Asia-Pacific
Economic Cooperation

Assessment of Verification Testing Capacity in the APEC Region and Identification of Cost Effective Options for Collaboration

APEC Expert Group on Energy Efficiency and Conservation (EGEE&C)

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Acknowledgments

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Executive Summary

This project continues an earlier (2012) APEC program *Survey of Market Compliance Mechanisms for Energy Efficiency Programs in APEC Economies*. It supports the development of successful market surveillance Monitoring, Verification and Enforcement (MV&E) regimes for the implementation of Standards and Labeling (S&L) policies in the APEC economies. MV&E is important since it plays an essential role in ensuring that the intended energy savings delivered by S&L are achieved.

By providing effective solutions to address challenges currently faced by MV&E authorities, it is intended that this project will deepen regional collaboration and information sharing among APEC economies. Enhancing the technical capacity of those economies will enable them to develop increasingly effective MV&E policies and overcome any barriers that are preventing them from achieving the full effectiveness of programs already implemented.

The first part of this project aimed to address the need, identified in the report *Survey of Market Compliance Mechanisms for Energy Efficiency Programs in APEC Economies*[1] (referred to as the '*2012 APEC Survey*' in this report), to improve the access to competent testing laboratories by MV&E authorities. The surveys undertaken for this project have identified some 250 suitably qualified testing laboratories across 17 APEC economies. Economies with the largest manufacturing capacities, China and the USA, were found to have the most testing facilities. This contrasts with some smaller economies where very little testing capacity was located. In a small minority of economies, there was insufficient testing capacity to support all of the S&L regulations they had currently in place.

The second part of this project focused on identifying cost effective options for verification testing. This need, identified at the APEC Compliance Workshop hosted in Beijing in June 2012[2], highlighted how the cost of undertaking verification testing is one of the most significant barriers preventing effective MV&E. There are a number of ways in which these costs can be reduced for authorities though most may require the implementation of policy changes first. For example, the costs of testing a product that is found to be non-compliant should be paid by the manufacturer (or importer) and not the MV&E authority - but the regulations in that particular economy may not currently require this. Further savings could be achieved if a product that was being sold in more than one APEC economy could be tested by authorities in those different economies working in partnership, i.e. "joint testing". Thus the costs of testing could be shared between them. Again, some policy changes may be necessary for this to be put into effect. For example, joint testing of products by different economies would require them to be using the same (harmonized) test methodology.

Working collaboratively achieves more than just cost savings through joint testing, as costs can be saved through the sharing of intelligence and expertise too. This report identifies further benefits as evidenced in existing collaborations undertaken by MV&E authorities in the EU and elsewhere. The greatest benefits being the leverage across regional markets that can be achieved by relatively few MV&E authorities working together, and the lifting of performance through the sharing of knowledge and experience and the adoption of best practices in MV&E by fellow authorities.

[1] http://www.clasponline.org/Resources/MVEResources/MVEPublicationLibrary/2012-APEC-MVE-Survey
[2] http://www.clasponline.org/en/Resources/MVEResources/MVEPublicationLibrary/APEC-Compliance-Workshop.aspx

Building a collaborative network of MV&E authorities is seen as playing a crucial role in the continuing development of successful MV&E regimes in APEC. This is because such a network would provide the basis for the communication channels and information exchanges that are key enablers for collaborative activities. There will be costs associated with this, such as those for travel and building databases, but these are outweighed by the benefits, which include improved leverage, skill building, support for smaller economies and test cost savings.

Preface

APEC economies vary widely in terms of their level of economic development and experience in implementing energy efficiency S&L programs. As identified at the APEC Compliance Workshop hosted in Beijing in June 2012, many APEC developing economies have limited resources and access to information required to establish successful market surveillance MV&E regimes.

This project builds on the *2012 APEC Survey*. That earlier work highlighted the need for market surveillance officials in the APEC economies to improve their access to competent testing facilities. The report proposed that this access be facilitated through developing listings of independent test facilities throughout the APEC region – their location, capabilities and capacity. This project takes that goal forward since the first part of the work undertaken has been to carry out an extensive survey of laboratory test facilities in the APEC economies.

The *2012 APEC Survey* included the further recommendation of supporting the development of more coordinated approaches to verification testing by APEC members. The second part of this project has been focussed on identifying best practices for verification testing and laying the foundations for creating an MV&E Network in the APEC region to facilitate continuous information sharing and partnership development.

The report will inform a Compliance Best Practices Workshop to be attended by MV&E officials from the APEC economies. A presentation of the findings of this report will be disseminated at the workshop and these are expected to lead to the formation of an APEC MV&E network in which collaborative activities can be developed and undertaken.

This study is funded by APEC with support from the Australian Department of Industry, New Zealand Energy Efficiency and Conservation Authority, CLASP, Copper Alliance, and UL.

This report which, when read in conjunction with its Appendices, provides the following content:

- Identification of existing test laboratories in the APEC economies, that undertake energy efficiency testing of electrical products;
- Analysis of cost effective options for verification testing; and
- Policy recommendations for a framework for policymakers in the APEC region to adopt in order to conduct verification testing cost effectively and collaboratively.

Part 1: Assessment of Verification Testing Capacity in the APEC Region

1.1 Introduction

This first part of the project was intended to identify testing capacity available in the APEC region in order to help policymakers locate and access available testing resources. The project was designed to provide an overview of testing facilities and their capacity of testing products for energy efficiency metrics.

Laboratory test facilities can be expected to exist where the needs are greatest. Historically, there has always been a symbiotic relationship between the manufacturers of products and the laboratories that test them. The largest producers (or manufacturing nations) in the world are among the 21 APEC economies, so one would assume there is a substantial number of test laboratories undertaking energy efficiency testing of products in those particular economies. Additionally, since most of the APEC economies now have S&L regulations, then it can be expected that some test laboratories will exist in many of those APEC economies in order to support the implementation of those regulations.

Nevertheless, identifying and building a knowledge base of those laboratories would be challenging. While there are large numbers of test laboratories, only a minority are likely to have the specialist equipment and expertise to test appliances using energy efficiency metrics. For example, many more laboratories have capability to test products for safety requirements than for energy efficiency requirements. This is primarily because the regulations governing the safety of products have been in force for much more time than the equivalent ones for energy efficiency.

The following section describes the techniques for data gathering that were developed for this project and provides summaries of the results obtained. More detailed results are available in Appendices 1-6.

1.2 Methodology

1.2.1 Prioritising the consumer products to focus on

Due to the large variety of appliances and lighting products in the APEC marketplace, it was necessary to clearly define the scope and prioritize the most high-impact products that this study was to focus on. This was accomplished though identifying the products that are most frequently regulated for S&L within the APEC economies. The detailed data sets that were compiled for the *2012 APEC Survey* were analysed since they identified which products were the focus of compliance (market surveillance/MV&E) activity in 18 of the 21 APEC economies. From this, and with some additional checks made using CLASP's Global S&L Database[3], it was possible to build a matrix that exhibited the various types of S&L that were in place for consumer products within the following categories:

- Computers & ICT
- Cooking & dishwashing
- Heating & air conditioning
- Laundry
- Lighting

[3] http://www.clasponline.org/en/Tools/Tools/SL_Search.aspx

- Miscellaneous (excluding outdoor tools & equipment, personal care and photovoltaic products)
- Motors
- Office equipment
- Power supply & power conversion
- Pumps
- Refrigeration
- Standby
- Televisions, displays & audio visual
- Ventilation, blowers & fans
- Water heating

The matrix displaying the full findings of this analysis can be found in Appendix 1.

In summary, the matrix identified the products that were the most frequently regulated and thus most commonly used and traded in the APEC region. It was therefore agreed with the project's Advisory Group[4] that a selection from these would make up the candidates for this study. The assessment of testing capacity for these products would provide a foundation for policymakers to identify resources and opportunities to collaborate on verification testing. These items are ranked by frequency in Table 1 below, with the top row (room air conditioners) being the product most frequently regulated (by 17 of the 18 APEC economies that were reviewed in the *2012 APEC Survey*).

Hierarchy of most frequently regulated products in APEC economies	Room air conditioners		
	Compact fluorescent lamps	Fridge freezers	Refrigerators
	Ballasts for fluorescent lighting		
	Flat screen TVs		
	Freezers	Clothes washers	
	Water heaters (storage)	(CRT) TVs	Computers

Table 1: Hierarchy of products with S&L in place, within the APEC economies

Based on the hierarchy of most frequently regulated consumer products, it was agreed to focus on the following products for the survey:

1. Room air conditioners
2. Lighting: compact fluorescent lamps and/or LEDs (typically laboratories that can test these can test other lighting products such as ballasts. LEDs have been included at the request of the project's Advisory Group as these represent the future of lighting products)
3. Domestic refrigerators (typically laboratories that can test these can also test fridge freezers and freezers)
4. Flat screen TVs (typically laboratories that can test these can also test other display products)
5. Clothes washers
6. Computers (typically laboratories that can test these can also test other ICT products)

[4] The Advisory Group members of this project included the Australian Department of Industry, New Zealand Energy Efficiency and Conservation Authority, CLASP, Copper Alliance, and UL.

1.2.2 Locating the testing organizations to be surveyed

1.2.2.1 Identifying test laboratories that were already known to MV&E officials in the APEC economies

Inevitably, many test laboratories would have already been used by the APEC MV&E community. A number of contacts in this community had previously been identified during the study undertaken for the *2012 APEC Survey.* Therefore it was agreed that an enquiry (via a survey questionnaire) should be developed and sent to these persons and also to a further list of their colleagues supplied by the APEC Expert Group on Energy Efficiency and Conservation (EGEE&C) Secretariat.

1.2.2.2 Identifying test laboratories from other information sources

Further activity was required to identify potentially suitable test laboratories that had not been identified by the MV&E officials. The following sources of test laboratory listings were used:

- Those published by the national accreditation bodies in the APEC member states; located through:
  - membership files of the International Laboratory Accreditation Cooperation (ILAC)[5]
  - Asia Pacific Laboratory Accreditation Cooperation (APLAC)[6]
  - Pacific Accreditation Cooperation (PAC)[7]
- Lists maintained by APEC economies and their agencies of "approved" or "designated" test laboratories, such as:
  - Viet Nam's National Energy Efficiency Program, managed by the Ministry of Industry and Trade[8];
  - Chinese National Institute of Standardization (CNIS)[9]
  - The United States Environmental Protection Agency (EPA)[10]
- International Electrotechnical Commission (IEC) System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE) listing of Certification Bodies[11]
- International Federation of Inspection Agencies (IFIA) membership list; and
- Internet searching was used to try to locate the minority of testing laboratories undertaking energy efficiency testing of products that may not have already been identified from the other listings

The listings published by each national accreditation body or bodies were regarded as being particularly important since they were likely to identity those public and private test laboratories that were accredited for a specific test standard against the requirements of the internationally recognized test laboratory accreditation standard – ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories.*

The IECEE listing of Certification Body (CB) testing laboratories was important to include because its listing is confined to those institutions that specialise in testing and certifying electrical products. Currently, the CB listings are largely comprised of laboratories that are

[5] https://www.ilac.org/membersbycategory.html
[6] https://www.aplac.org/index.php?id=96
[7] http://www.apec-pac.org/content/pac-members
[8] http://nhannangluong.com/home;jsessionid=B1E2B4EDCE655EE570E7FBBB966414AB
[9] http://www.energylabel.gov.cn/NewsDetail.aspx?ID=523
[10] https://www.energystar.gov/index.cfm?current_sort_column=s_code&current_sort_order=DESC&resultsPerPage=20&fuseaction=recognized_bodies_list.show_RCB_search_results&RCB_type=all&product_type_list=ALL&program_list=ALL
[11] http://members.iecee.org/iecee/ieceemembers.nsf?Opendatabase

testing the safety of products but a number of these laboratories have or are developing energy efficiency testing expertise since this is a logical development of their commercial activities. Indeed, the CB scheme is expanding to include energy efficiency testing.

Collectively, the listings included a very large number of laboratories. So it was necessary to confine the search to an overall target of 1000 laboratories that were most likely to be engaging in energy efficiency testing and were not first party (manufacturer) laboratories. To aid this, search terms such as “energy”, “efficiency”, ”electrical-electronic”, ”Energy Star”, etc. were used.

1.2.3 Surveys

It was necessary to undertake two surveys: the first one was needed to obtain information already known to MV&E officials about the test laboratories they have used, and the second one was needed to obtain information directly from the laboratories themselves. Surveys were conducted during the period February to July 2014.

In both cases, the proprietary online survey tool, Smart Survey[12], was used. This provided a similar questionnaire format to the one used in the previous 2012 study. Smart Survey was also selected for the following reasons:

- it provided a secure and robust platform;
- its management features enabled responses to be tracked and reminders sent when surveys were not completed or finished,
- it had many user friendly features such as: branching and skip logic to take respondents on a path dependant on their answers to earlier questions and a ‘save and continue’ function so that users could return to a part-completed questionnaire and continue from where they left off.

1.2.3.1 Questionnaire for MV&E officials

A short questionnaire for the MV&E officials was developed and included the following components:

- Identification of respondent
- A check on whether their authority has commissioned energy efficiency product testing from a laboratory or similar institution
- A request for details of the commissioned work
- A judgement of the quality of the testing undertaken
- Details of planned future testing

The full content of the questionnaire can be found in Appendix 2.

Each of the 48 identified MV&E officials were sent an email requesting their assistance. A copy of this email is shown in Appendix 3.

Fully completed questionnaires were received from MV&E officials in Australia; China; New Zealand; and the USA. A total of 31 MV&E officials partially completed the questionnaire. The results of the survey are described in Section 1.3.

1.2.3.2 Questionnaire for test laboratories

A more comprehensive questionnaire was developed for test laboratories, asking respondents to include the following:

[12] http://www.smartsurvey.co.uk/

- The products and test procedures for which the laboratory is currently able and qualified to perform tests;
- Test timeline/schedules and average test volumes for specific product groups;
- Basic laboratory infrastructure and available equipment;
- Staff capacities and training and duration of time laboratory has been testing specific products;
- Laboratory accreditation;
- Participation in mutual recognition agreement of Asia Pacific Laboratory Accreditation Cooperation (APLAC) or other accreditation body in the region;
- Test report requirements and major components in the test reports;
- Estimated cost/range of costs for testing for specific product categories;
- Future business/capacity expansion plans (if any).

The full content of the questionnaire can be found in Appendix 4.

The email addresses for approximately 1000 potentially suitable test laboratories were located – some in every APEC economy except Papua New Guinea. Each of these laboratories was sent a copy of the survey.

A total of 97 questionnaires were returned (approximately 10%) from 13 economies: Australia 13; Canada 24; China 13; Hong Kong, China 1; Chinese Taipei 9; Indonesia 1; Japan 4; Korea 2; Malaysia 2; Philippines 1; Singapore 5; Viet Nam 2; and the USA 20. Figure 1 shows the breakdown of email requests sent and questionnaires returned. All recipients of the original email that had not completed the questionnaire were reminded on a further two occasions.

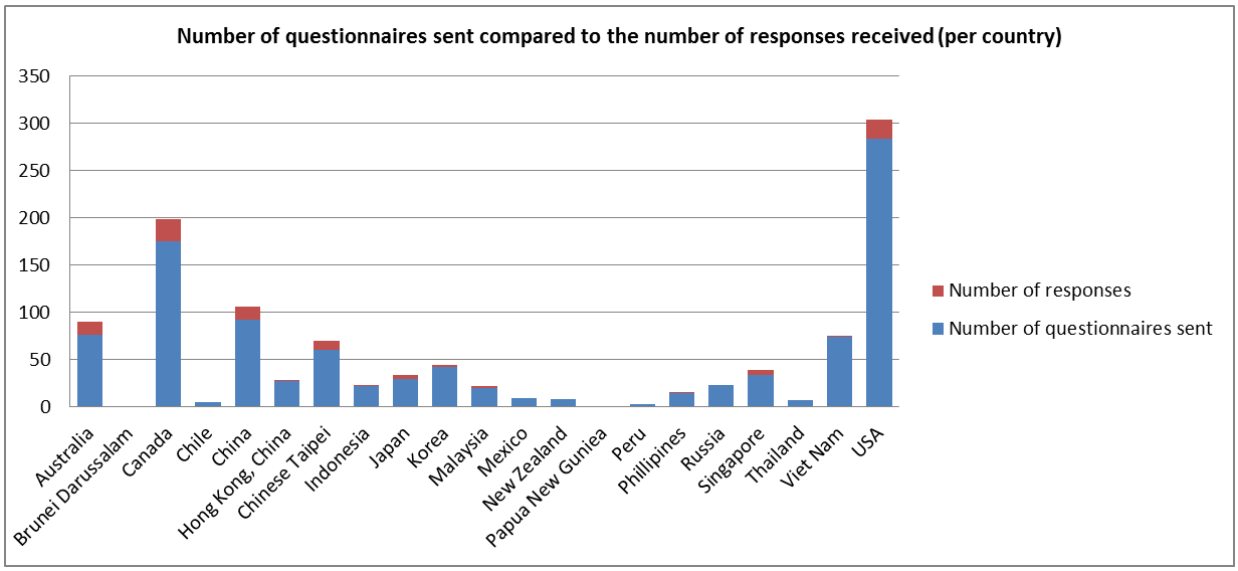


Figure 1: Response rates from test laboratories

The response rate of 10% is typical for unsolicited questionnaires of this nature. It is believed to provide a representative sample for the region as responses were obtained from 13 out of 21 economies and the economies that provided no responses, such as Brunei Darussalam and Papua New Guinea, have quite limited S&L activities and manufacturing capacity so were consequently less likely to have testing facilities.

1.2.3.3 Identification of additional test laboratories

To further add to the knowledge base that had (by then) been built using the responses received from the laboratories that had completed the questionnaire, the lists identified in Section 1.2.2.2 were further scrutinized to identify test laboratories that had been positively identified by third party organizations as specifically undertaking performance testing of the products that were the focus of this project.

1. 3 Survey results

Approximately 250 laboratories were identified as having energy efficiency testing for one or more of the following products:

- Room air conditioners;
- Lighting:
- Refrigerators;
- TVs;
- Clothes washers;
- Computers.

The results of the survey are presented in the following two Sections:

- Section 1.3.1 provides an overall set of results in order to provide a picture of the types of capacity located in each of the 21 APEC economies.
- Section 1.3.2 provides further breakdown of data compiled from the questionnaires completed by a subset of the laboratories

1.3.1 Overall survey results

The overall survey results are a combination of data taken from all the sources identified. The summary data set, which comprises of approximately 250 test laboratories, is given in Appendix 6. Analyses of the summary data set are given in the Figures below.

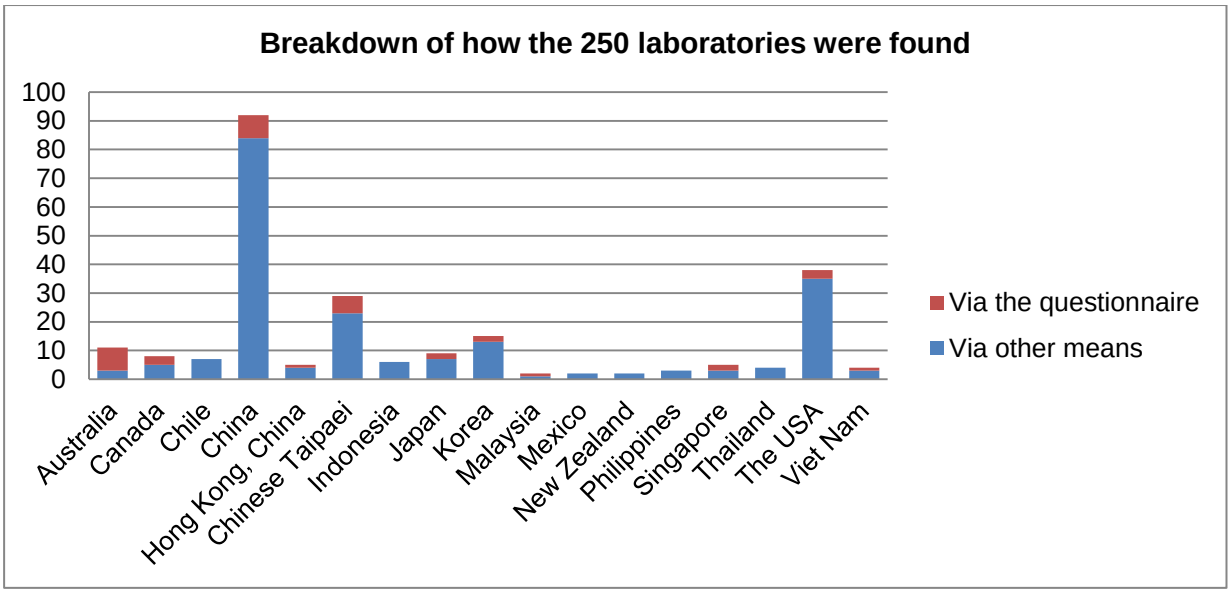


Figure 2: Number of test laboratories located in each APEC economy

Note: the economies of: Brunei Darussalam; Papua New Guinea; Peru; and Russia are not listed in the Figures in this section as no laboratories were located in those economies using the survey techniques deployed.

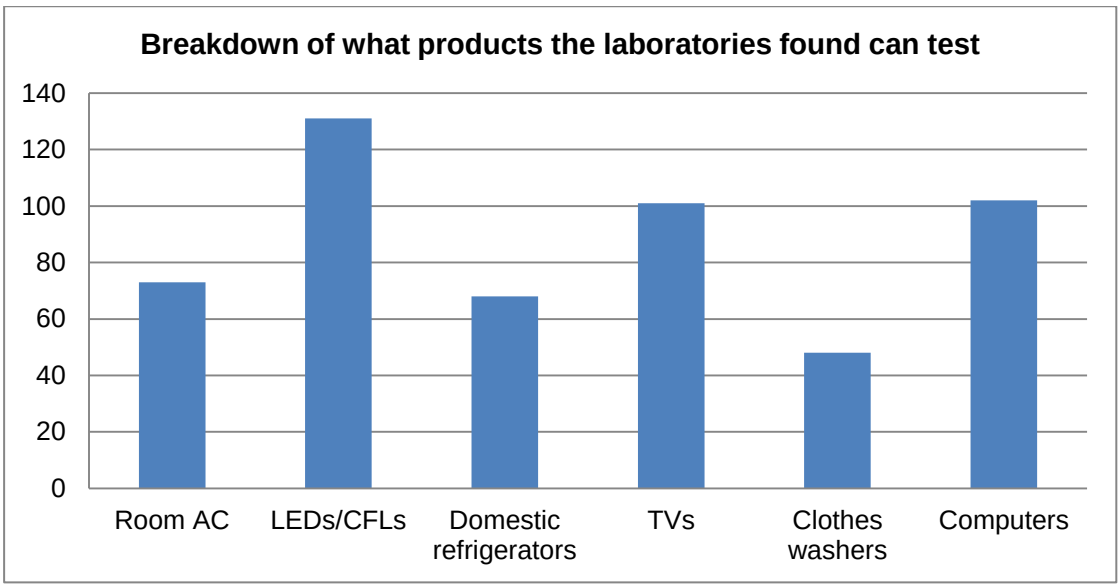


Figure 3: Total number of test labs located for each type of product (room air conditioners, lighting, refrigerators, TVs, clothes washers, computers)

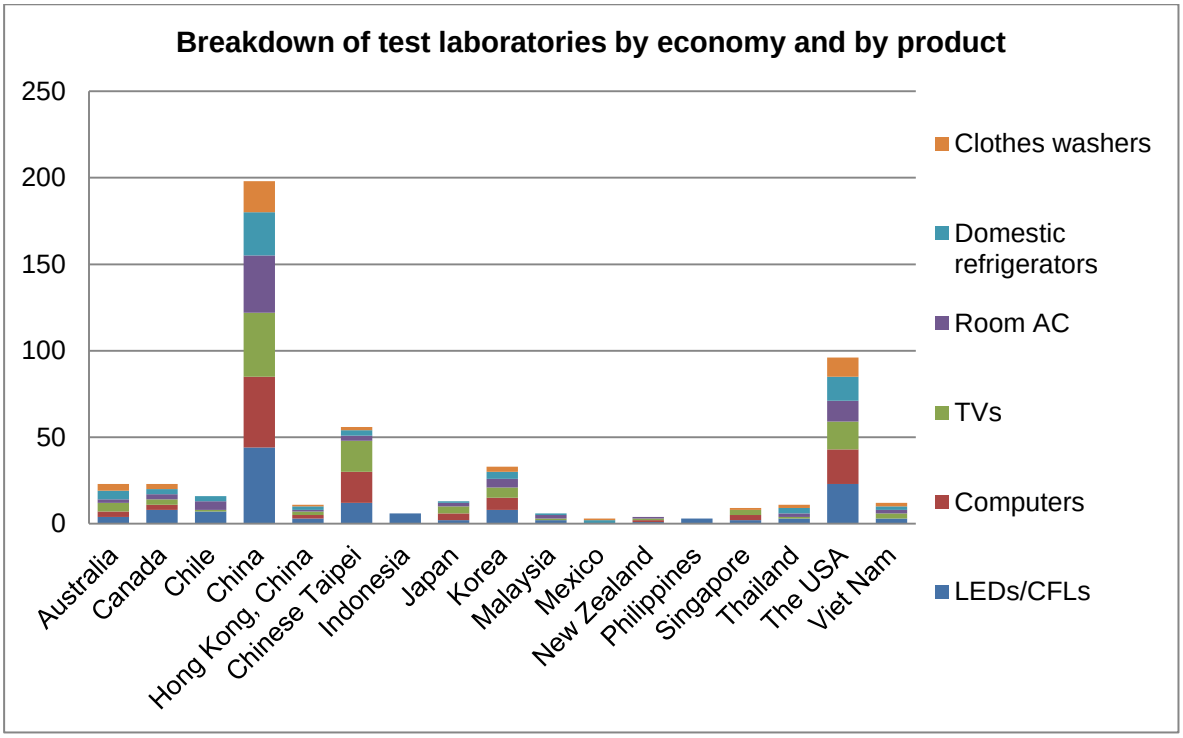


Figure 4: Comparative indication of the types of test labs found in the APEC economies

Figure 4 provides an overall comparison of the test laboratory capacity in the APEC economies. This data is broken down in the Figures that follow (Figure 4a to Figure 4q) and the product categories and the number of test laboratories that can perform energy efficiency testing in the APEC economies are identified, namely for: Australia; Canada; Chile; China; Hong Kong, China; Chinese Taipei; Indonesia; Japan; Korea; Malaysia; Mexico; New Zealand; the Philippines; Singapore; Thailand; the USA; and Viet Nam.

These results are discussed further in the sections that follow.

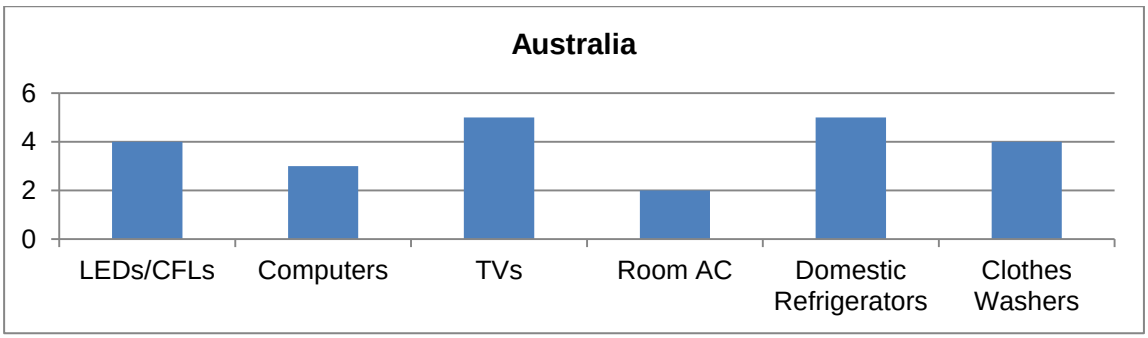


Figure 4a: Breakdown of Figure 4 by individual economy – Australia

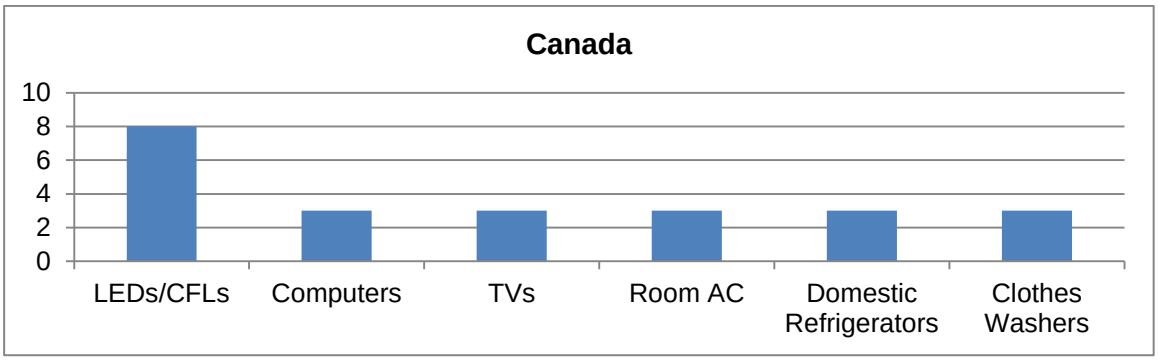


Figure 4b: Breakdown of Figure 4 by individual economy – Canada

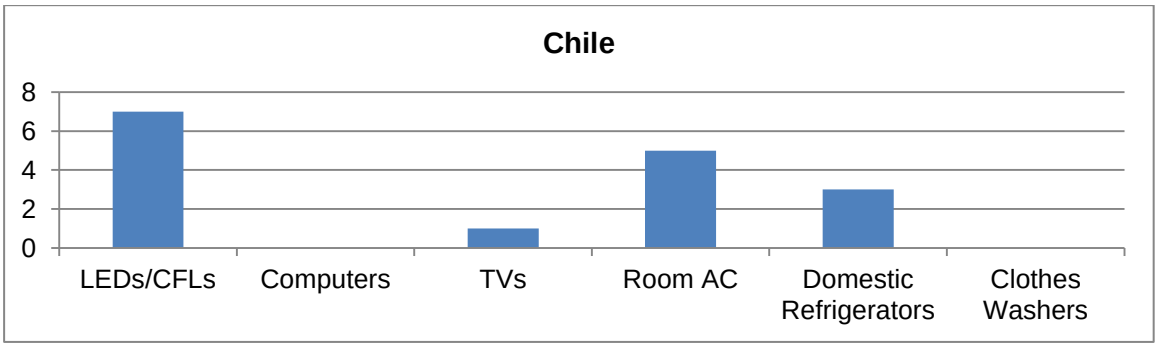


Figure 4c: Breakdown of Figure 4 by individual economy – Chile

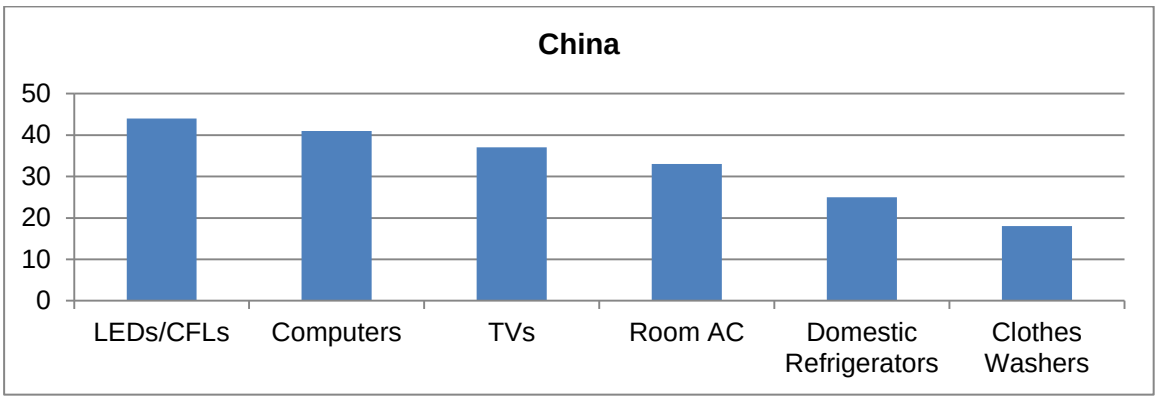


Figure 4d: Breakdown of Figure 4 by individual economy – China

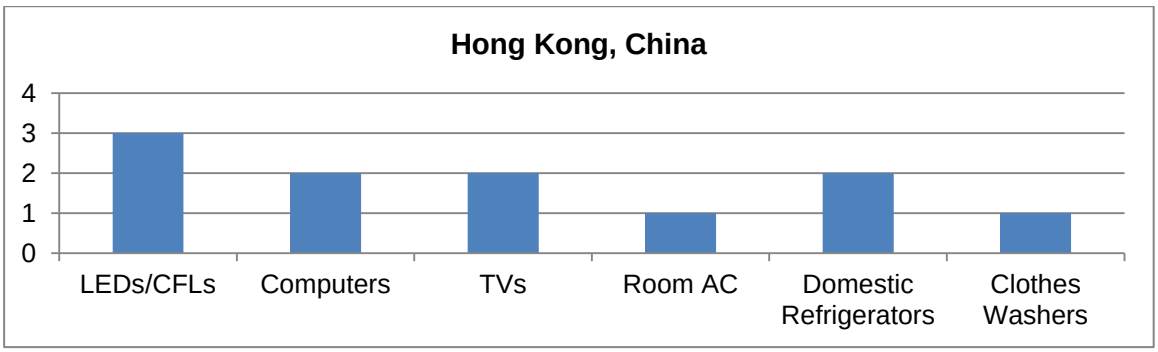


Figure 4e: Breakdown of Figure 4 by individual economy – Hong Kong, China

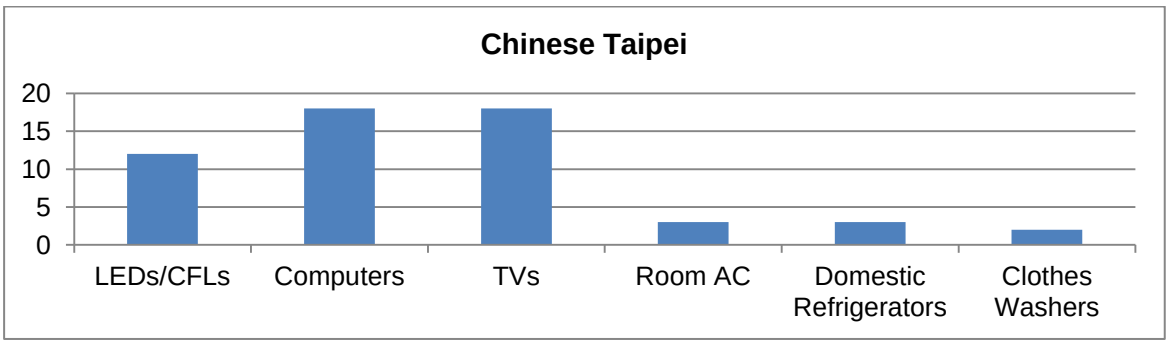


Figure 4f: Breakdown of Figure 4 by individual economy – Chinese Taipei

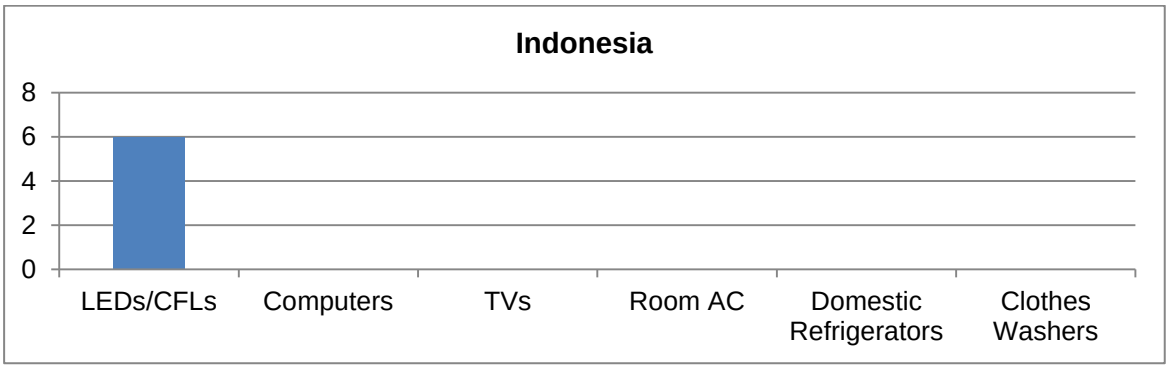


Figure 4g: Breakdown of Figure 4 by individual economy – Indonesia

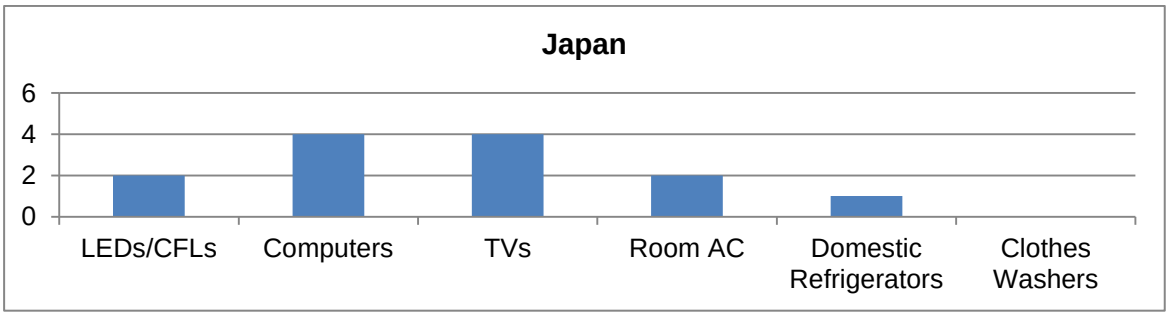


Figure 4h: Breakdown of Figure 4 by individual economy – Japan

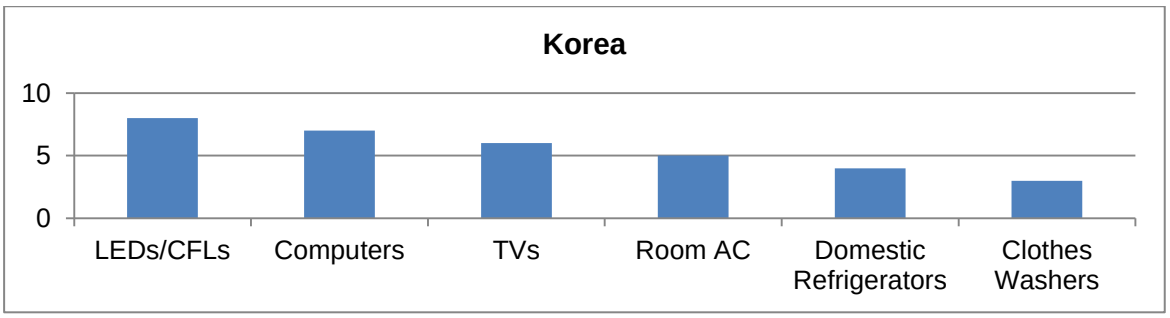


Figure 4i: Breakdown of Figure 4 by individual economy – Korea

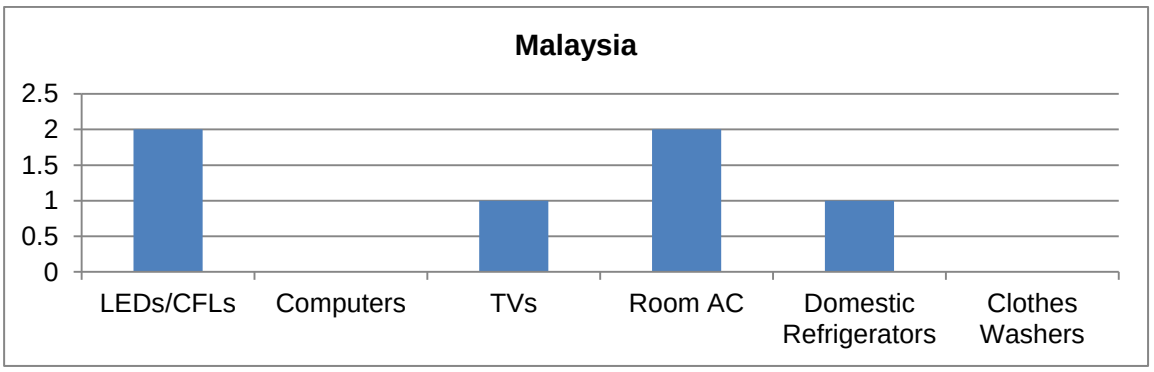


Figure 4j: Breakdown of Figure 4 by individual economy – Malaysia

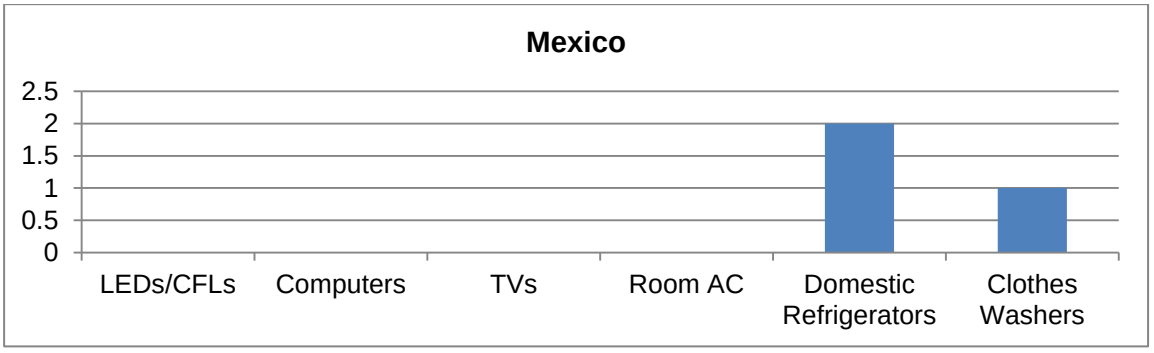


Figure 4k: Breakdown of Figure 4 by individual economy – Mexico

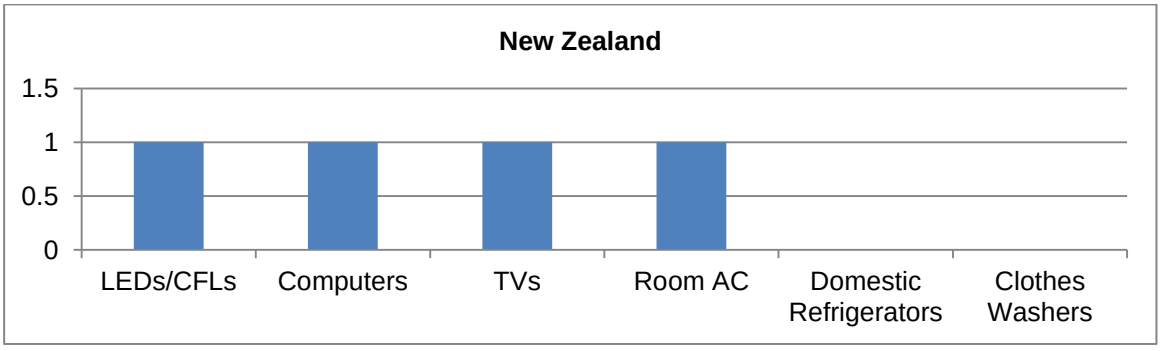


Figure 4l: Breakdown of Figure 4 by individual economy – New Zealand

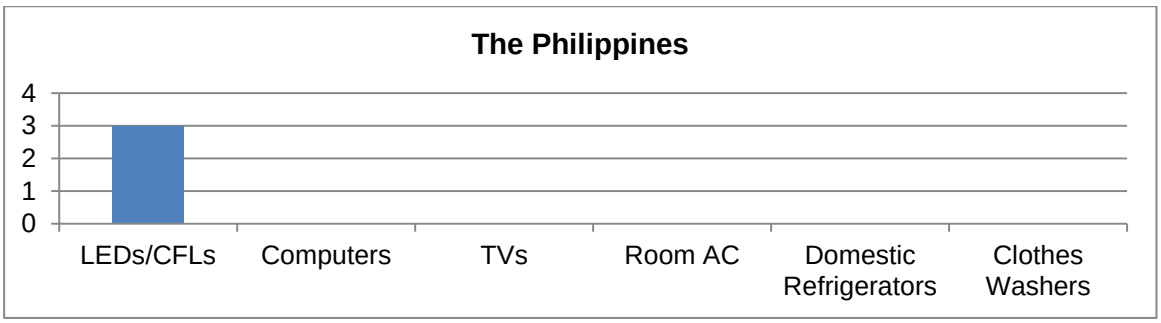


Figure 4m: Breakdown of Figure 4 by individual economy – the Philippines

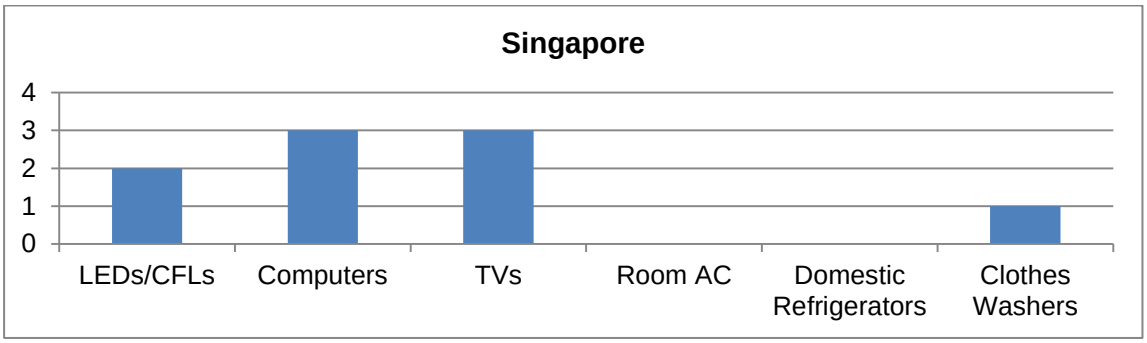


Figure 4n: Breakdown of Figure 4 by individual economy – Singapore

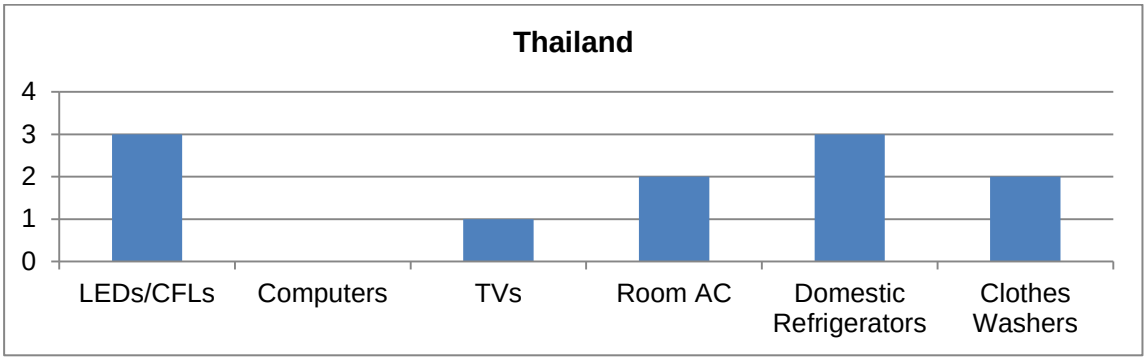


Figure 4o: Breakdown of Figure 4 by individual economy – Thailand

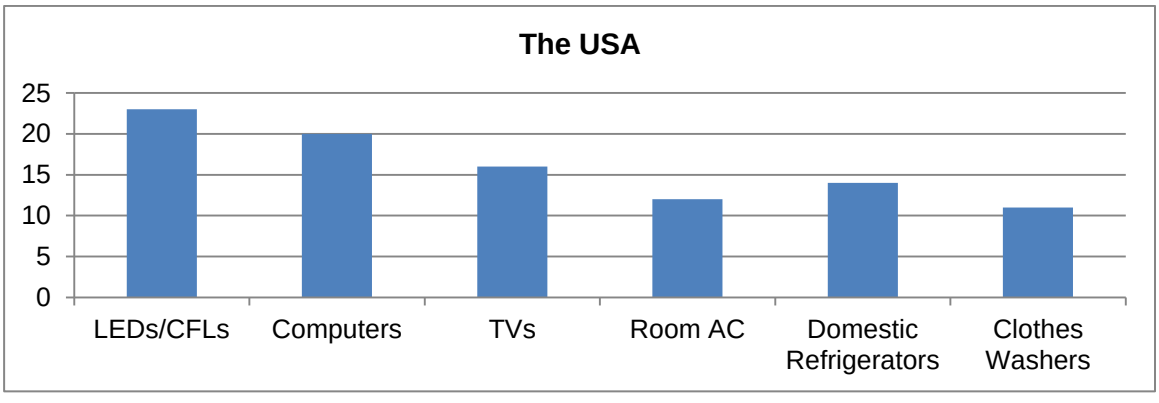


Figure 4p: Breakdown of Figure 4 by individual economy – the USA

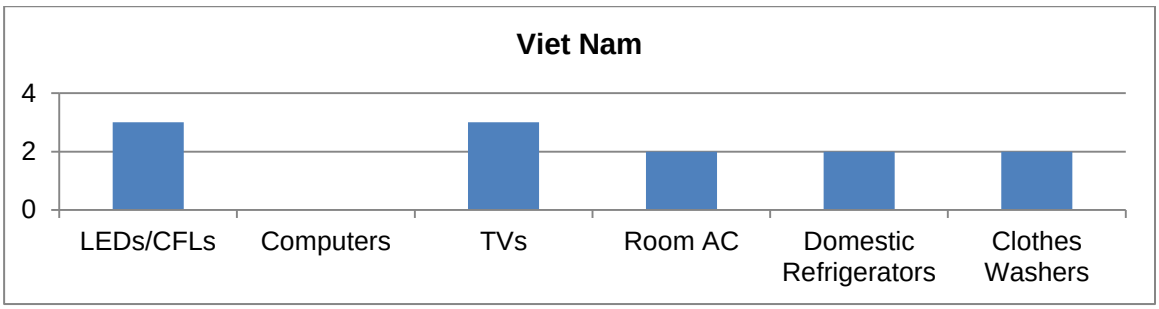


Figure 4q: Breakdown of Figure 4 by individual economy – Viet Nam

1.3.2 Questionnaire survey results

The details provided by the 97 laboratories that completed the questionnaire have been subject to further analysis. The questionnaire comprised of 25 questions but many of these provided the opportunity for respondents to supply multiple answers or complete an open ended respond (i.e. in their own words). Consequently, much of the data provided by the respondents, while very useful for a knowledge base, does not lend itself (nor was intended) to be simply aggregated and displayed in figure form.

Additional data to that given in the previous section is summarized in the figures below. Full data sets from the questionnaires can be supplied as a separate MSEXCEL file upon request.

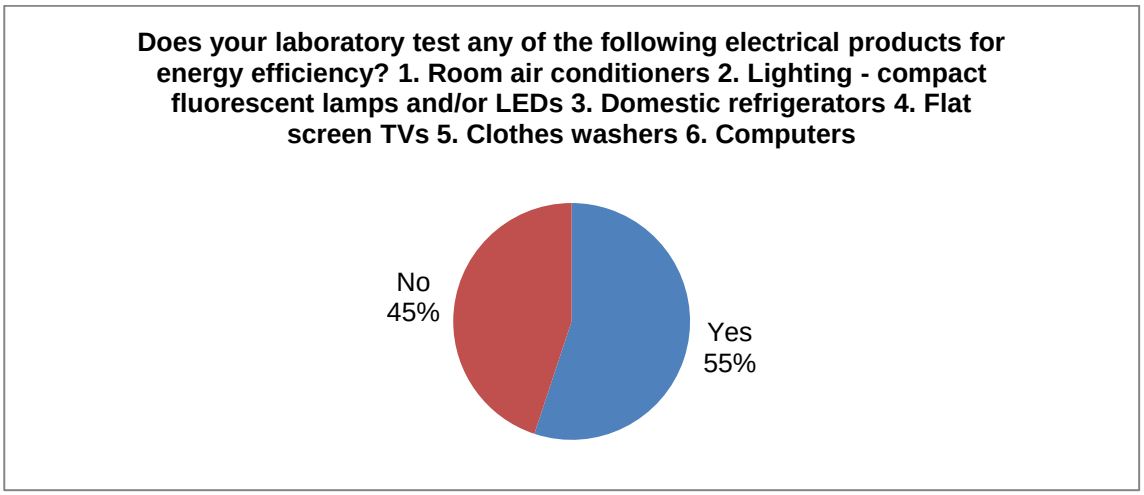


Figure 5: Proportion of responding test laboratories that undertake energy efficiency testing

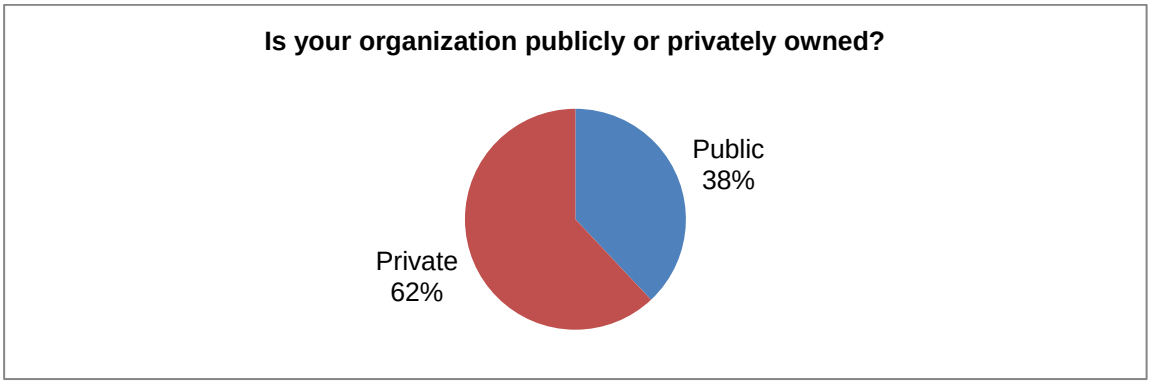


Figure 6: Proportion of responding laboratories that were publically owned

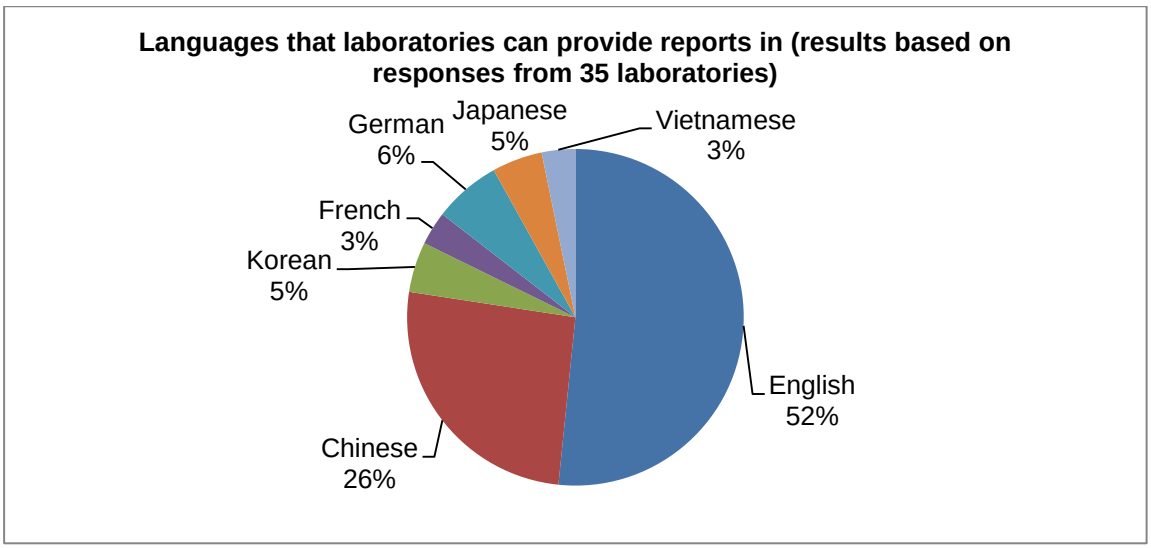


Figure 7: Report languages available from the responding test laboratories

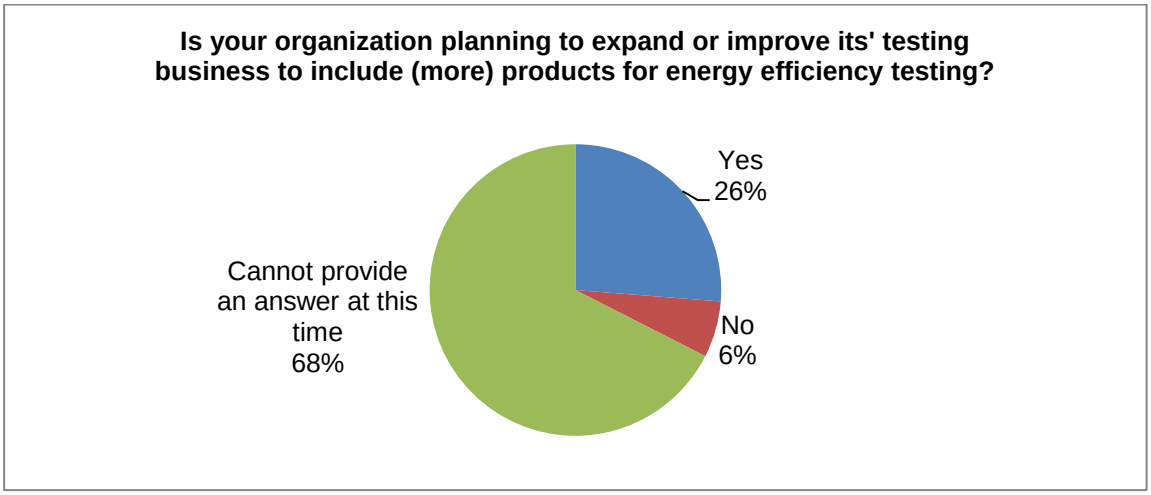


Figure 8a: Expansion plans

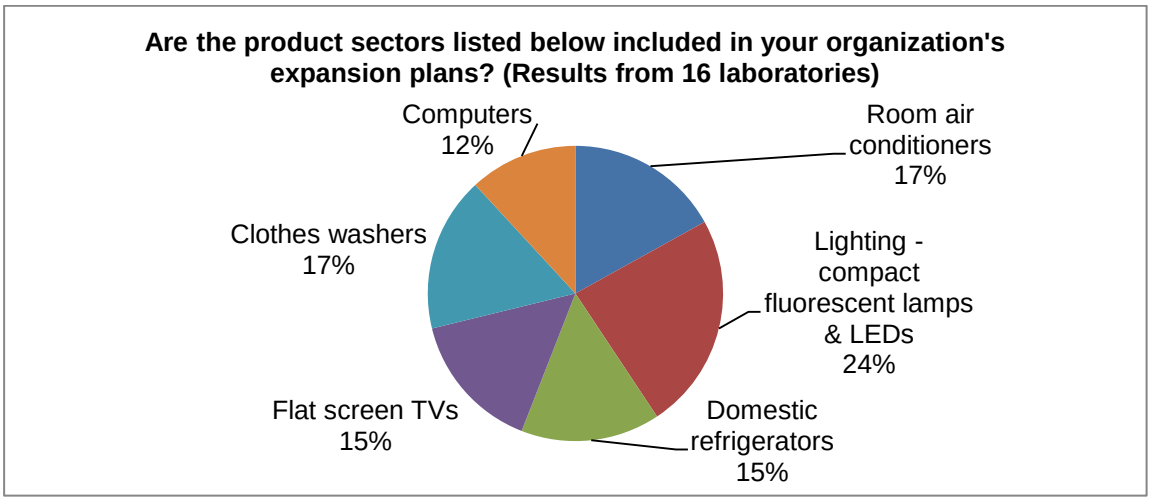


Figure 8b: Expansion plans in more detail

1.3.3 Discussion of the results of the surveys

One focus of the project was to build an understanding of the testing capacity available in the APEC region and so help policymakers to leverage available testing resources. The surveys

have provided an overview of testing facilities and their capacity of testing products for energy efficiency metrics in the APEC region.

Data collected for each testing laboratory has at a minimum included: location, branding, competence identified through the third party information, and website URL. These details (listed in Appendix 5) are a valuable contribution to the knowledge base and can be further developed over time. Although the data was collected from databases that can be expected to have applied some level of qualitative screening, e.g. compliance with ISO/IEC 17025[13], none of these necessarily provides a complete assurance of the competence of the laboratories listed.

The data summarized in Figure 2 shows that while there is a substantial number of test laboratories with the capacity to test the energy efficiency of products of interest to this project, they are concentrated in a minority of the APEC economies. Since the majority of the laboratories located will be operating as commercial entities, then it can be assumed that this distribution reflects the realities of the commercial market – capacity primarily existing where there is fee-paying business to be done. Thus it was to be expected that China has more laboratory test capacity than any other economy – it has the largest manufacturing base of any economy in the world. Similarly, it is no surprise that the USA has the next longest list as it has the second largest manufacturing base of any economy in the world. (The symbiotic relationship between manufacturing and test laboratory capacity was mentioned in Section 2.)

Consequently it can be expected (and seen from Figure 2) that laboratory test capacity will be much reduced, or may not even exist, in those economies that have small or non-existent manufacturing capacity. Where capacity exists but there is little or no corresponding manufacturing, then this capacity is largely coming from publically owned, rather than commercially owned, laboratories e.g. the Philippines and Viet Nam. Since laboratory capacity so closely matches manufacturing capacity then its corollary is that there is likely to be a lack of testing capacity in those economies that have no manufacturing base of the equivalent products. This presents challenges for the implementation of S&L regulations in such economies. If certification of products is required before entering the marketplace then this may need special arrangements to permit the acceptance of non-national certification. Any testing required by the enforcement authorities may need to be commissioned from a non-national laboratory with the legal and logistical complexities that that may introduce e.g. Viet Nam where laboratory capacity to test domestic refrigerators is so limited that a laboratory in Thailand has been officially designated by the Vietnamese authorities to certify such products.

Less expected were the results for Japan, where relatively few test laboratories were located and Russia, where no test laboratories were located. In both cases, it is possible that these low results do not reflect the actual situation in those economies so much as reflect the challenges the report compilers encountered when interpreting the listing systems used in those economies.

The original survey of the testing laboratories was designed to obtain detailed information from them but very few responded to the questionnaire and most of those who did, did not provide all of the information requested. Since many of the laboratories who were contacted, but did not respond, were known to be able to undertake these specific energy efficiency

[13] ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories* is the internationally recognized test laboratory accreditation standard

tests, it can be seen that drawing general conclusions from extrapolating from the responses to the questionnaires would be unrepresentative. Consequently, the analyses presented in Figures 5-8 should be treated as illustrative only. This contrasts with the specific detail provided about the individual testing laboratories in their questionnaire responses, which was directly provided by those laboratories and is available upon request via a separate MExcel file.

Though only illustrative, Figures 5-8 provide some useful indications. The language that reports can be made available in could be very important for those MV&E enforcement authorities that need to commission testing of products but do not have that particular testing capacity available in their own economy. Language will also be important for any economies that attempt to undertake some form of "joint testing" (see Part 2 of this report) in which the results of testing are shared by more than one economy.

Almost 40% of the responding laboratories identified their expansion plans while a number of the remaining respondents appeared to have some expansion plans but declined to give specific details. This provides a positive indication that laboratories across the region see energy efficiency testing as a growing area of activity. A total of 24% of the responses indicated that CFLs/LEDs are included in their business expansion plans. This product category looks remarkable compared to the lower but more similar levels across the other products, which fall into a range of 12% to 17%. Many of the laboratories will geographically be very close to manufacturing plants since that is where their main client base is, e.g. China is regarded as the largest producer of CFLs and LEDs and has almost twice as many test laboratories for these than any other economy. Might this mean that test laboratories view LEDs as the "coming" product area and computers, as they are currently configured, to be a market less likely to expand?

1.3.4 Comparison of APEC economies' verification testing needs with available national testing capacity

Comparison of APEC economies' verification testing needs with available national testing capacity can be achieved through matching the results of the surveys with listings of S&L regulations found in the *2012 APEC Survey*. The result of this comparison is shown in Table 2.

The comparison provided in Table 2 identifies the existence of a superficial match of testing capacity with the corresponding S&L regulations only. It does not identify whether there is sufficient capacity to meet the total market demand in that particular economy. Where there is not, or where no testing capacity exists at all (as in the case of a minority of APEC economies), then it will be necessary to locate capacity elsewhere in the region. This was the case cited for Viet Nam in Section 1.3.3.

APEC Economy	LEDs/CFLs	Computers	TVs	Room A/C	Domestic refrigerators	Clothes washers
Australia						
Canada						
Chile						
China						
Chinese Taipei						
Hong Kong, China						
Indonesia						
Japan						
Korea						
Malaysia						
Mexico						
New Zealand						
Peru						
Philippines						
Singapore						
Thailand						
United States						
Viet Nam						

Key:	Have S&L and some test capacity located	Have S&L but no test capacity located	No S&L

Table 2: Comparison of APEC economies' verification testing needs with available national testing capacity

Part 2: Cost effective options for verification testing

2.1 Introduction

This second part of the project follows on from Part 1 in so much that the testing of products is an integral part of MV&E (corresponding to the "V" for verification) activities undertaken by market surveillance authorities. Whereas Part 1 responded to the recommendation **Access to Competent Laboratories** identified in the *2012 APEC Survey,* Part 2 responds to another recommendation in that Survey: **Verification Testing**. For this, the following were identified as being beneficial for improving the impact of collaborative MV&E activity within the APEC economies:

- Agreement between programs in different jurisdictions to undertake verification tests on the same category of product at a similar time within their own economies, and share results, to gain a greater insight into compliance issues relating to individual product types.
- Agreement between programs in different jurisdictions to undertake verification tests on different categories of products over a designated period of time, and share results, in order to maximize coverage across a range of products.
- Agreement between programs in different jurisdictions to undertake verification tests on the same type of products at a similar time and within the same laboratory(ies), and share results, to gain cost savings through economies of scale.
- Mutual recognition of test reports: Where tests methodologies are technically equivalent, programs agree to allow suppliers to lodge the same test reports as evidence of compliance.
- The sharing of test results and/or notification of enforcement actions: where products have been proven to be non-compliant in one economy, this information may be used by other programs to justify increased scrutiny and improve the targeting of limited testing budgets.

All of which would be best enabled through the delivery of another recommendation from the same report, that of a **Regional Network** "*providing a focus for efforts to improve MV&E in the APEC region and to develop collaborative projects, economies should consider supporting the establishment of and participation in a forum on MV&E".* [14]

However, whilst building a regional network and developing collaborative activities between authorities can lead to reducing testing costs for MV&E, there are a number of other effective strategies that can be adopted by individual authorities, especially those with limited access to testing resources, which would reduce their dependence on testing and thereby reduce its costs.

This issue of cost reduction is the first to be dealt with in Section 2.2, which follows. Thereafter, Section 2.3 examines the issues of regional collaboration and Section 2.4 identifies policy options for conducting verification testing cost effectively and collaboratively.

[14] http://www.clasponline.org/Resources/MVEResources/MVEPublicationLibrary/2012-APEC-MVE-Survey

2.2 Identifying testing options and approaches for governments to reduce costs for verification testing

Full procedure verification testing of products is costly. Samples may have to be identified, purchased and transported for testing and the laboratory testing facilities are most frequently operated on a commercial fee paying model. These testing fees vary according to the product type concerned and can be very high (e.g. several thousands of US dollars) per sample tested.

Since budgets are always limited, it has been necessary for MV&E authorities to develop strategies for reducing the cost of verification testing. Broadly, these fall into five main approaches: risk analysis, avoidance of testing, transfer of cost, use of reduced testing procedures, and sharing of costs. Each is described in more detail in the following sub-sections.

2.2.1 Risk analysis

MV&E authorities will always encounter some restrictions on the activities they want to undertake due to the limitations of staff capacity and available budgets. Using some form of risk analysis can ensure that those limited capacities are focussed where they are most likely to be effective. Such an approach is used by established MV&E authorities in order to identify those products that are less likely to be compliant - thus enabling them to concentrate their more costly activities on the products identified. Typically, they apply a broad set of principles across a number of criteria likely to signal a higher risk of non-compliance e.g. high claims of performance at an unusually low purchase price, new entrant manufacturer, manufacturer with a history of non-compliance, complaints from competitors etc.

2.2.2 Avoidance of testing

It is important that verification testing is integrated into the overall market surveillance policy measure and ensuing regulations in such a way that publicly funded testing of products is a measure of last resort.

Testing should always be preceded by lower cost examinations of documentary evidence such as that of the results of laboratory testing conducted at the manufacturers' (or importers') expense. Attempts should be made to obtain and examine the production control records for the product under examination too. This is to ensure that a product has continued to be manufactured to its original specification since its original certification. Any discrepancies discovered in the documentation may enable the MV&E authority to take enforcement action without the necessity to undertake any testing of the product.

Examination of documents requires expertise. Product documentation can have a high level of technical content so will need to be checked by persons with knowledge of the test process and of the product itself. Not all MV&E authorities will have staff with the specific technical knowledge since many have to cover such a wide range of different product sectors. Under these circumstances, such tasks will need to be contracted to independent experts, such as those at test laboratories. Even so, the costs of employing such experts to perform these functions is usually far less than the cost of performing the tests themselves.

2.2.3Transfer of cost

In this model, it is the supplier who pays the costs of testing should tests on their product reveal non-compliance. Normally, the costs levied by the test laboratory for testing the first sample are initially met by the authority who subsequently recovers the cost from the supplier. Under these circumstances, the non-compliance found may lead to other financial sanctions (fines, etc.) being placed upon the supplier of which the testing cost is but a small part.

The cost of testing is only one part of the overall cost since the cost of purchasing the sample(s) for testing can be high too. Regulations in some economies enable MV&E authorities to take samples from their national markets at no initial cost i.e. they are not required to pay for them at the point of taking them from the market. The MV&E authorities

are, though, usually required to later pay for those products that have found to be fully compliant in the subsequent examination/testing process.

Transfer of cost is a particularly powerful tool in those economies with regulations that require further (replicate) samples to be tested when the first sample tested is found to be non-compliant. Under these circumstances, the MV&E authority can approach the supplier after the results of the first test are known. The supplier, when faced with the costs of testing further samples, may then accept the findings of non-compliance without the necessity of further testing.

Clearly, any refund of testing costs should be returned to the budget of the MV&E authority. However, the proceeds of any further financial sanction (fines, etc.) levied on a supplier of non-compliant products should go to a central treasury fund and so avoid enhancing the budget of the MV&E authority. This is necessary to avoid inadvertently developing financial incentives that could result in skewing the work program of an MV&E authority away from those products that do most damage (in terms of user detriment, excess carbon emissions, etc.) to those that provide the best financial rewards.

2.2.4a Use of lower cost (screening) test procedures

"Full procedure verification tests vary in cost depending upon the methodology and the product under test. They can be expensive, costing several thousands of dollars each. As a result, enforcement authorities should use these types of tests prudently, where their impact is likely to be the greatest.

Screening tests in which the specified procedure may not necessarily be followed precisely in order to provide a reasonable indication of energy performance at a lower cost and more quickly than in a full verification test. These tests are typically used to provide a preliminary assessment of products that are likely to fail a full verification test. Typical departures from the full procedure are that fewer replicate tests are made, laboratory or staff undertaking the tests may not be accredited, or not all of the test requirements are undertaken. These screening tests are sometimes referred to as check tests…"[15]

SCREENING TESTS IN AUSTRALIA[16]

Australian authorities have developed a cost efficient form of screening test, known locally as Check-testing. This procedure begins with a stage 1 check test, which requires a full or part test to the relevant Australian and New Zealand Standard, to be performed on one sample of the model. The sample is generally independently purchased (usually from a retail outlet) and tested by a laboratory accredited for check testing on behalf of the regulatory authorities. If that first sample fails the stage 1 check test, then the onus is on the manufacturer or importer to either provide evidence that the sample tested was defective or to fund a more elaborate stage 2 process requiring the testing of replicate samples.

DEWHA (2009)

Clearly, full procedure verification testing would normally be the process followed in support of subsequent enforcement action but the use of screening tests would have helped to avoid the costs of conducting full tests on products likely to be found compliant. In some circumstances, it may be appropriate for the results of screening tests to be shared with suppliers as this could lead to the avoidance of further full procedural testing or the transfer of all further testing costs to the supplier.

2.2.4b Use of lower cost (witness) test procedures

Witness testing is a cost effective alternative to purchasing and shipping large items to a test laboratory as the manufacturer supplies the sample to be tested at their own cost and testing takes place in the manufacturer's own facility. A suitable witness, who could be a member of the MV&E authority staff (or perhaps an independent testing expert to represent them),

[15] Excerpt taken from: Compliance Counts: A Practitioner's Guidebook on Best Practice Monitoring, Verification, and Enforcement for Appliance Standards & Labeling.
[16] Case study taken from: Compliance Counts: A Practitioner's Guidebook on Best Practice Monitoring, Verification, and Enforcement for Appliance Standards & Labeling.

would examine the test facility operated by the manufacturer and then witness testing performed by their staff using their equipment and test set-up for the relevant test standard.

This approach not only saves sample purchase and shipping cost and avoids testing fees, but also provides a suitable laboratory in which to conduct the test procedures. This can be particularly valuable when there is no suitable alternative independent laboratory readily available as is often the case when tests on larger industrial equipment are required.

The approach can incur the costs of commissioning a suitable expert and possibly high travel costs if the testing facility is overseas, which can be the case. However, these costs would still be lower than the (likely to be) substantial costs of the alternative full independent testing procedure.

It can be difficult to pursue an enforcement action right through to prosecution based on witness test results. It is not unusual for the expert witness to identify defects in the test equipment used or procedure being followed which would throw into doubt the validity of any self-certification made by the manufacturer. However, these are unlikely to place a numerical value on the possible non-compliance and so could be open to dispute in Court with uncertain results. That said, any discrepancies identified during witness testing are likely to cause the manufacturer to take effective remedial action.

2.2.5 Share the cost between authorities

Some MV&E authorities, e.g. those from Australia and New Zealand, already conduct some of their market surveillance programs in partnership together. This enables them to operate a single test program and share the costs of testing products that are commonly available in both economies. Potentially, and in these particular circumstances, this can discount the cost of testing a product by 50% for each MV&E authority. However, the full benefits of sharing the cost of testing ("joint testing") can only be maximized under limited circumstances. For example:

- Where the same products are available in each market;
- Where the regulations in each economy require the same or very similar test procedures; and
- Where the legal procedures on one country will accord full recognition to a test report from a laboratory[17] in another economy.

A smaller benefit can be obtained through MV&E authorities acting as a buying consortium that conducts a form of joint "bulk-buy" testing program. Essentially, this delivers lower testing costs through the consortia negotiating a reduced testing cost by offering test laboratories a multiple unit testing contract under a competitive tendering regime. This enables the test laboratories to pass back the financial savings from operating in a more efficient manner due to the economies of scale. The full benefits of this form of joint testing are only maximized when:

- Where the regulations in each economy require similar test procedures; and
- Where the legal procedures in one economy will accord full recognition to a test report from a laboratory in another economyy.

Experience in Europe, where regional collaboration ("networks") for MV&E have already become established in some regulatory areas, has shown that this can lead to a substantial number of benefits. The common feature of most developed collaborations is that they include different bodies working together to share the planning and results of testing[18] the same types of products.

[17] Some test laboratories operate a global trading model in which the testing is done at a specialized facility in one country with the test report or certification being issued in another country. Such an approach may facilitate the development of joint testing by MV&E authorities.
[18] The expression "testing" includes related activities such as document examinations.

Benefits can include:

- Cost savings through sharing the expense of testing a product;
- Multilateral/regional exploitation of the results of MV&E through the development of shared intelligence and databases;
- Lifting of regional and national MV&E performance through adoption of best practice, peer reviews or exchange of experiences;
- Increased confidence and motivation of market surveillance authority staff;
- Withdrawal of non-compliant products from markets beyond those where the MV&E authorities have taken part in the joint activity; and
- Reduction of duplicated activities.

These, and their related cost impacts, are examined in more detail in the next section.

2.3 Review of benefit and costs of regional collaboration

Each of the benefits listed in the previous section is explored further below. In most cases, descriptions are provided of associated factors that need to be considered as well as the relevant costs.

<table>
<tr><th colspan="2">Cost savings through sharing the cost of testing a product</th></tr>
<tr><td>Benefit:
Financial benefits are achieved when economies can work together in order to share the costs of conducting the necessary compliance testing at a suitable laboratory.
Sharing is particularly beneficial for smaller, less developed MV&E authorities who often have to operate within a low budget regime.</td><td>Cost:
The costs of testing a product can be substantial, e.g. +$1500 for an air conditioner, so there is a potential saving of $1000 per test per MV&E authority if three different MV&E authorities were sharing the cost.

Note: There are additional costs that offset some of the savings:
Shipping samples to a laboratory in another economy;
Time and travelling cost of attending meetings to agree the program and evaluate the results and decide exploitation actions.
Testing costs need not be equally shared. The more developed MV&E authorities may have access to larger budgets and agree to cover the majority of the testing cost.</td></tr>
<tr><td colspan="2">Things to consider:
The same or very similar test methods need to have been adopted by the partnering economies.
The legal system of one economy needs to be able to accept reports of products obtained in that economy but tested at a suitably “approved” laboratory in another economy.</td></tr>
<tr><td colspan="2"></td></tr>
</table>

Multilateral/regional exploitation of the results of MV&E through the development of shared intelligence and databases	
Benefit: • The results obtained by one MV&E authority can possibly be exploited by others. • A single set of test results could be leveraged through multilateral exploitation. • The results and other product data obtained by one MV&E authority can be used as a source of intelligence by others. • An established network of MV&E authorities enables the benefits of working together to be more readily identified and realized. • A shared database provides quick and easy access to information. Access to reliable robust information is an essential tool for an effective MV&E authority.	**Cost:** • Other MV&E authorities could exploit the results at little or no further cost to themselves. • Leverage would be effected at little or no further cost • Reliable intelligence is obtained by recipient MV&E authorities at no cost to them. • The travel costs of attending regular network meetings are likely to be high. • There is a moderate cost for setting up an online password protected database. The cost for MV&E authorities to access information stored in the database would be very low.
Things to consider: 1. The benefits of exploiting the test results obtained by another MV&E authority are maximized where the economies require the same test procedure/method for each product category. 2. The sharing of legally and commercially sensitive information will need to be governed by a set of protocols and will need to be established through secure electronic means. 3. A network is unlikely to be self-sustaining without some form of secretariat in place to promote communications, maintain the database, follow-up actions, etc.	
Lifting of regional and national MV&E performance through adoption of best practice, peer reviews or exchange of experiences	
Benefit: • MV&E authorities will want to seek to improve their performance and the best way to achieve this is through knowledge transfer and by learning from others. • The least experienced MV&E authorities are likely to benefit most from training opportunities.	**Cost:** • Training materials such as Best Practice Guidance sheets will need to be produced. The cost of production, if done by an external consultant, would be fairly high. • The organization of classroom style training would be high as this would require budgets for the travel costs of trainees.

• Training activities could be included as part of the program for network meetings. • Written training materials can be widely disseminated and re-used.	• The cost of including training activities in network meetings should be low. • The costs of further use of training materials are very low though a small budget for translating materials is advisable.
Things to consider: 1. Although legal systems will vary from economy to economy, the systems operated by MV&E authorities are less likely to vary. 2. The most significant barrier is likely to be that of language. While training materials can be translated, there may be no experts available with the necessary language skills to present them. 3. Peer reviews can work well when a more developed MV&E authority "adopts" and supports a less developed one.	
Increased confidence and motivation of market surveillance authority staff	
Benefit: • It is not uncommon for MV&E authority staff to lack confidence when executing certain compliance activities. This is not surprising since they operate in sectors where they may lack technical knowledge about the products they are responsible for and often operate on skeleton budgets. Their work can be strongly challenged by seemingly more knowledgeable and better funded suppliers/manufacturers. Working with other MV&E authorities provides the same "strength in numbers" benefits that are known to derive from working in teams. That strength (and ensuing confidence) coming from knowing that they have others working on their side too and can leverage their counterpart's knowledge and experiences dealing with specific issues. Experience in the EU has shown that suppliers/manufacturers are much less aggressive when faced with a group of MV&E authorities.	**Cost:** • It will be necessary to meet together to achieve this benefit, so there can be high costs for travel.
Things to consider: 1. This build-up of confidence and motivation stems from staff within MV&E authorities that have established working relationships, which means at least that they meet together and get to know each other to some extent. It is crucial to create the necessary environment, such as events and regular meetings, and mechanisms (i.e. contact sheets) for MV&E authorities to establish work contacts and communications.	

Withdrawal of non-compliant products from markets beyond those where the MV&E authorities have taken part in the joint activity	
Benefit: • There tends to have a spill-over effect for other MV&E authorities from outside of the collaboration to take compliance actions based on the result of a group activity. Such activities send a signal to manufacturers and reduce illegal dumping of non-compliant products to other economies with limited MV&E programs.	**Cost:** • Nil.
Things to consider: 1. It is necessary to maximize the publicity of exploitation actions taken by MV&E authorities in the region.	
Reduction of duplicated activities	
Benefit: • By coordinating compliance activities with other MV&E authorities, they can avoid conducting the same activities and thus reduce their time and resources invested in compliance.	**Cost:** • There will be a cost to set up and maintain a database that contains scheduling information provided by each MV&E authority in the network, though this would be a small additional cost if it was a subset of any other database being shared by MV&E authorities.
Things to consider 1. A mechanism is required to be in place for MV&E authorities to share work plans and schedules.	

Figure 9: Benefits of collaborative MV&E Testing

2.3.1 Existing operating models of regional collaboration or networks

There are five existing models of networks known to exist that undertake joint testing of products. Three are based in the EU, one is already based in APEC and one is worldwide. This internationally organized network, which does not include MV&E authorities, is active in some APEC economies. All five networks are described below.

2.3.1.1 PROSAFE Joint Actions

Who are they?

PROSAFE (the Product Safety Enforcement Forum of Europe) are a European NGO based in Brussels. Their membership is comprised entirely of MV&E authorities based in the EU and EFTA (the European Economic Area or "EEA"). Further details are available at http://www.prosafe.org

What do they do?

PROSAFE runs a "Joint Action" program each year. Each Joint Action is a package that typically comprises of joint tests on five different product sectors plus the implementation of best practice and skills development programs. MV&E authorities from approximately 25

economies join each year, though most only actively take part in a sub-set (of their choosing) of the program. Currently, these programs are predominantly concerned with establishing compliance with safety regulations. The PROSAFE management of joint tests was based on that operated by ICRT (see Section 2.3.1.5) but has developed further since.

Why were they established?
PROSAFE was established by market surveillance officers from various economies throughout Europe in 1990. PROSAFE started organising Joint Actions in 2006 and began developing a Best Practice Guide then (copy available at: http://prosafe.org/index.php?option=com_content&view=article&id=15&Itemid=254).

What is their continuing *raison d'etre*?
PROSAFE has become the de facto coordinating body for MV&E in Europe across a widening range of regulatory areas. Its performance has been recognized by the European Commission and the European Parliament, and will develop further when the forthcoming Regulation on Market Surveillance is adopted by the EU. It has recently been encouraged by the European Commission to expand its operations in order to coordinate MV&E in support of the EU's S&L regulations.

How are they organized?
PROSAFE acts as the Secretariat for its membership. PROSAFE organises coordination meetings, agrees testing schedules, develops the test programs, contracts with laboratories to carry out the testing, etc.

How are they funded?
Currently, each annual Joint Action typically requires funding of $2 million. A total of 66% of the funding is provided by the European Commission. This covers the costs of administering the program, the costs of PROSAFE employing consultants to undertake most of the management of the joint testing on behalf of the MV&E authorities, costs of travelling to meetings by them and the costs of testing. The remainder of the funding comes from the participating MV&E authorities in the form of a contribution in kind (the calculated value of their staff time).

2.3.1.2 Administrative Co-operation Working Group (ADCOs)

Who are they?
ADCOs are independent Working Groups run and chaired by the national MV&E authorities from the EEA that have been formally established by the European Commission. The Groups are forums for both cooperation and exchanges of information between national MV&E authorities. There is an ADCO for standards and another for labeling.

What do they do?
They meet twice a year and primarily act, as stated above, as a forum for exchanging experiences and information. To date, they have not undertaken any significant coordination of activities or joint programs (but see ECOPLIANT in the following Section).

Why were they established?
ADCOs are routinely established for each new EU regulation requiring market surveillance.

What is their continuing *raison d'etre*?
Acting as forums for cooperation and exchange of information.

How are they organized?
There are formal rules of procedure covering meeting arrangements, agendas, admissibility of third parties, access to documents and confidentiality. The European Commission provides the Secretariat. A similar Terms of Reference has been provided in Appendix 7, since this could be adopted for an equivalent network in APEC.

How are they funded?
All activities are self-funded by the MV&E authorities except for the travelling expenses to one meeting a year, which are funded by the European Commission.

2.3.1.3 ECOPLIANT and EEPLIANT

What is it?
ECOPLIANT was an EU grant funded project (European Ecodesign Compliance Project) being run by a consortium of national government policy leads and MV&E authorities from 10 EU member states. All of these MV&E authorities are also members of the Ecodesign (Standards) ADCO. Further details on http://www.ecopliant.eu/

What does it do?
It was created to develop a framework for the cost effective coordination of the MV&E of the standards regulations in the EU. Additionally, it was to:

- identify best practices in MV&E;
- create the supporting infrastructure (e.g. databases) that MV&E authorities need to share market surveillance data and best practice; and
- improve knowledge and experience among national MV&E authorities, through the creation of training tools for MV&E authority staff.

ECOPLIANT's management of joint tests is similar to that operated by ICRT (see Section 2.3.1.5).

Why were they established?
Until that time (2011) there had not been any coordination or transnational work done on developing MV&E in the EU on energy efficiency regulations.

What is their continuing *raison d'etre*?
This three-year project was completed in mid-2014. It will be replaced by a similar project, *EEPLIANT,* which will begin in 2015.

How are they organized?
Although one national policy lead participant managed the ECOPLIANT project, all other development, organization and coordination activities were undertaken by the MV&E authorities. Most of these activities would transfer to PROSAFE in any future program as the experience from ECOPLIANT was that most MV&E authorities struggled to find the capacity to be able to absorb these extra duties.

How are they funded?
The original grant was approximately $3.3 million, though not all this budget was spent. These costs included staff costs for the MV&E authorities that, in some cases, amounted to an extra two full-time persons. EEPLIANT has a similar budget but would be closer to 50% of this figure if staff costs for MV&E authorities were not included and reduced significantly further if the cost of obtaining samples was removed. (Some industrial equipment covered by the EU S&L regulations is budgeted to cost >$20k per sample.)

2.3.1.4 Nordsyn

What is it?
The Nordic economies (Denmark, Finland, Sweden, Norway and Iceland) have established a collaborative work program in the field of market surveillance of Ecodesign (MEPS) and Energy labeling. This collaboration, *Nordsyn,* was established in 2011 with the overarching aim of improving the efficiency of market surveillance of ecodesign and energy labelling.

Why were they established?
The Nordic economies have a formal treaty of cooperation that was first established in 1962 (The Helsinki Treaty). As they already work together over many matters, so it was logical for them to cooperate in this area too.

What do they do?
The MV&E authorities undertake many collaborative activities e.g. use the same checklist approach to dealing with manufactures, develop and share best practices, share plans and they share their test results and the results of their document inspections. Their initial task was review the barriers to collaboration under headings: 1) Transposition of legislation - different implementations in different economies, 2) Publication of test results, 3) Sanctions, 4) Test Laboratories, 5) How much market surveillance and financial differs, 6) Buy or borrow products for test, 7) Who pays for the test, 8) Budget Procedures, 9) Language, 10) Commercial codes, and 11) Use of databases. Their written outputs are in English, which is not the native language of any of the national members.

How are they funded?
Nordsyn is funded by the Nordic Council of Ministers.

2.3.1.5 E3 compliance program

Who are they?
The compliance teams from Australia's Department of Industry (DoI) and New Zealand's Energy Efficiency and Conservation Authority (EECA).

What do they do?
The E3 compliance team manages a check testing program. The E3 compliance team consults with DoI and EECA on the products to be tested and products are selected under the E3 selection criteria[19]. The E3 program has a single check test procedure and records follow up actions and outcomes of check testing on the energy rating website.

New Zealand and Australia generally share product test results that fall outside the E3 check testing program. New Zealand has a check testing program in place for their ENERGY STAR program and freely shares these results with Australia if they are of interest. Also Australia has conducted product testing outside E3 regulated products such as insulation, lighting (before regulation) and heat pump water heaters that they have shared with New Zealand.

Labeling compliance is the responsibility of each jurisdiction; however results are shared and compared. This comparison is useful even though the surveys are not conducted in an identical way.

Why were they established?
The two economies have a comprehensive free trade agreement (the Closer Economic Relations Agreement) and so work in partnership to develop and maintain regulations that apply in both economies.

What is their continuing *raison d'etre*?
Australia and New Zealand are effectively a single market, so the delivery of those regulations and their implementation needs to be maintained in a consistent manner.

How are they organized?
See above.

How are they funded?

[19] http://www.energyrating.gov.au/wp-content/uploads/Energy_Rating_Documents/Library/Compliance/Compliance/Verification-testing-Selection-Criteria-FINAL.pdf

The E3 compliance budget comprises of contributions on a population pro-rata basis from Australian Federal and State Governments, and the New Zealand Government.

2.3.1.6 International Consumer Research and Testing (ICRT)

Who are they?
ICRT are an NGO with headquarters in London. Their membership is comprised entirely of consumer organizations. Its global membership includes organizations in nine APEC economies. Further details are available at: http://www.international-testing.org/index.html

What do they do?
ICRT runs more than 50 large joint tests and numerous smaller joint tests on consumer products each year. They use around 60 test laboratories worldwide to carry out research and tests on thousands of products per year. Through their coordination of tests for their members, ICRT can make savings of around 60% per test joined for their more affluent members and up to 90% savings for their less affluent members (the more affluent members make larger contributions towards the costs).

Why were they established?
ICRT were originally established in the mid-1970s in the EU. They were inspired through the need to eliminate inconsistencies between the test results published by consumer organizations that shared common products and common borders. This led to the concept of joint testing i.e. testing products in partnership to a single test program at a single test laboratory with an agreed and consistent interpretation of the results. In the early days, typically only three or four organizations worked together on a joint program. Between 10 and 20 organizations working together has now become more common.

What is their continuing *raison d'etre*?
The business models of almost all consumer organizations are based around the sale of magazines containing the results of tests on products. Joint testing through ICRT is attractive for such consumer organizations because it reduces their operational costs. Additionally, ICRT seeks to help small organizations to grow through a program of capacity building and knowledge sharing.

How are they organized?
ICRT acts as the Secretariat. Through their establishment of rules and guidelines, they collect scheduling information from their members, organize coordination meetings, agree testing schedules, contract with labs to carry out the testing, etc. Leadership of the individual joint test programs (which includes tasks such as development of the exact content of the test program, selection of samples and evaluation of the results) is undertaken by staff from the consumer associations.

How are they funded?
A percentage is added to the testing costs levied on each organization (every organization only pays towards the test results that it publishes). This percentage varies according to the affluence of the organization. This is a financially self-sustaining program. This is only possible due to the substantially commercial operations run by the major consumer organizations that have multimillion dollar annual turnovers.

2.4 Policy options for a framework for policymakers in the APEC region to adopt in order to conduct verification testing cost effectively and collaboratively

As identified in the previous section, the benefits of collaboration can be significant since they lead to improved performance, cost savings and increased staff motivation. Consequently, APEC economies should consider a regional approach for MV&E. Such an approach would result in increasing the regional capacity as well as ensuring that those APEC economies with less testing resources do not become a safe haven for non-compliant products.

There are a number of policies that can improve the operational effectiveness of MV&E in all economies though the first two listed in Table 3 below (that of adopting harmonized test methodologies and that of accepting the results of full verification tests conducted by another MV&E authority) are particularly beneficial for collaborative activity too.

A number of the policy/regulatory recommendations listed in Table 3 may be considered quite demanding. This is a reflection of the situation in many markets where the levels of non-compliance are currently unacceptably high. Such levels are due, in part, to the markets being unbalanced. Those markets have fairly relaxed entry conditions and low penalty regimes for non-compliance - both occurring at the same time as the MV&E authorities are under resourced. Some of the suggested requirements, such as additional details on the rating plate and mandatory certification, may already exist under other (safety) regulatory measures for the very same products.

Identifier	Policy/regulation content
a	Adoption of harmonized test methodologies based on international standards. This is the key enabler that will lead to manufacturers more readily obtaining third party certification, for MV&E authorities being able to share results and intelligence, and for them to undertake joint testing programs. Note: History suggests that this is likely to happen. The safety test standards for these very same products were as internationally dis-harmonized in 1950 as energy efficiency test standards are today. Within 20 years, safety test standards had become almost fully harmonized to the international standard (the USA being the most notable exception). Harmonization of safety standards led to internationally recognized third party (independent test laboratory) certification of products – the IECEE CB scheme[20]. This scheme has recently expanded to include energy efficiency testing standards in its operation.
b	The results of full verification tests conducted by another MV&E authority are acceptable for enforcement purposes (subject to the tests being conducted on a representative sample and to the appropriate test standard and in a suitable laboratory). This requirement or something very similar needs to be in place to enable the sharing of test programs (and, so, testing costs) by different MV&E authorities. Note: it is not necessary for the performance levels to have been harmonized since these can be calculated by the MV&E authority in accordance with their national regulations.

[20] http://www.iecee.org/cbscheme/cbfunct.pdf

c	Registration of product prior to placing on market. Registration or its equivalent is essential since it provides a mechanism for informing the MV&E authority of what products are in their market. Without this knowledge, MV&E authorities have to divert some of their resources into making market surveys to establish what products are in their market.
d	Mandatory third-party verification and/or certification by a test laboratory accredited to ISO/IEC17025 is required as part of registration process. This provides the assurance that the product submitted by the manufacturer was found to be compliant by an independent and competent body when tested. The alternative of permitting self-declarations by manufacturers based on their in-house testing and calculations has been found to be particularly unreliable[21]. A mandatory requirement for third-party certification thus shifts the responsibility for ensuring a compliant marketplace much more onto the manufacturer with the consequence of a higher cost operating model for themselves but a lower operating cost model for MV&E authorities (due to them needing to do less testing).
e	"Technical File" required to be maintained by the manufacturer for each product registered. Contents to include: identification and design history of all models that share the same certification, production control records listing all subsequent specification changes and on-going check test details. Full Technical File to be made available to market surveillance authority within (say) 15 days of request. There are three important factors that need to be covered here: 1. It is common practice among manufacturers to have a "parent" model certified but not to pay for additional certification for those models that are derived from the parent model (through, perhaps, the incorporation of cosmetic changes or the addition of convenience features) but which retain the same specification for the design and components that provide the energy efficient performance. Consequently, the sample taken from the market by the MV&E authority may have a different model number to that shown on the certification. Under these very common circumstances there must be a transparent and auditable documented record available to MV&E authorities showing the specification relationship between the certified model and the different model being evaluated by the MV&E authority. 2. Production control records are maintained by manufacturers to record what specification changes have been incorporated in the product since certification. These are important since changes to specifications, such as the substitution of specific components, can occur during the ongoing production of products. Changing components could result in changing the performance of the product

[21] http://www.atlete.eu/index.php

	and this needs to be properly considered by the manufacturer and, if necessary, retesting and recertification should have taken place. *3.* Complete technical files are notoriously difficult to obtain from manufacturers. Some arrive only partially completed and some take weeks to arrive. The regulations should identify a time period in which the complete file should be supplied to the requesting MV&E authority. Failure to do so in the time period then becomes a non-compliance for which a sanction can be applied.
f	Rating plate on product to include unique registration code. This enables the most rapid and cost effective tracking of the product by a MV&E authority. So much so, that tracking could then be done via the Internet in real time at the point of sale.
g	The results of full verification testing of one sample are sufficient for legally determining non-compliance. If a manufacturer wishes to challenge this and test further products, it shall be done at their expense under the direct supervision of the MV&E authority and at test laboratories approved by MV&E authority. Undertaking replicate testing simply multiplies the cost of enforcement. Consequently, as most MV&E authorities operate on small budgets, a requirement in regulations for replicate testing can result in them not taking enforcement action against a product they suspect to be non-compliant as they do not have sufficient budget. This policy proposal thus shifts the cost of replicate testing away from the MV&E authority onto the manufacturer or supplier.
h	A maximum tolerance[22] on the declared result should be permitted. There are two sources for variations in the measured performance of a product: 1. One is the manufacturing variation between different samples of the same product. These are entirely the responsibility of the manufacturer who should register the poorer, rather than best, possible performance of the product. 2. The second are the unavoidable uncertainties of measurement that occur in laboratory tests. An allowance for these must be made in regulations, as they cannot be completely eliminated. Competent test laboratories can usually work within maximum of 5% of uncertainties for most individual measurements.
i	Witness testing by an MV&E authority or their representative can be used as a substitute for full verification testing. Increasingly, regulations cover industrial sized products for which few independent test laboratories currently exist. And those that do often conduct their test programs through sending their experts to examine the test facilities at the manufacturers' premises and to "witness" the tests being performed by the manufacturer's own expert staff. This is a well-established and widely used practice that MV&E authorities should consider adopting since it would be

[22] The level of tolerance should be less than 5% for most products for the reason given above.

	done at a lower cost than obtaining, transporting and testing the sample in a suitable independent laboratory.
j	All costs of testing any product found to be non-compliant in full verification tests conducted by an MV&E authority are to be refunded to them by the manufacturer/importer. This reduces pressure on the budgets of MV&E authorities.
k	Samples for compliance checking can be removed from manufacturer/importer stock at no upfront cost to the MV&E authority. The MV&E authority to refund cost of, or return undamaged, any product found to be compliant. This requirement reduces the pressure on the budgets of MV&E authorities though does not necessarily entirely reduce the exposure of those budgets since compliant products will still need to be paid for (or returned to manufacturers' stocks – if undamaged).
l	MV&E authority shall not directly benefit from fines or other financial penalties imposed in respect of non-compliant products.
m	Non-compliance should normally be treated as a civil offence but could be treated as a criminal offence when there is intent to defraud. This is dependent upon the legal system that applies in any particular country but many include a less stringent legal code for civil actions. This may enable an MV&E authority to apply a sanctions regime without recourse to full court proceedings and so speed up the process at a much lower administrative cost.
n	Where sanctions are necessary, they should always be sufficient to outweigh the benefits of non-compliance. The sanctions for non-compliance should be defined in regulations and could comprise of the following: 1. Financial penalty based on level of energy "lost" i.e. number of models sold, level of miss-claimed efficiency. Note: consideration should be given to varying the level of financial penalties to take account of the responsiveness of the transgressor; 2. Recall of non-compliant products where the incorrect energy efficiency exceeds x%; 3. Owners of recalled products to be compensated with the choice of refund of purchase cost or a replacement product; 4. Owners of non-recalled products to be paid compensation for the additional energy costs over the lifetime of the product.

Table 3: Policy options

The relationship between the options for reducing verification costs as identified in Section 2.2 and the policy/regulatory measures listed in Table 3 is shown in Table 4. The data spread there identifies those policies/regulatory measures that have a direct impact on reducing the cost of verification (signified by "✓") and those ("a", "l", "m", "n") that support a regulatory environment that can be expected to lead to a more compliant market and so indirectly reduce the costs for the MV&E authorities.

Identifier	Avoidance of testing	Transfer of cost	Use lower cost (screening) test procedures	Use lower cost (witness) test procedures	Share the cost between authorities
a					
b					✓
c	✓				
d	✓				
e	✓				
f	✓				
g		✓			
h					
i				✓	
j		✓			
k		✓			
l					
m					
n					

Table 4: Matrix comparing policy options with methods for saving costs

Concluding remarks

Some 250 test laboratories capable of testing energy efficiency metrics for LEDs or CFLs, computers, TVs, room air conditioners, domestic refrigerators and clothes washers were located across the APEC economies. The distribution of the laboratories was heavily weighted towards those economies that have a large manufacturing base; China and the USA having both the largest manufacturing capacity and the most testing capacity. This was to be expected as most test laboratories surveyed were commercial enterprises whose client base is likely to be dominated by manufacturers. The results for those economies with low manufacturing bases were also as expected, since they had relatively low testing capacity.

Though it was not possible to determine the quality of all the testing services they could undertake, a number of laboratories were recognized as they were listed by national authorities such as CNIS in China or through their ISO/IEC 17025 accreditation records maintained by national accreditation organisations.

It is intended that the listings of test laboratories created from the survey results of this project will form a database that will be made available to MV&E authorities. That being so, it will need to continue to be added to and updated in order for it to remain a useful tool. If it were to become a secure database for the sole use of MV&E authorities then it would become sensible for them to add details of their experiences of using any of the listed laboratories in order to assist other authorities to identify those with superior (or inferior) performance.

The cost of conducting verification testing is probably the largest single barrier faced by MV&E authorities. Yet there are a range of policies identified in this report that have already been adopted in some other economies, which can significantly reduce the costs of verification testing.

The implementation of these policies would make a significant difference for MV&E authorities, but it still may not be enough. Ultimately, there may need to be a paradigm shift in which the burden of verification shifts from “end of pipe”, i.e. as currently monitored and verified by MV&E authorities *after* the products have entered the marketplace to “front of pipe” in which the responsibility for verifying and demonstrating that the products are fully compliant is wholly with the manufacturer (or importer) *before* they enter the market. What this would mean is that the burden currently on the MV&E authority for having to prove that a product is non-compliant shifts so that it is the manufacturer who has to prove that it is compliant and not the MV&E authority.

This may appear to be what happens currently. For example, in many cases, the manufacturers have their products certified prior to placing on the market. But that, generally, is all that they do. Thereafter, minor specification changes, incremental model development, changes in production, substitution of components, etc. can all contribute to changing the performance for which the original certification was given. In extremis, a third-party solution may be necessary in which independent certification bodies monitor production and thus ensure compliance before the product leaves the factory.

The implementation of such solutions may be years away, should they be implemented at all. Meantime, apart from adopting cost reduction policies for testing, there are important benefits for MV&E authorities to gain through building a network and increasing their collaborative activities. These benefits could include savings through sharing the cost of testing and by

improving the targeting of their testing though use of intelligence supplied by other MV&E authorities. Some of these benefits could be achieved quickly, i.e. intelligence sharing, while others may need the implementation of policy changes such as the adoption of harmonized test methodologies, before all savings could be achieved.

Appendix 1: APEC S&L Matrix

APEC Country	Air cleaner	Audio visual	Battery chargers	Boilers and furnaces (central)	Boilers and furnaces	Ceiling fan	Ceiling fan lighting kit	Central AC	Chiller	Climate control	Clothes dryers	Clothes washers	Clothes washer dryers	Coffee machines	Computers	Cooker hoods	Dehumidifier	Dishdryer	Dishwashers	Displays (monitors)	Display (CRT)	DVD/Blu Ray player
Australia								MEPS	MEPS		LC	LC			MEPS				LC	LC, MEPS		
Canada	LE		LE	LE, MEPS	MEPS	LC, MEPS	LC, MEPS	LE, MEPS		MEPS	MEPS, LC	MEPS, LC, LE	MEPS, LC		LE	LE	MEPS, LE		LC, MEPS, LE		LE	LE
Chile												LC										
People's Republic of China						LC, LE, MEPS		LE, MEPS, LC	MEPS, LC, LE			LC, LE, MEPS			LE, MEPS	LE, MEPS				LE, MEPS, LC		
Chinese Taipei				MEPS		MEPS, LE			MEPS			LE			LE		LE, LC, MEPS		LE		LE	LE
Hong Kong, China											LC	LC			LE		LE, LC					
Indonesia									MEPS													
Japan		MEPS													LC, LE, MEPS							LC
Korea	LC, MEPS	LE		MEPS, LC, LE	LE	LE		LE, LC, MEPS	LE			MEPS, LE, LC			LE		MEPS, LC	MEPS, LC	MEPS, LC		LE	LE
Malaysia																						
Mexico								MEPS, LC, LE				LE, LC, MEPS										LE
New Zealand								MEPS	MEPS		LC	LE, LC			MEPS, LE				LE, LC	LE, LC, MEPS		
Peru																						
Philippines																						
Singapore											LC			LE					LE			
Thailand								LE				LE			LE							LE
United States	LE		LE	MEPS	LE, LC	LE, MEPS, LC	MEPS, LE	LE, MEPS, LC			MEPS	LC, LE, MEPS	LE		LE		MEPS, LE		LE, MEPS, LC		LE	
Vietnam						MEPS, LC						MEPS, LC										
Total no of countries with S&L in place	**3**	**2**	**2**	**4**	**3**	**6**	**2**	**8**	**4**	**1**	**5**	**12**	**2**	**1**	**10**	**2**	**5**	**1**	**7**	**3**	**4**	**6**

NOTES

Key:

MEPS - Minimum Energy Performance Standard label (pending, in place, in force with revision completed but not yet implemented, or pending revision)
LE - Label Endorsement (pending, in place, in force with revision completed but not yet implemented, or pending revision)
LC - Label Comparative (pending, in place, in force with revision completed but not yet implemented, or pending revision)

Consumer Product Groups covered:

Computers & ICT
Cooking & Dishwashing
Heating & Air Conditioning
Laundry
Lighting
Miscellaneous (excluding Outdoor Tools & Equipment, Personal Care and Photovoltaic Products)
Motors
Office Equipment
Power Supply & Power Conversion
Pumps
Refrigeration
Standby
Televisions, Displays & Audio Visual
Ventilation, Blowers & Fans
Water Heating

APEC Country	Elevator	Exhaust fan	External power supply	Fluorescent lighting (Ballast)	Fluorescent lighting (CFL)	Fluorescent lighting (other)	Freezers	Fridge Freezers	Games console	Griddle	Halogen lighting	Hand dryer	Hard drive	High intensity discharge lighting	Hobs and cooker tops	Home theatre equipment	Ice machine	Imaging machine	Incandescent lighting	Industrial blower	Integrated fans	Internal power supply
Australia			MEPS	MEPS	MEPS		MEPS, LC	LC, MEPS											MEPS			
Canada		LE	LE, MEPS	MEPS	LE, LC		LC, MEPS, LE	MEPS, LE, LC								LE, MEPS	MEPS	LE	LC, MEPS		LE	
Chile				LC	LC	LC	LC	LC			LC								LC			
People's Republic of China			MEPS, LE	MEPS, LE	MEPS, LE, LC	MEPS, LE		LE						MEPS, LE, LC	LE, LC, MEPS			LE				LE
Chinese Taipei		LE		MEPS	MEPS, LE, LC	LE	LE	MEPS, LE, LC				LE			LC, LE	LE		LE	MEPS			
Hong Kong, China					LE, LC													LE				
Indonesia					LC			LC														
Japan						MEPS, LC	LC, MEPS	MEPS		LC			LC, MEPS		LC, MEPS							
Korea			MEPS	LE, MEPS	LE, LC, MEPS	LC, MEPS, LE	LC, MEPS	LC, MEPS						LE	MEPS	LE		LE	LC, MEPS	LE		
Malaysia				MEPS	MEPS		LC	LE, LC														
Mexico	LE			LE	MEPS, LE	LE	LC, LE	LE, MEPS, LC						LE, MEPS	MEPS, LC	LE			MEPS			
New Zealand			MEPS	MEPS	MEPS, LE		LC, MEPS, LE	MEPS, LC, LE										LE				
Peru				MEPS	MEPS, LE		MEPS	MEPS						MEPS								
Philippines				LC	LC, MEPS, LE		LC	LC														
Singapore								LC, MEPS, LE														
Thailand				LE, LC	LC, MEPS, LE	LC, MEPS		MEPS, LC, LE										LE				
United States			MEPS	MEPS, LC	LE, MEPS, LC	LC, MEPS	MEPS, LE, LC	LE, LC, MEPS	LE		LC			MEPS, LC				LE	MEPS, LC		LE	
Vietnam				MEPS, LC, LE	LE, LC, MEPS	MEPS, LC								MEPS				LC, MEPS	MEPS			
Total no of countries with S&L in place	**1**	**2**	**6**	**14**	**16**	**9**	**12**	**16**	**1**	**1**	**2**	**1**	**1**	**6**	**5**	**4**	**1**	**8**	**8**	**1**	**2**	**1**

Is S&L in place, under revision or pending implementation for the following consumer products in the listed APEC nations:

APEC Country	Inverter	Iron	Kettle	Kim-Chi Refrigerator	Light fixture	Lighting (ballast)	Lighting (sensor and control)	Lighting systems	Microwave	Motors (medium 3 phase)	Motors (small 1 phase)	Motors (small 3 phase)	Motors (variable speed drive)	Networking equipment	Oven	Packaged terminal heaters	Pool heater	Pool pumps	Portable fan	Power Saving Device	Power strip	Pumps
Australia										MEPS						LC, MEPS		LC				
Canada					LE			MEPS		MEPS					LC, MEPS	MEPS						
Chile												LC										
People's Republic of China		LE						LE, MEPS	MEPS, LE, LC	LC, MEPS, LE	LE		LE	LE					LE		LE	MEPS, LE
Chinese Taipei					LE				LE						LE							
Hong Kong, China						LE																
Indonesia																MEPS						
Japan									MEPS, LC					MEPS	MEPS							
Korea				LC, MEPS		MEPS	LE		LE		LE	LE, MEPS		LE					MEPS, LC	LE		LE
Malaysia																			LE, LC, MEPS			
Mexico	LE							MEPS, LE		LE	LE				LC, MEPS	LC, MEPS						LC, MEPS, LE
New Zealand								LE		MEPS												
Peru										MEPS												
Philippines								LC, LE														
Singapore																						
Thailand			LC, MEPS						LE										LC			
United States					LE				MEPS		MEPS	MEPS				MEPS	MEPS, LC					
Vietnam																						
Total no of countries with S&L in place	**1**	**1**	**1**	**1**	**3**	**2**	**1**	**6**	**6**	**4**	**4**	**3**	**1**	**3**	**4**	**5**	**1**	**1**	**4**	**1**	**1**	**3**

APEC Country	Pump systems	Refrigerated cabinet	Refrigerators	Rice cooker	Room A/C	Servers (IT)	Set Top Boxes	Set Top Boxes (complex)	Set Top Boxes (simple)	Signal lighting (exit sign)	Signal lighting (traffic light)	Solid state lighting	Solid state lighting (self ballasted)	Solid state lighting (other)	Space heaters	Standby (all equipment)	Steam cookers	String lighting	Telephony	Televisions (CRT)	Televisions (flat screen)	Televisions
Australia		MEPS	MEPS, LC		LC, MEPS		MEPS													MEPS, LC	MEPS, LC	
Canada			LC, MEPS, LE		MEPS, LE, LC	LE		LE, MEPS	MEPS, LE	MEPS			LE	LE	MEPS		LE	LE	LE	LE, MEPS	LE, MEPS	
Chile			LC		LC								LC			LC						
People's Republic of China	LE		LE, LC, MEPS	LE, MEPS, LC	LC, LE, MEPS	LE	MEPS	MEPS	LE				LE		LE						LE	
Chinese Taipei			LE, MEPS	LE	LE, MEPS, LC					LE	LE									LE	LE	
Hong Kong, China			LC	LE	LC							LE									LE	LC
Indonesia			LC, MEPS		LC																	
Japan			LC, MEPS	LC	MEPS, LC								LE		MEPS, LC					LC, LE, MEPS	MEPS, LC, LE	
Korea			LC, LE, MEPS	MEPS, LC	LE, MEPS			LE	LE	LE	LE			LE	MEPS				LE	LE	LE, MEPS, LC	
Malaysia			LC, MEPS		LE, MEPS, LC								MEPS							LE, LC	LE	
Mexico	LE				MEPS, LE, LC				LE				LE, MEPS	LE, MEPS								
New Zealand		MEPS	MEPS, LC, LE		MEPS, LC, LE		MEPS					LE								LC, MEPS, LE	LC, MEPS	
Peru																						
Philippines			LC		LC, MEPS																	
Singapore			LC, MEPS, LE		LC, MEPS															LE	LE	
Thailand			LE, LC	LC	LE, LC, MEPS											LC				LE	LE	
United States			MEPS, LC, LE		LC, MEPS, LE	LE		LE	LE		MEPS	MEPS	LE, LC	LE	MEPS			LE	LE	LE, LC	LE, LC	
Vietnam		MEPS, LC	MEPS, LC	LC, MEPS	MEPS, LC				MEPS, LC												MEPS, LC	
Total no of countries with S&L in place	**2**	**1**	**16**	**7**	**17**	**4**	**3**	**4**	**6**	**3**	**3**	**2**	**7**	**4**	**6**	**2**	**1**	**2**	**3**	**10**	**13**	**1**

APEC Country	Toilet seats (electric)	Torchiere lighting	Transformers	Uninterupted power supply	Vacuum cleaner	Water coolers	Water Heaters	Water heaters (instantaneous)	Water heaters (storage)	Wine coolers
Australia			MEPS					LC, MEPS	MEPS	
Canada		MEPS	MEPS	MEPS		LE		LE	LE, MEPS	LC, MEPS
Chile										
People's Republic of China					LE	LE		MEPS, LC, LE	LE, LC, MEPS	
Chinese Taipei			LE			LE		LE, LC	LE, MEPS	
Hong Kong, China						LE		LE	LC	
Indonesia										
Japan	LC, MEPS							MEPS		
Korea	LE		MEPS, LE	LE	MEPS, LC	MEPS, LC		MEPS		
Malaysia										
Mexico			LE	LE		LE		LC, MEPS	LC, MEPS	
New Zealand			MEPS				LE, MEPS	LC, LE	MEPS	
Peru								MEPS	MEPS	
Philippines										
Singapore										
Thailand								LC		
United States			MEPS	LE		LE		LC, LE, MEPS	LE, LC, MEPS	
Vietnam									MEPS	
Total no of countries with S&L in place	**2**	**1**	**5**	**4**	**2**	**7**	**1**	**12**	**10**	**1**

Appendix 2: Survey to locate Energy Efficiency Compliance Testing Organizations

1. Please provide your contact details:

Country	
Authority	
Contact person	
Position	
Email	
Phone	

2. Has your authority (or a sister authority in your country) commissioned energy efficiency product testing from a laboratory or similar institution?

If 'no', please go to Question 5.

- yes
- no

3. If your authority (or a sister authority in your country) has commissioned energy efficiency product testing from a laboratory or similar institution, please complete this table for those products you have tested within the past 5 years:

	Type of product	Approximate year when tested	Test standard used	Testing organization used (Name, town, country where located)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

4. For each line in the table above, please choose which one of the following descriptions applies:

Very satisfied - accurate, reliable, expert organization. Would recommend their use to colleagues.
Satisfied - reasonable job done, would only use again if unable to find a better alternative.
Not satisfied - poor job done. Would not use again.

	Very satisfied	Satisfied	Not satisfied

1	○	○	○
2	○	○	○
3	○	○	○
4	○	○	○
5	○	○	○
6	○	○	○
7	○	○	○
8	○	○	○
9	○	○	○
10	○	○	○

5. Is your authority (or a sister authority in your country) expecting or planning to commission energy efficiency product testing from a laboratory or similar institution? If your answer is yes, please complete the table below:

	Type of product	**Approximate year when testing is expected to take place**	**Test standard to be used**	**Testing organizations that may be used and reason for choice – if already known**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

6. Additional Contact Information

If you felt unable to answer the questions above in full, please provide contact information for a colleague who may be able to help us further.

Contact person	
Position	
Email	
Phone	

You have completed this survey.

Thank you for your time.

www.clasponline.org

www.apec.org

www.s2e4.com

Appendix 3: Example email sent to MV&E officials

ASSESSMENT OF VERIFICATION TESTING CAPACITY IN THE APEC REGION

The Asia-Pacific Economic Cooperation (APEC) has commissioned S2E4 Ltd to undertake this program. Its objective is to map out existing and planned resources for testing energy efficient products in the APEC economies as well as analyzing cost effective options for verification testing for 5 to 10 key consumer appliances.

This program closely follows on from an earlier study Survey of Market Compliance Mechanisms for Energy Efficiency Programs in APEC Economies. This compiled and disseminated information on monitoring, verification and enforcement (MV&E) processes used by regulatory and enforcement agencies to ensure compliance in energy Standards & Labeling programs within APEC economies. Copy available here:
http://www.clasponline.org/en/Resources/MVEResources/MVEPublicationLibrary/2012-APEC-MVE-Survey

Three main phases of activities are planned for this new program:

1. Overcome common barriers on verification testing in the APEC region by conducting surveys to identify available testing resources in the region, and cost effective policy options for conducting testing suitable for developing economies.
2. Lay the foundation for building a robust and effective regional collaboration, and identify testing resources (i.e. national and private laboratories) and capacity for MV&E among APEC economies.
3. Communicate the results through reporting and presenting the findings through a conference to be organized in combination with an APEC ECEE&G meeting.

We are asking for your help. If you are already using test laboratories or know of test laboratories for this purpose, please complete the short questionnaire available on this link:
http://www.smartsurvey.co.uk/s/SurveyToLocateTestingOrganisations

This email address for S2E4 - research@s2e4.com - is the first point of contact for any staff who would appreciate assistance with the questionnaire.

Note that the quality of the outputs of this program depends upon receiving responses to the survey questionnaires. Completion of the questionnaires will need to be done by the person(s) in your organization who have the necessary knowledge.

Please complete the questionnaire by…

Appendix 4: Survey of Energy Efficiency Laboratory Testing Capacity in the APEC Region

1. Please complete the detail below.

Name of test laboratory:

City:

Country:

Contact person completing this questionnaire:

Position:

Email:

Phone:

2. Does your laboratory test any of the following electrical products for *energy efficiency*?

1. Room air conditioners
2. Lighting - compact fluorescent lamps and/or LEDs
3. Domestic refrigerators
4. Flat screen TVs
5. Clothes washers
6. Computers

- Yes
- No

3. What is the 'Operating Name' of your organization:

4. What is the name of your 'Parent Organization':

5. Approximately how many years has your organization been in business?

6. Is your organization publicly or privately owned:

- Public
- Private

7. If your organization is privately owned, please declare that it is not owned by, and so operates independently from, product manufacturer and supplier interests:

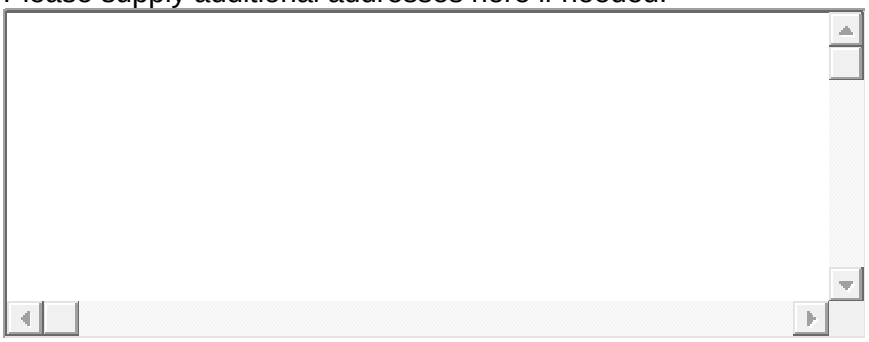
- By checking this box, you are declaring your independence.
- The laboratory is owned by product manufacturer or supplier interests and does not operate independently of these

8. Using the form below, please provide contact details for all of your organization's testing laboratories located within the APEC economies:

Lab 1 Name and Address	
Address continued...	
Country	
Telephone	
Fax	
Email	
Lab 2 Name and Address	
Address continued...	
Country	
Telephone	
Fax	
Email	
Lab 3 Name and Address	
Address continued...	
Country	
Telephone	
Fax	
Email	
Lab 4 Name and Address	
Address continued...	
Country	

Telephone	
Fax	
Email	
Lab 5 Name and Address	
Address continued...	
Country	
Telephone	
Fax	
Email	
Lab 6 Name and Address	
Address continued...	
Country	
Telephone	
Fax	
Email	

Please supply additional addresses here if needed:



9. For the product types detailed below, please list the energy efficiency test procedures (by national standard number and/or international equivalent) that your organization can perform (and for which it is accredited to ISO/IEC 17025):

1. Room air conditioners	
2. Lighting - compact fluorescent lamps & LEDs	
3. Domestic refrigerators	
4. Flat screen TVs	
5. Clothes washers	
6. Computers	

10. Thinking about all the test laboratories within your organization, please supply details of all relevant accreditation bodies:

11. Again, thinking about all test laboratories within your organization, please list details of any other bodies that have inspected and approved the relevant facilities:

12. Is your organization involved in any mutual recognition agreements, if so please provide details:

13. In the boxes below, please explain who you undertake energy efficiency and/or verification testing for. Examples may include enforcement authorities, manufacturers, suppliers, clients from other countries, etc.

1. Room air conditioners	
2. Lighting - compact fluorescent lamps & LEDs	
3. Domestic refrigerators	
4. Flat screen TVs	
5. Clothes washers	
6. Computers	

14. Please detail all commissions undertaken for enforcement authorities in the past 3 years i.e. which products and what you were testing them for:

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

15. Please provide a summary of your organization infrastructure, including testing equipment that is typically available and main streams of testing activity:

16. What is the staff capacity of your organization, please outline their experience of conducting relevant tests and whether external test training was received:

17. What inter-laboratory trials (“round robin tests”) has your organization taken part in in the past 3 years that are relevant to energy efficiency testing? Add details of any witness testing or peer evaluation programs that they have taken part in:

18. Using the boxes below please provide an indicative scale of fees, or illustrative figures, for undertaking relevant tests for each of the products listed:

1. Room air conditioners
2. Lighting - compact fluorescent lamps & LEDs
3. Domestic refrigerators
4. Flat screen TVs
5. Clothes washers
6. Computers

9. Is your organization able to accept orders for work denominated in non-local currency e.g. USD?

- Yes
- No

20. What languages can your organization provide reports in? Please list them in the boxes below:

1
2
3
4
5
6

21. What is the typical amount of time required to undertake energy efficiency/verification testing of a product? Please add details on your organization's testing capacity i.e. how many

samples can be tested in a given time. Typically, how much notice does your organization need to have in order to create capacity? Use the box below for your explanation:

THE LAST SECTION OF THIS QUESTIONNAIRE DEALS WITH YOUR ORGANIZATION'S FUTURE BUSINESS PLANS.

22. Is your organization planning to expand or improve its' testing business to include (more) products for energy efficiency testing?

IMPORTANT NOTE: Any information you provide will be treated as commercially sensitive. It will not be published in the public domain (though it may be shared amongst market surveillance officials who are responsible for commissioning verification testing of products).

- Yes
- No
- Cannot provide an answer at this time

23. If the answer to the previous question was yes, please use the box below to detail your organization's expansion and/or improvement plans.

NOTE: If you would prefer to answer this question via a telephone interview, please use the box below to add a contact name and telephone number (including national dialling code).

24. Are the product sectors listed below included in your organization's expansion plans? If yes, please provide the year/s by which you expect the facilities to be ready:

	Year in which the testing facility will be ready
Room air conditioners	
Lighting - compact	

fluorescent lamps & LEDs	
Domestic refrigerators	
Flat screen TVs	
Clothes washers	
Computers	

25. Do you have any other views on testing issues regarding the energy efficiency of products? Please use the box below to give as much detail as possible:

You have completed this survey.

www.s2e4.com

For further information or queries, please email us at research@s2e4.com

APEC thanks you for your time.

www.apec.org

Appendix 5: Contact details of approximately 1000 laboratories that were sent an email containing a link the main questionnaire

Australia

Abstec Calibrations Australia Pty Ltd	79 Ledger Rd, Beverley, SA 5009	www.abstec-calibrations.com.au	Mr G L Smith	graham.smith@abstec-calibrations.com.au	(08) 8244 1355
SA Power Networks	47-61 Barnes Avenue, Marleston, SA 5033		Mr B Howell	blair.howell@sapowernetworks.com.au	(08) 8292 0121
Thales Australia	421-449 Gordon St, Maribyrnong, VIC 3032	www.thalesgroup.com.au	Mr L Mackinnon	leigh.mckinnon@thalesgroup.com.au	(03) 9319 4444
Western Power	6 Hillary PLace, Forrestfield, WA 6058	www.westernpower.com.au	Mr D Ball	derek.ball@westernpower.com.au	(08) 9359 7250
ECEFast	26 Business Park Drive, Notting Hill, VIC 3168	www.ecefast.com.au	Mr F E Fanning	frank.fanning@ecefast.com.au	(03) 9538 8188
Master Calibration Co Ltd	547 Soi Ratchadanivat, Kwaeng Samsennok, Khet, Huaykwang, Bangkok, Thailand, OOS 10310	www.mastercalibration.com	Mr Aekpong Yuvawanitchakom	calibrate@mastercalibration.com	(662) 2274 2978
EMC Technologies Pty Ltd	176 Harrick Rd, Keilor Park, VIC 3042	www.emctech.com.au	Mr C Zombolas	chris@exctech.com.au	(03) 9365 1000
International Centre for Radio Astronomy Research	Building 610, 1 Turner Ave, Technology Park, Bentley WA 6102	www.icar.org	Dr F Schlagenhaufer	f.schlagenhaufer@curtin.edu.au	(08) 9266 9473
Projects etc Pty Ltd	7 Culnies Ross Court, Brisbane Technology Park, Eight Mile Plains, QLD 4113	www.projectsetc.com	Mr G Rutherford	tech@projectsetc.com	(07) 3147 8285
Vipac Engineers & Scientists Ltd	Victorian Technology Centre, 275-283 Normanby Rd, Port Melbourne, VIC 3207	www.vipac.com.au	Mr Theo Michael	theom@vipac.com.au	(03) 9647 9746

LightLab International	50 Redcliffe Gardens Drive, Clontraf, QLD 4019	www.lsa.com.au	Mr E Southgate	eric@lsa.com.au	(07) 3283 7862
Australian Consumers' Association	57 Carrington Rd, Marrickville, NSW 2204	www.testresearch.com.au	Dr John Ashes	jashes@choice.com,au	(02) 9577 3370
Australian Digital Testing Pty Ltd	Unit 6, 155 Glendenning Rd, Glendenning, NSW 2761	www.digitaltesting.com.au	Mr Keith Jones	keithj@digitaltesting.com.au	(02) 8007 7033
Australian National Testing Laboratories Pty Ltd	Unit 17, 15 Suscatand Street, Rocklea, QLD 4106	www.antl.com.au	Mr J Profke	jprofke@antl.com.au	(07) 3274 0737
Comtest Laboratories Pty Ltd	Unit 1/570 City Rd, South Melbourne, VIC 3205	www.comtest.com.au	Mr P K Arms	parms@comtest.com.au	(03) 9645 5933
Comtest Labs, Sydney			Lab Manager, Robert Norris; General Enquiries	rnorris@comteset.com.au; comtest@comtest.com.au	
EMC Technologies Pty Ltd	3/87 Station Rd, Seven Hills, NSW 2147	www.emctech.com.au	Mr L T Dickenson	les@emctech.com.au	(02) 9624 2777
Legrand Australia	Nexus Industry Park, Unit 4, 43-47 Lyn Parade, Prestons, NSW 2170	www.hpmlegrand.com.au	Mr W He	winter.he@hpmlegrand.com.au	(02) 8783 4647
LightLab International	50 Redcliffe Gardens Drive, Clontraf, QLD 4019	www.lsa.com.au	Mr E Southgate	eric@lsa.com.au	(07) 3283 7862
SGS Australia Pty Ltd	480 Princes Highway, Noble Park, VIC 3174	www.au.sgs.com	Mr Terence Fonseca	terence.fonseca@sgs.com	(03) 9790 3427
SGS Australia Pty Ltd	73 Williams Rd, Blackburn, VIC 3130	www.au.sgs.com	Mr Ryan Currin	ee.australia@sgs.com	(03) 9875 9000
Sylvania Lighting Australasia	Sylvania Way, Lisarow, NSW 2250	www.sla.net.au	Mr D Ford	lab@sla.net.au	(02) 4328 0678
The University of New South Wales	School of Mechanical and Manufacturing Engineering, Gate 14, Barker St, Kensington, NSW 2033		Dr C Menictas	c.menictas@unsw.edu.au	(02) 9385 6269
Mechlab, UNSW, Sydney				mechlab@unsw.edu.au	
TUV Rheinland Australia Pty Ltd	182 Dougharty Rd, Heidelberg West, VIC 3081	www.tuv.com	Mr I Szecsel	info@au.tuv.com	(03) 9450 1400

Vipac Engineers & Scientists Ltd	2 Sirius Rd, Lane Cove, NSW 2066	www.vipac.com.au	Dr Sean Williams	seanw@vipac.com.au	(02) 9422 4206
Solahart Industries Pty Ltd	112 Pilbara St, Welshpool, WA 6106		Mr Raymond Turley	raymond.turley@solahart.com.au	(08) 9351 4633
SPI Powernet Pty Ltd	28 Raglan Rd, Auburn, NSW 2144	www.select-solutions.com.au	Ms M Phuong Le	martha.le@select-solutions,com,au	(02) 9721 9019
Meridian Test Laboratory	112 O'Sullivan Beach Rd, Lonsdale, SA 5160	www.seeleyinternational.com	Mr P Schwarz	pschwarz@seeleyinternational.com	(08) 8328 3265
The University of New South Wales	School of Mechanical and Manufacturing Engineering, Gate 14, Barker St, Kensington, NSW 2033		Dr C Menictas	c.menictas@unsw.edu.au	(02) 9385 6269
Thales Australia	421-449 Gordon St, Maribyrnong, VIC 3032	www.thalesgroup.com.au	Mr L Mackinnon	leigh.mckinnon@thalesgroup.com.au	(03) 9319 4444
Australian National Testing Laboratories Pty Ltd	Unit 17, 15 Suscatand Street, Rocklea, QLD 4106	www.antl.com.au	Mr J Profke	jprofke@antl.com.au	(07) 3274 0737
EMC Technologies Pty Ltd	3/87 Station Rd, Seven Hills, NSW 2147	www.emctech.com.au	Mr L T Dickenson	les@emctech.com.au	(02) 9624 2777
Rheem Austrialia Pty Ltd	55 Brodie St, Rydalmere, NSW 2116	www.rheem.com.au	Mr Graham Smith	graham.smith@rheem.com.au	(02) 9684 9256
SAI Global Ltd	15 Wadhurst Drive, Boronia, VIC 3155	www.saiglobal.com	Mr D Gray	saigauslab@saiglobal.com	(03) 8669 2300
Sylvania Lighting Australasia	Sylvania Way, Lisarow, NSW 2250	www.sla.net.au	Mr D Ford	lab@sla.net.au	(02) 4328 0678
The Australian Gas Association	66 Malcolm Rd, Braeside, VIC 3195	www.aga.asn.au	B Tabourlos	btabourlos@aga.asn.au	(03) 9580 4500
The University of New South Wales	School of Mechanical and Manufacturing Engineering, Gate 14, Barker St, Kensington, NSW 2033		Dr C Menictas	c.menictas@unsw.edu.au	(02) 9385 6269
TUV Rheinland Australia Pty Ltd	182 Dougharty Rd, Heidelberg West, VIC 3081	www.tuv.com	Mr I Szecsel	info@au.tuv.com	(03) 9450 1400
Vipac Engineers & Scientists Ltd	2 Sirius Rd, Lane Cove, NSW 20662	www.vipac.com.au	Dr Sean Williams	seanw@vipac.com.au	(02) 9422 4206

WattTest Electrical Safety Testing Pty Ltd	Unit 9 / 51, Township Drive, West Burleigh, QLD 4220	www.wtest.com.au	Mr J P Gorman	john.gorman@wtest.com.au	(07) 5535 6030
Accredited Test Services	2153 Melbourne-Lancefield Rd, Monegeetta, VIC 3433				
Exova Warringtonfire Aus Pty Ltd	Unit 2 409-411 Hammond Rd, Dandenong, VIC 3175	www.exova.com	Mr P Motteram	patrick.motteram@exova.com	(03) 9767 1000
SAI Global	GPO Box 5420, 2001 Sydney, Australia	sai-global.com	Mukundan Srinivasan	mukundan.srinivasan@saiglobal.com	+61 2 8206 6612
BSI	Suite 2, Level 7, 15 Talavera Road, Macquarie Park, NSW 2113	http://www.bsigroup.com/en-AU/Our-services/Product-Certification/		sales.aus@bsigroup.com	1300 730 134
Bureau Veritas	BUREAU VERITAS - OIL & GAS Ground & 1st Floors 26 Colin Street West Perth WA - PERTH - WEST PERTH - OIL & GAS 6005	bureauveritas.com		Contact Form	+61 8 9481 0100
Australian Gas Association (AGA)	66 Malcolm Rd, Braeside, Melbourne VIC 3195 Australia	aga.asn.au	Mr Steve Chopping	schopping@melbourne.gas.au	03 9580 4500
SAA Approvals Pty Ltd t/a SAA Approvals	5/20 Rivergate Palce, Murarrie QLD 4172 Australia	saaapproivals.com.au	Mr Des Ede	des@saaapprovals.com.au	07 33939455
Austest	Unit 2, 9 Packard Avenue, Castle Hill, NSW 2154	http://www.austest.com.au/contact_us.php		info@approvalspecialists.com	61 (0)2 9680 9990
Intertek	Various	http://www.intertek.com/contact/asiapacific/australia/		2 x enquiry form sent	61 2 9316 6544
Parkside Laboratories (AUSTRALIA) Pty Ltd.	27 Sheehan Road , Heidelberg West Victoria 3081, AUSTRALIA			matt.toohey@parksidelabs.com	64 03 9458 3988

Brunei Darussalam

Bureau Veritas	Lot 4996 NEGARA BRUNEI DARUSSALAM	bureauveritas.com		Contact Form	+673 3 330 265

Canada

UL Verification Services, UL-Newton	3020 1st Ave.E. Newton, IA, 50208 USA		Curtis Tremel	curtis.tremel@ul.com	+1 641 787 8812
Intertek Testing Services NA Inc, ITS Cortland Laboratory	3933 US Route 11, PO Box 2040, Cortland, NY, 13045-0950 USA		Terence O'Beirne	terence.obeirne@intertek.com	+1 607 753 6711
Nemko Canada Inc	303 River Rd, Ottawa, ON, KIV 1H2, Canada		Stuart Beck	stuart.beck@nemko.com	+1 613 737 9680
Canadian Standards Association, CSA Griup Tortonto	178 Rexdale Boulevard, Etobicoke, ON, M9W 1R3, Canada		Benjamin Barker	benjamin.barker@csagroup.org	(416) 747 4013 x44013
QPS Evaluaiton Services Inc	81 Kelfield St, Unit 8, Toronto, ON, M9W 5A3, Canada		Alfonso Mattucci	amattucci@qps.ca	
Flextronics Canada Design Services Inc, Design Validation Centre	21 Richardson Side Rd, Ottawa, ON, K2K 2C1, Canada		Stephen Tippet	steve.tippet@ca.flextronics.com	+1 613 895 2050 x2820
NSF International	789 N Dixboro Rd, Ann Arbor, MI, 48105, USA		Lynn Turek-Reynolds	lturekreynolds@nsf.org	+1 734 827 5677
Intertek Testing Services NA Ltd, Intertek Vancouver LAboratory	1500 Brigantine Dr, Coquitlam, BC, V3K 7C1, Canada		Simon Knight	simon.knight@intertek.com	+1 604 520 3321
Canadian Standards Association, operating as CSA Group	865 Ellingham St, POinte CLaire, QC, H9R 5E8, Canada		Pierre Carrier	pierre.carrier@csagroup.org	(514) 694 8110
Canadian Standards Association, operating as CSA Group	1707-94 Street, Edmonton, AB, T6N 1E6, Canada		Benjamin Barker	benjamin.barker@csagroup.org	+1 416 747 4013 x44013
Cambridge Materials Testing Ltd	1177 Franklin Blvd, Cambridge ON, N1R 7W4, Canada		Jill Cook	jillcook@cambridgematerials.com	+1 519 621 6600
Canadian Building Envelope Science and Technology CAN-BEST Testing Laboratory	38 Regan Rd, Unit 4, Brampton, ON, L7A 1C6, Canada		Elie Alkhoury	elie@can-best.com	+1 905 840 2014

Underwriters Laboratories of Canada	7 Underwriters Rd, Toronto, ON, M1R 3A9, Canada		Gunsimar Paintal	gunsimar.paintal@ul.com	+1 416 757 5250 x61217
CSA Group - Richmond (Vancouver)	13799 Commerce Parkway, Richmond, BC, V6V 2N9, Canada		Benjamin Barker	benjamin.barker@csagroup.org	(416) 747 4013 x44013
Fortisbc Energy Inc (Triple Point High Pressure Turbine Meter Calibration Facility)	444 Okanagan Ave E, Penticon, BC, V2A 3K3, Canada		Shawn Nouraei	shawn.nouraei@fortisbc.com	+1 250 490 2653
Prairie Agricultural MAchinery Institute	2215 8th Ave, Humboldt, SK, S0K 2A0, Canada		Philip Leduc	pleduc@pami.ca	+1 306 682 5033
Exova Canada Inc, Mississauga Laoratory	2395 Speakman Drive, Mississauga, ON, L5K 1B3, Canada		Lisa Kane	lisa.kane@exova.com	+1 905 822 4111 x11325
AGAT Laboratories Ltd, Oil and Gas Cemistry Division Western Canada	3650 21st St NE, Calgary, AB, T2E 6V6, Canada		Maide Shi	shi@agatlabs.com	(403) 299 2172
UL LLC, Northbrook Laboratories	333 Pfingsten Rd, Northbrook, IL, 60062-2096, USA		Rick Titus	rick.a.titus@us.ul.com	(847) 664 3281
Groupe CTT Inc, CTT Group Inc	3000 rue Boulle, St Hyacinthe, QC, J2S 1H9, Canada		Liette Courchesne	lcourchesne@gcttg.com	(450) 778 1870
FM Approvals LLC	1151 Boston-Providence Turnpike, Norwood, MA, 02062, USA		John P Hill	john.hill@fmapprovals.com	+1 781 255 4972
UL LLC Research Triangle Park Laboratories	12 Laboratory Drive, PO Box 13995, Research Triangle Park, NC, 27709-3995, USA		Rick Titus	rick.a.titus@us.ul.com	847 664 3281
Maxaam Analytics International Corporation, Edmonton Laboratory	Petroleum Technology Center, 6744-50 Street NW, Edmonton, AB, T6B 3M9, Canada		Maria de Chavez	mdechavez@maxxam.ca	+1 780 378 8508
FM Approvals LLC	743 Reynolds Road, West Gloucester, RI, 02814, USA		John Hill	john.hill@fmglobal.com	+1 781 255 4972
Morgan Schaffer Inc, Laboratory Division	8300 St PAtrick, Suite 150, LaSalle, QC, H8N 2H1, Canada		Marc Cyr	mcyr@morganschaffer.com	+1 514 739 1967 x32

Intertek Testing Services NA Ltd, Intertek Montreal Laboratory	1829, 32e Avenue, Lachine, QC, H8T 3J1, Canada		Rossana Sarai	rossana.sarai@intertek.com	(514) 631-3100 x266
Kinectrics Inc	800 Kipling Ave, UNit 2, KL 206, Toronto, ON, M8Z 5G5, Canada		Dave Clarke	dave.clarke@kinectrics.com	(416) 207 6539
ALS USA Inc, ALS Minerals Reno	4977 energy Way, Reno, NV, 89502, USA		Erin Miller	erin.miller@alsglobal.com	+1 604 984 0221
Hydro-Quebec / TransEnergie, Laboratoire Jeanne D'Arc	2275 Rue D'Orleans, Montreal, QC, H1W 3S3, Canada		Isabelle Turner	turner.isabelle@hydro.qc.ca	+1 514 289 5551 poste 5708
Quality Auditing Institute Ltd, QAI Laboratories Ltd	16-211 Schoolhouse St Coquitlam, BC, V3K 4X9, Canada		Lawrence Gibson	lgibson@qai.org	+1 604 527 8378
Centre de Recherche Indusstrielle du Quebec	1201 boulevard Cremazie Est, bureau 1.210, Montreal, QC, H2M 0A6, Canada		Martin Theriault	martin.theriault@criq.qc.ca	(514) 383 1550 poste 3422
Protocol Data Systems Inc	4741 Olund Rd, Abbotsford, BC, V4X 2A1, Canada		Robert Stirling	robs@protocol-emc.com	(604) 607 0012
BC Hydro, Powertech Labs Inc	12388 88th Ave, Surrey, BC, V3W 7R7, Canada		Keith Lee	keith.lee@powertechlabs.com	+1 604 590 7438
Laboratoire D'essais CEM Inc	1490-D rue Nobel, Boucherville, QC, J4B 5H3, Canada		Pierre Thibault	pthibault@labcem.com	+1 450 868 0360
SGS Canada Inc, Agri-Food Laboratory	Suite B, 3260 Production Way, Burnaby, BC, V5A 4W4, Canada		Laiwa Cheung	laiwa.cheung@sgs.com	+1 604 638 2349
LVM Inc, Filiale de Dessau Inc, Laboratoire du Service 072	325 rue de l'Espinay, Quebec, QC, G1L 2J2, Canada		Francois Santerre	francois.santerre@lvm.ca	+1 418 647 2435 poste 230
Exova Canada Inc, Lloydminster Laboratory	6203B-43 St, Lloydminster, AB, T9V 2W9, Canada		Daniel Leshures	daniel.leshures@exova.com	(780) 874 9245
Maxxam Analytics	6740 Camponello Rd, Mississauga, ON, L5N 2LB, Canada		Salima Haniff	shaniff@maxxam.ca	+1 905 817 5700 ext 4047

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CTI Hong Kong	Unit B2 , 7/F, Wah Shing , Industrial Building, No.18 Cheung Shun Street, Lai Chi Kok, Kowloon, Hong Kong	http://www.cti-cert.com/en/otherservice/network.aspx?chid=218#CTI		Hongkong@cti-cert.com	852-27432128
TUV Nord	See website	http://www.tuev-nord.de/locationfinder?lng=en		asiapacific@tuv-nord.com	
Hong Kong Standards and Testing Centre	10 Dai Wang Street, Tai Po Industrial Estate, Tai Po, N.T., HK	http://www.stc-group.org/en/contact.aspx?s_id=15		hkstc@hkstc.org	852 2666 1888
Anbotek	:C-1-D, 6/F, WING HING INDUSTRIAL BUILDING, 14-16HING YIP ST.,KWUN, TONG,KOWLOON,HONGKONG.	ww.anbotek.com/contact.php		service@anbotek.com	852-82110118

Center for Energy and Thermal Systems (CETS)	Department of Mechanical Engineering, Room 2568, Main Academic Building, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong	http://www.me.ust.hk/general/enquiry.html		menquiry@ust.hk	852 2358-8650
TUV Sud	18/F, Yuen Long Trading Centre, 33 Wang Yip Street West, Yuen Long, Hong Kong S.A.R.	http://www.tuv-sud.cn/cn-en/locations		yuki.chan@tuv-sud.hk	852 2443 3774
Bell Southcn Hong Kong	250 Hennessy Road, Wanchai, Hong Kong, Cheuk Nang Plaza 15B-15 floor	http://bell-southcn.com/en/about_a.asp?id=48		No email or phone number, but have contacted their marketing dept with survey link	
VDE	Unit 616, 6/F, East Wing, No. 10 Science Park West Avenue, Hong Kong Science Park; Shatin N.T., Hong Kong	https://www.vde.com/en/Institute/International/VDE-Institute-worldwide/Pages/China.aspx	VDE-HK@vde.com; Frederic.Holive@vde.com		852 2788 2012
Accurate Technology Co., Ltd.	802, 8/Floor, Charmay Centre, 12 Ka Hing Road, Kwai Chung, N.T.Hongkong.	www.atc-lab.com		victor@emilab.net	86-755-26503290
BST Test	UNIT A10,9/F SILVERCORP INTERNATIONAL TOWER,707-713 NATHAN ROAD,MONGKOK,KOWLOON,HONG KONG	www.bst-best.com		service@bst-lab.com	0755-26505185
Shenzhen Huatongwei International Inspection Co., Ltd.	Huatongwei Building, Keji'nan 12th Road, High-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, China	http://en.szhtw.com.cn/		sales@szhtw.com.cn; safety@szhtw.com.cn	86-755-26748078
SLG Asia Test Labs & Service (HK) Ltd.	25-26/F., Tamson Plaza, 161 Wai Yip Street, Kwun Tong, Kowloon Hong Kong	http://www.slg.de.com/en/pruef_und_zertifizierungs_gmbh/unternehmen_ansprechpartner_international.html		hr@slg.asia; catherine@slg.asia	852 3101 9393

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Ham & Lin Technologies Co Ltd	222 8F, No. 29, Lane 155, Sec. 3 Pei Shen Rd., Shen-Kenh Hsiang, Taipei, Taiwan		LEE Tsung-Chih		02-2664-1920
Metal Industries Research & Development Centre	407 No. 25, 37th Road, Industrial Park, Taichung City, Taiwan, R.O.C.		HO, Chen-Ping	cpho@mailmirdc.org.tw	04-23502169
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Compliance Certification Services Inc	248 No.11, Wugong 6th Rd., Wugu Dist.,New Taipei City 24891, Taiwan. (R.O.C.)		Chen, Kurt		03-3240332 x37
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Precision Machinery Research & Development Centre	407 No.27, 37th Rd., Taichung Industrial Park, Taichung City 407, Taiwan (R.O.C.)		HO, Frank	e9011@mail.pmc.org.tw	04-2359909-312
Creative Safety & Consultant Co	231 13F, No 190, Sec 2, cung Hsing Road, Hsin Tien District, New Taipei City		Richie Feng	richie@csclab.com.tw	02-29125752 x100
Feima Ltd Taiwan Branch	110 Suite 1705, 17F No 2 Lane 150, Sec 5, Sinyi Rd, Sinyi District, Taipei City 110, Taiwan, (ROC)		PALMU, Olli-Pekka	olli-pekka.palmu@fime.com	02-663 60400
SGS Taiwan Ltd	248 33, Wu Chyuan Rd (New Taipei Industrial Park) Wu Ku District, New Taipei City, Taiwan 248		TZOU, Calvin		02-2299 3279 x3888

Photometric Solution International Ltd	70953 No. 288, Haizhong St Annan Dist., Tainan City, Taiwan, ROC		Zhu Wei Huang	zhuwei@lightlab.com.tw	06-2568831 x34
Great One Global Certification Co Ltd	231 9F-2 No. 120, Qiaohe Rd, Zhonghe Dist, New Taipei City, 235, Taiwan		Yuan, Ellen	service@go-safety.com.tw	(02) 2248 0810 x109
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Sporton Internationnal INC (KunShan)	No.3-2 Pingxiang Road, Kunshan, Jiangsu Province, RPC		CHEN, Alex		03-327-3456
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Taiwan Electric Research & Testing Centre	328 No6-6 Ronggong S Rd, Caota Village, Guanyin Township, Taoyuan County 328, Taiwan (ROC)		CHUANG Ying-Hao	wilson@ms.tertec.org.tw; hank@ms.tertec.org.tw	03-483 9090 x7202
Universal Standard Service Inc	24448 8F-1 and 2F-1, No 266 Sec 1 WenHua, 2nd Rd, Lin Kou Dist., New Taipei City, Taiwan		SU, Edward	edward.su@uss.com.tw	(02) 2608 1258
Audix Technology (Shanghai) Co Ltd	241 3F Building 34 No. 680, Guiping Rd, Caohejing Hi-Tech Part, Shanghai City 200233 China		KWO, Byron		+86 21 64955500 x21
Audix Technology Corporation	114 7th Fl., No.8, Lane 120, Sec. 1, Neihu Rd., Taipei, Taiwan, R.O.C.		CHEN, Jeff	jeff@audix.com	02 8797 6688
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Intertek Testing Services Taiwan Ltd	104 8F, No.423, Ruiguang Rd., Neihu District, Taipei City 114, Taiwan (R.O.C.)		Liu, Chia-Wei	bessy.liu@intertek.com	02-6602-2888 Ext:660

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Electronics Testing Centre, Taiwan	702 No.5 Hsin Ho 2 Rd.,An Pin Industrial Park,Tainan Taiwan,R.O.C		WANG Steven	st.wang@etc.org.tw	(06) 2925787-12
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Action Technology Patent Co Ltd	221 3 F, No.196, Sec.3, Da-Tung Rd., Hsi Chih Dist., New Taipei City 221, Taiwan (R.O.C.)		Yen, Hank	hank@action-inc.com.tw	02-8647-1366
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Industrial Technology Research Institute	310 108 R. 28 Bldg. No. 195, Chung Hsing Rd., Sec. 4 Chu Tung, Hsin Chu, Taiwan 310, R.O.C.		Nian, Shy-Her	shnian@itri.org.tw	03-5915 397
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Jing Hong Examine Technology Co Ltd	649 No.170,Jiancuolun Rd., Erlun Township,Yunlin County 649,Taiwan (R.O.C)		I CHUAN, LI	jh.lab@msa.hinet.net	05-5989662

Netmag Technology Corporatiom	300 No.8 Li-shing 7 Rd.,Science-based Industrial Park,Hsincu,Taiwan,R.O.C		TSAI, Kelly	kelly_tsai@alphanetworks.com	03-5636666x6760
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Antek Certification Inc	114 7F, No.351, Yangguang St., Neihu District, Taipei City 114, Taiwan		LIN, Joe Y. L.	joe.lin@atclab.com.tw	02-8752-3779
Intertek Testing Services Shanghai	Building No.86 1198 Qinzhou Road (North), Shanghai 200233, P.R.China		XU, Leah	leah.xu@intertek.com	86 21 6127 8329
Intertek Testing Services Hangzhou Ltd	NO.16, 1 Ave., Xiasha Economic Development District, Hangzhou 310018, China		Chen, Amanda	amanda.chen@intertek.com	086 571 28997859
Intertek Testing Services Shenzhen Ltd Kejiyuan Branch	6F, D Block, Huahan Building, Langshan Road, Nanshan District, Shenzhen		CHEN, Allan	allan.chen@intertek.com	86-755-8614-0691
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SGS Taiwan Ltd	24803, No. 134, Wu Kung Rd, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803		LU, Jimmy	jimmy.lu@sgs.com	02-2299 3279 x1468
QuieTek Corporation	244 No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan, R.O.C.		Vincent Lin	vincent@quietek.com	02-86013788
BSI				infotaiwan@bsigroup.com	+886 2 2656 0333

UL	Daye Road, Beitou District, Taipei City 112, 1st Floor, No. 260	ul.com		customerservice.tw@tw.ul.com	+886 2 7737 3000
Electronics Testing Centre, Taiwan	No.8, Ln. 29,Wenming Rd., Guishan Township, Taoyuan County, Taiwan	http://www.etc.org.tw/en-us/default.aspx		Sent request via website	886-3-328-0026
Great One Global Certification Co., Ltd		http://www.go-safety.com.tw	sales@go-safety.com.tw		886-2-2248-0810
IST	1F, NO.19, Puding Rd., Hsin-chu 30072, Taiwan,	http://www.istgroup.com/english	sales@istgroup.com		
Leading Testing Laboratories	9F-2, No.120, Qiaohe Rd., Zhonghe Dist., New Taipei City 235, Taiwan (R.O.C.)	http://www.ltlqa.com/	hksales06@ltlqa.com		886-2-2248.0810 Ext. 111
Universal Standard Service, Inc.	8F-1, No. 266, Sec. 1, WenHua 2nd Road, Lin Kou Dist. 24448, New Taipei City , taiwan.	http://www.uss.com.tw/	service@uss.com.tw		886-2-2608-1258
Allion	9F, No.3-1, Yuan Ku Street, Taipei, Taiwan 11503 R.O.C.	http://www.allion.com/contact.html	service@allion.com		886-2-2655-7877
Neutron Engineering Inc	B1, No.37, Lane 365, YangGuang St., NeiHu District 114, Taipei , Taiwan	http://www.neutronlab.com/index/eabout.asp?id=22	service@btl.org.cn		886-2-26573299
TSMC	9, Li-Hsin 4th Rd., Hsinchu Science Park., Hsinchu City, Taiwan 300-78, R.O.C.	http://www.tsmcssl.com/english/others/contact.aspx	BIZ_SSL@tsmc.com		886-3-5636688
TUV Rheinland Taiwan Ltd	11F, No. 758, Sec. 4, Bade Rd., Songshan Dist., Taipei 105, Taiwan	http://www.tuv.com/en/greater_china/locations_gc/locationdetails_gc_26766.html	Sent enquiry		
Victronic	4F., No. 130, Lane 235, Baoqiao Road., Xindian District, New Taipei City 23145, Taiwan(R.O.C.)	http://www.victronic.com.tw/en/location.html		service@victronic.com.tw	886-2-89121249
CTI Taiwan	5-13,9NanKan RD TaoYuan, Taiwan	http://www.cti-cert.com/en/otherservice/network.aspx?chid=218#CTI		Taiwan@cti-cert.com	886-3-2220721
MET Taiwan	14F.-5, No.700, Zhongzheng Rd., Zhonghe Dist., New Taipei City 23552	http://www.metlabs.com/Contact-Us.aspx		mettaiwan@metlabs.com	886.2.8227.8887
VDE	Various but all emailed	https://www.vde.com/en/Institute/International/VDE-Institute-worldwide/Pages/Taiwan.aspx		VDE-Taiwan@vde.com; David.Lo@vde.com; soeren.schilling@asig	886 2 2312 0808

				.com.tw	

Indonesia

Institute for Industrial Certification	Balai Sertifikasi Industri Building, Jl. Cikini IV, No. 15, Jakarta Pusat 10330, DKI JAKARTA INDONESIA	www.lspro.kemenperin.go.id	Ms. Astika Andhini, Mr. Adi Irfan Shidqy, Mr. Hendra Ariefstyanto, Mr. Muhammad Fachri	bsi@kemenperin.go.id, asti_dhini@yahoo.com, aisfile_best@yahoo.com, reefal@gmail.com, achri.agam@gmail.com	+62 21 31925807
Product Certification Body - PPMB	Jl. Raya Bogor Km.26 Ciracas 13740 Jakarta INDONESIA	http://ppmb.depdag.go.id	Ms Ayu Saqita	ayu.wulan@kemendag.go.id; ayu.sagita@gmail.com	+62 21 877063835
PT. Sucofindo (Persero), Sucofindo International Certification Services (SICS)	Graha Sucofindo B1 floor, Jl. Raya Pasar Minggu Kav. 34 12780 Jakarta INDONESIA	www.sucofindo.co.id	Mr. Mangajana Tambunan, Mr. Yerry Taizar	yerry@sucofindo.co.id, mtambunan@sucofindo.co.id	+ 62 21 7983666
BSI	Menara Bidakara 2 - 17th Floor, Unit 5, Jl Jend. Gatot Subroto Kav. 71-73 Komplek Bidakara, Pancoran Jakarta Selatan 12870 Indonesia			info.indonesia@bsigroup.com	+6221 8379 3174 - 77
Bureau Veritas	Ariobimo Sentral Penthouse 1st Floor JL. H.R. Rasuna Said Kav 5. Blok X-2 JAKARTA 12920	bureauveritas.com		Contact Form	+62 21 521 0393

Bureau Veritas	PT. Bureau Veritas Consumer Products Services Indonesia Gedung KKM Lt. 2 - 3 Jl. Cideng Timur No. 38 JAKARTA PUSAT 10130	bureauveritas.com		Contact Form	+62 21 634 8877
Puslitbang Teknologi Ketenagalistrikan dan Energi Baru Terbarukan (P3TKEBT) – Kementerian ESDM. (Center Research for electricity, New, Renewable Energy, and Energy Conservation – Ministry of Energy and Mineral Resources)	Jl. Ciledug raya Kav. 109 Cipulir Kebayoran Lama, Jakarta Selatan 12230	http://www.p3tkebt.esdm.go.id/index.php?lang=en			Telp: 021-720-3530, Fax: 021-720-3525.
Balai Besar Bahan dan Barang Teknik (B4T) – Kementerian Perindustrian. (Center for Material and Technical Product – Ministry of Industry)	Jl. Sangkuriang No. 14 Bandung 40135	http://www.b4t.go.id/lang/en/		info@b4t.go.id	022-2504088, 022-2504828, 022-2510682
Jl. Ciledug Raya Kav. 109 Cipulir Kebayoran Lama	Jakarta Selatan, Jakarta 12230, Indonesia	www.p3tkebt.esdm.go.id		Contact Form	
Balai Besar Bahan dan Barang Teknik (B4T)	Jl. Sangkuriang no.14, Bandung, Indonesia	www.b4t.go.id		info@b4t.go.id	

Balai Besar Teknologi Energi (B2TE-BPPT)	Kawasan PUSPIPTEK Gd.620 - 622 Serpong - Tangerang Selatan 15314, Pelayanan Jasa, Indonesia	http://b2te.bppt.go.id/		peltek@b2te.bppt.go.id	
Balai Pengujian Mutu Barabg - Ministry of Trade, Indonesia	Jl. Raya Bogor Km.26 Ciracas 13740 Jakarta INDONESIA		Mr Andi Ampa	ampa_jm@yahoo.co.id	(52-21) 8772 1002
LSPro - PUSTAN DEPPERIN	Jln. Gatot Subroto Kav. 52-53 West Java, Jakarta, Indonesia		Agus Suminto		62-21 5265285 FAX: 62 21 52903228
PT HIT, Indonesia	Jl. Raya Semarang Demak Km 9, Sayung, Indonesia		Aloysius Purwanto, Executive Head Officer		+62 24 659 2220; FAX: 62-24-6592225
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Pusat Standarisari Kementrian Perindustrian (Ls Pro PUSTAN Ministry of Industry)	Jendral Gatot Subroto KAv. 52-53 Lt 21, Jakarta, Indonesia		Hamdan Nurdin, Management Representative of Product Certification Body		62 21 5265285; FAX 62 21 52903228
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TUV Nord	Jakarta	http://www.tuv-nord.com/id/en/our-services-555.htm		indonesia@tuv-nord.com; laboratorydivision@tuv-nord.com	62 21 89840318
SGS Indonesia	Cilandak Commercial Estate #108C, Jl. Raya Cilandak KKO, Jakarta Selatan, 12560	http://www.sgs.co.id/en/Consumer-Goods-Retail/Electrical-and-Electronics/Luminaires/Technical-Assistance/Energy-Efficiency.aspx		Enquiry sent	62 21 7818111
TUV Sud	?	http://www.tuv-sud.co.id/		enquiries@tuv-sud-psb.sg and enquiry sent	62 21 2986 5795

Japan

Intertek Japan	Various			Enquiry form sent	
Nichia				Enquiry form sent	
Allion	Takanawa Park Tower 1F/12F, 3-20-14, Higashi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0022	http://www.allion.com/contact.html		service@allion.co.jp	81-3-5488-7368
Integrated Service Technology	1118-20 Imaizumi, Hadano-city, Kanagawa , 257-0014, Japan	http://www.icservice.jp/		sales@istgroup.com; cherie_chen@istgroup.com	

VDE	Kouraibashi Yamamoto Bld. 4F, 3-1-14, Kouraibashi, Chuo-ku, Osaka-shi, Osaka 541-0043	https://www.vde.com/en/Institute/International/VDE-Institute-worldwide/Pages/Singapore.aspx		VDE-Japan@vde.com; Hideki.Nishimura@vde.com	81 6 6232 1567

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Intertek Testing Service Korea Ltd	1/F An-Ju Digital Tower, 284-56 Seongsu-2ga, Seongdong-gu, Seoul, 133-833, Korea		Joo-Young, Kim	bo.park@intertek.com	82-2-6090-9500
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Korea Testing Laboratory	87 Digital26-gil, Guro-gu, Seoul, Korea		Namgung Min	sglee@wm.ktl.re.kr	82-31-500-0305
TUV				info@tuv-sud.kr	
Korea Electrotechnology Research Institute (KERI)	111 Hanggaul-ro, Sangnok-gu, Ansan-si, Gyeonggi-do, 426-910, Republic of Korea	www.keri.re.kr	Mr Ho-Sung Won	hswon@keri.re.kr	+82-31-8040-4404
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Korea Electrotechnology Research Institute (KERI)	66-6 Jeil-Ri, Yangji-Myn, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-825 Korea	www.ktr.or.kr	Ms Youn-Haeng CHO	yhcho@ktr.or.kr	+82 31 679 9663

Korea Testing Certification	22 Heungan-daero 27 beon-gil, Gunpo-si, Gyeonggi-Do, 435-862 KOREA, REPUBLIC OF	www.ktc.re.kr	Mr. Seung-In Yang	siyang@ktc.re.kr	+82-31-4287 541
New and Renewable Energy Centre (NREC)	388 Poeun Daero, Suji-gu Yongin-si Gyeonggi-do 449-994 KOREA, REPUBLIC OF	www.kemco.or.kr	Mr. PARK SUNG WOO	swkemco@kemco.or.kr	+82-31-260-4653
BSI				bsikorea@bsigroup.com	+82 2 777 4123
Bureau Veritas	Rm1103, Keungil Tower 677-25, Yeoksam-dong, Gangnam-gu SEOUL 135-914	bureauveritas.com		Generic Contact Form	+ 82 2 555 8834
Bureau Veritas	Rm1102, Keungil Tower 677-25, Yeoksam-dong, Gangnam-gu SEOUL 135-914	bureauveritas.com		Generic Contact Form	+ 82 2 567 9001
Bureau Veritas	Innoplex 1st Complex, No.2 B303, 552 Woncheon-dong Yeongtong-gu, Suwon-Si GYEONGGI-DO 443-380	bureauveritas.com		Generic Contact Form	+ 82 31 8002 3060
Bureau Veritas	2F KOTITI bldg., 138-7, Sangdaewon-dong, Jungwon-gu Seongnam-si GYEONGGI-DO	bureauveritas.com		Generic Contact Form	+ 82 2 3451 7300
Bureau Veritas	459-28 Gasan-Dong, Gumcheon-Gu SEOUL 135-914	bureauveritas.com		Generic Contact Form	+ 82 2 2102 2553

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Korea Testing Certification	Heungan-daero 27 beon-gil 22, Gunpo-city, Gyeonggi-do, Post: 435-823	http://www.ktc.re.kr/u_eng/	Kim, Jeong-Han	jhkim@ktc.re.kr	82-31-428-7524
Korea Testing & Research Institute	88-2, 8th YeongDeungPo-Dong, YeongDeungPo-Gu, Seoul Zip Code : 150-038	http://www.ktr.or.kr/eng/		admin@ktr.or.kr	82-2-2163-0011
Mnemko	Nemko Korea Co. Ltd., 159, Osan-ro (300-2, Osan-ri), Mohyeon-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do (Seoul area), KOREA, 449-852		Hyun Ho Kim	hyunho.kim@nemko.com	82 31 330 1700
Allion	2F, 1527-6 Sa-Dong, Sangrok-Gu, Ansan-Si, Gyunggi-Do, Korea			kr_service@allion.com	82-31-409-9333
MET Korea	Suite 1002, KOFOMO Tower, 16-3, Sunae-dong, Bundang-gu, Seongnam-si, 463-020, Korea	http://www.metlabs.com/Contact-Us.aspx		metkorea@metlabs.com	82-31-697-8202

TUV Nord	See website	http://www.tuev-nord.de/locationfinder?lng=en		jameslee@tuv-nord.com; seoul@incok.com; incok@tuv-nord.com	82 2 6000 4222
VDE	7F, Elson Bldg., 162-2, Samsung-Dong, Gangnam-Gu, Seoul, 135-881, Korea	https://www.vde.com/en/Institute/International/VDE-Institute-worldwide/Pages/Singapore.aspx		VDE-Korea@vde.com	82-2-539-1153

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Makmal Perkhidmatan Perjangkaan Ipoh, tenaga National Berhad, Perak	No 2, Jalan Kilang 1 Kawasan Perindustrian Jelapang Taman Pertama 30100 Ipoh, Perak, Malaysia		Mr Norshamizatul Sima B. Samsuddin	norshamizatulshima@tnb.com.my	605-5262711
Malaysian Intelligence Meters Sdn Bhd, Selangor	no 3, jalan Pemberita U1/49 Temasya Industrial Park Seksyen U1, Glenmarie 40150 Shah Alam, Selangor Malaysia		Mr Syaiful Nahar B. Mokhtar		603-55695461

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Bureau Veritas	No.7, Jalan Laman Setia 7/3 Taman Laman Setia 81550 JOHOR BAHRU 81550	bureauveritas.com		Generic Contact Form	6 07 5587266
TUV Nord	20, Jalan Tiara 3, Tiara Square Taman, Perindustrian UEP, MY - 47600 Subang Jaya, Selangor	http://www.tuev-nord.de/locationfinder?lng=en		malaysia@tuv-nord.com	603 8023 2124
SGS Malysia	Unit 10-1, 10th Floor, Bangunan Malaysian RE, No 17 Lorong Dungun, Damansara Heights, Kuala Lumpur, Selangor, 50490	http://www.sgs.my/en/Sustainability/Environment/Energy-Services/Energy-Audits-and-Management/Energy-Management-Training.aspx		enquiry form completed	60(3) 2095 9200
TUV Sud	36, Jalan Serendah 26/39, Kawasan Perindustrian HICOM, Seksyen 26, 40400 Shah Alam, Selangor	http://www.tuv-sud.my/		enquiries@tuv-sud.my	60 3 5103 8128

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ANCE - Asociación de Normalización y Certificación, A.C.	Avenida Eje Central No. 869, Col. Nueva Industrial Vallejo, 07700 México, D.F., MEXICO	www.ance.org.mx	Pólux SÁNCHEZ REYES	polux.sanchez@ance.org.mx	+52 55 57 47 55 50 xt. 4732

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Bureau Veritas	Circuito del Sol #3905-1 Col. Nuevo Amanecer PUEBLA 72400	bureauveritas.com		Contact Form	+52 222 266 0561
Bureau Veritas	César Sandino 741, 6to Piso Col. Primero de Mayo VILLAHERMOSA 86190	bureauveritas.com		Contact Form	+52 993 315 0368
UL	UL, Blas Pascal 205, Los Morales, Mexico, D F 11510	ul.com		CustomerService.mx@mx.ul.com	+52.55.3000.5400
Leading Testing Laboratories	Av. 611 No.35 Col. San Juan de Aragón 3a. Sección C.P. 07970 México, D.F.	http://www.ltlqa.com		info@ltlqa.com	+52(55)2158 1900 ext. 1919
TUV Sud	TÜV SÜD América de México, Jesus Cantú Leal No. 652, Col. Buenos Aires, Monterrey N.L. México	http://www.tuv-sud.mx/		iso@tuvmex.com.mx	52 81 8221 3530

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Applied Research Services, Nelson, NZ				info@appliedresearch.co.nz	
Project Solar Ltd, Otago University, Dunedin				andrew.wallace@otago.ac.nz	
bureau Veritas	Head Office 35 O'Rorke Road Penrose PENROSE AUCKLAND 1061			Generic Contact Form	
Enviro-Mark Solutions Ltd (t/a carboNZero Holdings)	Gerald St, Lincoln, Canterbury, 7640 New Zealand	enviro-mark.com	Dr Belinda Mathers	mathersb@landcareresearch.co.nz	0064 3 321 9893
Harvest Labs	16A, 9 Laidlaw Way, East Tamaki, Manukau 2016	http://www.harvestlabs.com/contact_us/page5		info@harvestlabs.com	64 (0)9 2722971

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No laboratories found

Peru

Bureau Veritas	Torre Central AV. CAMINO REAL 390) PISO 14 (1402) SAN ISIDRO LIMA L-27	bureauveritas.com		Contact Form	+51 1 422 9000
Bureau Veritas	BIVAC DEL PERU S.A.C. Torre Central del Centro Comercial Camino Real Av. Camino Real Nº 390, Piso 14 Oficina 1402 San Isidro LIMA 27	bureauveritas.com		Contact Form	+51 1 422 9000

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Bureau Veritas	OFFICE 14 29, KRASNYJ AVE. NOVOSIBIRSKAYA OBLAST NOVOSIBIRSK 630099	bureauveritas.com		Contact Form	+7 913 947 17 17
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VDE	Galina N. Ivanova, Kurlandskaya 1, RF-198103 St. Petersburg	https://www.vde.com/en/Institute/International/VDE-Institute-worldwide/Pages/RussianFederation.aspx		ivanova@rustest.spb.ru	7 81 2575 4138

Singapore

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Centiforce Instruments Pte ltd	Blk 55 Ayer Rajah Crescent, 02-01 Ayer Rajah Industrial estate, Singapore, 139949	www.centiforce.com	Goh Wee Khong	weekhong.goh@centriforce.com	(65) 8102 4138 (HP)
Clipsal international Private Ltd (Also Singapore Electrical Testing Services (SETS))	97 Pioneer Rd, Singapore 639579		Mr Wong Chee Kian	chee-kian.wong@sets.com.sg	(65) 6861 9118
Delphi Automotive Systems Singapore Pte Ltd	501 Ang Mo Kio Ind Park 1, Singapore, 569621				
EDMI Electronics Sdn Bhd	PLO 226A Jalan Cyber 1A, Senai Industrial Park Phase III, Malaysia 81400 Senai Johor, Malaysia	www.edmi-meters.com	Tracey lee Puei Lan	tracey.lee@edmi-meters.com	(607) 598 4748 x2004
EDMI Ltd	No. 47 Yishun Industrial park A, Singapore 768724	www.edmi-meters.com	Adrain Tan Yam Keam	adriantan@edmi-meters.com	(65) 6751 7661
EMC Department - Singapore Epson Industrial Pte Ltd	1 Tuas Link 4, Singapore, 637898	www.epson.com.sg			(65) 6861 8311

GP Batteries International	97 Pioneer Rd, Singapore 639579	www.gpbatteries.com.sg			6559 9800
Intertek Testing Services (Singapore) Pte ltd	5 Pereira Road, Asiawide Industrial Building, 06-01 Singapore 368025	www.intertek-cb.com			(65) 6282 7187 x209
Molex Singapore Pte Ltd	110 International Road, Jurong, Singapore 629174	www.molex.xom	Ang Kar Hwee	karhwee.ang@molex.com	(65) 6266 6868
Schneider Electric South East Asia (HQ) Pte Ltd	10 Ang Mo Kio St 65, Techpoint 02-01/06 Singapore 569059		Mr Terry Sanjaya HALIM (snr Engineer)	terry-sanjaya.halim@schneider-electric.com	64823323
Setsco Services Pte Ltd	18 Teban Gardens Crescent, Singapore 608925	www.setsco.com	Zaidee Bakee	zaidee@setsco.com / christinecd@setsco.com / maryam@setsco.com	(65) 6895 0671
Singapore Test Services Pte Ltd	249 Jalan Boon Lay Singapore 619523	www.test.com.sg	Gayathiri Ravindran	gayathiri@stengg.com	(65) 6660 7587
Singapore Test Services Pte Ltd	249 Jalan Boon Lay Singapore 619523	www.test.com.sg	Mr Lau Kok Yan	lauky@ststest.sg	6854 3567
Singapore Test Services Pte Ltd (Rifle Range Road Branch)	601 Rifle Range Road, Singapore 588398	www.test.com.sg	Gayathiri Ravindran	gayathiri@stengg.com	(65) 6660 7587
Solar Energy Research Institute of Singapore (SERIS)	27 International Business Park, 04-03 I-Quest@IBP, Singapore, 609924				(65) 6516 4119

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TUV SUD PSB Pte Ltd - Testing Services	Electrical & Electronics Centre (EEC) 1 Science Park Drive, Singapore 118221	www.tuv-sud-psb.sg			(65) 6885 1380
UL International Singapore Private Ltd	20 Kian Teck Lane Singapore 627854	www.ul-asia.com	Ian Chen	ian.chen@ul.com	(65) 6854 7918
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CTI Singapore	Blk 10 Ubi Crescent #03-26 (Room C) Ubi Techpark S408564	http://www.cti-cert.com/en/otherservice/network.aspx?chid=218#CTI		Singapore@cti-cert.com	65 67495821
TUV Rheinland	25 International Business Park, #05-105 German Centre, Singapore 609916	http://www.tuv.com/en/singapore/locations_sg/locationdetails_19985.html		Enquiry sent	65 6562 8750

AFMA	Keystone Cable, 27 Senoko Way, Singapore 758060	http://www.streetdirectory.com/businessfinder/company_detail.php?companyid=132777&branchid=170601		Enquiry sent	65 6481 6112
DNVBA	DNV GL Technology Centre, 16 Science Park Drive, Singapore 11822			ros.oh@dnvgl.com	65 6508 3285
VDE	Jose Jojo, No. 27 International Business Park, IQuest @ IBP, #04-03, Singapore 609924	https://www.vde.com/en/Institute/International/VDE-Institute-worldwide/Pages/Singapore.aspx		jose.jojo@vde.com	65 6567 5857

Thailand

Intertek Testing Services (Thailand) Limited (ITS Thailand-1)	546 Univest Complex, Floor 4th, Ratchadapisek Road, Chan Kasem, Chatuchak, Bangkok		Ms Naruemon Kerdsawangnetr, Quality Manager
Intertek Testing Services (Thailand) Limited (ITS Thailand-2)	12/32 Moo 11, Lat Phrao, Bangkok		Ms Naruemon Kerdsawangnetr, Quality Manager
TUV Nord	See website	http://www.tuev-nord.de/locationfinder?lng=en	

SGS Thailand	100 Nanglinchee Road, Chongnonsee, Yannawa, Bangkok, 10120	http://www.sgs.co.th/en/Energy/Energy-Sources/Fuel-Oils/Laboratory-Services.aspx	
Eurofins Product Service	344/2 Soi Soonvijai 4, Rama9 Rd., Bangkapi, Huaykwang, 10310 Bangkok	http://www.eurofins.com/en/about-us/laboratory-contacts/thailand/eurofins-product-service.aspx	
Tuv Sud	111 Thailand Science Park, Moo 9 Paholyothin Rd.,Klong 1, Klong Luang,Pathumthani 12120	http://www.tuv-sud.co.th/	

Viet Nam

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Electro-Mechanical testing lab				sukthls@hn.vnn.vn	
Environmental Lab				attech@hn.vnn.vn	
High technical lab or material				hitechlom@gmail.com	
Lab for testing energy efficiency				ptn@ialyhpc.vn	
lab for battery testing		www.Pinaco.com.vn			061 3569968
lab for quality control				ralaco@hn.vnn.vn	
lab for testing energy efficiciency				labfteevn@gmail.com	
lab of battery testing				pinaco@pinaco.com.vn	
lab of electricity				dien@vmi.gov.vn	
lab of informatics - posts - telecommunications					84 37543672
lab of physical parameter measurement if rock and mine sample					0321 3985923
LIOA electric lab				hoa_thanh.soa@lioa.com	
measurement and experiment lab				tranthang@vtc.gov.vn	

national key laboratory for high voltage techniques					08 383 26714
NgoHan Lab				hienlt@ngohanwire.com	
Optical testing lab					04 38271914
post and telematics testing centre					04 37820990 / ext 302
product quality testing lan				phongkcsm3@gmail.com	
quality assurance testing centre 1				testlab2@quatest1.com.vn	
quality assurance testing centre 1	8 Hoang Quoc Viet, Cau Giay, Ha Noi, Viet Nam		Mr Kim Duc Thu, Deputy Director - Testing Manager	qm@quatest1.com.vn	(84 4) 791 1597
quality assurance testing centre 3				qt-kythuattn@quatest3.coom.vn	
quality assurance and testing centre 2 technical division 4				k7.quatest2@quatest2.com.vn	
quality control dept				ccthappy@taya.com.vn	
Quality testing centrre					04 37569271
quality testing lab				hanotest@yahoo.com	
research and development dept				phuocdv@fpt.com.vn	

RF testing and measurement division				vilas060@rfd.gov.vn	
science technology progress application centre of dongnal province -STADONA					061 3210970
Small Power transformer testing lab (SPT Testing Lab) - ABB Ltd				trang.hoangnhu@vn.abb.com	
SOMECO Technology one member company ltd				info@somecotech.com	
Song Da electrical engineering joint stock company branch - electrical testing centre				etc-seec@vnn.vn	
southern electrical testing company				nhanph@etc2.vn	
test unit					08.383 266714
testing and measurement lab					04 62727201
testing lab				thamhv@yahoo.com	
testing lab of lighting equipment					8.38290135
the automation dept of engineering services centre				esc@dhd.com.vn	
transformer testing lab					0613 836 139
TSR- electrical testing centre				nguyentk@pvtsr.vn	

verification and certification centre 2				lqv@mic.gov.vn	
verifying and testing dept		web: www.tdcbinhdinh.orh.vn		chicuc@ttdcbinhdinh.org.vn	
BSI	BSI Vietnam Co Ltd, Unit 301-303 Saigon Software Park, 123 Truong Dinh, Ward 7, Dist 3, Ho Chi Minh City, Vietnam			info.vietnam@bsigroup.com	+84 39320778
Bureau Veritas	Oriental Fl 14 324 Tay Son Dong Da District HANOI			Generic Contact Form	+84-4-3934 3494
Bureau Veritas	Lot C7-C9, Conurbation 2, Cat Lai Industrial Zone Thanh My Loi Ward, District 2 HO CHI MINH CITY			Generic Contact Form	(84) 8 3742 1604
Vietnam Certification Centre - QUACERT	no 8 Hoang Quoc Viet Rd, Cau Glay District, Hanoi City, Viet Nam	quacert.gov.vn	Mr Nguyen Nam Hai	hainn@quacert.gov.vn	84 4 3756 3188
TUV Nord	See website	http://www.tuev-nord.de/locationfinder?lng=en		vietnam@tuv-nord.com	84 4 772 2892

TUV Rheinland	Unit 805-806, Centre Point Building, 106 Nguyen Van Troi St., Ward 8, Phu Nhuan Dist., Ho Chi Minh City	http://www.tuv.com/en/usa/locations_1/locationdetails_19992.html		Sent enquiry form	84 8 3842 0600
Quatest 1	No 8 Hoang Quoc Viet, Cau Giay, Hanoi	http://www.quatest1.com.vn/		kehoach@quatest1.com.vn ; contact@quatest1.com.vn	(84.4) 38361399
Quatest 3	9 Pasteur Street, District 1, HCMC	tp://www.quatest3.com.vn/		info@quatest3.com.vn	(84-8) 38,294,274
Quatest 2	97 Ly Thai & 02 Ngo Quyen Street, Da Nang.	http://www.quatest2.com.vn/hoat-dong/chung-nhan/quatest2.html		Quatest2@quatest2.com.vn	05113 833 009

The USA

TUV				info@tuvam.com	
CSA International Cleveland Lab	8501 East Pleasant Valley Road, Independence, OH, 44131-5516	www.csagroup.org		client.services@csagroup.org	216 524 4990
Design Services Network	1351N Vandemarkk Rd, Sidney			Enquiry Form	
IAPMO R&T Lab	5001 E Philadelphia St, Ontario, CA	iapmo.org		iapmo@iapmo.org	1-909-472-4100
Intertek	3933 US Route 11, Cortland, NY			Enquiry Form	
NSF International LAboratory	789 N Dixboro Rd, Ann Arbor, MI	nsf.org		info@nsf.org	734.769.8010
UL Newton	3020 1st Avenue E, Newton, IA	ul.com		cec.us@us.ul.com; stephen.jeong@ul.com	877 854 3577
UL LLC	333 Pfingsten Road, Northbrook, IL	ul.com		cec.us@us.ul.com	877 854 3577

UL LLC	801 Klein Road, Suite 200, lano, TX	ul.com		cec.us@us.ul.com	877 854 3577
UL LLC	455 E Trimble Rd, San Jose, CA	ul.com		cec.us@us.ul.com	+1 408 754 6500
Advanced Compliance Solutions Laboratory	5015 B U Bowman Drive, Buford, GA	acsenergy.com			
CSA International Irvine Lab	2805 Barranca Parkway, Irvine, CA	csagroup.org		client.services@csagroup.org	949 733 4300
Ecova Laboratory	1199 Main Ave, Suite 242, Durango, CO	ecova.com		Enquiry Form	800 767 4197
Electric Power Research Institute (EPRI) Laboratory	942 Corridor Park Boulevard, Knoxville, TN	epri.com		askepri@epri.com	800 313 3774
Elliott Laboratories LLC an NTS Company	41039 Boyce Rd, Fremont, CA	elliottlabs.com		info@elliottlabs.com	510 578-3500
Hewlett Packard Fort Collins Hardware Test Centre	3404 E Harmony Rd, MS 63, Fort Collins, CO	hp.com			
Intertek Arlington Heights Lab	545 East Algonquin Rd, Suite F, Arlington Heights, IL	intertek.com		Enquiry Form	847 439 5667
Intertek Atlanta Lab	1950 Evergreen Blvd, Suite 100, Atlanta, GA			Enquiry Form	1 678 775 2400
Intertek Fairfield Laboratory	41 Plymouth St, Unit C, Fairfield, NJ			Enquiry Form	1 973 461 1847
Intertek Testing Services NA Inc Lake Forest	25791 Commercentre Drive, Lake Forest, CA			Enquiry Form	1 949 448 4100
MET Laboratories Austin Lab	13301 McCallen Pass, Austin, TX			info@metlabs.com	512 287 2500
MET Laboratories Baltimore Lab	914 W Patapsco Ave, Baltimore, MD	metlabs.com		info@metlabs.com	410 354 3300
Nemko USA Inc San Diego Division	2210 Faraday Avenue Suite 150, San Diego, CA	nemko.com	Ole-Martin Oien	ole-martin.oien@nemko.com	1 760 444 3500
Rhein Tech Laboratories Inc	360 Herndon Parway Suite 1400, Herndon, VA			sales@rheintech.com	703 689 0368

SGS North America Inc Laboratory	620 Old Peechtree Road, Suite 100, Suwanee, GA			Enquiry Form	1 973 575 5252
TUV Rheinland of North America Inc Pleasanton Laboratory	1279Quarry Lane Suite A Pleasanton, CA			Enquiry Form	1 888 743 4652
TUV SUD America Inc Laboratory	5945 Cabot Parkway, Suite 100, Alpharetta, GA			info@tuvam.com	
ITS - Intertel Testing Services NA	165 South Main Street, Cortland, NY 13045-2995 USA	www.intertek-etlsemko.com	Mr. William T. Fiske and Mr. John Quigley	icenter@intertek.com, bill.fiske@intertek.com, john.quigley@intertek.com	+1 607 758 6233
MET Laboratories Inc	914 W Patapsco Ave, Baltimore, MD 21230-3432 uSA	www.metlabs.com	Mr Jonathon Fuhrman	jfuhrman@metlabs.com	+1 410.949.1880
TUV Rheinland of North America Inc	12 Commerce Rd, Newton, CT 06470 USA	www.us.tuv.com	Mr Dan Sullivan	certification@us.tuv.com, dsullivan@us.tuv.com	+1 (203) 426 0888
UL (US)	333 Pfingsten Road, IL 60062-2096, Northbrook, USA	www.ul.com	Jola Wroblewska. Alternate: Steven T. Margis	Jola.Wroblewska@us.ul.com, Steven.T.Margis@ul.com	+1 (847) 272-8800
A & B Environmental Services, Inc	10100 East Freeway, Suite 100, Houston, TX77029	http://www.ablabs.com/	Mark Johnston	info@ablabs.com	713.453.6061
Advanced Environmental Laboratories, Inc	6681 Southpoint Parkway, Jacksonville, FL 32216	http://www.aellab.com/	Kelly Bortle	jgebhardt@aellab.com	904-363-9350
ALS Canada	5420 Mainway Drive, Burlington, ON L7L 6A4	http://www.alsglobal.com/en	Ron McLeod	ALSBU.ClientServices@alsglobal.com	905-331-3111 (canada)
ALS-Columbia	9143 Philips Highway, Suite #200, Jacksonville, FL 32256	http://www.caslab.com/	Eric Smith	ALSBU.ClientServices@alsglobal.com	904-739-2277
ALS Environmental-Kelso	1317 South 13th Avenue, Kelso, WA 98626	http://www.caslab.com/	Lee Wolf	ALSBU.ClientServices@alsglobal.c	360-577-7222

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ALS Environmental-Rochester	1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623	http://www.caslab.com/	Lisa Reyes	ALSBU.ClientServices@alsglobal.com	585-288-5380
ALS Environmental	2655 Park Center Drive, Suite A, Simi Valley, CA 93065	http://www.caslab.com/	Chaney Humphrey	ALSBU.ClientServices@alsglobal.com	805-526-7161
Badger Technical Services, LLC/Badger AAP Environmental Laboratory	S7560 US Highway 12, North Freedom, WI 53951	http://www.badger-tech.com/	Michael Conry	John.Reeder@specpro-inc.com	608-643-3361
BC Laboratories, Inc.	4100 Atlas Court, Bakerfield, CA 93308	http://www.bclabs.com/	Sara Guron	sguron@bclabs.com	661-327-4911
Biotest Laboratories, Inc.	9303 West Broadway Avenue, Brooklyn Park, MN 55445	http://www.biotestlabs.com/	Jean Gerlach	Contact Form	763-315-1200
Buyers Laboratory, LLC.	20 Railroad Avenue, Hackensack, NJ 07601	http://www.buyerslab.com/	Tony Polifrone	Contact Form	201-488-0101
Certified Energy Labs, LLC	324 NW Capitol Drive, Lee's Summit, MO 64086	http://ce2l.com/	Joshua Swift	sales@ce2l.com	816.389.8405
Citizen Electronics Co., Ltd.	1-23-1 Kamikurechi, Fujiyoshida-shi, Yamanashi 4030001	http://ce.citizen.co.jp/e/	Kazuhiro Arai	info@cecol.com	055.523.4212 (japan)
Continental Analytical Services, Inc.	525 North Eighth Street, Salina, KS 67402	http://www.cas-lab.com/	Cliff Baker	caslab@swbell.net	785-827-1273
Demartek	5300 Tabor Street, Arvada, CO 80002	http://www.demartek.com/	Dennis Martin	info@demartek.com	303-940-7575
DHL Analytical	2300 Double Creek Drive., Round Rock, TX 78664	https://www.dhlanalytical.com/	Sherri Herschmann	Need to call them	512.388.8222
Eberline Analytical – Oak Ridge Laboratory	601 Scarboro Road, Oak Ridge, TN 37830-7371	http://www.eberlineservices.com/	Michael McDougall	info@eberlineservices.com	865-481-0683
Environmental Monitoring & Technologies, Inc.	8100 North Austin Avenue, Morton Grove, IL 60053	http://www.emt.com/	Kassandra Bray	info@emt.com	847-324-3334
Environmental Services Laboratories, Inc.	1803 Philadelphia Street, Indiana, PA 15701	http://www.environmentalservicelab.com/	Angela Chapman	achapman@envlabs.com	724-463-8378

Eurofins Frontier Global Sciences, Inc.	11720 North Creek Parkway North, Suite 400, Bothell, WA 98011	http://www.frontiergs.com/	Patrick Garcia-Strickland	info@frontiergs.com	425-686-3584
Experior Laboratories, Inc.	1635 Ives Avenue, Oxnard, CA 93033	http://www.experiorlabs.com/	Lorenz Cartellieri	lorenz@experiorlabs.com	805-483-3400
Jupiter Environmental Laboratories, Inc.	150 S. Old Dixie Highway, Jupiter, FL 33458	http://www.jupiterlabs.com/About	Edward Dabrea	Clientservices@Jupiterlabs.com	561-575-0030
KB Labs, Inc.	6821 SW Archer Rd., Gainesville, FL 32608	http://www.kbmobilelabs.com/	Kelly Bergdoll	info@kbmobilelabs.com	352-367-0073
Magill Services, Inc.	450 Century Circle Suite B, Conway, SC 29526	http://magillservicesinc.com/	Edward Magill	info@magillservicesinc.com	603-747-4111
Maxxam Analytics International Corp. O/A	6740 Campobello Road, Mississauga, ON L5N 2L8, Canada	http://maxxam.ca/	Salima Haniff	Contact Form	905-817-5700
Merit Laboratories, Inc	2680 East Lansing Drive, East Lansing, MI 48823	http://www.meritlabs.com/	Maya Murshak	mayamurshak@meritlabs.com	517-332-0167
NVL Laboratories	4708 Aurora Avenue North, Seattle, WA 98103	http://www.nvllabs.com/	Munaf Khan	Contact Form	206-547-0100
ST and S Testing and Analysis	108 Rosedale Ave. Richmond, KY 40475	http://standsgroup.com/site-map/	John O'Brien	Contact Form	859-353-5914
Weck Laboratories, Inc.	14859 East Clark Avenue, City of Industry, CA 91745	http://www.wecklabs.com/	Mr. Alfredo Pierri	marilyn.romero@wecklabs.com	626-336-2139
Xenco Laboratories	6017 Financial Drive, Norcross, GA 30071	http://www.xenco.com/	Nikita Kuruganty	David.Fuller@xenco.com	770-449-8800
A & B Environmental Services, Inc	10100 East Freeway, Suite 100, Houston, TX77029	http://www.ablabs.com/	Mark Johnston	info@ablabs.com	713.453.6061
Advanced Environmental Laboratories, Inc	6681 Southpoint Parkway, Jacksonville, FL 32216	http://www.aellab.com/	Kelly Bortle	jgebhardt@aellab.com	904-363-9350
ACC Climate Control	22428 Elkhart East Blvd, Elkhart, IN 46514, US	http://www.accclimatecontrol.com/		Contact Form	574-264-2190
Acertara Acoustic Laboratories	1860 Lefthand Circle, Suite H Longmont, CO 80501	http://www.acertaralabs.com/		sales@acertaralabs.com	303-834-8413
Advanced Compliance Solutions, Inc	3998 Fau Blvd Suite 310, Boca Raton, FL 33431	http://www.acstestlab.com/		info@acstestlab.com	770-831-8048
Advanced Component Testing	2402-2 Ocean Avenue, Ronkonkoma , NY 11779	http://www.actestlab.com/		sales@actestlab.com	631-676-6390
American Certification Body, Inc. T/A ACB, Inc.	360 Herndon Pkwy, Suite 1400, Herndon, VA 20170	http://acbcert.com/		sales@acbcert.com	703-847-4700

Certification Solutions	505 Providence Drive, Friendswood, TX 77546	http://www.certification-solutions.com/		You will need to call them	(281)630-6026
E-Labs, Inc.	5150 Lad Land Drive, Fredericksburg, VA 22407	http://www.e-labsinc.com/		Info@E-LabsInc.com	540-834-0372
Energy Assurance, LLC	5202 Belle Wood Court, Suite 106, Buford, GA 30518	http://energy-assurance.com/		information@energy-assurance.com	770-294-8395
Evans Analytical Group, LLC	2710 Walsh Avenue, Santa Clara, CA 95051	http://www.eag.com/		Contact Form	408-454-4600
IAPMO R&T Lab	5001 E. Philadelphia St., Ontario, CA 91761	http://www.iapmort.org/Pages/default.aspx		neil.bogatz@iapmo.org	(909) 472-4100
Ingersoll Rand Residential Solutions	6200 Troup Highway, Tyler, TX 75707	http://company.ingersollrand.com/ircorp/en/index.html		Contact Form	1-903-7304517
Innovative Circuits Engineering, Inc.	2310 Lundy Avenue, San Jose, CA 95131	http://www.icenginc.com/		serena@icenginc.com	408-955-9505
Innovative Testing Solutions, Inc.	32680 Townley Street, Madison Heights, MI 48071	http://www.innovatest.com/		Contact Form	(248) 589-4997
N.F. Smith & Associates	5306 Hollister Street, Houston, TX 77040	http://www.smithweb.com/		houston@nfsmith.com	713.430.3958
Rhein Tech Laboratories, Inc.	360 Herndon Pkwy, Suite 1400, Herndon, VA 20170	http://www.rheintech.com/		sales@rheintech.com	703-689-0368
Rockwell Automation Drives Business	6400 W. Enterprise Drive, Mequon, WI 53092	http://www.rockwellautomation.com/		Contact Form	262-512-2051
Sartorius Corporation	160 Wilbur Place, Suite 700, Bohemia, NY 11716	http://www.sartorius.com/		Contact Form	631-254-4249 x8371
SMT Corporation	14 High Bridge Road, Sandy Hook , CT 06482	http://www.smtcorp.com/		info@smtcorp.com	203-270-4700
Tektronix Service Solutions	7 Sterling Rd, N. Billerica, MA 01862	http://service-solutions.tektronix.com/		Contact Form	978-663-2137
Washington Laboratories, Ltd.	7560 Lindbergh Drive, Gaithersburg, MD 20879	http://wll.com/us/		Contact Form	301.216.1500
Wilger Liaison Company, Inc.	5654 Sarah Avenue, Sarasota , FL 34233	http://www.wilgertesting.com/		contactus@wilgertesting.com	941-925-2049
Alpha Analytical, Inc.	255 Glendale Avenue, Suite 21, Sparks , NV 89431	http://www.alpha-analytical.com/		efruciano@alpha-analytical.com	775-355-1044

ALS Environmental - Salt Lake City	960 West LeVoy Drive, Salt Lake City, UT 84123	http://www.alsglobal.com/Home/Our-Services/Life-Sciences/Environmental/Capabilities/North-America-Capabilities/USA/USA-Laboratories/Salt-Lake-City-Laboratory/		Contact Form	
American Radiation Services, Inc. DBA ARS International	2609 N River Road, Port Allen , LA 70767	http://www.amrad.com/		Contact Form	225-381-2991
CH2M HILL Applied Sciences Laboratory	1100 NE Circle Blvd, Suite 300, Corvallis, OR 97330	http://www.ch2m.com		Contact Form	541-768-3111
DLS Conformity Assessment Inc.	200 E Marquardt DR, Wheeling, IL 60090	http://www.dlsemc.com/		jblack@dlsemc.com	(847)537-6400
Horiba Instruments Incorporated – Contract Testing Services	2890 John R. Rd., Troy, MI 48083	http://www.horiba.com/us/en/		Contact Form	(248)689-9000
Innovative Circuits Engineering, Inc.	2310 Lundy Avenue, San Jose, CA 95131	http://www.icenginc.com/		serena@icenginc.com	408-955-9505
Occupational Services Incorporated (OSI)	6397 Nancy Ridge Drive, San Diego, CA 92121	http://occserv.com/		nick@occserv.com	858-558-6736
Pace Analytical Services - Product Testing	723 Kasota Ave SE, Minneapolis, MN 55414	http://www.pacelabs.com/lab-operations/product-testing.html		Contact Form	612-656-1160
UL Environment, Inc.	2211 Newmarket Parkway, #106, Marietta, GA 30067	http://www.ul.com/global/eng/pages/		Environment@ul.com	770-933-0638
				Sarah_Crowl@steris.com	
				Pat_Szemacs@steris.com	
BSI	12110 Sunset Hills Road, Suite 200 Reston, VA 20190			inquiry.msamericas@bsigroup.com	1 800 862 4977
3M Communication Markets Division Product Performance Laboratory	Austin, TX			barbara_buchan@mmm.com	512 984 5297
ADR Testing Service Motorola Mobility LLC	Chicago, IL			kevin.gallagher@motorola.com	847 727 1486
ADTRAN Inc	Huntsville, AL			sherry.james@adtran.com	256 963 8821
AEGIS Labs Inc	Irvine, CA	http://www.aegislabsinc.com/		steve@aegislabsinc.com	949-751-8089
Alacatel Lucent	Murray Hill, NJ	http://www.alcatel-lucent.com/		jessica.george@a	908 582

				lcatel-lucent.com	6726
Alstom Grid Inc., R&D Test Lab	Charleroi, PA			justin.rebovich@alstom.com	724 483 7876
ARRIS Group, Inc.	Horsham, PA			Jorge.Villarreal@arrisi.com	215-323-2141
Artesyn Product Testing Services	Tempe, AZ			tom.tuttle@artesyn.com	602 659 7869
Artin Engineering	San Diego, CA	http://www.artinengineering.com/		ef@artinengineering.com	858 204 9286
AT4 Wireless	Herndon, VA	http://www.at4wireless.com/		jmfernandez@at4wirelessusa.com	703 657 2004
Atlas Compliance & Engineering	San Jose, CA	http://www.atlasce.com/		bruces@atlasce.com	408 971 9743
AVAYA Regulatory Compliance Laboratory (ARCL)	Westminster, CO			mej5@avaya.com	303 538 6697
Bay Area Compliance Labs Corp	Sunnyvale, CA	http://www.baclcorp.com/		kaveh@baclcorp.com	408 732 9162 x3043
BEC Incorporated	Pottstown, PA	http://www.bec-ccl.com/		sfanella@bec-ccl.com	610 970 6880
Bose Corporation	Framingham, MA			jon_kanter@bose.com	508 766 1180
CDTL Americas	South Plainfield , NJ	http://www.canvasm.com/site/we-are.aspx		gangadhar.amingad@TechMahindra.com	908-205-9613
CETECOM	San Diego, CA	http://www.cetecom.com/		Sabrina.Sarne@cetecom.com	408 586 6249
Chomerics Test Services - Rochester, NY	Rochester, NY			dinman@parker.com	781 939 4375
Chryseler - E/E Systems Compatibility EMC Laboratory	Auburn Hills, M	http://www.chryslertestservices.com/		rk381@chrysler.com	248 576 6915
CISCO	San Jose, CA	http://www.cisco.com/		dawilso2@cisco.com	408 853 5646
CKC Laboratories	Mariposa, CA	http://www.ckc.com/		steve.behm@ckc.com	209 966 5240 x2221

Compliance Management Group	Marlborough, MA	http://www.cmgcorp.net/		mmorrow@cmgcorp.net	508 460 1400
Compliance Testing LLC	Meza, AZ	http://www.compliancetesting.com/index.html		michaels@complianceteting.com	480 926 3100
Compliance Worldwide Inc	Sandown, NH			bob@complianceworldwide.com	603 887 3903
Contech Research Inc.	Attleboro, MA			mgates@contechresearch.com	508 226 4800
Continental Automotive Systems	Lake Zurich, IL			ken.klimek@continental-corporation.com	847 862 0131
Core Compliance Testing Services	Hudson, NH	http://www.corecompliancetesting.com/		KHCMacGrath@aol.com	603 889 5545
Cross & Black Inc	Redford, MI			mkaler@crossandblack.com	313 534 8309
Dayton T Brown	Bohemia, NY	http://www.dtbtest.com/		mderaris@dtbtest.com	631 244 6315
Delphi Corporation	El Paso, TX			jesus.terrazas@delphi.com	915 612 8617
Delphi Electronics & Safety Test Lab	Kokomo, IN			kevin.d.davis@delphi.com	765 451 8173
Delphi Packard Electrical/Electronic Architecture	Warren, OH			janice.zwilling@delphi.com	330 306 1041
Denso International America (DIAM) EMC	Southfield, MI			michael_bosley@denso-diam.com	248 372 8076
Device IOT	Irving, TX			sidharth.pratap@nsn.com	972-992-8628
DNV KEMA Renewables Inc	Seattle, WA	http://www.gl-garradhassan.com/en/renewables_advisory.php		megan.quick@dnv.com	206 708 8379
Eaton Corporation	Belmont, NC	http://www.eaton-highpowertestlabs.com/		bryanmfields@eaton.com	704 825 2695 x16
ECLIPSE ENERGY	Anderson, IN			chris.murphy@eclipseenergy.us	317 385 1858
Electromagnetic Investigations LLC	Hillsboro, OR	http://www.emicomply.com/		henry@emicomply.com	503 466 1160
Element Warren	Warren, MI	http://www.dtl-inc.com/		sandra.frank@ele	561 776

				ment.com	7339
Elite Electronic Engineering	Downers Grove, IL	http://www.elitetest.com/		lbrooks@elitetest.com	630-495-9770 X 166
EMC Corporation	Hopkinton, MA			bill.bogert@emc.com	774-803-2080
EMC Tempest Engineering	Anaheim, CA	http://www.emctempest.com/		tiffeny@emctempest.com	714 778 1726
Engineered Systems LLc	Indianapolis, IN	http://www.engineered-testing.com/		golten@engineered-testing.com	317 396 0573
Enterasys Networks	Salem, NH	http://www.extremenetworks.com/		whissel@enterasys.com	603 952 5861
Environ Laboratories LLC	Minneapolis, MN			mtm@environlab.com	952 888 7795
Ericsson Inc.	Plano, TX			omkar.dalal@ericsson.com	972 583 1423
ETS Lindgren Inc	Cedar Park, TX	http://www.ets-lindgren.com/		ron.bethel@ets-lindgren.com	512 531 6400
Exponent Inc	Phoenix, AZ	http://www.exponent.com/		kreichelderfer@exponent.com	650 688 6996
Extron Electrics	Anaheim, CA	http://www.extron.com/		hahmadi@extron.com	714 491 1500
F2 Labs	Middlefield, OH			wfuster@f2labs.com	301 253 4500 x101
GE	Waukesha, WI	http://www.ge.com/		daniel.schofield@med.ge.com	262 548 2978
Gentex Corporation	Zeeland, MI	http://www.gentex.com/		paul.vanlente@gentex.com	616 772 1590 x5257
Green Mountain Electromagnetics	Middlebury, VT	www.gmelectro.com		gme@gmelectro.com	(802) 388-3390
Group Dekko Innovation Center	LaOtto, IN	http://www.dekko.com/		maureen@dekko.com	260 599 3922
Harley Davidson EMC Laboratory	Wauwatosa, WI	http://www.harley-davidson.com/en_GB/Content/Pages/home.html		jim.rader@harley-davidson.com	414 465 6537
Harman International North America EMC Test	Farmington Hills, MI			jerry.smyth@harman.com	248 592 3212

Laboratory					
Hewlett-Packard Company, Roseville Hardware Test & Compliance	Roseville, CA			mharmon@hp.com	916 785 5051
Hitachi Automotive Systems Americas, Inc.	Farmington Hills, MI			barry.steltz@hitachi-automotive.us	248 473 6797
Honeywell Sensing and Control EMC Laboratory	Freeport, IL			john.modica@honeywell.com	815 235 5871
Independent Testing Laboratories Inc	Costa Mesa, CA	http://itltesting.net/		kristian@itltesting.net	714 662 1011
Intel Corporation EPSD Regulatory Compliance Laboratory	DuPont, WA			Nicholas.F.Garinger@intel.com	253 371 5620
International Compliance Laboratories	Neenah, WI	http://www.icl-us.com/		rzimmerman@icl-us.com	920 720 5555
Intertek Testing Services NA	Lexington, KY			james.sudduth@intertek.com	859 226 1037
ITC Engineering	Sunol, CA	http://www.itcemc.com/		MGbadebo@itcemc.com	925 862 2944
Jacobs Technology, Inc. - EMC Testing Laboratory	Milford, MI			Debra.Stefanik@jacobs.com	248 388 9981
JBI Corporation	Genoa, OH			joe@jbicorp.com	419 855 3389
Johnson Controls Automotive Experience	Holland, MI	http://www.johnsoncontrols.com/		? Sent message via contact us form	616 394 6194
JSC Receiving Inspection and Test Facility	Houston, TX			deborah.b.applegate@nasa.gov	281 483 0288
Keystone Compliance	New Castle, PA	http://www.keystonecompliance.com/		joey@keystonecompliance.com	724 657 9940
Kyocera Compliance & Certification	San Diego, CA	http://www.kyocera-wireless.com/		Susan.Rozok@kyocera.com	858-882-2628
Lawrenceville Energy Systems Safety & Test Laboratory (ESS&T)	Lawrenceville, GA			amy.herrmann@motorolasolutions.com	770 338 3124
Lexmark Acoustics and Energy (AEL) Laboratory	Lexington, KY			fessler@lexmark.com	859 232 1444

Liberty Laboratories	Milpitas, CA	http://libertylab.com/		ahmad@libertylab.com	408 262 6633
Lighting Technologies	Pittsfield, MA	http://www.nts.com/		John.DiNicola@nts.com	413 499 2135
LS Research	Cedarburg, WI	http://www.lsr.com/		rurness@lsr.com	262 375 4400
Magna Testing Laboratories	Auburn Hills, MI			erika.rezek@magnasteyr.com	248 836 1129
Medical Equipment Compliance Associates	Franklin, WI	http://www.mecalabs.com/		ag@60601-1.com	262 752 4017 ext. 105
Medtronic Inc	Auburn Hills, MI			michael.simpeh@medtronic.com	248 836 1129
MICON Labs	Pleasanton, CA	http://www.micomlabs.com/		gordon_hurst@micomlabs.com	925 462 0304
Microsoft EMC Laboratory	Redmond, WA			sajose@microsoft.com	1-425-421-9799
Microtek Laboratories	Anaheim, CA	http://www.thetestlab.com/		robert@thetestlab.com	714 999 1616
Mobile Power Solutions	Beaverton, OR	http://www.mobilepowersolutions.com/		shauna@mobilepowersolutions.com	503 645 6789
Motorola Product Testing Services	Lawrenceville, GA	http://www.motorola.co.uk/		ChrisShelton@motorola.com	770 408 0601
National Analysis Centre	West Palm Beach, FL	http://www.nationalanalysiscenter.com/		steve.franklin@the-nac.com	561 615 2622
National Electric Energy Testing & Research Application Centre	Forest Park, GA	http://www.neetrac.gatech.edu/		jeannette.rudolph@neetrac.gatech.edu	404 675 1877
National Instruments	Austin, TX	http://uk.ni.com/		compliance.engineering.qms@ni.com	512 683 0100
National Renewable Energy Laboratory (NREL)	Golden, CO			john.morris@nrel.gov	303 275 4618
National Technical Systems	Plano, TX	http://www.nts.com/		kimberly.zavala@nts.com	972 509 2566
Nebraska Centre for Excellence in Electronics	Lincoln, NE	http://www.nceelabs.com/		asteggs@nceelabs.com	402.323.6233

NetApp Inc.	Wichita, KS			john.Lucas@netapp.com	316 636 8192
Netgear Carlsbad Test Lab	Carlsbad, CA			jeff.wu@netgear.com	760 476 8756
Nevada Controls	Carson City, NV	http://www.nevadacontrols.com/		ejesse@nevadacontrols.com	775 841 6501
Nexteer EMC Lab	Saginaw, MI			william.demaray@nexteer.com	989 797 0172
Nidec Automotive Motor Americas	Auburn Hills, M			john.suriano@nidec.com	248 340 9977 ext. 1133
Northrop Grumman Product Qualification Laboratory, Charlottesville	Charlottesville, VA			Joseph.Reisinger@NGC.com	434 974 2141
Novatel Wireless Radiated Performance Test Laboratory	San Diego, CA	http://www.nvtl.com/		wstewart@nvtl.com	858 431 0756
NSS Laboratories	Fort Collins, CO	http://www.nss-labs.com/		harkness@nss-labs.com	970 472 0602
NU Laboratories	Annandale, NJ	http://www.nulabs.com/		fgardner@nulabs.com	908 713 9300 ext 113
P3 Communications Inc	Morristown, NJ	http://www.p3-group.com/en/home-1859.html		Debbie.Althoff@p3-group.com	973-984-6050
PCTEST Engineering Laboratory	Columbia, MD	http://www.pctestlab.com/		randy.ortanez@pctestlab.com	410-290-6652
Philips Lumileds Lighting Company	San Jose, CA	http://www.philipslumileds.com/		Majed.Alayleh@philips.com	408-964-2793
Phoenix International Corporation	Fargo, ND	http://www.deere.com/wps/dcom/en_US/industry/electronic_solutions/electronic_solutions.page		GillesTrevorR@johndeere.com	701 552 8441
Product Safety Engineering	Dade City, FL	http://www.pseinc.com/		shoke@pseinc.com	352 588 2209 x 104
PV Evolution Labs	Berkeley, CA	http://www.pvel.com/		greer@pvel.com	510 334 5736
Qualcomm	San Diego, CA	http://www.qualcomm.com/		pconnor@qti.qualcomm.com	858 658 3225
Qualtest	Orlando, FL	http://www.qualtest.com/		mmccord@qualte	407 293

				st.com	5844
Radiometrics	Romeoville, IL	http://www.radiomet.com/		joe@radiomet.com	815 293 0772
RF Exposure Lab LLC	San Marcos, CA	http://www.rfexposurelab.com/		joe@radiomet.com	760 471 2121
Robert Bosch	Plymouth, M			brian.shortridge@us.bosch.com	734 979 3126
Robisan Laboratory Inc	Indianapolis, IN	http://www.robisan.com/		jkoch@robisan.com;	317 353 6249
S&C Electric Company	Chicago, IL	http://www.sandc.com/		jim.ruebensam@sandc.com	773 338 1000
Satimo	Kennesaw, GA	http://www.satimo.com/		krutkowski@satimo.com	678 797 9172
Schweitzer Engineering Laboratories	Pullman, WA	https://www.selinc.com/		olivia_wooldridge@selinc.com	509 332 1890
SGS North America, Consumer Testing Services	Suwanee, GA			david.schramm@sgs.com	770 570 1800
SIEMIB Laboratories	Milpitas, CA	http://www.siemic.com/		leslie.bai@siemic.com	408 526 1188
Spirent Communications Service Experience lab	Frederick, MD	http://www.spirent.com/Service-Experience		ron.johnsen@spirent.com	301 418 6683
T.K. Holdings Inc.	Pontiac , MI			Ron.Martindale@Takata.com	248-451-4226
Technicolour Lab Service	Indianapolis, IN	http://www.technicolorlabservices.com/		nancy.boettner@technicolor.com	317 587 4086
Tektronix EMC Lab	Beaverton, OR			charles.j.tohlen@tektronix.com	503 627 7779
Telcordia Technologies	Piscataway, NJ	http://www.telcordia.com/		melissa.handa@ericsson.com	732 699 4080
Thomas A. Edison Technical Center Power Test Laboratory	Franksville, WI			frank.decesaro@cooperindustries.com	262 835 1529
Timco Engineering Inc	Newberry, FL	http://www.timcoengr.com/		tei@timcoengr.com	352 472 5500
Toro Company	Riverside, CA			gary.okafuji@toro.com	951 785 3378
Trace Laboratories	Hunt Valley, MD	http://www.tracelabs.com/		sbrammer@tracelabs.com	410 584 9099

Triathlon Corporation	Burton, MI	http://www.trialon.com/		mgrills@trialon.com	764 459 0590
TRW Automotive - Validation Laboratory	Farmington Hills, MI			alex.simonov@trw.com	248 699 4269
TRW BCS CTL EMC Laboratory	Winona, MN			Syed.Faruque@TRW.COM	507 457 3750 x8525
TUV Rheinland of North America	Webster, NY			DAVID.LANSKI@XEROX.COM	585 645 0125 EXT. 1721
TUV SUD America Inc	Plymouth, MI	http://www.tuv-sud-america.com/		rhatmaker@tuvam.com	734 455 4841
david	Novi, MI			Robert.A.Spence@ul.com	248 427 5323
Valeo EMC Laboratory	Troy, MI			dan.welker@valeo.com	248 619 8534
Verizon Wireless	Bedminster, NJ			william.buchala@verizonwireless.com	908 306 4856
Visteon Corporation	Van Buren Township, MI	http://www.visteon.com/company/		dtitus2@visteon.com	734 710 7462
Welch Allyn	Skaneateles Falls, NY	http://www.welchallyn.com/		brian.killoran@welchallyn.com	315 685 4535
White-Rodgers Engineering Lab	St. Louis, MO			steve.derousse@emerson.com	314 553 3140
Wireless Testing Centre of North Carolina	Wake Forest, NC			randle.sherian@wirelesscenter-nc.org	919-435-1051 x102
Yazaki Testing Center	Canton, MI			Simon.Bennett@us.yazaki.com	734 983 6400
American West Analytical Laboratories	Houston, TX	http://www.awal-labs.com/		Rebecca.Pierrot@alsglobal.com	713-266-1599
Applied Research & Development Laboratory	Mount Vernon, IL	http://www.ardlinc.com/		ddickerson@ardlinc.com	618-244-3235 x227
Cape Fear Analytical	Wilmington, NC	http://www.capefearanalytical.com/cape-fear-analytical		mlarkins@cfanalytical.com	910-795-0421
Consumers Energy	Jackson, MI	http://www.consumersenergy.com/conte		naserafin@cmsen	517 788

Laboratory Services		nt.aspx?id=1642		ergy.com	2238
CT Laboratories	Baraboo, WI			delwood@ctlaboratories.com	608 356 2760
Curtis & Tompkins	Berkeley, CA	http://curtisandtompkins.com/		teresa.morrison@ctberk.com	510 204 2237
Eanalytics	Loveland, CO	http://www.eanalyticslab.com/		trhea@eAnalyticsLab.com	970-667-6975
EMSL	Baton Rouge, LA	http://www.emsl.com/		BHeitzmann@EMSL.com	(225) 755-1920
Environmental Chemistry Laboratory	Portsmouth, VA			Barbara.B.Walker@navy.mil	757 646 3479
Eurofins - Lancaster Labs	Lancaster, PA	http://lancasterlabs.com/		pha@lancasterlabs.com	717 556 7327
Fulton County Environmental Laboratory Section	Roswell, GA			Bekele.Tsegaselassie@fultoncountyga.gov	404-612-0221
GEL Laboratories LLC	Charleston, SC	http://www.gel.com/		rlp@gel.com	843-556-8171
Martel Laboratories JDS Inc	Towson, MD	http://www.martellabs.com/		ms@martellabs.com	410 825 7790 x104
Microbac	Erie, PA	http://www.microbac.com/		dave.danis@microbac.com	814-825-8533
Nationwide Laboratory Services	Fort Lauderdale, FL	http://www.nationwidelab.com/		MLessig@nationwidelab.com	954-633-3580
Pace Analytical Services	Minneapolis, MN			Melanie.ollila@pacelabs.com	612-607-6352
RI Analytical	Warwick, RI	http://www.rianalytical.com/pages/cfHome.cfm		ejensen@rianalytical.com	401-562-1333
RTI Laboratories Inc	Livonia, MI	http://www.rtilab.com/		cobryan@rtilab.com	734 422 8000 x215
SGS Group	Anchorage, AK	http://www.sgsgroup.us.com/		heather.hall@sgs.com	907-562-2343
Spectrum Analytical	Agawam, MA	http://www.spectrum-analytical.com/		nleja@spectrum-analytical.com	413 789 9018
Summit Environmental Technologies	Cuyahoga Falls, OH	http://www.settek.com/		MDougherty@settek.com	330 253 8211
Test America Inc	Arvada, CO	http://www.testamericainc.com/		peggy.sleevi@testamericainc.com	303-736-0116

Lighting Research Center, NVLAP	Troy, USA		Lenda Lyman	lymanl@rpi.edu	518 687 7139
Acuity Brands Lighting	1170 Peachtree Street NE Suite 2300, Atlanta, GA 30309-7676	http://www.acuitybrands.com/		Info@acuitybrands.com	404-853-1400
American Testing & Assessment Laboratory, LLC	812-B Frey Road, Houston, TX 77034	http://ts.nist.gov/standards/scopes/2010190.htm		jun.xiang@xtralight.com	832-360-1920
BALLabs	1618 Headland Drive, Fenton, Missouri 63026	http://www.ballabs.com/		info@BALLabs.com	636-343-6006
Cree	4600 Silicon Drive, Durham, North Carolina 27703	http://www.cree.com/		No email address so sent request	919-313-5300
Gamma Scientific	9925 Carroll Canyon Road | San Diego, CA 92131	http://www.gamma-sci.com/		contact@gamma-sci.com	858-279-8034
ITL Boulder	4066 Camelot Circle, Longmont, CO 80504	http://www.itlboulder.com		itl@itlboulder.com	303.442.1255
Integrated Service Technology (iST)	530 Mercury Drive Sunnyvale, CA 94085	http://www.istgroup.com/english		USSales@istgroup.com	
Light Laboratory, Inc.	8165 E. Kaiser Blvd, Anaheim, CA 92808	http://www.lightlaboratory.com/		yilmazy@lightlaboratory.com	(714) 282 2270
LightLab International		http://lightlabint.com		No email address so sent request	623-434-1499
Leading Testing Laboratories	6201 Bonhomme 218-N Houston TX 77036	http://www.ltlqa.com/		Paul.nie@ltlqa.com	832 831 6458
STS	801 Buckeye Court, Milpitas, CA 95035, USA	http://www.sts-usa.com/		No email address so sent request	(408) 432 1790
Euorfins	180 Blue Ravine Road, Ste. B, Folsom, CA 95630, USA	www.eurofins.com/voc-contacts.aspx#china	Michael Crook	michaelcrook@eurofinsus.com	-11604
Morlab	3519 E. Campo Bello Dr., Phoenix, AZ 85032,	http://www.morlab.cn/kr/contact.html			+1 (602)3818282
Allion	1365 NW Amberglen PKWY, HILLSBORO, Oregon, 97006, United States	http://www.allion.com/contact.html		us_service@allion.com	1- 503-906-8150
Applied Research Laboratories	5371 NW 161st Street, Miami, FL 33014	http://arl-test.com/contact.html		info@arl-test.com	305.624.4800
Bridgelux Laboratory	101 Portola Avenue, Livermore, CA 94551	http://www.bridgelux.com/contact-us/		sales@bridgelux.com	925-583-8400

7 Layers	15 Musick, Irvine, California 92618, USA	http://www.bureauveritas.com/wps/wcm/connect/bv_com/group/home/about-us/our-business/cps/contact-us		info.us@7Layers.com	949 716 6512
Bureau Veritas Consumer Products Services	Littleton Distribution Center, One Distribution Center Circle, Suite #1, Littleton, MA 01460, USA	http://www.bureauveritas.com/wps/wcm/connect/bv_com/group/home/about-us/our-business/cps/contact-us		cssales@us.bureauveritas.com	978 486 8828
Bureau Veritas Consumer Products Services, Inc	100 Northpointe Parkway, Buffalo, New York 14228, USA	http://www.bureauveritas.com/wps/wcm/connect/bv_com/group/home/about-us/our-business/cps/contact-us		info@us.bureauveritas.com	1 716 505 3300
Hubbell Lighting Photometric Laboratory	701 Millennium Blvd, Greenville, SC 29607		Steven Regnaud	slregnaud@hubbell-ltg.com	864-678-1303
Orb Optronix	1003 7th Ave, Kirkland, WA 98033	http://www.orboptronix.com/contact.html	ul	DBajorins@OrbOptronix.com	425 605 8500
Riverside Energy Efficiency Laboratory	Bldg. 6502, Texas A&M University - Riverside Campus, 3100 State Highway 47, Bryan, TX 77807	http://esl.tamu.edu/index.php/riverside-laboratory/reel-location	Michael B. Pate	mpate@tamu.edu	(979) 458-2264
Lighting Research centre	1995-2014 Rensselaer Polytechnic Institute, Troy, NY 12180 USA	http://www.lrc.rpi.edu/		lrc@rpi.edu	(518) 687-7100
CTI USA	Suite 230, 1455 Lincoln Parkway, Atlanta, GA, 30346	http://www.cti-cert.com/en/otherservice/network.aspx?chid=218#CTI		USA@cti-cert.com	248-461-3673
Approval Specialists	4609 W. 17th Street, Los Angeles, CA 90019	http://www.approvalspecialists.com/contact_us/page10		info@approvalspecialists.com	1 323 571 0971
VDE	Various but all emailed	https://www.vde.com/en/Institute/International/VDE-Institute-worldwide/Pages/NorthAmerica.aspx		john.sedgwick@vde.com; steven.fabian@vde.com; burkhard.holder@vde.com	

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Appendix 6: Summary sheet of the 250 labs identified

Country	City	Name of test laboratory	Energy efficiency test capabilities (in *amber* if not yet available)						Reliability of data: P = obtained directly from lab or other primary source S = obtained from secondary sources	Notes	Website
			Room ac	LEDs/CFLs	Domestic refrigerators	TVs	Clothes washers	Computers			
Australia	Brisbane	LightLab International	x	✓	x	x	x	x	P	All further details in full spreadsheet	
	Lonsdale	Meridian	✓	x	x	x	x	x	S	NATA listed	
	Marrickville	Choice	x	✓	✓	✓	✓	x	P	Australian Government listed	
	Melbourne	Austest	x	x	✓	✓	✓	✓	P	Refrigerators from 2014	
	Melbourne	Australian Gas Association	x	x	✓	x	✓	x	P	All further details in full spreadsheet	
	Melbourne	Comtest	x	✓Limited	x	✓	x	✓Limited	P	Australian Government listed, Lighting and Computers limited to power	
	Melbourne	TÜV Rheinland	x	x	x	✓	x	✓	P	All further details in full spreadsheet	
	Melbourne	Vipac	✓	x	✓	x	x	x	S	Australian Government and NATA listed	
	Noble Park	SGS	x	x	✓	x	✓	x	P	All further details in full spreadsheet	
	Penrith	Australian Digital Testing	x	x	x	✓	x	x	S	Australian Government listed	http://www.digitaltesting.com.au
	Sydney	LED Lab	x	✓	x	x	x	x	P	Not yet accredited	
Brunei	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	No labs yet located in this country from qualitative sources	
Canada	Edmonton	PBR	✓	✓	✓	✓	✓	✓	P	Testing facilities planned to become available in 2016	
	Ottawa	Nemko	x	✓	x	✓	x	✓	P	All further details in full spreadsheet	
	Montreal	Spectra Lux	x	✓	x	x	x	x	S	EPA listed	www.spectralux.ca
	Richmond	Labttest Certification	x	✓	x	x	x	x	S	SCC listed	www.labtestcert.com
	Toronto	CSA	✓	✓	✓	✓	✓	✓	P	Multiple sites in Canada. Info part sourced from website	
	Toronto	Lumentra	x	✓	x	x	x	x	S	EPA listed	http://lumentra.com/
	Toronto	QPS	x	✓	✓	x	✓	x	S	SCC listed	www.qps.ca
	Toronto	UL	✓	✓	x	x	x	x	S	SCC listed	www.ca.ul.com
Chile	Santiago	Energia	x	✓	x	x	x	x	S	INN listed	not found
	Santiago	ICOMCER	✓	✓	x	x	x	x	S	INN listed	http://www.icomcer.cl/
	Santiago	INGCER	✓	✓	x	x	x	x	S	INN listed	www.ingcer.cl
	Santiago	LENOR	✓	✓	✓	✓	x	x	S	INN listed	www.lenorsrl.com.ar
	Santiago	Sical	✓	✓	x	x	x	x	S	INN listed	www.sical.cl
	Santiago	TÜV Rheinland	✓	✓	✓	x	x	x	S	INN listed	www.tuv.com/es/chile/home.jsp
	Santiago	Underfire	x	✓	✓	x	x	x	S	INN listed	http://www.underfire.cl/ufel.php
	Anhui	Anhui Science and Technology Co	✓	x	✓	x	✓	x	S	CNIS listed	
	Beijing	CESI	x	x	x	x	x	✓	S	EPA listed	www.en.cesi.cn
	Beijing	NLTC (*or* GELC)	x	✓	x	x	x	x	S	EPA listed	
	Beijing	Olympic test century (Beijing) Technology Co.	x	x	x	x	x	✓	S	CNIS listed	not found
	Beijing	China Household Electric Appliance Research Institute	✓	x	✓	x	✓	x	S	CNIS listed	
	Beijing	China Testing & Inspection Institute for Household Electric Appliances (also known as/ related to Beijing Testing and Inspection Station for household electrical appliances (BTIHEA)	✓	x	✓	x	x	x	S	CNIS& EPA listed	Part of www.cheari.org
	Beijing	Beijing Entry-Exit Inspection and Testing Center of electromechanical products	x	x	x	✓	x	✓	S	CNIS listed	not found

	Country	City	Name of test laboratory	Energy efficiency test capabilities (in *amber* if not yet available)						Reliability of data: P = obtained directly from lab or other primary source S = obtained from secondary sources	Notes	Website
				Room ac	LEDs/CFLs	Domestic refrigerators	TVs	Clothes washers	Computers			
41		Beijing	Beijing Science and Technology Co., Ltd. Zun Crown / State Quality Supervision and Inspection Center computer	x	x	x	x	x	✓	S	CNIS listed	not found
42		Beijing	Beijing TIRT Technology Service	x	x	x	✓	x	✓	S	EPA listed	www.tirt.com.cn
43		Beijing	Beijing Terrett Detection Technology Services, LLC (National Radio and Television Product Quality Supervision and Inspection Center)	x	x	x	✓	x	✓	S	CNIS listed	not found
44		Beijing	National Computer Quality Supervising Test Center (NCTC)	x	x	x	✓	x	✓	S	assumed name change to this from CNIS listing	www.nctc.org.cn
45		Baoji	National Light Industry Product Quality Supervision and Testing of electric light	✓	x	x	x	x	x	S	CNIS listed	not found
46		Changzhou	Changzhou City Product Quality Supervision and Inspection	✓	x	x	x	x	x	S	CNIS listed	not found
47		Chongqing	Chongqing electrical and electronic products product quality supervision and inspection center	x	x	x	x	✓	x	S	CNIS listed	not found
48		Dongguan	Bay Area Compliance Laboratories	x	✓	x	x	x	x	S	EPA listed, also in Shenzhen	http://www.baclcorp.com.cn/
49		Dongguan	EMTEK	x	✓	x	✓	x	✓	S	EPA listed	http://www.emtek.com.cn/en/
50		Dongguan	Measurement Science and Technology	x	✓	x	x	x	x	S	CNIS listed	not found
51		Dongguan	Neutron Engineering	x	x	x	✓	x	✓	S	EPA listed	http://www.neutronlab.com
52		Dongguan	STC	x	✓	x	x	x	✓	S	EPA listed	http://www.dgstc.org
53		Foshan	Foshan Supervision Testing Centre for Quality and Metrology,	✓	x	x	x	x	x	S	CNIS listed	www.fszjzx.com/en/
54		Fujian	Fujian Provincial Institute of Product Quality Inspection FQII)	x	x	x	✓	x	✓	S	CNIS listed	www.fcii.net
55		Haining	Haining City Product Quality Supervision and Inspection	✓	x	x	x	x	x	S	CNIS listed	not found
56		Hangzhou	Everfine	x	✓	x	x	x	x	S	EPA listed	www.everfine.cn
57		Hangzhou	Hangzhou Academy of Quality and Technical Supervision and Inspection	✓	x	x	x	x	x	S	CNIS listed	not found
58		Hangzhou	Intertek	x	✓	x	x	x	x	S	EPA listed	
59		Hangzhou	Lead (*or* Leading)	x	✓	x	x	x	x	P	Facilities opening in USA and Mexico in 2015	
60		Hefei	HGMRI, (Hefei General Machinery Research Institute)	✓	x	✓	x	✓	x	S	CNIS listed	
61		Foshan	SGS-CSTC	✓	✓	✓	✓	x	✓	S	EPA listed, other sites in China	
62		Guangdong	GQI (CEST)	✓	x	✓	x	x	x	S	CNIS listed	
63		Guangdong	Guangdong Inspection and Quarantine Technology Center.	✓	x	x	✓	x	x	S	EPA listed	
64		Guangdong	Shenzhen Huatongwei International Inspection	x	x	x	✓	x	x	S	EPA listed	http://en.szhtw.com.cn/
65		Guangdong Sheng Hui	Inspection Technology	✓	x	✓	✓	x	✓	S	CNIS listed	not found
66		Guangzhou	CEPREI	✓	x	✓	✓	x	✓	S	CNIS listed	http://www.ceprei.org/english/

1				Energy efficiency test capabilities (in *amber* if not yet available)								
2	Country	City	Name of test laboratory	Room ac	LEDs/CFLs	Domestic refrigerators	TVs	Clothes washers	Computers	Reliability of data: P = obtained directly from lab or other primary source S = obtained from secondary sources	Notes	Website
67	China (PR)	Guangzhou	CESI	x	✓	x	x	x	x	S	EPA listed	http://www.cesi-gz.org.cn/
68		Guangzhou	CSA	✓	✓	✓	✓	✓	✓	S	EPA listed, other sites in China	http://www.csagroup.org/ca/en/contact-us
69		Guangzhou	Guangzhou Heng Chong Testing Technology Services	x	✓	x	x	x	x	S	CNIS listed	
70		Guangzhou	Intertek	✓	x	✓	✓	✓	✓	S	P	http://www.intertek.com/energystar/
71		Guangzhou	ITL	x	x	x	✓	x	✓	S	EPA listed	http://www.i-testlab.com/en/gsjj.asp
72		Guangzhou	Ten One Services	x	x	x	✓	x	✓	S	EPA listed	http://www.tups.com.cn/en/About.asp
73		Guangzhou	TÜV SÜD	✓	✓	✓	✓	x	✓	P		
74		Guangzhou	UL-CCIC	✓	✓	✓	✓	✓	✓	P	Has other locations	
75		Guangzhou	CVC (Vkan Certification and Testing)	✓	✓	✓	✓	x	✓	S	EPA listed	http://eng.cvc.org.cn/
76		Guangzhou	Standard-tech Co	x	✓	x	x	x	x	S	EPA listed	www.standard-tech.com
77		Guangzhou (?)	Weikai Detection Technology Co	✓	x	✓	x	✓	✓	S	CNIS listed	
78		Jiangsu	Jiangsu Province Product Quality Supervision and Inspection Institute (JSMI)	✓	x	x	✓	x	x	S	CNIS listed	not found
79		Ningbo	Ningbo Joysun Product Testing Service Company	x	x	✓	x	x	x	S	CNIS listed	not found
80		Ningbo	Ningbo Zhong Sheng product testing company	x	x	x	x	✓	x	S	CNIS listed	not found
81		Sichuan	Electronic Products Supervision and Inspection	✓	x	x	x	x	✓	S	CNIS listed	not found
82		Sichuan	Sichuan Provincial Quality Supervision, Inspection and testing centers	x	✓	x	x	x	x	S	CNIS listed	not found
83		Shandong	(SDQI) Shandong Product Quality Supervision & Inspection Research Institute	x	x	✓	x	x	x	S	CNIS listed	not found
84		Shandong	Shandong Institute of Metrology	x	x	x	x	✓	x	S	CNIS listed	not found
85		Shanghai	AITL (Aurora)	x	✓	x	x	x	x	P	All further details in full spreadsheet	
86		Shanghai	BV LCIE	✓	✓	✓	✓	✓	✓	P	Other sites in China	
87		Shanghai	Shanghai Institute of Quality Inspection (SQI)	✓	✓	✓	✓	✓	✓	S	CNIS & EPA listed	www.sqi.com.cn
88		Shanghai	Centre Testing International (CTI)	x	✓	x	x	x	x	S	EPA listed, other sites in China and Hong	http://www.cti-cert.com/
89		Shanghai	Dekra	x	✓	x	x	x	x	S	EPA listed	www.dekra-certification.com
90		Shanghai	Intertek	✓	✓	✓	✓	✓	✓	P	All further details in full spreadsheet	
91		Shanghai	Machinery & Electrical Products Testing Center of Shanghai (same organisation as directly above?)	✓	x	✓	x	x	x	S	EPA listed	smec.shciq.gov.cn
92		Shanghai	OnSpex (CSA)	x	✓	x	x	x	x	S	EPA listed	
93		Shanghai	Shanghai Entry-Exit Inspection	✓	x	✓	x	✓	x	S	CNIS listed	Not found
94		Shanghai	TÜV Rheinland	✓	✓	x	✓	x	✓	S	EPA listed, other sites in China	www.tuv.com
95		Shanghai	TÜV SÜD	x	✓	✓	✓	x	✓	S	EPA listed, other sites in China	http://www.tuv-sud.com
96		Shanghai	Universal Standard Service	x	x	x	✓	x	✓	S	EPA listed, other sites in China	http://www.uss.com.tw/
97		Shenzhen	AOV Testing Technology	x	✓	x	✓	x	x	S	CNIS listed, other sites in China	www.aovt.com
98		Shenzhen	Audix	x	x	x	✓	x	✓	S	EPA listed	http://www.audix.com.cn
99		Shenzhen	Beko Electronic Technology	x	✓	x	x	x	x	S	CNIS listed	not found
100		Shenzhen	Bell-Southcn	x	✓	x	x	x	x	S	EPA listed	http://bell-southcn.com/en/about_a.asp?id=48
101		Shenzhen	BEST Test Service Shenzhen	x	✓	x	x	x	x	S	EPA listed	www.bestcert.cn
102		Shenzhen	BST	x	✓	x	x	x	x	S	EPA listed	http://www.bst-lab.com/
103		Shenzhen	Bureau Veritas	✓	x	x	x	x	x	P		
104		Shenzhen	CCIC	✓		?	✓	?	✓	S	EPA listed, other sites in China	
105		Shenzhen	EMTEK	x	x	x	x	x	✓	S	EPA listed, other sites in China	www.emtek.com.cn/
106		Shenzhen	Eurofins	x	x	x	✓	x	✓	S	EPA listed	http://www.product-testing.eurofins.com/

	Country	City	Name of test laboratory	Energy efficiency test capabilities (in *amber* if not yet available)						Reliability of data: P = obtained directly from lab or other primary source S = obtained from secondary sources	Notes	Website
				Room ac	LEDs/CFLs	Domestic refrigerators	TVs	Clothes washers	Computers			
144	Chinese Taipei	New Taipei City	SGS	x	✓	x	✓	x	✓	S	EPA listed	http://www.sgs.com.tw/
145		New Taipei City	Sporton International	x	x	x	✓	x	x	S	EPA listed	http://www.sporton.com.tw
146		New Taipei City	Unity Opto	x	✓	x	x	x	x	S	EPA listed	http://www.unityopto.com.tw
147		New Taipei City	Universal Standard Service	x	x	x	✓	x	✓	S	EPA listed	http://www.uss.com.tw/
148		Taichung	Metal Industries Research & Development Center	x	✓	x	x	x	x	S	TAF listed	www.mirdc.org.tw
149		Taichung	Precision Machinery Research & Development Center	✓	x	x	x	x	x	S	TAF listed	www.pmc.org.tw
150		Taichung	TÜV Rheinland	x	x	x	✓	x	✓	S	EPA listed	www.tuv.com/en/greater_china/home.jsp
151		Taipei	Audix	x	x	x	✓	x	✓	S	EPA listed	http://www.audix.com/index_en.aspx
152		Taipei	Great One Global Certification	x	✓	x	x	x	x	S	EPA listed, also has sites in China	Great One Global Certification Co Ltd
153		Taipei	Intertek	x	x	x	✓	x	✓	S	EPA listed	http://www.intertek.com/energystar/
154		Taipei	Nemko	x	x	x	✓	x	✓	S	EPA listed	http://nemko.com/
155		Taipei	Neutron Engineering	x	x	x	✓	x	✓	S	EPA listed	http://www.neutronlab.com
156		Taipei	UL	x	x	x	✓	x	✓	P	All further details in full spreadsheet	
157		Taoyuan	Bureau Veritas	x	x	x	✓	x	✓	P	All further details in full spreadsheet	
158		Taoyuan	Cerpass Technology Corporation	x	✓	x	✓	x	✓	P	Lighting Testing planned to become available in 2016	
159		Taoyuan	ETC Electronics Testing Centre	x	✓	x	✓	x	✓	S	EPA listed	http://www.etc.org.tw/default.aspx
160		Taoyuan	Quanta Safety Laboratory	x	x	x	x	x	✓	S	EPA listed	http://www.quantalabs.com/
161		Taoyuan	TERTEC	✓	✓	✓	x	✓	x	P	All further details in full spreadsheet	www.tertec.org.tw
162		Taoyuan	VDE	✓	✓	✓	✓	✓	✓	P	All further details in full spreadsheet	
163		Tinan	TPSI	x	✓	x	x	x	x	P	All further details in full spreadsheet	
164												
165	Indonesia	Bandung	Balai Besar Bahan dan Barang Teknik (B4T)	x	✓	x	x	x	x	S	Lites Asia program listed	not found
166		Banten	B2TE-BPPT	x	✓	x	x	x	x	S	Lites Asia program listed (may not yet be accredited)	not found
167		Jakata	Balai Pengujian Mutu Barabg (BPMB)	x	✓	x	x	x	x	S	Lites Asia program listed (may not yet be accredited)	not found
168		Jakata	PT. Sucofindo	x	✓	x	x	x	x	S	Lites Asia program listed (may not yet be accredited)	www.sucofindo.co.id
169		Jakata	P3TKEBT	x	✓	x	x	x	x	S	Lites Asia program listed	www.p3tkebt.esdm.go.id
170		Jawa Timur	Baristand Surabaya	x	✓	x	x	x	x	S	Lites Asia program listed (may not yet be accredited)	http://surabaya.bpkimi.kemenperin.go.id/
171												
172	Japan	Ise-shi	UL	x	x	x	✓	x	✓	P	All further details in full spreadsheet	
173		Hyogo	JET	✓	x	x	✓	x	✓	P	NITE listed, site also in Yokohama	www.jet.or.jp
174		Kyoto	KEC	x	x	x	✓	x	x	S	EPA listed	http://www.kec.jp/testing-division/certify/english/
175		Osaka	TÜV Rheinland	x	x	x	x	x	✓	S	EPA listed, also ther site(s) in Japan	http://www.tuv.com/jp/japan/home.jsp
176		Sunayama	Intertek	x	x	✓	x	x	x	S	VLAC listed, also other sites in Japan	http://www.intertek.com/contact/asiapacific/japan/#ib
177		Tokushima	Nichia	x	✓	x	x	x	x	S	NITE listed	www.nichia.co.jp
178		Tokyo	JATL	✓	x	x	x	x	x	S	Source: JATL website	www.jatl.or.jp
179		Tokyo	JQA	x	x	x	✓	x	✓	S	NITE listed, also other sites in Japan	http://www.jqa.jp/
180		Tokyo	TÜV SÜD								Facilites TBC	https://www.tuv-sud.jp
181		Tokushima	Perfectural Industrial Technology Center	x	✓	x	x	x	x	S	NITE listed	www.itc.pref.tokushima.jp

	Country	City	Name of test laboratory	Energy efficiency test capabilities (in *amber* if not yet available)						Reliability of data: P = obtained directly from lab or other primary source S = obtained from secondary sources	Notes	Website
				Room ac	LEDs/CFLs	Domestic refrigerators	TVs	Clothes washers	Computers			
183	Korea(S)	Gyeongbuk	LED-IT Fusion Technology Research Centre (LIFTRC)	x	✓	x	x	x	x	S	Kolas listed	not found
184		Busan	Pukyong National University LED-Marine Convergence Technology R&BD Center	x	✓	x	x	x	x	S	Kolas listed	not found
185		Gyeonggi-do	Nemko	✓	✓	✓	✓	✓	✓	P	Date for extra facilities not yet known	nemko.com
186		Gyeonggi-do	Korea Institute of Lighting Technology (KILT)	x	✓	x	x	x	x	S	EPA listed	www.kilt.re.kr/
187		Gyeonggi-do	Korea Refrigeration & Air-Conditioning Assessment Center (KRAAC, part of KEMCO)	✓	x	✓	x	x	x	S	Kolas listed	www.kemco.or.kr/up_load/company/KRAAC%20Brochure.PDF
188		Gyeonggi-do	Korea Testing Certification	✓	x	x	x	x	✓	S	Kolas listed	www.ktc.re.kr/
189		Gyeonggi-do	Lumens	x	✓	x	x	x	x	S	Kolas listed	www.lumens.co.kr/
190		Gyeonggi-do	ONETECH	x	x	x	x	x	✓	S	EPA listed	http://www.onetech.co.kr/
191		Seoul	Korea Photonics Technology Institute	x	✓	x	x	x	x	S	EPA listed	www.kopti.re.kr
192		Seoul	Korea Testing and Research Institute	x	✓	x	✓	x	x	S	EPA listed	http://ktr.or.kr/english/company/company01.php
193		Seoul	Intertek	✓	x	✓	✓	✓	✓	S	EPA listed, Kolas listed	www.intertek.co.kr
194		Seoul	KTL	✓	x	✓	✓	✓	✓	P	All further details in full spreadsheet	
195		Seoul	TÜV Rheinland	x	x	x	✓	x	✓	S	EPA listed, also other sites in Korea	http://www.tuv.com/ko/korea/home.jsp
196		Seoul	TÜV SÜD								Facilites TBC	
197		Seoul	CSA								Facilites TBC	
198		Yongin-City	DT&C	x	x	x	✓	x	✓	S	EPA listed	http://www.digitalemc.com/
199		Yongin-City	Lumimicro	x	✓	x	x	x	x	S	Kolas listed	
201	Malaysia	Pingang	QAV Tech	✓	✓	x	x	x	x	S	Source: partial questionnaire, website, EPA listed	
202		Selangor	Sirim QAS (EEST1, EEST2)	✓	✓	✓	✓	x	x	P	All further details in full spreadsheet	
204	Mexico	Cuautitlán Izcal	APEESA.	x	x	✓	x	✓	x	S	EMA listed	www.prodigy.net.mx
205		Vallejo	ANCE	x	x	✓	x	x	x	S	EMA listed, has other locations	www.ance.org.mx
207	New Zealand	Auckland/ Christchurch	UL	x	x	x	✓	x	✓	S	NZ Government listed, EECA	
208		Albany	Massey university	x	✓	x	x	x	x		NX Government listed	www.massey.ac.nz
209		Nelson	Applied Research Services	✓	x	x	x	x	x	S	NX Government listed	www.appliedresearch.co.nz
211	Papua New			n/a	n/a	n/a	n/a	n/a	n/a	n/a	No labs yet located in this country from qualitative sources	
213	Peru			n/a	n/a	n/a	n/a	n/a	n/a	n/a	Scopes of accredited test laboratories e.g "0083-2014/SNA-INDECOPI" cannot be downloaded. No other	
215	Philippines	Fort Bonifacio Taguig City	Energy Research and Testing Laboratory Services	x	✓	x	x	x	x	S	Lies Asia listed	www.doe.gov.ph
216		Quezon City	IIEE	x	✓	x	x	x	x	S	Lies Asia listed	www.iiee.org.ph
217		Quezon City	SEALS	x	✓	x	x	x	x	S	Lies Asia listed	www.seals.ph
219	Russia			n/a	n/a	n/a	n/a	n/a	n/a	n/a	No labs yet located in this country from qualitative sources	
221		Singapore	UL	x	✓	x	✓	x	✓	P, S	Testing facilities planned to become available in 2015	

	Country	City	Name of test laboratory	Energy efficiency test capabilities (in *amber* if not yet available)						Reliability of data: P = obtained directly from lab or other primary source S = obtained from secondary sources	Notes	Website
				Room ac	LEDs/CFLs	Domestic refrigerators	TVs	Clothes washers	Computers			
222		Singapore	Intertek	x	x	x	✓	x	x	S	SAC listed	
223	Singapore	Singapore	Consumer Technology (UL)	x	x	x	x	x	✓	P	All further details in full spreadsheet	
224		Singapore	Setsco	x	x	x	x	✓	x	S	SAC listed	http://www.setsco.com/setsco/
225		Singapore	TÜV SÜD	x	✓	x	✓	x	✓	S	EPA listed	www.tuv-sud-psb.sg/
226												
227		Bangkok	Intertek	✓	✓	✓	x	✓	x	S	Listed on http://nhannangluong.com/laboratory and	www.intertek.com.th
228	Thailand	Bangkok	TISI	x	✓	x	x	x	x	S	Lites Asia listed	www.tisi.go.th
229		Pathum Thani	TÜV SÜD	x	x	✓	x	x	x	S	Listed on TISI/TLAS	www.tuv-sud-psb.co.th
230		Samut Prakan	Electrical and Electronics Institute,	✓	✓	✓	✓	✓	x	S	Listed on TISI/TLAS	www.thaieei.com
231												
232		Anaheim	Light Laboratory	x	✓	x	x	x	x	S	EPA listed	www.lightlaboratory.com
233		Ann Arbor	NSF	x	x	✓	x	x	x	S	EPA listed	www.nsf.org
234		Arlington	Air Conditioning, heating and refrigeration institute	✓	x	✓	x	x	x	S	SCC listed	www.ahrinet.org
235		Atlanta	CSA	x	✓	x	x	x	x	S	EPA listed, has other sites	http://www.csagroup.org/ca/en/contact-us
236		Aurora	Technical Consumer Products - Compliance Test Labo	x	✓	x	x	x	x	S	EPA listed	www.tcpi.com
237		Austin	TÜV Rheinland	✓	✓	✓	✓	✓	✓	S	SCC listed, has other locations in USA and China	
238		Baltimore	MET	x	✓	x	✓	x	✓	P	All further details in full spreadsheet	www.metlabs.com
239		Boulder	ITL	x	✓	x	x	x	x	S	EPA listed	http://www.itlboulder.com/
240		Buford	Advanced Compliance Solutions	✓	✓	✓	✓	✓	✓	S	EPA listed	http://acstestlab.com/
241		Burke	OPS	x	x	x	✓	✓	✓	S	EPA listed	not found
242		Cortland	Intertek	✓	✓	✓	✓	✓	✓	S	EPA listed, has other locations	http://www.intertek.com/energystar/
243		Durango	Ecova	x	x	x	✓	x	✓	S	EPA listed	www.ecova.com
244		Etters	Keystone	x	✓	x	x	x	x	S	EPA listed	http://www.keystonecerts.com/page/home
245		Fairfield	SGS	✓	✓	✓	✓	✓	✓	S	EPA listed	http://www.sgsgroup.us.com/en/Consumer-Goods-Retail.aspx
246		Freemont	Elliott	x	x	x	x	x	✓	S	EPA listed	http://www.elliottlabs.com/
247		Gaithersburg	Washington Laboratories	x	x	x	✓	x	✓	S	EPA listed	www.wll.com
248		Greenville	Hubbell Lighting Photometric Laboratory	x	✓	x	x	x	x	S	EPA listed	not found
249		Herndon	Thein Tech	x	x	x	✓	x	✓	S	EPA listed	http://www.rheintech.com/
250	USA	Hudson	Core Compliance	✓	✓	✓	✓	✓	✓	P	Testing facilities planned to become available in 2015	
251		Huntington Bea	BR Laboratories	x	x	✓	x	x	x	S	EPA listed	not found
252		Kirkland	ORB Optonix (CSA)	x	✓	x	x	x	x	S	EPA listed	http://www.orboptronix.com
253		Knoxville	EPRI	x	x	x	x	x	✓	S	EPA listed	www.epri.com
254		Littleton	Curtis-Straus (Bureau Veritas)	✓	✓	✓	✓	✓	✓	S	EPA listed	www.bureauveritas.com/wps/wcm/connect/bv_com/group/hon
255		Livermore	Bridgelux	x	✓	x	x	x	x	S	EPA listed	http://www.bridgelux.com
256		McLean	ACB	x	x	x	✓	x	✓	S	EPA listed	http://www.acbcert.com
257		Newark	National Technical Systems	x	x	x	x	x	✓	S	EPA lsited	www.nts.com
258		Newtown	TÜV Rheinland	x	✓	x	✓	x	✓	S	EPA lsited, has other locations	www.tuv.com/en/usa/home.jsp
259		Northbrook	UL	✓	✓	✓	✓	✓	✓	P	Has other locations	www.ul.com
260		Ontario (CA)	IAPMO	✓	x	✓	x	✓	x	S	SCC listed	www.iapmort.org
261		Peabody	TÜV SÜD	✓	✓	✓	✓	✓	✓	S	EPA listed, has other locations	www.tuv-sud-america.com
262		Pheonix	LightLab International	x	✓	x	x	x	x	S	EPA listed	http://lightlabint.com
263		San Diego	Gama Scientific	x	✓	x	x	x	x	S	EPA listed	www.gamma-sci.com

1				Energy efficiency test capabilities (in *amber* if not yet available)								
2	Country	City	Name of test laboratory	Room ac	LEDs/CFLs	Domestic refrigerators	TVs	Clothes washers	Computers	Reliability of data: P = obtained directly from lab or other primary source S = obtained from secondary sources	Notes	Website
264		San Diego	Nemko	x	x	x	x	x	✓	S	EPA listed	www.nemko.com
265		San Jose	Innovative Circuits Engineering	x	✓	x	x	x	x	S	EPA listed	http://www.icenginc.com/
266		Sidney	Design Services Network	✓	x	✓	x	x	x	S	EPA listed	www.emersonclimate.com/en-US/service
267		S Florida	ARL	✓	x	x	x	x	x	S	EPA listed	www.arl-test.com
268		Sunnyvale	Bay Area Compliance laboratories	x	✓	✓	✓	✓	✓	S	EPA listed	www.baclcorp.com
269		Troy	Lighting Research Centre	x	✓	x	x	x	x	S	This lab may not offer commercial testing services	
270												
271		Da Nang	QUATEST2	x	✓	x	x	x	x	S	http://nhannangluong.com/laboratory	www.quatest2.com.vn
272		Hanoi	QUATEST1	x	✓	x	✓	✓	x	S	Listed on	www.quatest1.com.vn
273	Vietnam	Hanoi	Center for Testing - Vinacomin	✓	x	✓	✓	x	x	S	Listed on	not found
274		Ho Chi Minh	QUATEST3	✓	✓	✓	✓	✓	x	P	Listed on http://nhannangluong.com/laboratory Room	www.quatest3.com.vn
275												

Appendix 7: Terms of Reference

Authors note: The document below is a first draft that may need amending in order to align its contents with APEC's procedures. APEC will need to confirm whether this proposed network is to be a Working Group of EGEE&C.

TERMS of REFERENCE of the APEC NETWORK of EXPERTS on MARKET SURVEILLANCE of MINIMUM ENERGY PERFORMANCE STANDARDS and ENERGY LABELLING

CLAUSE 1: **Purpose of network**

1. To enhance the cost effective delivery of monitoring, verification and enforcement through collaborative activities undertaken between the responsible authorities.

2. Collaborative activities are expected to include some or all of the following:

    - Development of common guidelines
    - Knowledge transfer and sharing of information
    - Joint research and testing of products
    - Adoption of best practice
    - Assisting less developed authorities

CLAUSE 2: **Membership**

1. Membership of the group is limited to representatives of market surveillance authorities from the APEC economies.

2. Members shall select Secretary from amongst their membership. The role of Secretary should be held for a maximum of 3 years before a replacement is selected.

CLAUSE 3: **Meetings**

1. A meeting of the full network shall be held annually; task-group meetings e.g. if a joint testing program was being conducted between some members of the network, shall be held as required.

2. Full network meetings are chaired by the host economy; task leaders would chair their task-group meetings.

3. The secretariat shall draw up the agenda for the full meeting under the responsibility of the Chair and send it to the members of the network. The task leader draws up the agenda for task meetings. The agenda for full Network meetings must always include progress reporting from each task-group.

4. The secretariat shall send the invitation to the meeting and the draft agenda to the Network members no later than 30 days before the date of the meeting.

5. At each meeting, the secretariat shall compile an attendance list specifying the participants and the authorities, organisations or bodies to which they belong.

6. Minutes of all meetings shall be sent to the members of the Network or task-group within 30 days.

CLAUSE 4: **Opinions of the Network**

1. As far as possible, the network shall adopt its opinions, recommendations or reports by consensus.

2. In the event of a vote, the outcome of the vote shall be decided by a simple majority of the members.

CLAUSE 5: **Task-groups**

1. The Network shall set up task-groups to examine specific issues and/or carry out specific projects. Such sub-groups shall be disbanded as soon as their mandate is fulfilled.

2. Membership of task-groups is open to any member of the full network.

3. The sub-groups shall report to the Network.

CLAUSE 6: **Admission of third parties**

1. Members of EGEE&C may attend any meeting of the Network or its task-groups.

2. The Network or task-group may invite on an ad hoc basis experts from outside the group with specific competence in a subject on the agenda. Subject to agreement of its members, the Network may give observer status to organisations.

3. Should a conflict of interest in relation to an expert arise, the meeting may decide that the expert in question shall abstain from discussing the items on the agenda concerned and from any vote on these items. Conflicts of interest shall be reported in writing, e.g. in the minutes of the meeting.

CLAUSE 7: **Confidentiality of deliberations**

1. The Network's deliberations shall be confidential unless they agree by a simple majority of its members to open (some of) its deliberations to the public.

CLAUSE 8: **Meeting expenses**

1. Participants in the activities of the Network shall not be remunerated for the services they render.

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