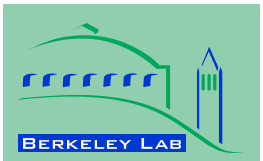
LBNL-5289E



ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY

Status of the Local Enforcement of Energy Efficiency Standards and Labeling Program in China

Nan Zhou, Nina Zheng, Cecilia Fino-Chen, and David Fridley
China Energy Group, Energy Analysis Department
Environmental Energy Technologies Division
Lawrence Berkeley National Laboratory

Cao Ning
China National Institute of Standardization

November 2011

This work was supported by the China Sustainable Energy Program of the Energy Foundation and the Collaborative Labeling and Appliance Standards Program (CLASP) through the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.

Disclaimer

Abstract

As part of its commitment to promoting and improving the local enforcement of appliance energy efficiency standards and labeling, the China National Institute of Standardization (CNIS) launched the National and Local Enforcement of Energy Efficiency Standards and Labeling project on August 14, 2009. The project's short-term goal is to expand the effort to improve enforcement of standards and labeling requirements to the entire country within three years, with a long-term goal of perfecting overall enforcement. For this project, Jiangsu, Shandong, Sichuan and Shanghai were selected as pilot locations. This report provides information on the local enforcement project's recent background, activities and results as well as comparison to previous rounds of check-testing in 2006 and 2007. In addition, the report also offers evaluation on the achievement and weaknesses in the local enforcement scheme and recommendations.

The results demonstrate both improvement and some backsliding. Enforcement schemes are in place in all target cities and applicable national standards and regulations were followed as the basis for local check testing. Check testing results show in general high labeling compliance across regions with 100% compliance for five products, including full compliance for all three products tested in Jiangsu province and two out of three products tested in Shandong province. Program results also identified key weaknesses in labeling compliance in Sichuan as well as in the efficiency standards compliance levels for small and medium three-phase asynchronous motors and self-ballasted fluorescent lamps. For example, compliance for the same product ranged from as low as 40% to 100% with mixed results for products that had been tested in previous rounds. For refrigerators, in particular, the efficiency standards compliance rate exhibited a wider range of 50% to 100%, and the average rate across all tested models also dropped from 96% in 2007 to 63%, possibly due to the implementation of newly strengthened efficiency standards in 2009.

Areas for improvement include: Greater awareness at the local level to ensure that all manufacturers register their products with the label certification project and to minimize their resistance to inspections; improvement of the product sampling methodology to include representative testing of both large and small manufacturers and greater standardization of testing tools and procedures; and continued improvement in local enforcement efforts.

Table of Contents

1. Introduction

With growing awareness of the importance of energy efficiency and government support for reducing the growth of energy consumption, China has undertaken actions to strengthen and expand its appliance and equipment energy efficiency standards and labeling programs in recent years. After over twenty years of experience with standards and labeling programs, China now has minimum energy performance standards (MEPS) for over 30 products and a mandatory energy information label (China Energy Label) covering 19 products. One particular area of focus that has emerged with the expansion of the standards and labeling programs is the need for improved implementation and enforcement of the energy efficiency standards and the China Energy Label. With the support of international organizations including the Collaborative Labeling and Appliance Standards Program (CLASP), LBNL, and the Japanese Ministry of Economy Trade and Industry and Institute of Energy Economics, the China National Institute of Standardization (CNIS) initiated compliance testing in 2006 in response to the increasing need for the development of a monitoring system to track compliance with MEPS and the energy label.

Check-testing of the energy efficiency of major regulated appliances and compliance with applicable minimum energy performance standards and energy labeling has been undertaken in other countries with mandatory labeling programs such as Australia but had not been conducted on a national scale before 2006 in China. In 2006, CNIS, with international support, conducted modest sample testing for refrigerators, freezers and room air conditioners in the sample cities of Beijing, Shanghai and Hefei.. The results found that 11 out of 54 tested products were out of compliance and that performance varied between models sold in high-end, first-tier appliance retailers and those sold in second- and third-tier retailers. A second phase of follow-up check-testing was conducted in 2007 and revealed higher overall average compliance of 96%, or compliance in 70 out of 73 tested models, after models that initially failed had been retested. In 2009, CNIS also launched an inter-laboratory round-robin testing of air conditioners to verify consistency and accuracy of testing between different test laboratories. Since the earlier rounds of check-testing and round-robin testing have been discussed in other reports[1], this report focuses on the most recent round of regional appliance energy efficiency check-testing.

As part of its commitment to promoting and improving the local enforcement of appliance energy efficiency standards and labeling, CNIS launched the National and Local Enforcement of Energy Efficiency Standards and Labeling project on August 14, 2009. The project's short-term goal is to expand the effort to improve enforcement of standards and labeling to the entire country within three years, with a long-term goal of perfecting overall enforcement.[2] Under this project, the provinces of Jiangsu, Shandong, Sichuan and the city of Shanghai were selected as the pilot locations.[3] This report provides information on the background, activities and results of the current round of the enforcement project as well as comparisons with previous rounds of check-testing.

[1] See: Zhou, et al., 2008, "Check-testing of manufacturer self reported labeling data and compliance with MEPS." LBNL Report-247E; Saheb et al., 2011, "Compliance and verification of standards and labeling programs in China." LBNL Report-4599E.

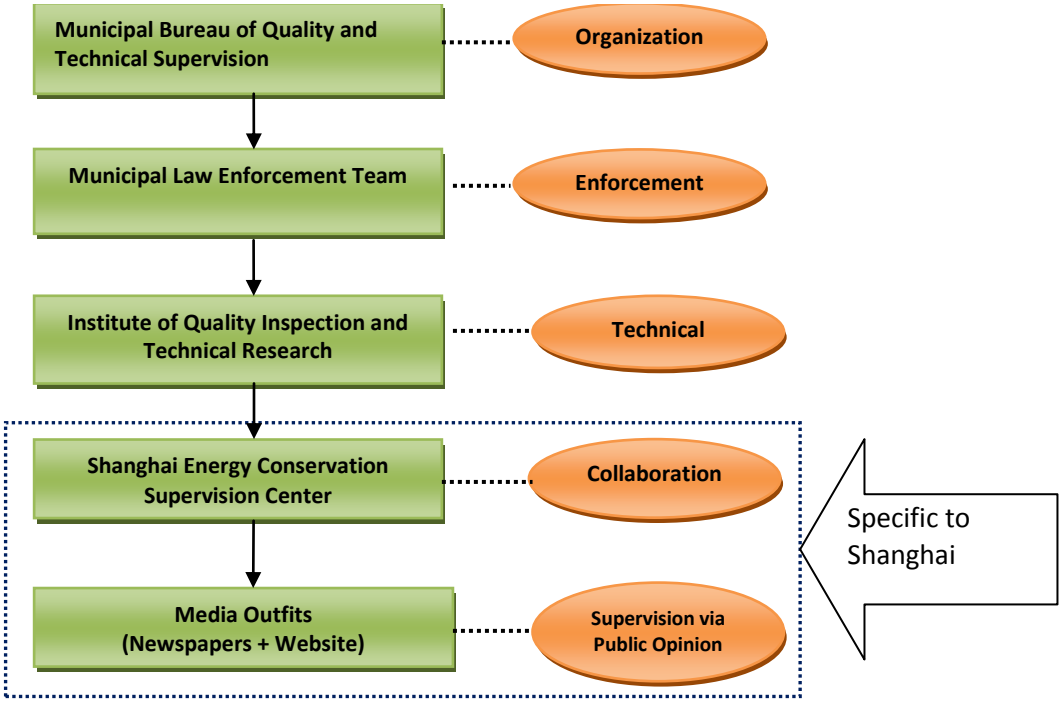
[2] Web portal of China's Central Government. 2009. AQSIQ:China launched its national and local enforcement of energy efficiency standards and labeling (质检总局：我能效标准标识实施机制推进项目启动). http://www.gov.cn/gzdt/2009-08/25/content_1400681.htm. Access Oct. 26, 2011.

[3] Ibid.

2. Organizational Structure

In implementing this project, the four pilot locations (Jiangsu Province, Shandong Province, Sichuan Province and Shanghai City) established organizational structures as illustrated in the case of Shanghai in Figure 1 below. In the case of the three provinces, the provincial Bureau of Quality and Technical Supervision took the lead in organizing and mobilizing enforcement, supported by the city-level Bureau of Quality and Technical Supervision which actually undertook enforcement. The products subject to testing were randomly selected from manufacturers' warehouses, and/or retailers and sent to the provincial Institute of Quality Inspection and Technical Research for label compliance inspection and energy efficiency check testing. For Shanghai, its municipal government took enforcement one step further by collaborating with its Energy Conservation Supervision Center and inviting five media outfits (primarily newspapers) to oversee their work via public opinion.[4]

Figure 1 Organizational Structure for Local Enforcement Programs in Shanghai City



Funding for the 2009 local enforcement project primarily came from the Energy Foundation in China, with CNIS allocating a total of 0.2 million RBM to each local Institute of Quality Inspection and Technical Research. The local governments contributed from their own budget to supplement the funding and provided in-kind support. Although no details are available from the four pilot locations regarding their 2009 budgets and expenditures for the project, the funding was used to underwrite local efforts in sampling, inspection and testing, data collection and statistical analysis, labor costs, as well as project publicity campaign and training[5]. Statistics on the specific staffing resources for the market inspection

[4] Shanghai Institute of Quality Inspection and Technical Research. January 27, 2011. "Work Summary of National and Local Enforcement of Energy Efficiency Standards and Labeling".

[5] "2010 Sichuan Province's monitoring system for energy efficiency products" (draft).

and check-testing were not available due to the complexity of various levels (e.g. city, county, and district) of government agencies involved in enforcement. In the absence of specific data on staffing or detailed breakdown of monetary resources for the enforcement project in the four pilot locations, the organizational structure provides a glimpse into the core institutional resources.

Given the growing number of check-testing projects in China, it should be noted that this local enforcement project is not linked to the national-scale market inspection conducted by CNIS for the China Energy Label System, which is focused on improving nation-wide compliance. It is, however, linked to other government policies such as the "Home Appliances to Rural Areas," a subsidy project promoting the sale of efficient appliances, and the governmental supervision of local products. The local inspection results are fed into the CNIS's nation-wide inspection program as well.

3. Check-testing Process and Results

3.1 Energy Efficiency Labeling Compliance Inspection

Inspection Process[6]

The first step in the inspection process is to identify the target criteria for energy efficiency label compliance inspections. Across Jiangsu, Sichuan, Shandong and Shanghai, the four criteria that were targeted for inspection include:

- Energy efficiency label implementation by the inspected manufacturer, including whether it has registered with the government to be part of the label certification project, the percent of products produced by a manufacturer that have an energy label, as well as how it manages the labeling system;
- Whether inspected products are properly labeled in compliance with the requirements set out by the government;
- Whether the design of the label of inspected products is in compliance with pertinent requirements;
- Whether the information on the energy label is consistent with that on the nameplate of the products inspected.

For the 2009 local enforcement project, the pilot provinces and city each identified the types of products to be included in the energy efficiency label compliance inspection as well as energy efficiency check-testing based on two conditions: the capabilities of local laboratories in testing the selected products and the potential social impact brought about by the selected products. The greater the impact that a product's efficiency could have on the market (i.e., if product is in widespread use or if it consumes significant amount of energy per unit), the more likely that product will be selected for inspection and check-testing (Table 1). For Jiangsu, room air conditioners, self-ballasted fluorescent lamps (a.k.a "energy-saving lamp"), and electric storage water heaters were selected. For Sichuan, small and medium three-phase asynchronous motors and self-ballasted fluorescent lamps were selected. For Shandong, household induction cooktops, household refrigerators and small and medium three-phase asynchronous motor were selected. For Shanghai, household refrigerators, inverter (variable speed) air-conditioners and LCD computer monitors were selected.

[6] Information on the process is based on 2010 energy efficiency labeling enforcement and supervision draft scheme of Jiangsu, Sichuan, Shandong and Shanghai Province, since 2009 information on the process was not available. However, it is reasonable to believe that the same process was followed by each of the participating provinces and city.

Table 1 Products included in 2009 Energy Efficiency Check-Testing

	Jiangsu	Sichuan	Shandong	Shanghai
Room air conditioners	√			
Self-ballasted fluorescent lamps	√	√		
Electric storage water heaters	√			
Small and medium 3-phase asynchronous motors		√	√	
Household induction cooktops			√	
Household refrigerators			√	√
Variable speed air-conditioners				√
LCD computer monitors				√

Once the inspection criteria and products were determined, the city-level Bureau of Quality and Technical Supervision, under the supervision of its provincial-level counterpart, conducted sampling and inspection at the manufacturers' warehouses and in selected retailers that sell the products. The inspection results were recorded by product type and tabulated for data analysis. For products for which the label was deemed as non-compliant, the inspection team took on-the-spot photos of the product model and nameplate as documentation of non-compliance. Manufacturers and retailers that failed to comply with requirements of the label certification project were subject to penalties based on pertinent laws and regulations. All of the statistical results of the inspections were then reported to the provincial Institute of Quality and Technical Supervision for publication on its website. To raise the general public's awareness of energy efficiency labeling and improve manufacturers' compliance, the China Energy Label Management Center made a list of non-compliant manufacturers public on websites and through media outlets (e.g. newspapers and televisions). Table 2 shows the results provided by the participating provinces of Jiangsu[7], Sichuan[8] and Shandong[9] (information on Shanghai was not available).

Based on the inspection results by region, Sichuan had the lowest compliance rate (an average of 41% for two inspected product type) compared with the 100% compliance rate attained by Jiangsu for all three product types inspected, as well as an average of 87% attained by the three product types inspected in Shandong (Figure 2). This variation in performance may be attributed to three main factors: local economic situation, level of standardization in energy efficiency labeling in local markets as well as level of law enforcement in local markets. Economically, landlocked Sichuan is far behind the booming coastal provinces of Jiangsu and Shandong, possibly leading to lower awareness and acceptance of the labeling regulation among manufacturers and consumers. It is also likely that a less-than robust economy in Sichuan might have contributed to its weak standardization in labeling and relative lax enforcement. In addition, it is also possible that the degree of consolidation of manufacturing in each

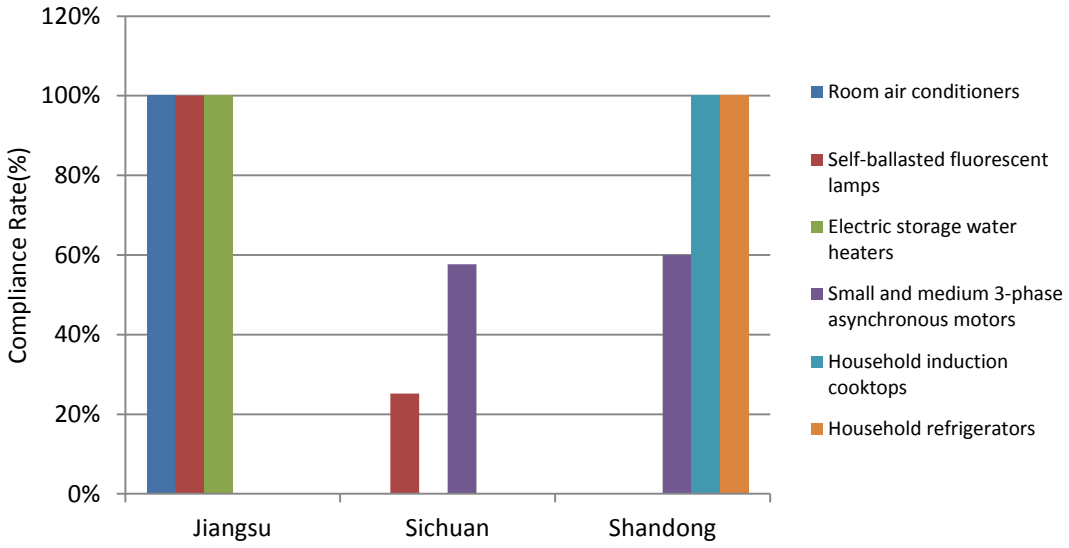
[7] Presentation on Phase Results of Energy Efficiency Check-Testing by Institute of Quality Inspection and Technical Research, Jiangsu Province (in Chinese) on April 26, 2010.

[8] Presentation on 2009 Summary report of Sichuan Province's Local Enforcement of Energy Efficiency Standards and Labeling project by Institute of Quality Inspection and Technical Research, Sichuan Province (in Chinese)

[9] Presentation on "Phase II of the National and Local Enforcement of Energy Efficiency Standards and Labeling project" by Institute of Quality Inspection and Technical Research, Shandong Province (in Chinese) on December 12, 2011.

product market might be a factor as well. It might be easier to achieve compliance with a dozen refrigerator manufacturers than with 100 CFL manufacturers.

Figure 2 2009 Labeling Compliance Results by Region



With regard to labeling compliance by product type, four products achieved 100% compliance, including room air conditioners, storage electric water heaters, household induction cooktops and household refrigerators, but these results came from only a single province (Jiangsu or Shandong). Small and medium 3-phase asynchronous motors reached close to 60% compliance rate with 60% in Shandong and 57.7% in Sichuan. For self-ballasted fluorescent lamp, the range of the results was fairly wide, with 100% compliance in Jiangsu and 25.2% in Sichuan (Figure 3).

Figure 3 2009 Labeling Compliance Results by Product Type

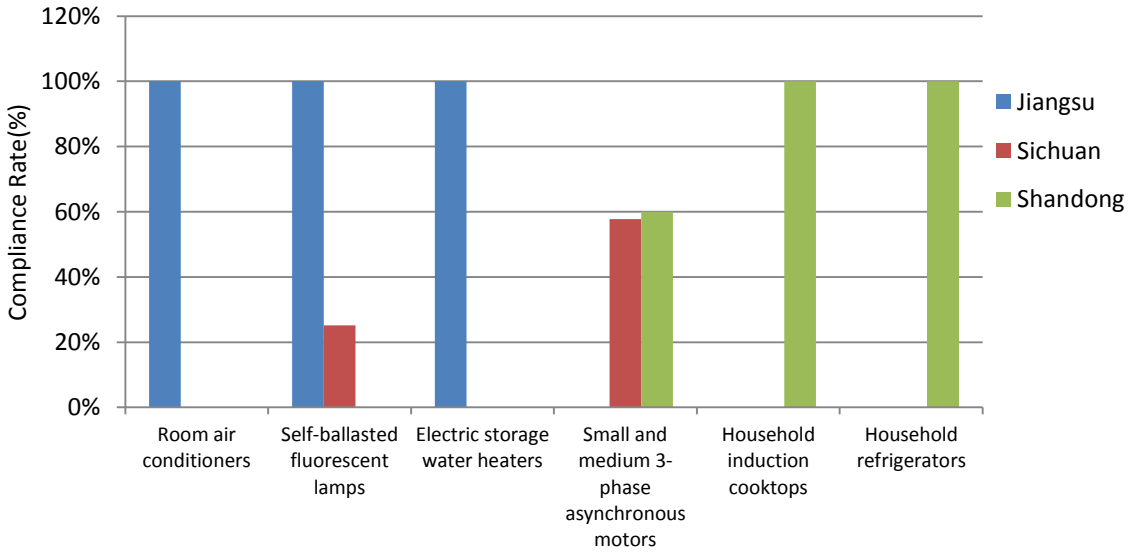


Table 2 2009 Energy Efficiency Labeling Compliance Results

Products Inspected	Jiangsu		Sichuan		Shandong		Shanghai	
	Inspection batches (compliant batches/all batches)	Compliance Rate (%)	Inspection batches (compliant batches/all batches)	Compliance Rate (%)	Inspection batches (compliant batches/all batches)	Compliance Rate (%)	Inspection batches (compliant batches/all batches)	Compliance Rate (%)
Room air conditioners	7/7	100%						
Self-ballasted fluorescent lamps	16/16	100%	30/119	25.2%				
Electric storage water heaters	6/6	100%						
Small and medium 3-phase asynchronous motors			15/26	57.7%	6/10	60%		
Household induction cooktops					5/5	100%		
Household refrigerators					5/5	100%	N/A	N/A
Variable speed air conditioners							N/A	N/A
LCD computer monitors							N/A	N/A

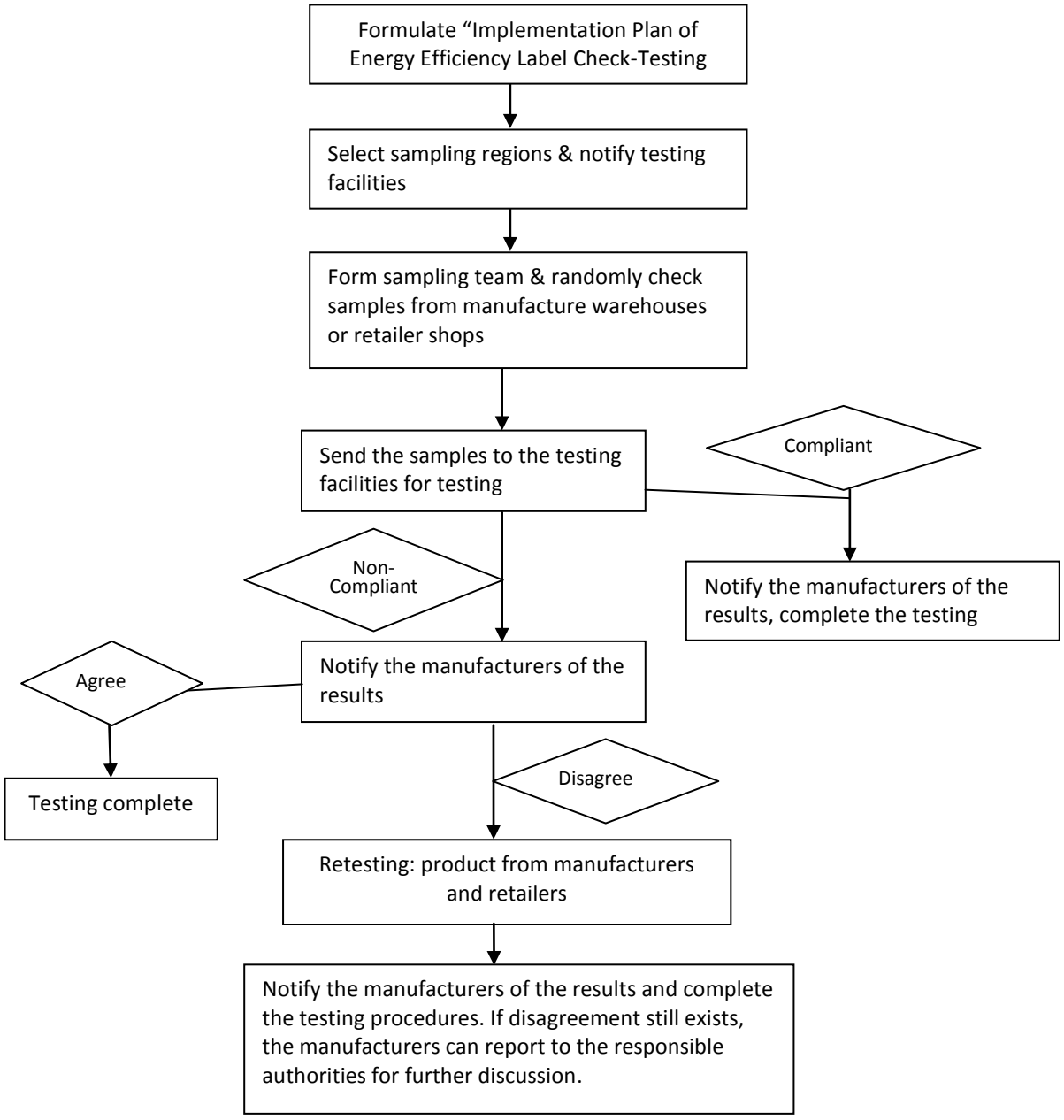
3.2 Product Sampling Methodology for Energy Efficiency Check-Testing

Product Sampling Process

To validate the information printed on the energy label of each product, the provincial Bureau of Quality and Technical Supervision specifies details on sampling, testing, data collection and statistical analysis in a work plan for implementing the energy efficiency check-testing project.[10] The sampling process thus involves formulating a work plan, selecting sampling regions and notifying the testing facilities, forming a sampling team and checking samples randomly from manufacturers' warehouses and/or retailers. The samples are then sent to the testing facilities to see if they are compliant or not and manufacturers are notified of the testing results. The products are tested in sample batches, with each product tested once to verify whether it meets the efficiency standards and energy label efficiency grade requirements. The testing process is finished once the product is deemed in compliance, but for non-compliant products, the manufacturers have to decide if they wish to pursue retesting. If the manufacturers contest the results, they have to request retesting within 15 days after receiving the test results. The process is illustrated in **Error! Reference source not found.**.

[10] The 2009 work plan was not available from all the pilot locations; this description follows the 2010 draft of the monitoring system for energy efficiency labeling products.

Figure 4 Energy Efficiency Check-testing Process



Sampling Methodology

In addition to product types, the Jiangsu, Sichuan, Shandong and Shanghai governments also specified the sample size (including the number of units chosen per batch, number of manufacturers represented, number of reference vs. tested units), number of times for sampling, origin of samples (i.e. manufacturers' warehouse, , or retailers), and requirements for sample products [11](Table 3).

Table 3 Sampling Methodology for 2009 Energy Efficiency Check-Testing

Sample Product	No. of Batches for Sampling	Sample Size				Sample Origin		Region
		Manufacturers Represented	Units chosen	Units Tested	Unit Referenced	Warehouse	Retailer	
Room air conditioners	7	7	21	14	7	0	7	**Jiangsu**
Self-ballasted fluorescent lamps	16	16	32	16	16	8	8	**Jiangsu**
	30	23	720*	360	360	0	25	**Sichuan**
Storage electric water heaters	6	6	3	2	1	0	6	**Jiangsu**
Small and medium 3-phase asynchronous motors	15	12	15	15	0	0	10	**Sichuan**
	10	N/A	30	30	0	10	0	**Shandong**
Household induction cooktop	5	N/A	15	15	0	3	2	**Shandong**
Household refrigerators	5	N/A	5	5	0	2	3	**Shandong**
	8	N/A	24	N/A	N/A	N/A	N/A	**Shanghai**
Variable-speed air-conditioners	6	N/A	12	N/A	N/A	N/A	N/A	**Shanghai**
LCD computer monitors	10	N/A	20	20	0	N/A	N/A	**Shanghai**

***** 720 lamp units were packaged into 60 sets. Set is the unit in sampling.

3.3 Check-testing Methodology

Check-Testing Criteria

In order to maintain the consistency of check-testing and to follow legal requirements, the pilot locations all followed applicable national standards and regulations in testing the compliance of a

[11] Information on product requirements was not available for 2009 project but available for 2010 project. Requirements for household refrigerators, for example, include: Measured cooling capacity shall be at or over 95% of the rated cooling capacity, measured cooling power consumption shall not exceed the rated cooling power consumption by 110%, and measured intermediated cooling capacity shall be at or over 95% of the rated intermediated cooling capacity, among others.

particular product met to the requirements specified in the national standards and regulations. Table 4 lists the relevant national standards and regulations applicable to the check-testing project.

Table 4 Standards, Regulations and Testing Items for 2009 Energy Efficiency Check-Testing

Products	Applicable National Standards and Regulations	Check-Testing Items
Room air conditioners	▪ GB 12021.3-2004 "*The Minimum Allowable Value of the Energy Efficiency and Energy Efficiency Grades for Room Air Conditioners*". ▪ CEL-002-2004 "*Implementation Rules for Room Air Conditioner Efficiency Labeling*"	▪ Cooling capacity ▪ Cooling power consumption ▪ Energy efficiency ratio
Self-ballasted fluorescent lamps	▪ GB/T 17263-2002 "*Self-Ballasted Fluorescent Lamp for General Lighting*" ▪ GB 19044-2003 "*The Minimum Allowable Value of the Energy Efficiency and Energy Efficiency Grades for Self-Ballasted Fluorescent Lamp for General Lighting*" ▪ CEL-005-2006 "*Implementation Rules for Self-Ballasted Fluorescent Lamp Efficiency Labeling*"	▪ Lamp power ▪ Chromaticity tolerance ▪ Minimum allowable values of energy efficiency ▪ Initial luminous efficacy
Electric storage water heaters	▪ GB 21519-2008 "*The Minimum Allowable Value of the Energy Efficiency and Energy Grades for Electric Storage Water Heater*" ▪ CEL-012-2008 "*Implementation Rules for Electric Storage Water Heater Efficiency Labeling*"	▪ Inherent energy factor for 24 hours ▪ Hot water output ratio
Small and medium three-phase asynchronous motors	▪ GB/T 1032-2005 "*Test Procedures for Small and Medium Three-phase Asynchronous Motor*" ▪ GB 18613-2006 "*The Minimum Allowable Value of the Energy Efficiency and Energy Grades for Small and Medium Three-phase Asynchronous Motor*" ▪ CEL-007-2008 "*Implementation Rules for Small and Medium Three-phase Asynchronous Motor Efficiency Labeling*" ▪ GB 755-2000 " *Rotating Electrical Machines-Rating and Performance*"	▪ Efficiency
Household induction cooktops	▪ GB 21456-2008 "*The Minimum Allowable Value of the Energy Efficiency and Energy Grades for Household Induction Cookers*"	▪ Heating efficiency ▪ Standby power consumption
Household refrigerators	▪ GB 12021.2-2003（2008）" *The Minimum Allowable Value of the Energy Efficiency and Energy Grades for Household Refrigerator*" ▪ GB/T 8059.1-4-1995 " *Household Refrigerating Appliances*" ▪ CEL-001-2004 " *Implementation Rules for Household Refrigerator Efficiency Labeling*"	▪ Power consumption ▪ Internal volume ▪ Efficiency indicators
Variable speed room air conditioners	▪ GB/T 7725-2004 "*Room Air Conditioner*" ▪ GB 21455-2008 " *The Minimum Allowable Value of the Energy Efficiency and Energy Efficiency Grades for Variable Speed Room Air Conditioners"* ▪ CEL-010-2008 "*Implementation Rules for Variable Speed Room Air Conditioners Efficiency Labeling*"	▪ Cooling capacity ▪ Cooling energy consumption ▪ Intermediate cooling capacity ▪ Intermediate cooling energy consumption ▪ Seasonal energy efficiency ratio
LCD computer monitors	▪ GB 21520-2008 "*The Minimum Allowable Value of the Energy Efficiency and Energy Efficiency Grades for Computer Monitor*" ▪ CEL-014-2008 "*Implementation Rules for Computer Monitor Efficiency Labeling*"	▪ Energy efficiency ▪ Energy consumption in off mode

Check-Testing Results

Although it is not possible to directly compare the four pilot locations in terms of compliance because different combinations of product types were tested, some general comparisons between the regions' compliance rates can be made. Based on the reported results, Jiangsu had the highest compliance rates for the sample products it tested, including 100% for both room air conditioners and electric storage

water heater and 87.5% for self-ballasted fluorescent lamp. Shanghai has the second highest compliance rate, with 100% for both variable speed air-conditioner and LCD computer monitor and 50% for household refrigerator. Shanghai is followed by Shandong, which also achieved 100% compliance for household refrigerator and small and medium three-phase asynchronous motor, but only 40% compliance for household induction stove. Of the four regions, Sichuan had the lowest compliance results, with 60% compliance in self-ballasted fluorescent lamp and 40% compliance in small and medium three-phase asynchronous motors (Table 5 and Figure 5).

In terms of compliance rates by product type, 100% compliance rates were achieved, at least in part, for five products: room air conditioners, electric storage water heaters, household refrigerators, variable speed air conditioners and LCD computer monitors. However, it is important to note that 100% compliance was reached in only one location (either Jiangsu, Shandong or Shanghai) because the product was tested only in one location or in the case of household refrigerators, 100% compliance was achieved by only one of the two areas (Shandong) where testing was conducted. Self-ballasted fluorescent lamps had an average compliance rate of 73.75%, with 87.5% in Jiangsu and 60% in Sichuan. For small and medium three-phase asynchronous motors, the results range widely from 100% compliance in Shandong to only 40% in Sichuan. Part of the reason for the extreme range in compliance is because Shandong noted in its report that 100% compliance rate for motors was the result of taking into account the tolerance in additional losses between nominal and minimum energy efficiency values.12 If measured solely on the basis of nominal efficiency, the rate of compliance would have been down to 50%. A wide range of compliance is also observed for household refrigerators, with Shandong reporting 100% compliance and Shanghai only 50%. The household induction cooktop had the lowest compliance rate of 40% (Figure 5)

[12] In measuring motor efficiency, both nominal (expected nameplate efficiency) and minimum guaranteed efficiency is used. The minimum guaranteed efficiency allows for higher losses that are expected due to statistical variation in a population of motors.

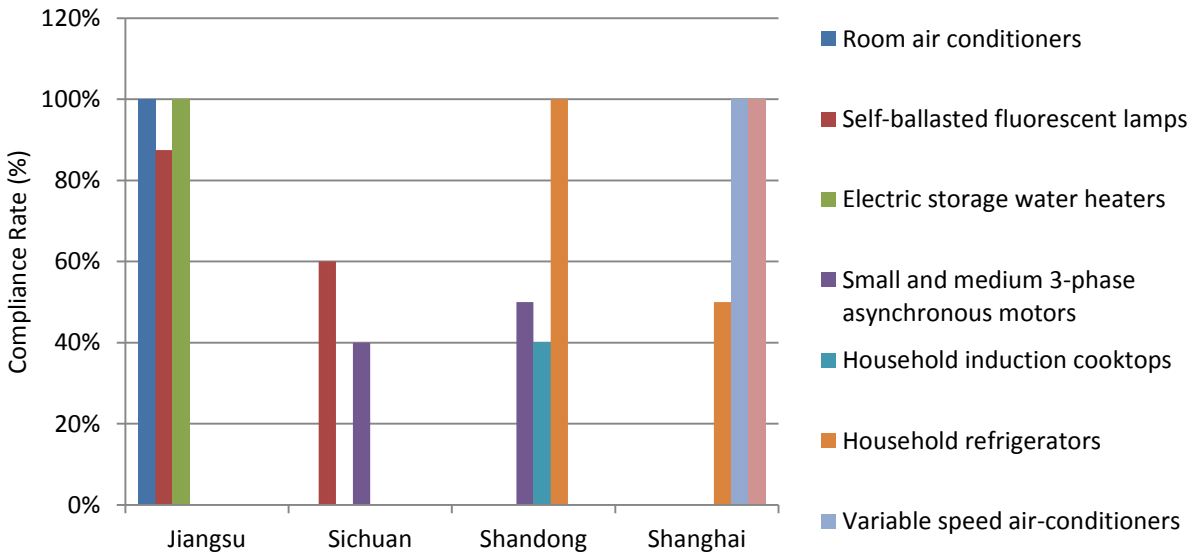
Table 5 2009 Energy Efficiency Check-Testing Results

Products Inspected	Jiangsu		Sichuan		Shandong		Shanghai	
	No. of Batches for Inspection	Compliance Rate (%)	No. of Batches for Inspection	Compliance Rate (%)	No. of Batches for Inspection	Compliance Rate (%)	No. of Batches for Inspection	Compliance Rate (%)
Room air conditioners	7/7	100%						
Self-ballasted fluorescent lamps	14*/16	87.5%	18/ 30	60%				
Electric storage water heaters	6/6	100%						
Small and medium three-phase asynchronous motors			6/ 15	40%	10/ 10	100%**		
Household induction cooktops					2/ 5	40%		
Household refrigerators					3/3	100%	4/8	50%
Variable speed air-conditioners							6/6	100%
LCD computer monitors							10/10	100%

**The number on the left represents the number of inspections that yielded compliance results while the number on the right represents the total number of inspections for one particular type of product.*

***The 100% compliance rate is based on minimum guaranteed efficiency, not nominal efficiency for a given motor.*

Figure 5 2009 Energy Efficiency Check-Testing Compliance Results by Region



4. Comparison with 2006 and 2007 Results

As an expanded check-testing project with more products types tested in different pilot locations, the 2009 energy efficiency standards and labeling project check-testing differs in many respects from the previous check-testing efforts of 2006 and 2007. In particular, notable differences are observed in the sampling and energy efficiency testing methodologies as well as the compliance results. As more enterprises are registered in the CNIS product database for regulated products, the scope and extent of the check-testing project widened in 2009.

Greater Scope for Sampling and Efficiency Testing

The first notable aspect of the 2009 check-testing project is the larger geographic and product coverage of the check-testing efforts, with expansion from three cities in both 2006 and 2007 to three provinces and one city in 2009. In terms of product coverage, the check-testing encompasses twice as many product types as the 2007 project with a total of 8 products with testing for the same product undertaken in two regions in most cases. Additionally, the product types covered by the 2009 testing project also stands out for including industrial (i.e., three-phase asynchronous motors) and office equipment (i.e., LCD computer monitors). As a result of the wider geographic and testing scope, the sample size increased from 73 models in 2007 to more than 110 units representing 62 manufacturers in 2009. Unlike previous years where the samples were purchased only from retailers, the 2009 samples originated from both manufacturer warehouses and retailers. Lastly, the 2009 testing results were reported as number of batches tested or rather than as tested physical units that were determined to be in compliance during the 2006 and 2007 check-testing.

Greater Range of Compliance Results by Product Types

The wider scope of sampling and testing in 2009 resulted in a greater range of compliance rates across product types when compared with previous rounds of check-testing. Across all product types and even within one product category (small and medium three-phase asynchronous motors), the compliance rates ranged from 40% to 100%. For products that were tested in 2006 and 2007—namely room air conditioners and refrigerators—the 2009 compliance results revealed mixed success. For room air conditioners, the overall compliance rate remained at 100%, although testing was only done in Jiangsu. However, the compliance results for refrigerators was less positive, with a much greater range of 50% to 100% compliance in Shanghai and Shandong, respectively, compared to 2007 rates of 71% to 100%. In addition, the weighted average [13]compliance rate of refrigerators across regions dropped significantly from 96% in 2007 to only 63% in 2009, which is much lower when compared to the initial 2006 compliance rate of 81%.

Although explanations of why the compliance rate for refrigerators dropped so significantly were not offered in 2009, an important factor may be the very recent implementation of a more stringent Minimum Energy Performance Standards (MEPS) for refrigerators in May of 2009. The wide range in compliance rates across regions for a given product reflects not only enforcement issues, but it also illustrates persisting challenges in standardizing testing. In fact, the 2009 test reports highlighted challenges in standardizing testing tools and procedures among different laboratories with reported incidences of different results for the same tested product.

[13] In 2006 and 2007, the compliance rate was weighted by the number of sample units tested while in 2009 it was weighted by batches.

Regional Variations in Overall Compliance Rates

From a geographic perspective, there are also notably larger variations in compliance rates across regions. In contrast to 2007 when compliance rates for a given region were closer in range with less than 30% range between the highest and lowest compliance rates, the testing regions in 2009 had a much greater range in compliance. For Shandong and Shanghai, high compliance rates of 100% for two of the three tested products are offset by much lower compliance rates of only 40% and 50%, respectively. Sichuan's much lower compliance rates of 60% and 40% were also well below any of the three regions in the 2007 round of testing, which had a lowest compliance rate of 67%. A possible explanation for the greater range in compliance rates within a region and lower compliance rates could be that different sampling methods were undertaken (e.g., samples taken from manufacturers in the local testing versus retailers in the national testing done in 2007) and that previous testing conducted by CNIS were more focused on a national-scale with a target of large cities, and may not have highlighted the nuances in local conditions, particularly for the smaller cities.

5. Feedback and Recommendations based on 2009 Local Enforcement

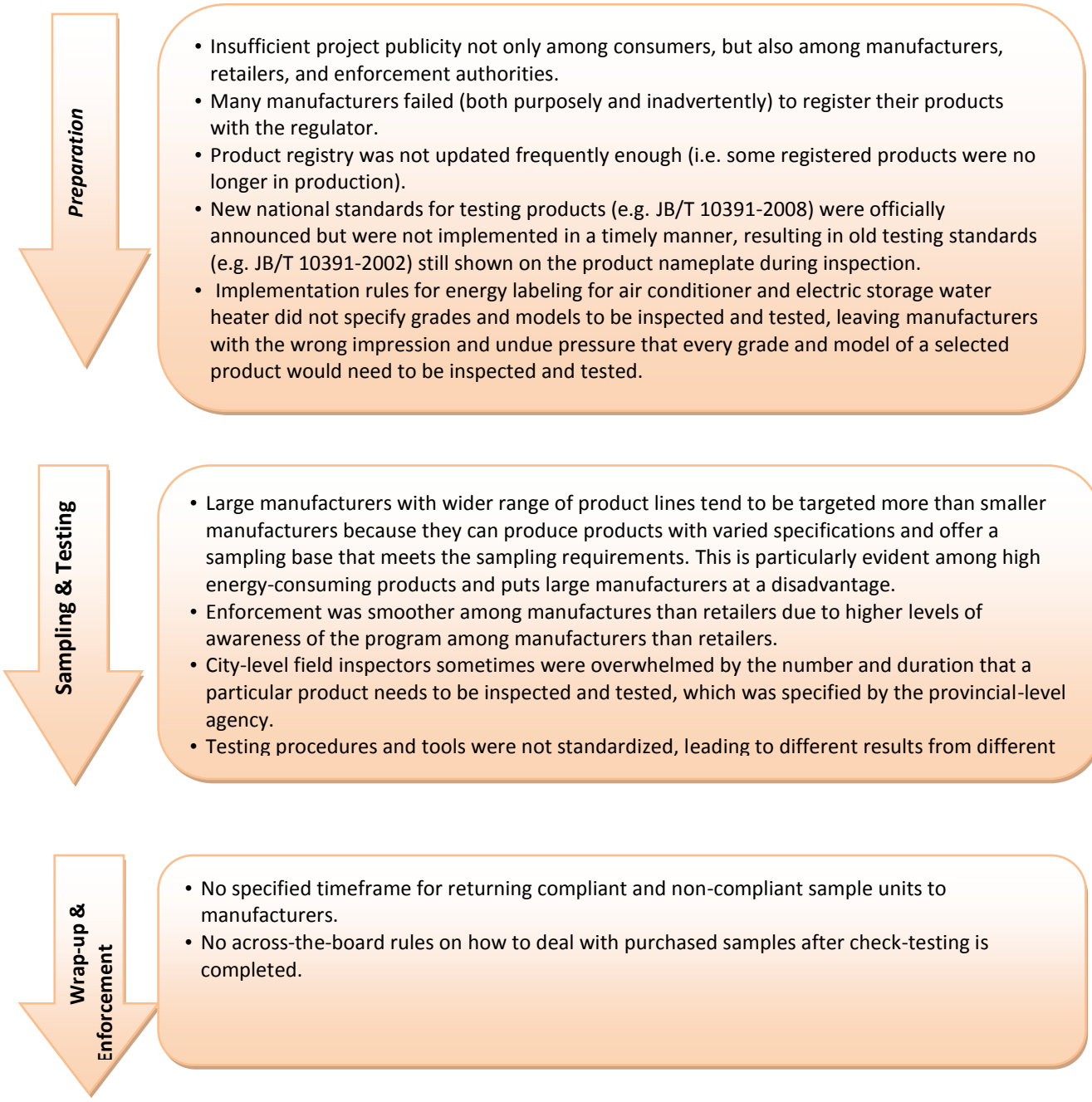
According to reports from the four pilot locations, several challenges emerged during the implementation phase of the check-testing project. Overall, the check-testing project's tasks and activities can be divided into three phases: preparation, implementation (sampling and check-testing) and wrap-up. The main challenge during the preparation phase was the lack of awareness among customers, manufacturers and retailers as a result of insufficient publicity. This in turn has resulted in manufacturers failing to register their products with the label certification project, as was discovered during one of the inspections, and some retailers remaining resistant to inspection and check-testing. Although specific reasons behind retailers' resistance to inspections were not reported, it is likely that some retailers may be worried about the negative impact of enforcement officials selecting and inspecting products on consumer confidence and the retailer's reputation. Furthermore, because enforcement authorities do not fully understand and appreciate the scope and details of the project, they are unable to respond quick enough in updating the relevant online information (i.e. product registry, product-specific national standards and regulations).

Challenges that emerged during the sampling and check-testing phases center on weaknesses in the standardization of testing tools and procedures amongst different labs, which produce different testing results for the same tested product. In addition, big manufacturers were frequently targeted for inspection because they are capable of producing products of varied specifications and their market presence offers a sample base that otherwise couldn't be matched by smaller manufacturers. This could result in weak enforcement of smaller manufacturers, which may have lower compliance rates. Issues reported for the wrap-up phase were less significant, and mainly concerned the timeframe for returning compliant and non-compliant samples (see Figure 6).

Based on these implementation issues, several actions are recommended for the China National Institute of Standardization and provincial Bureaus of Quality and Technical Supervision in order to expand the implementation scale and to improve the effectiveness of enforcement. Project publicity campaign should continue to be increased. This should be led by the China National Institute of Standardization, based on insights and feedback from provincial Bureaus of Quality and Technical Supervision. National-level project campaigns increase exposure and awareness of the project among stakeholders. In addition, this top-down approach helps facilitate enforcement standards and reduce discrepancy among participating provinces and cities, which also benefit manufacturers and retailers

that produce or sell products across provincial or national borders. Moreover, provincial governments should also set aside specific funding and staffing for the enforcement project to be carried out successfully. This would help clarify roles and responsibilities of enforcement staff and inspectors, lead to better accountability, higher working morale and productivity.

Figure 6 Reported Issues from 2009 Local Labeling and Check-testing Enforcement Program



6. Conclusions

The 2009 check-test project demonstrated that capacity for local check testing has continued to expand and strengthen, although a number of challenges remain, including funding, product sampling scope, testing consistency, and comparability of results. Nonetheless, participating locations have established infrastructure for local enforcement and organizations for technical support, and in some cities, government agencies have lent key support at the policy level, and media outlets have undertaken publicity campaigns to bring garner support and understanding among local populations. As has been the case with the national level compliance testing program (Zhou, 2008), funding for local enforcement schemes has been provided by international foundations, but local governments have also provided significant in kind support.

The check testing program incorporated both compliance to national energy efficiency standards as well as compliance to regulations for the use of the China Energy Label. The results of the check testing found the lowest overall level of compliance—for both energy efficiency standards and labeling—in Sichuan. These reasons for lower compliance are not clear, but the variance from other regions could suggest ways to improve or reform the check-testing program in the future. Sichuan is less economically advanced than the other pilot locations, and this could impact the level of awareness, staff expertise, and amount of funding available. In addition, the two products tested in Sichuan—compact fluorescent lamps and small- and medium-size motors—are products from a fairly unconsolidated manufacturing sector, which may also be a factor in the compliance disparity. In the case of Shanghai, testing found that the compliance rate of refrigerators was significantly lower compared with previous tests. This may be attributable to the fact that a new more stringent refrigerator standard went into effect in May 2009.

The small scope of the testing creates uncertainty about the representativeness of the results to national averages, but because the process involved a range of local stakeholders—government administrators, testing laboratories, manufacturers, and media, it strengthened understanding of the need for and benefit of further work in this area. Compared with the previous rounds of check testing in 2006 and 2007, the 2009 tests covered a wider regional scope as well as larger product type coverage. A total of 110 units representing 62 manufactures were tested in local laboratories according to applicable national standards and regulations. Unlike the 2006 and 2007 test, some samples were taken from manufacturers' warehouses. Greater variation in compliance results was observed across product types and within the same product category, while overall the compliance rate was lower than the tests in 2006 and 2007, when the test focused on large cities and on fewer product types. Local media assisting in making the results public, and non-compliance was dealt with according to existing legal requirements, including measures such as fines and prohibitions on sales. .

A number of challenges emerged in this round of testing. They including lack of awareness and lack of an initial publicity campaign which resulted in manufactures' failing to register their products; retailers' resistance to inspection; lack of timely updating of product information online; incidents of different laboratories reaching different results for the same product; higher compliance rates for products produced by large manufacturers along with lack of attention to enforcement for smaller manufacturers.

Further improvement in enforcement could come about through more awareness and educational campaigns both at the national and provincial level; more publicity for those who continuously excel in compliance and those who fail; both central and provincial governments should also setting aside of specific funding and staffing from central and provincial governments for the local enforcement projects;

emphasis on targeting non-compliant manufacturers in subsequent years; and greater emphasis on implementing standardized testing tools and procedures among different laboratories.

7. References

Saheb, Y., Zhou, N., Fridley, D., and A. Pierrot. 2011. “Compliance and verification of standards and labeling programs in China.” LBNL Report-4599E.

Shanghai Institute of Quality Inspection and Technical Research. January 27, 2011. “Work Summary of National and Local Enforcement of Energy Efficiency Standards and Labeling”.

Sichuan Quality Technology Supervision Bureau, 2010. Sichuan Province’s Monitoring System for Energy Efficiency Products (draft) , internal report.

Web portal of China’s Central Government. 2009. AQSIQ: China launched its national and local enforcement of energy efficiency standards and labeling (质检总局：我能效标准标识实施机制推进项目启动). http://www.gov.cn/gzdt/2009-08/25/content_1400681.htm. Access Oct. 26, 2011.

Zhou, N., Zheng, N., Fridley, D., Wang, R., and C. Egan. 2008. “Check-testing of Manufacturer Self-Reported Labeling Data and Compliance with MEPS.” Report LBNL-247E. Berkeley, CA: Lawrence Berkeley National Laboratory.