scope of the Appliance Efficiency Regulations cover appliances "sold or offered for sale in California." Thus manufacturing of the appliances may happen outside California or the United States. Indeed, as Title 20 has increased in scope, the proportion of appliances that are sold in California but manufactured out of the state or the United States has increased exponentially.

Historically, the Title 20 regulations have been developed in consultation with appliance manufacturers and their trade associations. However, as more appliances are manufactured globally and by smaller manufacturers in other countries, there is bound to be less participation by these manufacturers in the regulation development and revision process.

Most enforcement actions by the Energy Commission to date have tended to target those appliances or stores where specific intelligence was provided by manufacturers or other stakeholders about non-compliance. This approach works when the number of appliances is limited and when there are established industry partners who will aid in the enforcement effort. However, this is increasingly not the case as more consumer products are regulated and the stakeholders, though invited, are not part of the standards setting and compliance efforts.

**Limited Knowledge of the Appliance Efficiency Regulations**

Through interviews conducted by HMG for various appliance types, along every stage of the supply chain, market actors indicated high awareness that California generally has separate and more stringent standards than the rest of the United States, but their understanding was extremely limited beyond the knowledge of the regulations' existence. Opinions on which market actor had primary responsibility for compliance with the regulations varied greatly.

The appliances selected for the surveys were those for which there was little data in the appliance database. Not surprisingly then, the authors' surveys found a general lack of knowledge of the Title 20 Appliance Efficiency Regulations. Interestingly, even certain appliance supply chains that are very knowledgeable on Title 24 Building Standards were unaware of Title 20. Even when compliance occurred, it did not appear to be influenced by Title 20.

One of the challenges to greater understanding of the standards regulation is the nature of the document itself. The regulations are written in a manner that is not easy to understand for those not well-versed in regulatory language.

Further, as the number of appliances regulated increases, and there are greater numbers of sellers, distributors, and manufacturers that are affected by regulations, there is greater need for more education on the standards requirements and scope.

**Frequency of Updates and Revisions to the Appliance Efficiency Regulations**

The California Title 24 Building Efficiency Regulations have a set schedule for updates and revisions, and one that has significant time between updates, so stakeholders can prepare in advance. The appliance standards, on the other hand, are a continuously updated code and hence harder to keep track of. This continuous update matched with a long list of regulated appliances makes it harder for stakeholders to keep track of all regulations, especially when the appliances are sold globally, and the vendors/retailers may not be limited to California for sales. This is especially true for large retailers or distributors who sell multiple appliances that are regulated by Title 20.

**Lack of Clarity of Roles in Ensuring Compliance**

It was unclear to many individuals the authors spoke with who was supposed to be enforcing these standards, and every individual seemed to have a different opinion on the matter. Collaboration by the Energy Commission with market actors will help determine the best process to ensure compliance. For example, in the torchiere market supply chain, retail outlets are the most common sales location. Asking retail management to limit their suppliers only to those whose torchieres met the regulatory requirements would be an effective compliance strategy. In comparison, for luminaries, lighting specifiers could limit their project specifications based on Title 20 regulations as a compliance strategy. However, without clear guidelines from the Energy Commission the tendency to "pass the buck" will continue regarding compliance with appliance regulations.

# Alternative Appliance Standards Enforcement Strategies

## *Identify and Establish Partnerships for Compliance Enforcement*

The Energy Commission has the regulatory authority and thus responsibility for ensuring compliance with the regulations. However, there are several other entities in the state that are equally concerned with the state meeting the efficiency regulations and should be willing partners in compliance enforcement efforts. These agencies are shaping public opinion on energy efficiency and in some cases working toward increasing the compliance rates with relevant standards. While the efforts of these agencies have been done in good faith and cooperation with the Energy Commission, there is nevertheless a need for a more structured and formal partnership between the Energy Commission and these agencies to ensure that the efforts are coordinated and intelligence is shared between agencies.

**California Investor Owned Utilities (IOU)**

Recent decisions by the California Public Utility Commission (CPUC) allows the California investor-owned utilities (IOU) to count energy savings achieved through Codes and Standards Enhancement (CASE) efforts toward their CPUC mandated energy efficiency program goals. This decision has fundamentally altered the perception of the IOUs in the standards development and compliance efforts. In the past, the CASE efforts were often seen as being contradictory to the IOUs' energy efficiency program goals. Now this barrier is no longer present, and in fact there is greater pressure on the IOUs to ensure that the energy savings estimated in the CASE proposals are indeed achieved in reality. This is because of another CPUC decision that allows the IOUs to only count those savings that are verified on site (and not those that were predicted in the CASE reports) toward program goals.

As a result of this new regulatory framework, the IOUs are getting more actively involved in compliance assistance efforts. For example, Pacific Gas and Electric (PG&E) is in the process of rolling out a statewide compliance assistance effort aimed at increasing compliance rates of appliances and buildings. One of PG&E's planned efforts is aimed at partnering with major retailers to increase awareness of, and thus better compliance with, the Title 20 regulations.

This has the potential to make the IOUs strategic partners with the Energy Commission in appliance standards enforcement efforts. However this also has the potential for conflicting enforcement related actions by the IOUs and the Energy Commission due to lack of knowledge about actions of the other, and potentially conflicting actions targeting the same stakeholders. It is therefore imperative for the Energy Commission and IOUs to coordinate their compliance enforcement activities so that they can share resources, market intelligence, compliance data, and stakeholder contact information.

**California State Climate Action Team**

The main interagency body for energy issues is the State's Climate Action Team (http://www.climatechange.ca.gov/climate_action_team/index.html) that takes a strategic view of energy security and energy efficiency in the state. This team brings together a number of state agencies, including:

- California Environmental Protection Agency (Cal/EPA) and Air Resources Board (ARB)
- Business, Transportation and Housing Agency (BTH)
- California Department of Food and Agriculture (CDFA)
- State and Consumer Services Agency (SCSA)
- California Department of Forestry and Fire Protection (CalFire)
- California Energy Commission (Energy Commission)
- Department of General Services (DGS)
- Department of Water Resources (DWR)
- Integrated Waste Management Board (IWMB)
- California Public Utilities Commission (CPUC)

There may be a role for including compliance (Title 20 and Title 24) as a strategic issue that could be discussed at this forum. This could be the proper forum to secure interagency agreements between the Energy Commission and relevant agencies such as the SCSA, Cal/EPA, and the ARB to share data relevant to appliance standards compliance.

**Sales Tax Regulatory Agencies**

The Board of Equalization (BOE) (www.boe.ca.gov) is responsible for the collection of sales taxes for goods sold in the state. Sales tax returns are submitted as gross sales recorded at the till (for small businesses) or via the inventory system (for large businesses). This gives no opportunity to identify individual appliance sales for a retailer. The audit functions done by the BOE do not go into the detail required for identifying the sale of noncompliant goods. However, options could be explored with the BOE to see if separate declarations could be made for state-regulated items that would aid in documenting appliance make and model numbers sold in the state. This documentation could then be shared with, and used by, the Energy Commission to determine the sale of non-compliant appliances in the state.

**Flex Your Power**

The Flex Your Power campaign has developed numerous informational resources aimed at increasing awareness of energy efficiency issues in the state. While this report is not intended to provide a comprehensive review of resources by this campaign, the following resources have strong potential to assist in the compliance enforcement efforts of the Energy Commission.

- Commercial and Residential Product Guides – These Web-based product guides are intended to provide an overview of the energy efficiency options for building products and appliances. They provide information about efficiency ratings such as Energy Star requirements for the product. Where relevant they provide information on what the federal efficiency standards are. However, these product guides do not provide information regarding relevant Title 20 regulations for these appliances, nor about how the customers can be certain of buying only California Title 20 compliant appliances.
- Product Finder – This Web-based search feature allows consumers to search for retailers/distributors who sell Energy Star compliant equipment in their area. This is geared toward finding Energy Star rated equipment. As the Title 20 regulations increase the number of consumer appliances it regulates, this product finder can be used to provide information about where consumers can find appliances that have been newly regulated by Title 20. This product finder can be combined with the list of Title 20-compliant equipment and results of compliance surveys to highlight those retailers/distributors that have high compliance rates with Title 20 as recommended later in this report.
- List of Manufacturers – For each appliance type, the website provides links to the Energy Star website to find manufacturers that meet the Energy Star requirement for that particular appliance. As mentioned in the item above, there is opportunity for the Energy Commission to add the list of Title 20 compliant manufacturers and model numbers to this list so that only those appliances that meet code are highlighted.

As with the IOUs and state agencies, the Energy Commission needs to establish a strategic partnership with Flex Your Power to coordinate their information dissemination activities as well as highlight results of the Energy Commission compliance enforcement actions.

**Multi-state Coalition**

As mentioned in Chapter 2 of this report, a coalition of states in the United States have established a regulatory framework to adopt and share California appliance certification and listing data in order to meet their own state regulations. This coalition greatly expands the geographic and political influence of the California Title 20 regulations.

A strategic partnership with this consortium of states that support California's appliance standards could be considered to highlight concerns about labeling and consumer awareness with a view to developing improved national appliance standards enforcement.

This strategic partnership could work in two ways:

- Coordinated Enforcement of California Regulations: The Energy Commission could share its energy efficiency regulation information, especially those pertaining to appliance certification and appliance database listings, with the member states of this coalition to increase the reach of its informational resources.
  As mentioned in Chapter 2, some of the states in the coalition have regulatory authority to levy penalties on non-compliant sellers of appliances. The Energy Commission can explore joint enforcement actions (such as coordinated market surveys and appliance testing) and information learned from such enforcement actions should be shared by all states. This will ensure that there is greater pressure on the manufacturers and retailers to comply with California regulations.
- Increased Enforcement of Federal Regulations: The primary responsibility of ensuring compliance with federal regulations lies with the federal regulatory bodies. However, the coalition of states along with California can form a unified interest group to lobby for greater enforcement actions by the federal agencies.
  One specific enforcement action that could be advocated is to ensure that only those appliances that comply with federal regulations are allowed to enter the country and thus individual states. U.S. Customs and Border Protection (CBP) is the unified border agency within the Department of Homeland Security (DHS). CBP combined the inspectional workforces and broad border authorities of U.S. Customs, U.S. Immigration, Animal and Plant Health Inspection Service, and the entire U.S. Border Patrol. This agency can have a role in ensuring that imported appliances meet relevant federal energy efficiency regulations. Such a precedent exists in Canada where the Canadian equivalent of the CBP requires importers to provide a list of appliances included in every consignment, and compares that list against the official database of regulated appliances. Thus, appliances that do not meet the energy efficiency regulations can be stopped from entering the country all together. This greatly reduces the need for more dispersed compliance enforcement efforts throughout the country. The CBP cannot enforce state laws, but could have a role in informing appliance importers that they must comply with the federal regulations, and with the Energy Commission's appliance standards if the imported appliances are to be sold in California (and partner states). This would be better affected at the import license application stage, if there is a working relationship between CBP and the state.

**Suggested Language for Section 1608**

There is no language in the current Title 20 regulations Section 1608 that requires or allows the Energy Commission to establish such strategic partnerships. HMG recommends the following draft language to be added to Section 1608

*Section 1608 (j)(1): Compliance Enforcement Partnerships*

*The Executive Director may identify partner agencies within the state of California, investor-owned utilities, agencies in other states in the United States, federal agencies regulating appliance standards*

*enforcement and other relevant agencies. The Executive Director may establish compliance enforcement partnerships with such partner agencies to coordinate enforcement actions.*

## *Establish Compliance Workgroups With Stakeholders*

This section concentrates on finding appropriate stakeholders that are involved in the manufacture and sales of appliances. Various regulatory entities around the world such as Australia have had good success with formal workgroups that assist regulators in developing regulations as well as identifying solutions to enforcement barriers. The Energy Commission has been developing its building and appliance regulations through a public process with participation of stakeholders. However, as the number of appliances increases, and as the stakeholder roles are more diffuse (no single stakeholder group controls sales of an appliance) there is a need for a more formal compliance workgroup or workgroups by appliances to engage all the stakeholders and regulators on an ongoing basis instead of only at the formative stages of the regulations. These compliance workgroups need to bring together all entities that are involved in developing regulations, selling appliances that are regulated as well as those partners that can assist in compliance enforcement.

### Identify the Right Stakeholders

A critical piece of successful enforcement and compliance of the Title 20 Appliance Efficiency Regulations is effective communication with market actors. Market actors are organizations who are involved in the manufacturing and sale of appliances, as well as representative groups. To determine the appropriate market actors, a study of the market is required. For appliances such as motors in pool pumps or under-cabinet luminaires, it is often not clear who is responsible for compliance. It is therefore important to clearly establish responsibilities of the different stakeholders and find the right stakeholders to engage in standards-making and enforcement efforts.

Often, this process is composed of searching for leads by trial and error, gathering information along the way until the market characteristics for the appliance is understood.

Although finding market actors is not a straightforward process, we recommend the following methods to find appropriate markets actors to communicate with on the enforcement and compliance of appliances:

- If available, review the appropriate Title 20 CASE report for any listed industry contacts, such as manufacturers and distributors.
- Contact the individuals involved in designing the standard to gather their industry contacts.
- Conduct a broad-based Internet search for commonly sold brands to create a list of manufacturers, retailers, and distributors
- Conduct an Internet search for corporate websites of the indentified market actors to identify telephone and mailing address information.

**Form Ongoing Relations With Retailers/Distributors For Compliance**

Once the right stakeholders are identified, there needs to be ongoing communication between the Energy Commission and the stakeholders. This ensures that the Energy Commission understands the market structure and the barriers to appliance standards compliance. It also ensures that the stakeholders understand not only the content, but also the intent of the regulations.

Such relationships exist between the Energy Commission and manufacturers of heating, ventilation, and air-conditioning (HVAC) equipment (to give an example). However, there has not been a long history of such relationships between the Energy Commission and retailers or distributors of appliances in the state. These relationships with retailers/distributors will continue to become critical as the number of foreign manufacturers increases and smaller/niche products start being regulated by Title 20.

**Identify Barriers for Compliance and Solutions For Barriers**

The compliance workgroups proposed earlier in this section can serve as a forum for discussions on what barriers exist in the marketplace, such as conflicting or unclear regulations, conflicting interests of stakeholders that are hindering compliance with the regulations. The workgroup can also serve as a forum to develop solutions to address these barriers, as well as delineate responsibilities for the various stakeholders and partners.

**Identify New Partners for Compliance Efforts**

One of the main goals of the workgroups should be to bring those stakeholders currently not aware of or involved into the standards compliance process. The workgroups can then serve the function of forming lasting relationships with stakeholders and get more insight into market forces that shape compliance, as well as intelligence on non-compliance by competitors.

**Develop Integrated Strategies for Compliance Enforcement With Partners**

As mentioned in the previous section it is important that the Energy Commission establish an integrated set of strategies for compliance with Title 20 that clearly outlines the roles and responsibilities of the various partners. This will ensure that partners do not engage in conflicting strategies and that they share data to help each other's efforts.

**Suggested Language for Section 1608**

There is no language in the current Title 20 regulations Section 1608 that requires or allows the Energy Commission to establish such compliance workgroups. HMG recommends the following draft language to be added to Section 1608

*Section 1608 (j)(2): Compliance Workgroups*

*The Executive Director may identify stakeholders responsible for sale of regulated appliances in the state of California, and may establish ad-hoc compliance workgroups with the aim of increasing awareness of and compliance with the regulations established in Sections 1603 through 1607 for those appliances that are within the scope of Section 1601 of these appliance efficiency regulations.*

### *Enhance Title 20 Information Resources*

The first priority of the compliance efforts should be to make sure that stakeholders know what the regulations are.

Studies conducted by HMG through this Energy Commission contract as well as other related efforts through the IOU compliance efforts have shown that there is a need for better education of the stakeholders that are not typically involved in the standards-setting process. As mentioned in Chapter 1, market actors at every stage of the supply chain indicated high awareness that California has separate and more stringent appliance efficiency standards than the rest of the United States, but their understanding was extremely limited beyond the knowledge of the Regulations' existence. There is a clear need for better education of these stakeholders on what the regulations are and what their responsibilities are. This includes both the need to find the appropriate stakeholder to educate, but also better education and information resources to explain the intent and content of the regulations.

**Title 20 Compliance Manual**

Most stakeholders cannot easily understand the labyrinthine nature of the Appliance Efficiency Regulations document and the language used for the standards document.

The Title 20 requirements vary significantly by type of appliance. Further, there are various classes of appliances within a type of appliance that have different federal or state requirements. The distinctions in these classes of appliances are often not clear to the stakeholders since they are not used to categorizing the appliances in such manner.

There is a need for an easier to understand document explaining the standards requirements in a language that can be easily understood by persons not involved in writing or enforcing the standards. There is a precedent to this type of resource through the Compliance Manuals for the Title 24 Building Energy Efficiency Standards.

**Title 20 Briefs for Product Groups and/or Seller Groups**

In the Appliance Efficiency Regulations, the requirements for a given appliance are often spread throughout several sections of the document, and there are several regulations that are not explicitly spelled out in the standards document when a certain requirement is applicable by inference (motor efficiency in appliances as an example). Understanding all the regulations and details of the regulations can prove quite daunting for persons without intimate knowledge of the regulations.

Retailers and distributors that sell multiple appliances regulated by Title 20 are particularly affected by this issue. A short, concise summary of all applicable regulations for a given appliance is the best way to educate the stakeholders on the regulations for that appliance. While it would help to have "Title 20 briefs" such as short electronic and printed document (2-8 pages) for all regulated appliances, they should be made a priority for consumer appliances where there are large numbers of retailers/distributors who are involved in the sale of the appliances. Market studies and stakeholder requests can identify the need for specific Title 20 briefs.

**Title 20 Website Improvements**

The current Energy Commission website includes sections devoted to Title 20 standards. These contain links to the official Title 20 document, links to related documents used in the development and implementation of the Title 20 standards, the appliance database and forms and procedures for appliance testing and certification. While this information is present on the website, there is definitely room for improvement in the presentation of the information.

One such improvement would be to make the appliance databases available in a searchable format on the website[9]. This will enable manufacturers, retailers, distributors, and consumers to search for compliant appliances in an easier manner. The current database structure of multiple zip files is not conducive to easy and fast search for compliant equipment. The Australian Standards website (http://www.energyrating.gov.au/index.html) is a good example of such a searchable database.

Another improvement would be to provide links for stakeholders to provide information about non-compliance to the appropriate Title 20 compliance officers.

**Title 20 Compliance Newsletters**

As the complexity of the standards increase and the number of stakeholders increase, there is a need for regular correspondence from the Energy Commission with the stakeholders to highlight specific appliance regulations, enforcement efforts and distribute official notices and correspondence. This can be achieved through regular newsletters published on the Energy Commission website as well as distributed via electronic mail.

The Title 20 compliance newsletter can also be used to highlight partnerships, stakeholder workgroups, enforcement results and calls for compliance.

The newsletters can also provide positive publicity for stakeholders that have high compliance rates and who are partners in compliance enforcement, as well as negative publicity for non-compliant stakeholders. Australia is a good example of regulators publishing regular compliance newsletters to this effect. (http://www.energyrating.gov.au/newsletters.html)

**Title 20 Training Events**

The Energy Commission needs to partner with the trade associations of retailers and distributors on standards education. In addition to providing standards information available through the website, there is also a need to take the education on standards to the stakeholders during their regular training events and conferences. These on-site training events can serve to gather stakeholder feedback as well as increase awareness of the other Energy Commission informational resources recommended above.

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[9] At the time of production of this report, the Energy Commission is making improvements to the database of compliant appliances so as to make it searchable on the Energy Commission website. These improvements are expected to be completed in spring/summer of 2009.

**Suggested Language for Section 1608**

There is currently no language in Section 1608 that specifies what kinds of informational and educational actions may be undertaken by the Energy Commission. It is not clear to HMG without input from the Energy Commission's legal advisors whether any such language is needed to implement the recommendations given above. However, in the event that the Energy Commission requires explicit authority to conduct such informational and educational actions, HMG recommends the following text to be added to Section 1608:

*Section 1608 (k): Appliance Efficiency Regulation Interpretations*

*(1) The Executive Director may make a written determination as to the applicability or interpretation of any provision of the appliance efficiency regulations.*

*(2) The Executive Director may, as required, give written advice concerning the meaning of any provision of the appliance efficiency regulations. Such advice is not binding on any person.*

## *Improve Enforcement Mechanisms*

Establishing partnerships and educating stakeholders eliminates unintentional non-compliance with the standards requirements; however they are no guarantee to 100 percent compliance. There will always be newer stakeholders and newer products regulated where the compliance is less than optimal or where barriers exist to compliance that is not uncovered by the consensus-based process described above. In such cases, the Energy Commission needs additional regulatory mechanisms that will enable the Energy Commission to gather market intelligence firsthand as well as act decisively against those stakeholders found to be non-compliant.

**Systematic Market Surveys and Inspections**

Without an active enforcement effort that includes proactive market-level studies (market intelligence) and targeted inspections, it is often not possible to catch loopholes in the Title 20 regulations or systemic abuse of the standards. Continuous and methodical market studies and third-party product testing greatly improve compliance rates as evidenced by Australia in its aptly titled policy report "*When You Keep Measuring It, You Know Even More about It!.*"

The principal benefit of conducting these studies in California at specified intervals will be that the Energy Commission can track changes in compliance levels by appliances or by retailer/distributor over the years of regulations. This will enable the Energy Commission to adapt to changing market conditions and adopt appropriate enforcement strategies.

The Energy Commission, as with most enforcement agencies, has a limited budget to conduct enforcement activities, and the number of products to be regulated continues to increase. The Australian example shows that the key to a good enforcement mechanism is to target the enforcement efforts by collecting information from various sources (retailer surveys, selective product testing, manufacturer data) about those appliances and retailers/manufacturers that are suspected of non-compliance. Developing such market intelligence involves cooperation from manufacturers associations, retailers and consumer groups. In the case of Germany for example,

one of the interviewees noted that the consumer magazines such as *TEST* are often the most active supporters of standards enforcement and conduct independent testing as part of their consumer awareness efforts.

In California, the stakeholder workgroups and partnerships explained earlier in this document can serve such a role. The IOUs' compliance plans may already include elements of market surveys and stakeholder identification. The Energy Commission should coordinate these activities with the IOUs and other partners to ensure there are no duplication of efforts and that results of partner sponsored studies are relayed to the Energy Commission in a timely manner.

The actual survey activity can be done by other private entities such as the IOUs or consumer groups as long as the Energy Commission sets rules and procedures for data to be collected.

*Suggested Language for Section 1608*

Section 1608 (d) (1) currently authorizes the Energy Commission to "periodically inspect appliances sold or offered for sale in the state, to determine whether they conform" with the relevant standards in Title 20.

HMG recommends the addition of the following language (added language in italics):

*Section 1608 (d) (1):*

*(A) The Executive Director shall periodically at set intervals inspect appliances sold or offered for sale in the state, to determine whether they conform with the applicable energy design and water design standards of Sections 1605.1, 1605.2, and 1605.3, and with the applicable marking requirements of Section 1607.*

*(B) The Executive Director shall establish procedures and schedules for such standardized appliance efficiency compliance inspections.*

*(C) The Executive Director may conduct said inspections without prior notice to the manufacturers and sellers of regulated appliances.*

**California Energy Commission Appliance Standards Enforcement Staff**

As far as HMG is aware, the Energy Commission currently does not have any specific staff assigned for conducting targeted store inspections as their primary responsibilities. As the Energy Commission considers expanding the role of surveys and inspections based on the recommendations above, the Energy Commission should also explore creating the role of inspectors or partner with other agencies who can assist with inspections. This is critical to ensure that there is dedicated staff available to collect necessary data. This however brings the challenge of hiring the appropriate persons who are qualified and training these individuals on a continual basis on the regulatory requirements.

In all practicality, the Energy Commission may not have enough resources in terms of staff and funding to cover the entire state and all the appliances through its in-house staff. Partnerships with the IOUs and other agencies can however help target the efforts of the Energy Commission resources.

*Suggested Language for Section 1608*

Section 1608 (d) (1) currently authorizes the Energy Commission to "periodically inspect appliances sold or offered for sale in the state, to determine whether they conform" with the relevant standards in Title 20. However, this section does not stipulate who conducts the inspections nor does it stipulate any qualifications for the persons conducting the inspections.

HMG recommends the addition of the following language (added language in italics):

*Section 1608 (d) (1):*

*(D) The Executive Director may assign at its discretion Title 20 regulatory compliance enforcement officers to conduct said inspections. The Executive Director shall establish policies and procedures for training, oversight and management of such compliance enforcement officers.*

*(E) The Executive Director may assign the tasks of inspections to persons not directly employed by the Executive Director, if the Executive Director establishes to its satisfaction that such persons meet the requisite criteria set out in the policies and procedures established per Section 1608(d)(1)(D).*

**Punitive Procedures**

Currently, the punitive options available to the Energy Commission include sending enforcement letters, conducting product testing at manufacturer costs, and delisting appliances from the database. These strategies work well when there are limited number of manufacturers and sales channels for appliances. However, increasingly manufacturers are not local (or even within the United States), and appliances regulated are more consumer-oriented and thus sold through various channels.

The Energy Commission should explore the regulatory options available to get powers to issue on-the-spot penalties for non-compliance (much like the Department of Motor Vehicles issues penalties for speeding or breaking traffic rules) as well as the authority to confiscate non-compliant equipment. Such powers have been used to great success in the Australian provinces. The penalties need not be large monetary amounts; however, they serve as a deterrent to non-compliance since the consequences of non-compliance are immediate.

*Suggested Language for Section 1608*

HMG is aware that such statutory authority is currently not available to the Energy Commission, and the use of such authority would require the presence of the aforementioned Energy Commission inspectors who are authorized to levy such penalties. However, assuming that such authority is granted to the Energy Commission and the role of compliance enforcement inspectors is established, the following language may be added to Section 1608 (d).

*Section 1608 (d) (3): Powers of the compliance enforcement inspectors*

*(A) An authorized person who has entered any premises in accordance with this Section may, on or in the vicinity of the premises, -*

*1. Carry out any examination or investigation;*

*2. Take measurements, photographs or recordings;*

*3. Take samples;*

*4. Dismantle any regulated appliance;*

*5. Subject any regulated appliance to any process or test;*

*6. Take possession of and detain any thing for so long as may be necessary—*

*(i) in relation to the exercise of any other powers under this Section;*

*(ii) to ensure that it is not tampered with before its examination is complete; or*

*(iii) to ensure that it is available for use in any proceedings;*

*7. Require the production of records or extracts of records and inspect and take copies of such records or extracts;*

*8. Require any person to afford him facilities and assistance in relation to matters within the control or responsibility of that person.*

*(B) If on inspection of the regulated appliance, the authorized person determines that the appliance does not meet the regulations established by the Appliance Efficiency Regulations, the authorized person may –*

*1. Issue a monetary infringement penalty notice per non-compliant appliance found during the inspection of the said facility.*

*2. The Executive Director shall establish appropriate monetary infringement penalties per non-compliant appliance*

*3. The person(s) in the receipt of such monetary infringement notice must pay the requisite monetary penalties to the Executive Director within 14 days of receiving such a notice unless they submit a written appeal to the Executive Director for review of said notice.*

*4. The Executive Director shall on the receipt of appeal initiate proceedings pursuant to Sections 11445.10-11445.60 of the California Government Code (or, at the appellant person(s) option, Sections 11425.10-11425.60 of the California Government Code).*

**Compliance Recognition**

As the Energy Commission or its partners conduct regular market surveys or inspections, it should be possible to develop compliance scores for various manufacturers, retailers, and distributors. This will enable the Energy Commission to identify the worst offenders for further punitive actions. This will also enable the Energy Commission to encourage those stakeholders that have high compliance rates.

Having developed these compliance scores, the Energy Commission can then provide recognition for manufacturers, distributors, and retailers who are shown to have high compliance rates with T20, and who contribute positively to code development and

improvements. This can be through the compliance newsletters, Energy Commission website, and other publications. This can also be in the form of compliance certificates or other recognition.

At the same time, those manufacturers and sellers that are found to have low compliance scores can be called out by making the compliance ratings public in the compliance newsletter, Energy Commission website and other publications.

Australia and Japan both have history of doing such ratings and publicity (good or bad) for various appliances and sellers.

**A "California Title 20 Compliant" Label With Standardized Information for Products Not Covered by Federal Standards**

While Section 1607 of the current Title 20 regulations does require certain information to be "permanently, legibly, and conspicuously displayed on an accessible place on each unit," these regulations do not require the manufacturers to attach compliance data in any standard format (label) on the appliances sold in the market. For those appliances governed by federal regulations, standard labels such as Energy Star or Energy Guide ensure that the manufacturers and retailers know the exact nature of information to be presented, and consumers can compare appliances objectively.

However, for products governed only by Title 20 standards, sellers are not required to provide compliance data in any specific format. As a result, it is not easy for retailers, distributors and consumers to know which products meet California regulations.

The Energy Commission would probably need regulatory authority to develop a standard label format, but this aspect has not been explored further by HMG at this stage. Also the wide variety of appliances regulated and the large number of appliance features regulated, may make it difficult to develop a consistent label. However, a simple "*Title 20 compliant*" label that sellers are required to attach to those products registered with the Energy Commission and listed in the Energy Commission appliance database should decrease the confusion currently seen in the retail market for such products.

The Energy Commission staff has brought to the attention of HMG, Section 17533.6 of the California Business and Professions Code and referenced in the Energy Commission's "Generic Test Laboratory Application" instructions, which states:

"The Energy Commission is aware of statements in marketing literature stating or implying Commission approval of products or services. The Energy Commission does not endorse, favor, or recommend any particular product or service. Moreover, California law states that "It is unlawful for any person, firm, corporation, or association that is a nongovernmental entity to . . . solicit the purchase of or payment for a product or service . . . by means of a mailing, electronic message, or Internet Web site that contains a seal, insignia, trade or brand name, or any other term or symbol that reasonably could be interpreted or construed as implying any state or local government connection, approval, or endorsement," with exceptions not relevant here."

*Suggested Language for Section 1608*

Further analysis is warranted to establish if the regulation mentioned above would preclude the creation of a California Compliant label by the Energy Commission. At this time therefore HMG is unable to determine the exact language to be inserted in Section 1608.

However, HMG does feel the need for expansion of Section 1608 (h) to specify thus:

*Section 1608 (h)*

*(A) The Executive Director may specify, and require the use of, any particular form or format for the submittal of any data, reports, or other information required by this Article, including but not limited to computer programs or formats.*

*(B) The Executive Director shall specify, and require use of a standard format for the display of certification and labeling data prescribed by Sections 1606 and 1607 of the Appliance Efficiency Regulations on every appliance displayed, sold or offered for sale in the state of California in a conspicuous location on the appliance itself as well as on the product packaging and marketing materials.*

**Other regulatory mechanisms for the future**

HMG's analysis of appliance standards worldwide indicated that many regulators are looking into the use of innovative regulatory mechanisms in order to make big leaps in energy efficiency standards rather than small incremental changes in standards. One such approach is the one used by Japan and is called the "Top Runner" approach. Under this approach the appliance efficiency baseline is based on the efficiency of the most efficient products commercially available in each product category. The manufacturers and sellers are then given a 3-4 year window in which to achieve the efficiency level set by the regulator. This achievement is measured on a sales-weighted basis much like the CAFÉ standards for fuel efficiency are regulated for automobiles in the United States. Each year, manufacturer and retailer progress is tracked using sales figures.

The merits and demerits of such an approach are now being debated in the European Union. This approach may provide faster increase in energy efficiency of appliances, but also requires much higher level of cooperation from sellers and manufacturers than what is required for the current regulations in California. Getting sales data on specific appliance models has also proven to be a major challenge in California (as indeed with most anywhere in the world).

However, the Energy Commission may wish to look into such approaches as part of its strategic planning and to meet the greater goals of climate mitigation by 2020/2030 set out by the California Legislature and the Governor. Compliance workgroups set up as recommended earlier in this report can help in developing the necessary framework for considering such innovative approaches to regulation and enforcement.

# CHAPTER 4:
# Prioritized Enforcement Efforts

The authors of this report have identified several strategies for the Energy Commission to consider incorporating into their appliance standards enforcement efforts. Each strategy has merits and limitations, and the authors do not anticipate a 'magic bullet' solution to improving standards compliance. The authors recommend however, that the Energy Commission adopt a comprehensive approach that includes several strategies identified in this document. The authors recommend a particular mix of strategies based on the information gathered during this project. The organization of the set of recommendations in this section can be explained in simpler terms through a concept widely known as the Tipping Point theory.

## Tipping Point Concept

In sociology, a tipping point or angle of repose is the event of a previously rare phenomenon becoming rapidly and dramatically more common. The phrase was coined in its sociological use by Morton Grodzins – a professor of political science at the University of Chicago – by analogy with the fact in physics that adding a small amount of weight to a balanced object can cause it to suddenly and completely topple. The phrase has extended beyond its original meaning and been applied to any process in which, beyond a certain point, the rate at which the process proceeds increases dramatically. It has been applied in many fields, from economics to human ecology to epidemiology.

The basic premise of the concept is fairly simple: Any change to the status-quo is initially met with resistance and lack of traction due to entrenched interests. In this period, much effort is required to initiate changes in established behavior. Over time, and as more people start changing their established behavior, it gets progressively easier to implement widespread change. At a certain point, the process reaches the Tipping Point – a stage in change – where there is a confluence of events, or critical mass of followers, or both that leads to a sudden and expeditious change in behavior.

The authors of this report do not claim to be social scientists nor do they claim Tipping Point to be the sole mechanism of change. However, the authors do find the current appliance standards compliance landscape to be ripe for adaptation of this theory.

The authors claim that, in many ways, the State of California has reached the Tipping Point in terms of the policy makers' desire to ensure better compliance with appliance standards. The Energy Commission through this project has acknowledged the need for better compliance efforts. The California investor-owned utilities (IOUs) and the California Public Utilities Commission (CPUC) have also identified codes and standards as an area for further efforts. The IOUs' and CPUC's interest in better code compliance is driven largely by the change in CPUC policy that now allows the IOUs to claim energy savings through codes and standards enhancement efforts. As with any other energy efficiency programs, it is now incumbent on the

IOUs and the CPUC to ensure that energy savings through codes and standards adopted due to IOU participation in the codes and standards development process are achieved in practice.

The other aspect to this policy Tipping Point is the generally increased awareness of energy efficiency and its benefits to the environment as well as the economic bottom line for businesses and households.

Thus, the stage is set for a renewed push toward greater compliance with codes and standards as part of an increased emphasis on energy efficiency in buildings and appliances.

However, at this point in time, the California appliance standards enforcement is not close to the Tipping Point in terms of the actual compliance with standards in the field. The authors have identified several reasons for this in Chapters 1-3 as well as recommendations for overcoming those obstacles.

## Agents of Change for Compliance

There are several agents of change that will assist the compliance enforcement efforts by the Energy Commission. These can be categorized somewhat loosely into the following categories:

**Regulatory Compliance Activity**

The bulk of recommendations of this report fall into the category of regulatory mechanisms – be they educational efforts or punitive actions. The actions to be initiated by the Energy Commission, IOUs, and CPUC all carry the weight of a regulatory policy that will aim to drive for change in consumer and business behavior toward appliance standards compliance.

The Energy Commission already does regulatory activities in support of compliance as outlined in Chapter 3 of this document. The IOUs and CPUC are gearing up toward assisting this process through significant efforts starting in 2009. More needs to be done, of course, and the following section identifies specific strategies for consideration.

**Social Aspect to Compliance**

The role of public awareness or the overall social aspect to regulations is one that is not often studied. However, as the authors documented through the summary of appliance standards enforcement around the world, the societal aspect of regulation can be equally important. An educated, engaged populace can definitely assist and ultimately drive the need for better compliance. An example shared in Chapter 3 is that of Germany, where the role played by non-regulatory actors such as consumer groups and magazines is almost as important as the role played by regulatory agencies.

So far in California, this aspect to compliance enforcement has largely been untapped. With increasing awareness of energy efficiency as a big component of fighting global warming, the stage is set for increased societal participation in compliance efforts.

**Carrot AND the Stick**

Positive reinforcement (information) by itself will help but will not get to the Tipping Point without punitive activity. A review of compliance enforcement around the world underscores the need for a balanced approach between providing encouragement to stakeholders and the threat (real or implied) of punitive actions.

Providing the proverbial "carrot" by providing informational resources, engaging stakeholders, praising good behavior is very important in changing public awareness and perception of standards. This reduces the chance of accidental non-compliance.

However, this approach can fail for those few stakeholders that are willingly not complying with the standards. Having a robust mechanism to track non-compliance and to punish those willingly non-complying is critical to ensure a level playing field for all stakeholders. This is akin to a "maximum enforcement" action undertaken by the CHP[10] and local police departments to reduce instances of drunk-driving in the state. Doing such "maximum enforcement" can be cost-prohibitive on a sustained basis, but doing strategically placed enforcement locations, as well as strategically timed efforts, reminds everyone of the consequences of not complying with DMV[11] rules.

# Prioritized Compliance Enforcement Recommendations

The authors have identified several enforcement strategies that need to work together to achieve the goal of increased compliance with appliance regulations. To assist the Energy Commission staff in selecting appropriate strategies, the authors have organized the recommendations into short-term (immediate), medium-term, and long-term. These terms refer to the amount of time it would take the Energy Commission to implement the measures based on regulatory and budgetary constraints. The categorization does NOT mean that efforts on the long-term measures need to start in the long-term. Rather, Energy Commission staff should start efforts for all measures at the earliest opportunity. The categorization merely points out that some measures can be adopted immediately, while others will take more sustained efforts to implement.

# Short Term (Immediate)

## *Enhance Title 20 Informational Resources*

The first priority of the compliance efforts should be to make sure that stakeholders know what the regulations are.

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[10] CHP: California Highway Patrol

[11] DMV: California Department of Motor Vehicles

Studies conducted by HMG through this Energy Commission contract as well as other related efforts through the IOU compliance efforts have shown that there is a need for better education of the stakeholders that are not typically involved in the standards setting process. As mentioned in Chapter 1, along every stage of the supply chain, market actors indicated high awareness that California has a separate and more stringent standard than the rest of the United States, but their understanding was extremely limited beyond the knowledge of the regulations' existence. There is a clear need for better education of these stakeholders on what the regulations are and what their responsibilities are. This includes both the need to find the appropriate stakeholder to educate, but also better education and information resources to explain the intent and content of the regulations.

Lack of knowledge can greatly enhance "accidental non-compliance," where the stakeholders are not complying because they are not aware that the particular appliance is non-compliant.

Chapter 3 identifies several specific informational resources that need to be enhanced or added to the public information provided by the Energy Commission regarding appliance standards.

### *Establish Compliance Partnerships*

Other entities such as the IOUs have identified a similar need for greater education of their customers to improve compliance. As mentioned earlier in this report, the IOUs have a clear stake in ensuring greater compliance with standards that they have been actively championing through the codes and standards process. The IOUs have developed their own plans to greatly enhance codes and standards awareness. The Energy Commission and the IOUs must initiate constructive and comprehensive discussions to ensure that each entity can support the actions of the other, and the information resources developed are complementary and effective.

Apart from the IOUs, the Energy Commission should also establish working partnership with the other public awareness campaign in the state for energy efficiency, namely the Flex Your Power (FYP) campaign. As identified in Chapter 3, the FYP campaign has had great success in raising public awareness of energy efficiency. However, this resource has not been tapped yet for greater awareness of appliance standards. In fact, the authors of this report could not find any direct references to Title 20 on the FYP website, when at the same time EnergyStar and other regulations were mentioned in detail.

Last but perhaps most important, the Energy Commission must establish consistent and ongoing relations with large retailers and distributors. These entities have been consistently identified as the key stakeholders responsible for compliance and ones that can influence the point-of-sale of all regulated appliances in the state. Currently, the Energy Commission engages the retailers and distributors on ad-hoc basis depending on the need for their review and participation in the standards development process. These entities are also often the source of information on non-compliance by their peers. Having a more structured partnership with the retailers and distributors would provide a forum for the Energy Commission to understand their concerns and tailor enforcement resources to meet current gaps in compliance.

### *Tap Into the Social Aspect to Compliance Through a "Non-Compliance" Hotline*

The participation of the average consumer (business or home) can only assist in any compliance enforcement efforts. An educated consumer can be an important ally by reporting instances of non-compliant appliances being sold in the state. For example, if a consumer spots a non-compliant torchiere being sold in a store, it would help the enforcement efforts of the Energy Commission if the consumer has an avenue to convey that information to the Energy Commission. To that end, it would be a good idea to establish a "Non-Compliance Hotline" for consumers to call or email their complaints regarding non-compliance. There are several options for providing a hotline. The traditional approach has been to provide a toll-free number; however, this approach entails establishing the infrastructure such as staff, training, and oversight. A simpler approach may be to start with a website email link that is sent to a dedicated mailbox accessible to the appliance staff within the Energy Commission. This should be a simple and almost no-cost measure since the Energy Commission Webmaster should be able to set up this mailbox.

The efficacy of this compliance hotline is subject to the knowledge of the consumers – the less educated and aware the consumers are, the less effective this approach will be. However, the link has other advantages in that it will provide immediate visibility to the issue of standards compliance to those outside of the Energy Commission and standards development process.

The presence of the hotline or hotlink does carry with it an implied expectation of follow-up actions from the Energy Commission staff. Even a simple acknowledgement of the complaint with a promise to follow-up should encourage those who wish to take advantage of this link.

## Medium Term

### *Systematic Market Surveys*

**Need for Information**

The issue of compliance enforcement is somewhat complicated by the "chicken-and-egg" problem of lack of knowledge of the market, and lack of efforts to regulate the market. Without knowledge of where and how non-compliance happens, it is hard to target compliance enforcement efforts. On the other hand, without sustained compliance efforts, the areas of non-compliance may keep growing. Many entities around the world – Australia is perhaps the best example of this – have realized that the solution to this problem is sustained efforts at understanding the market and the impacts of existing enforcement actions. These are best done through structured and repeated market surveys. Australia, for example, repeats the same market study every year. This helps track progress of compliance efforts, identify patterns in non-compliance, and guide changes to policies.

**Partner with IOUs / Consumer Groups/ Retailers**

The Energy Commission needs to set the agenda for the quantity, quality, and accuracy requirements on the market studies. The Energy Commission also needs to set a mechanism for review of the market results and develop recommendations for future compliance actions.

To do this in-house, the Energy Commission would most probably need to rely on hired contractors to conduct the surveys since the Energy Commission lacks staff resources in-house for such statewide efforts.

The other alternative is for the Energy Commission as the policy maker to define the scope of the surveys, but let private entities such as the IOUs conduct the market studies. Partnerships with the IOUs established through the short-term measures identified above would provide the forum for developing a mutually acceptable schedule and structure of the surveys. Other partners such as the retailers themselves could also play a significant role by providing sales data on various appliances, and consumer groups can assist in conducting the surveys.

**Publish Findings**

In addition to conducting the market studies, it is equally important to understand the implications of the findings and develop work-plans based on the survey results. Publishing the survey findings would enable partners and other experts to provide feedback. It will also enable the Energy Commission to get all stakeholders not part of the survey efforts, to understand where the non-compliance is occurring so they can take corrective measures as needed, or assist in better enforcement actions.

**Update the Appliance Database**

The Energy Commission maintains a database of appliances on its' servers. This can be easily updated or tracked as more market intelligence is gathered from the surveys. If the surveys uncover appliances that are not listed in the database, the Energy Commission staff can initiate actions to have the manufacturers certify their appliances to the Energy Commission so that their appliances may be added to the database. The other reason to keep the database updated is that the database can serve as a basis for identifying appliances that may not meet the code requirements, and thus trigger follow-up actions.

### *Compliance Recognition*

**Need for Transparency**

One of the challenges to compliance enforcement efforts is the often secretive nature of the enforcement proceedings. Indeed it is often necessary to conduct enforcement activity away from public attention to achieve a successful resolution. However, the authors of this report are not aware of any reasons – legal or political – that would prevent the Energy Commission from publishing findings from enforcement actions. To take a page from Australia and Japan, the more transparent the process of enforcement becomes, the more aware the average consumer/retailer is about appliance standards.

**Compliance Scores**

As the Energy Commission learns more about the market and conducts additional enforcement activity, it can develop compliance scores for stakeholders to rate their compliance with the standards. These scores can be made public, along with the enforcement actions taken by the Energy Commission related to those findings.

Those entities that are following the regulations would then benefit by positive publicity, while those that are not complying will have reason for corrective action – greater public awareness of non-compliance may put them at a competitive disadvantage with those that comply with standards.

**Enforcement Newsletter**

One of the means of providing a structured flow of information about enforcement actions and results is a periodic compliance newsletter. Similar to the Energy Commission's existing publication *Blueprint*, this enforcement newsletter can be released periodically to highlight specific efforts or partnerships.

The newsletter can serve as a forum to highlight accomplishments, partnerships and invite participation from all stakeholders. In today's electronic age, this newsletter should take the form of an electronic newsletter that can be accessed through the Energy Commission website.

# Long Term

## *Enforcement Powers*

All the studies, publications and partnerships may not be sufficient to deter those that are intent to not meet the code provisions. For these individuals or entities, it is very important that the Energy Commission has authority to impose punitive measures.

**Additional Staff**

The Energy Commission currently lacks the manpower necessary to undertake comprehensive enforcement activities beyond the "surgical strikes" that the Energy Commission staff undertakes through targeted activities. Having more "boots on the ground" and more staff to deal with non-compliance can significantly assist in implementing a robust enforcement plan.

At one level, there is a need for additional staff to serve as liaisons with industry and other partners. On another level, there is a need for additional staff to manage and implement enforcement actions. There is also a need for staff to act as compliance enforcement agents that can conduct more active field reconnaissance and follow-through.

The nature and number of these additional staff resources will depend on the nature of enforcement activities chosen by the Energy Commission, and may be dependant on budgetary constraints.

**Punitive Powers**

Currently, the Energy Commission has limited leverage for punitive actions – mostly in the form of letters of non-compliance, and removal from appliance database as a final 'stick' if all else fails. However, these procedures take time and resources and may not be sufficient to deter those who do not mind having their appliances not listed.

An additional avenue for punitive action may be in the form of providing the Energy Commission enforcement staff the authority to impose on-the-spot penalties for non-compliance. Such strategies have been proven successful in Australia, for example.

In more extreme cases, there may be some merit to have the authority to detain or remove from the stream of commerce non-compliant equipment while other enforcement actions continue. However, this approach requires more man-power and has more potential for conflict between enforcement staff and stakeholders. It nevertheless will have the power to serve a powerful warning to those willing to risk non-compliance – namely, the loss of goods and therefore money.

## Enforcement Strategy Matrix

HMG does not anticipate that all strategies will serve all stakeholders equally, and has identified specific stakeholders or types of appliances where each strategy is more relevant. HMG has developed a matrix framework of the standards regulations, stakeholders and strategy options. This matrix framework provides an overview of which strategies are suited for which appliances and stakeholders. The matrix should help develop an appropriate mix of strategies that the Energy Commission can adopt.

An electronic copy of this matrix is attached with this report for Energy Commission review.

# Glossary

ACCC – Australian Competition and Consumer Commission

ACEEE – American Council for an Energy Efficient Economy

ADEME – French Environment and Energy Management Agency

AGO – Australian Greenhouse Office

AHAM – Association of Home Appliance Manufacturers

AHRI – The Air-Conditioning, Heating, and Refrigeration Institute

APEC – Asia-Pacific Economic Cooperation

ARB – Air Resources Board

ARI – Air-Conditioning and Refrigeration Institute

ASAP – Appliance Standards Awareness Project

ASHRAE – American Society of Heating, Refrigerating and Air-Conditioning Engineers

BOCA – Building Officials and Code Administrators International

BOE – Board of Equalization

BTH – Business, Transportation and Housing Agency

Cal/EPA – California Environmental Protection Agency

CalFire – California Department of Forestry and Fire Protection

CASE – Codes and Standards Enhancement (California)

CBP – U.S. Customs and Border Protection

CBSA – Canada Border Service Agency

CCRA – Canada Customs and Revenue Agency

CDFA – California Department of Food and Agriculture

CHP – California Highway Patrol

COAG – Council of Australian Governments

CPUC – California Public Utilities Commission

CSA – Canadian Standards Association International

DEFRA – Department for Environment, Food and Rural Affairs (United Kingdom)

DGS – Department of General Services

DHS – Department of Homeland Security

DMV – California Department of Motor Vehicles

DWR – Department of Water Resources

E3 Committee – National Equipment Energy Efficiency Committee of Australia

ECCJ – Energy Conservation Center of Japan

ECEEE – European Council for an Energy Efficient Economy

EDI – Electronic Data Interchange system (Canada)

ELD – Energy Labelling Denmark

EU – European Union

EuP – Energy-using Products (European Union)

FTC – Federal Trade Commission

FYP – Flex Your Power

HMG – Heschong Mahone Group, Inc.

HVI – Home Ventilating Institute

ICBO – International Conference of Building Officials

IOU – California investor-owned utilities

IWMB – Integrated Waste Management Board

LBNL – Lawrence Berkeley National Laboratory

MCE – Ministerial Council of Energy (Australia)

MEPS – Minimum Energy Performance Standards

METI - Minister of Economy, Trade and Industry (Japan)

MOU – Memorandum of Understanding

NAs – Negotiated Agreements

NATA - National Association of Testing Authorities (Australia)

NEMA – The Association of Electrical and Medical Imaging Equipment Manufacturers

NRCan – Natural Resources Canada

SCC – Standards Council of Canada

SCSA – State and Consumer Services Agency

UK – United Kingdom

UL – Underwriters Laboratories

U.S. DOE – United States Department of Energy

U.S. EPA – United States Environmental Protection Agency

WA – Work Authorization issued by the California Energy Commission