



**Asia-Pacific  
Economic Cooperation**

Expert Group on Energy Efficiency And Conservation under the Energy Working Group

# **APEC INTERNATIONAL CONFERENCE**

**Alignment of Standby Power Approaches  
*Moving Towards 1 Watt and Beyond***

**19 to 21 October 2010**

**Shinagawa Prince Hotel, Tokyo, Japan**

## **POLICY ALIGNMENT OPTIONS**





**Asia-Pacific  
Economic Cooperation**

APEC International Conference Policy Alignment Options  
Alignment of Standby Power Approaches

# **POLICY ALIGNMENT OPTIONS FOR APEC INTERNATIONAL CONFERENCE**

**Alignment of Standby Power Approaches**  
*Moving Towards 1 Watt and Beyond*

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# Asia-Pacific Economic Cooperation

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## *Introduction*

The APEC International Standby Power Conference - *Moving Towards 1 Watt and Beyond* was held from 19-21 October 2010 at the Shinagawa Prince Hotel, Tokyo, Japan. The conference brought together approximately 50 experts on standby power, representing 12 APEC economies, and 10 different manufacturers and suppliers. The purpose of the conference was to bring together both industry and government policy makers to gain an understanding of the possibilities for reducing consumption in standby power. The conference covered a wide range of standby related topics, ranging from technologies and components to high level policy and implementation issues

The conference concluded with an intensive half day workshop that reviewed all of the issues covered by the previous 2 days' presentations. The workshop was split into a technology stream and a policy stream. This report covers all of the technology related elements within the conference.

Three documents are available from the conference website:

1. Summary Report – contains a conference overview, program, list of speakers, list of presentations and participants.
2. Technology Report (this report) – contains an overview of technology related issues raised at the conference, copies of technology related papers (these provide more detail than the presentations themselves), technology workshop summary and conference outcomes.
3. Policy Report – contains an overview of policy related issues raised at the conference, copies of policy related papers (these provide more detail than the presentations themselves), policy workshop summary and outcomes.

A total of 22 presentations were made over the first two days and each of these presentations is available for download at <http://www.energyrating.gov.au/standby2010-apec-presentations.html>.

The policy stream of the conference covered a wide range of related topics; from the status of standby power measurement and standby power policies in APEC economies to the challenges of managing standby power in the network environment. Many of the papers at the conference reported in detail on the status of standby power policy in the various APEC economies and in the European Union. These policy approaches were shared with the participants and a workshop was held to discuss the possible challenges and approaches to the alignment of standby power policies. An overview of the policy stream of the conference follows

# *Overview of Policy Issues in Conference Papers*

## *Standby Power Measurement Issues*

### *International Cooperation and Alignment of Measurement Practices*

Melissa Damnic, of Maia Consulting Australia provided a summary of the status of measurement of standby power internationally, with all APEC economies involved agreeing to use a common measurement methodology. The measurement of standby power in retail stores has been underway since 2001 in Australia and is now being promoted by the Asia-Pacific Partnership on Clean Development and Climate (APP), the IEA 4E Standby Power Annex and in the European Union. These projects have encouraged the measurement of over 10,000 products, with Australia and Korea providing time series data.

International cooperation and alignment of approaches has been fostered in the basket of products project allowing 3 international projects to collect data for new products using the one methodology. The alignment of approaches prevents duplication across the areas of program development and implementation. Collaboration assists in making prudent use of resources, time and financial investment, and allows programs and their tools to be further developed as each new partner can use resources to building block the approach rather than for reinvention. Using the same methodological approach allows for sharing and comparison of results and by developing a common database, information from a range of sources can be pooled. The cooperative approach facilitates information exchange through co-hosting events and sharing communication tools such as newsletters and web links.

### *IEC62301 - Household electrical appliances - Measurement of Standby Power*

Lloyd Harrington of Energy Efficient Strategies, Australia described the background and updates for the 2<sup>nd</sup> Edition of the International Electrotechnical Commission (IEC) standard 62301. This International Standard - IEC 62301 - specifies methods of measurement of electrical power consumption in standby mode(s) and other low power modes (off mode and network mode), as applicable. Edition 1 of IEC62301 was published in June 2005. The second edition of this standard has been under development for the last 4 years and is expected to be published as Edition 2 of IEC62301 in early 2011. This measurement standard is primarily used by laboratories for the measurements of low power modes of products.

Edition 2 provides:

- greater detail in set-up procedures and introduction of stability requirements for all measurement methods to ensure that results are as representative as possible;

- refinement of measurement uncertainty requirements for power measuring instruments, especially for more difficult loads with high crest factor and/or low power factor;
- updated guidance on product configuration, instrumentation and calculation of measurement uncertainty;
- inclusion of definitions for low power modes as requested by TC59 and use of these new definitions and more rigorous terminology throughout the standard;
- inclusion of specific test conditions where power consumption is affected by ambient illumination.

### *Status and Trends of Standby Power Consumption in Japan*

Sho Hirayama of the Jyukankyo Research Institute, Japan provided an update of the status and trend of standby power in Japan. In 1992, major issues regarding the Standby Power Consumption (SPC) were firstly analysed quantitatively by Consumer Goods Research Institute (now-defunct) in Japan. They measured 16 households, and mean SPC was 9.1% of all electricity use. From 1995 to 1996, Jyukankyo Research Institute carried out 3 survey studies on SPC. The results showed that SPC accounted for 10-15% of national electrical power consumption per year. Meanwhile, 82% of home appliances were using standby power. From 1999 to 2008, expanded and enhanced surveys were conducted by the ECCJ (Energy Conservation Center, Japan), which were adopted by the METI (Ministry of Economy, Trade and Industry).

The results of the 2008 survey show that standby power per household was approximately 285 kWh and accounted for 6.0% of household electricity use. The largest contributions in order are, gas water heaters, air-conditioning system (combined space heating & space cooling) and telephone equipment. SPC of gas water heaters accounted significantly, followed by audio & video equipment and telecommunications equipment, respectively.

### *International Policy Developments*

Within the policy stream of the conference, a number of sessions were dedicated to the reporting of individual APEC economy policy actions and developments relating to standby power.

#### *Korea*

In 2004 the Korean government announced its plan to reduce the standby power by stating that “the government will offer full assistance in developing, procuring and disseminating standby power saving technologies so that by the year 2010, the standby power of all electronic products shall be reduced to below 1W.” Korea established a national roadmap (Standby Korea 2010) to limit standby power below 1W. Currently, standby power is included in three mandatory 1W policy measures: Standby Warning Label, MEPS and Energy Efficiency 1<sup>st</sup> grade label.

The implementation of standby warning label scheme has been successful in reducing the number of products with more than 1 Watt on the market. According to the analysis of production and sales data of TVs at the end of year 2009, the market share of high standby power reduction products increased in great magnitude from 60.2% in 2008 to 99.2% in 2009. On the other hand, the market share of 7 products that were targets for a standby warning label only accounted for 0.8%.

## *USA*

In the USA, the two major policy instruments targeting Standby Power are:

- ENERGY STAR: a voluntary endorsement labels that focused initially on standby, and is now focused on total power consumption
- EnergyGuide: the U.S. labeling program that focuses on total operating cost and electricity usage and has no separate declaration for standby

In 2007, a Consumer Electronics Association (CEA) study found that standby power accounted for about one-quarter of consumer electronics electricity consumption, which is about three percent of residential electricity consumption. Also, the CEA found a decrease in standby mode power draw for many devices ( a large portion had met the ENERGY STAR criteria), with the exception of complex set-top boxes. The CEA, who represent the consumer electronics market, believe that voluntary, market-driven approaches to reducing standby power appear to work well.

The ENERGY STAR program is currently expanding their specifications to cover network equipment and improving the specifications of existing products to address the power consumption of products with a network connection. The first specification for small network equipment (SNE) is underway and will be published in the first half of 2011.

## *Thailand*

The Energy Conservation Promotion Act in Thailand has been used since 1992, and it was revised in 2007. Department of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy has planned to establish minimum energy performance standards (MEPS) to be mandatory standards by collaboration with Thai Industrial Standards Institute (TISI). In addition, high-energy performance standards (HEPS) are the requirements in the Ministerial Regulations. HEPS is a voluntary programme.

DEDE set drafts MEPS and HEPS for energy consumption during appliances are operating in standby and off modes for 7 appliances i.e. computers, monitors, printers, multi-function devices, scanners, televisions and home audios in 2009. Currently, the standby power programme for televisions and monitors will be promoted by Electricity Generating Authority of Thailand (EGAT) at the end of 2010.



## *European Union*

The European Commission has enacted EC Regulations (1275/2008) that limit the standby power of many electronic consumer products to 2 Watts in 2010 and to 1 Watt standby power in 2012.

Further investigations are now underway to address network standby within Preparatory Studies, Lot 26 -- Networked Standby. This study is following the standardised Method for the Evaluation of Energy-using Products (MEEuP), with Tasks 1 through 5 completed to date, covering the definition of the relevant terms, analysis of the market and consumer use patterns, as well as the technical analysis of existing products and the definition of base cases. The policy approaches to address network standby will be explored within this study and should be completed in the first half of 2011.

## *Australia*

The Australian government has recently released a product profile focusing on a set of Home Entertainment products. It is an initial document for consultation with industry stakeholders on the potential for energy efficiency improvements and the scope of different international policy approaches. Australia also intends to shortly release a Regulatory Impact Statement (RIS) on the implementation of a horizontal 1 Watt standby policy. A RIS, which is a regulatory requirement, is prepared to provide government with feedback on proposed regulation, which in this case, is to improve existing levels of energy efficiency of standby mode (and off mode) in residential products and appliances that are not already covered by energy efficiency regulation.

## *Indonesia*

Indonesia has begun to investigate standby power policy approaches. The current EE labelling program covers CFL, Refrigerators and TVs with further products planned to be covered over the next 3 years. Standby power testing and measurement is also being investigated

## *Japan*

Japan has under the Energy Conservation Law, an energy efficiency target for household appliances and vehicles. This programme is implemented by the Top Runner method, where manufacturers and importers are obligated to meet certain standards. Achievement of the standard is judged on a weighted average for each category per manufacturer/importer. Among 23 Top Runner target products, standby power is included in the calculation of annual energy consumption efficiency (target standard value) of the following 7 products; TV sets, VCRs, Electric toilet seats, Electric rice cookers, Microwave ovens, Copiers and DVD recorders.

Japan has been implementing the ENERGY STAR program for office products since 1995. The government has also encouraged voluntary action by JRAIA, JEITA, and JEMA from 2001 to 2004, and additionally by JGKA from 2005 to 2009. According to

studies by METI, standby power consumption in the home has reduced from 398 kWh pa in 1999 to 285 kWh pa in 2008.

### *Hong Kong*

In Hong Kong, the government raises the public awareness on standby power consumption through publicity, seminars and briefings. Under the Voluntary Energy Efficiency Labelling Scheme, Televisions and LCD Monitors are required to meet the 1 watt standby requirement. Electricity power companies are also active in promoting external energy saving device to cut standby.

### *Chile*

Chile has a mandatory energy-efficiency labeling system for electric appliances, based on international standards (IEC) and the European labeling format. Certification follows ISO/CASCO procedures. Currently, three products have certification and labeling requirements for low-power modes (only stand-by is considered): Microwave ovens, Set-top boxes and TVs

### *China*

In 2000, China Standard Certification Center (CSC) introduced standby power concept into China and carried out a series of activities to promote the development of standby power. Since then, further measures have been introduced to reduce China's standby power consumption. The main policies include China's voluntary endorsement EE labelling program, the National Energy Efficiency Standard (MEPS), and implementing the China Government Procurement programme.

There are 9 types of products included in the standby power certification program; TVs, printers, faxes, copiers, computers, monitors, multifunction devices, projectors and external power supplies. MEPS with standby power requirements are also in place for 5 categories products; TVs, external power supplies, monitors, copiers and induction cookers. The China Government Procurement programme includes limits for standby power for 4 categories of equipment; TVs, computers, printers and monitors.

### *Network Standby Policy Approaches*

Networks were originally confined to computers and information technology equipment (primarily computers). However, over the past 5 years, the growth of networks has been remarkable and this is set to continue rapidly into the future. Mobile products and wireless applications, which both use different types of networks, are growing quickly and are becoming ubiquitous. There is also growth in the area of networked audio-visual equipment. There are a range of other normal household appliances starting to get network capability, so networks in general is an area of growing policy concern. It is conceivable that within 10 years nearly all products will be connected to some form of network. The main drivers for this are dramatically improved functionality, so this will be strongly driven irrespective of other factors. Unless network design and operation builds

in the concepts of energy efficiency and management, energy consumption will increase dramatically for many equipment types.

Network connectivity is not well-addressed in most existing policies that deal with low power modes of products. This policy gap appears to have occurred for a variety of reasons: the technology of networks is unfamiliar to many energy policy analysts and experts; there are significant complexities in network technologies and their associated protocols; networks are evolving rapidly on many parallel fronts and the number and type of products with network capabilities is expanding rapidly. However, there are a few examples where products with network capability have been successfully regulated or included in voluntary programs in recent years

It makes sense to address the topic of networks within an integrated approach of two larger overlapping topics: low -power mode policy generally (which includes “standby”), and policy responses to digital networks. Armed with sound information and a clear policy framework to address energy used in networks, the objectives of efficient networks and elimination of excessive standby power can be achieved.

Specifying power management requirements for networked products is a complex technical subject. Many of the most important types of equipment commonly used in networks are not covered by current program requirements for low power modes. The default “normal operation” at present is that network equipment remains continuously in active modes, which makes specifying mandatory low power mode requirements largely irrelevant in any case. A few current programs, however, are addressing issues related to networks and power management, which offer foundations to build improved global cooperation. In an effort to foster the possibility of aligned standby power policies, program managers need to adopt common fundamental definitions. The APP/4E report titled *Standby Power and Low Energy Networks – issues and directions*, released in September 2010, defines the concepts of mode and function and suggests that ultimately existing energy standards be the repository for these global definitions. This report can be obtained from <http://www.energyrating.gov.au/library/details2010-network-standby.html>.

The key components of an effective policy to achieve low energy networks and eliminate excessive standby power are proposed within an implementation framework of:

1. Guiding principles for good network design
2. Incorporating power management as the default
3. Capping power for network functions to existing reasonable levels within the technology bounds
4. Setting power limits for all secondary functions through a horizontal standby requirement.

Guiding principles for good network design can be set out as:

- Network Connected Devices – Initial EE Policy Objectives
  - Governments should ensure that electronic devices enter low-power modes automatically after a reasonable period when not being used (power management).

- Governments should consider limits on energy consumption in low-power modes for networked products and develop technically feasible options where these are warranted.
- Governments should ensure that network-connected electronic devices minimise total energy consumption, with a priority placed on the establishment of industry-wide protocols for power management.
- Energy efficiency specifications should not require a particular hardware or software technology.
- Requirements for networked products need to be generic and performance based.
- Network Connected Devices – Initial Hardware Objectives
  - All digital network technologies should actively support power management and should follow standard (international) energy management principles and designs.
  - Connection to a network should not impede a device from implementing its own power management activities.
  - Devices should not impede power management activities in other devices connected to the network.
  - Networks should be designed such that legacy or incompatible devices do not prevent other equipment on the network from effective power management activities.
  - Network connections should have the ability to modulate their own energy use in response to the amount of the service (level of function) required by the system.

## *Conference Policy Workshop*

The policy workshop was held on the third day of the conference. The workshop attempted to review all of the policy approaches that had been covered in presentations at the workshop. The topics were classified into four broad categories in terms of actions and outcomes:

- **Research required:** areas where further research is required in order to identify issues or problems and to set research and development directions and objectives.
- **Development required:** Areas where the likely policy direction has been identified but where further development is required in order to establish an approach. This may also include the development of technical standards and protocols.
- **Established:** technological aspects are well established and commercially available. However, work may still be required to ensure widespread implementation or adoption (often in the policy area).
- **Long Term Goals:** where the participants agreed that these measures should guide the long term policy aspirations and objectives

### *Policy Alignment Goals*

Status: Established

The workshop noted that the policy objective is broad alignment of approaches (not pure harmonisation) as state of development varies considerably by economy. This means that economies are welcome to choose voluntary or mandatory approaches that range from labelling to targets to minimum energy performance standards. Alignment of the policy targets is desirable for all economies, as it allows manufacturers to develop equipment that meets the targets, regardless of the policy instrument. For instance, one economy may choose to have a voluntary label for Microwave ovens which have a passive standby power consumption of 1W or less, while another economy may choose to regulate this target for all microwaves. Examples of the types of policy instruments include the following options:

- Endorsement (e.g. Energy Star)
- Dis-endorsement label - Negative label (e.g. Korea)
- Vertical approaches (total energy use) (applicable to some products that use more energy) (e.g. Energy Star for set top box products)
- Horizontal approaches or product by product power levels (setting a level for particular modes or combinations of functions in low power modes) (e.g. EU standby power regulations EC 1275/2008)
- Horizontal approaches can be mandatory or voluntary, and can be used for MEPS or labelling

## *Long Term Policy Targets*

Status: Long term goals

Conference participants defined the term “Alignment” as a set of common approaches within a framework of guiding principles. The specific levels and timing remain a matter for each economy to consider.

The participants promoted the following power limits (MEPS or voluntary levels or targets as basis for endorsement label/negative label) as the desired aspirational targets:

- Short term targets for low power modes (simple products) by 2012
  - 1 watt for modes without a display (comparable to EU Dec 2009 levels)
  - +1 watt adder for display (comparable to EU Dec 2009 levels)
- Medium terms targets for low power modes (simple products) by 2015 to 2018
  - 0.5 watt for modes without a display (comparable to EU Dec 2012 levels)
  - +0.5 watt adder for display (comparable to EU Dec 2012 levels)

## *Policy Targets for Complex Products*

Status: Development & Research required

For more complex products (including networked products) that cannot meet the long term goals, it was considered that further development was required for appropriate functional adders to set power targets. It was noted that this could be integrated into an item of work recommended in the APP/4E report titled ***Standby Power and Low Energy Networks – issues and directions*** (referenced as Project I). This project aims to develop a policy framework for low energy networks and includes the development of the concept of horizontal functionality.

Further research was recommended to be undertaken on the energy management requirements and how to specify these in policy measures. In particular, it was considered important to reward dynamic power management. Related to this research is the implementation of power scaling in complex products. It would be very useful for policy targets to specify these requirements in policy measures. Research could be undertaken to determine the types of empirical levels that could be initially established

## *Adoption of Current Measurement Methods and Energy Efficient Protocols*

Status: Established

The conference participants encouraged the widespread adoption of Energy Efficient Ethernet (IEEE 802.3az) in product specifications (including Energy Star). This recently ratified protocol can reduce the power in high speed network links during periods of low utilisation (most of the time).

There was also agreement that economies will encourage the adoption of IEC62301 Edition 2 as a measurement method for low power modes.

## *Development of Further Test Methodologies*

Status: Development required

It was noted that further development was required to address the energy and performance measurement of networks. The current IEC62301 does not cover the methodologies for measuring power on networks. This is currently an item of work recommended in the APP/4E report titled ***Standby Power and Low Energy Networks – issues and directions*** (referenced as Project C standard testing elements for networks – energy and performance). The project aims to develop a companion document to IEC62301, which could be later used by the IEC as the basis of a new or amended test standard.

Further development was also proposed to extend standby policy and related test methods to cover extra low voltage DC systems (or micro-grids). There are many ways of powering connected products (i.e., USB) which currently fall out of the scope of standard test methodologies however millions of these products are currently in use.

## *Development of Other Energy Efficient Protocols*

Status: Development required

The development of relevant wireless technical standards which enable energy management of wireless links was considered a priority for network protocols. The adoption of Energy Efficient Ethernet (IEEE 802.3az) for wired networks provides a pathway for the development of energy efficient wireless networks, which are very common in households and are essentially in idle mode for the vast majority of time.

## *Implementation of Guiding Principles for Good Network Design*

Status: Long term goals

The implementation of the Guiding Principles of Good Network Design was discussed by the participants. They encouraged the promotion of these principles by government and industry stakeholders. It was noted that the CEA offered to promote these guiding principles at their annual conference and convention in Las Vegas in Jan 2011 or at other conference forums to communicate and discuss the importance of energy efficiency in networks into the future.

## *Common Measurement and Evaluation Approaches*

Status: Established

Common measurement and evaluation approaches were discussed and encouraged to be further shared by participants. These approaches include:

- Measurement of new products (stores, labs, manufacturer data)
- Information sharing between APEC economies to facilitate policy development

- Measurement of the stock (measurements in use – spot measurements and measurement over long periods to determine usage patterns)
- Longitudinal measurements to obtain information on user related aspects
- Standardised reporting formats to facilitate APEC economy comparisons
- Clearing house and repository for data and shared resources
- Role of surveys and questionnaires
- Agreed approaches to the preparation of estimates
- Evaluation approaches and methodologies

### *Other Policy Tools*

Status: Established

Policy tools can be used to cover services as well as products such as Set top box providers, for instance Energy Star now accredits codes of conduct that encourage service providers pay for energy consumption of their products.

Building Codes can also be used to increase efficiency for built in equipment. e.g. automatic switches for power management.

### *Options for Facilitation of Long Term Cooperation of Policy Development*

Status: Development required

The options for the facilitation of long term cooperation of policy development of standby power policies were discussed in detail. Many of the participants expressed their willingness to continue the sharing of data and approaches to encourage low standby power. APP and the IEA have achieved significant international cooperation to address standby power over the last 10 years. The APP project funding may be diminishing over the next year and the participants identified a number of potential organisations and international cooperation arrangements that could be pursued, such as:

- APEC Energy Efficiency and Conservation Committee
- APEC ESIS website
- 4E Standby Annex for development of selected projects
- IEC, IEEE and other technical bodies for development of selected technical standards
- Super Efficiency Appliance Deployment (SEAD) (under IPEEC committee) may be able to take on some work



## *Conference Outcomes*

Conference participants learnt of new technologies that are available now to reduce standby power and advanced and innovative designs for power management and improved user interaction that have already reached the market. Advanced designs that could reduce the energy consumption of many "information based" devices during periods of low utilisation have been used for many years in mobile devices and it was acknowledged that there is a need to encourage their wide spread adoption into mains powered (tethered) products. This could result in large energy reductions in all modes (in addition to standby mode). There has been extensive international cooperation in the area of measurements and test procedures, forming a solid foundation for good policy alignment.

It was acknowledged that networks are an area of growing interest and importance and as such this topic was discussed at length. Increasingly more and more products are connected to networks, so attention needs to be paid to network protocols and product design to ensure that networks are configured to minimise product energy consumption through advanced power management, rather than allowing an increase in overall energy use in all modes. Network products (both products connected to networks and network equipment itself) for the most part are not covered in existing policy frameworks and therefore it is important to develop a path forward to ensure that today's policy is not made redundant with the rapid expansion of network products.

The policy workshop helped to identify areas where progress can be made now and where more research and development is needed to achieve a low standby power future. The conference participants concluded that long term aspirational goals should be pursued and that common frameworks be pursued to enhance the alignment of standby policies. It was acknowledged that further cooperation and sharing of data and approaches would assist with long term policy alignment.

There are a wide range of policy approaches for the improvement of standby power. The policy instruments range from voluntary or mandatory endorsement and warning labels to voluntary targets and mandatory MEPS. The key lesson from this conference was that alignment of testing and measurement approaches as well as the long term alignment of targeted power levels will enhance international goals to reduce standby power. Common targets will provide a key message that encourage manufacturers to act and reduce compliance costs worldwide.

The alignment of policy approaches workshop encouraged the pursuit of the following long term goals using a range of policy instruments, such as MEPS or voluntary levels or targets as basis for endorsement label/negative label:

- Short term targets for low power modes (simple products) by 2012
  - 1 watt for modes without a display (comparable to EU Dec 2009 levels)
  - +1 watt adder for display (comparable to EU Dec 2009 levels)
- Medium terms targets for low power modes (simple products) by 2015 to 2018
  - 0.5 watt for modes without a display (comparable to EU Dec 2012 levels)

- +0.5 watt adder for display (comparable to EU Dec 2012 levels)

Other conference outcomes are:

- Exchange of experiences and ideas of 50 conference participants over 3 days
- A total of 22 presentations made to conference participants, bringing them up to date with the latest technology and policy developments from around the world
- A technology and a policy workshop at the conclusion of the conference
- A conference website, which hosts all material from the conference including presentations and various conference reports ( see  
<http://www.energyrating.gov.au/standby2010-apec-presentations.html>)
- Preparation of a conference summary and overview document
- Preparation of a technology report
- Preparation of a conference policy approaches report (this report)

## Annex A - Conference Papers

This Annex contains brief summary papers describing the key issues and major points of each of the policy stream of presentations given on Day 2 of the APEC International Conference - Alignment of Standby Approaches. The papers were prepared by the presenters for inclusion in this report. Two papers were provided after the conference for inclusion in the conference report (China and Chile). Not all presenters provided a paper for publications in this report.

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## International Cooperation and Alignment of measurement practices

*Summary of the Presentation at the APEC International Standby Power Conference 19-22 October 2010  
Melissa Damnic, Partner, Maia Consulting Australia*

### 1. Introduction

International cooperation and alignment of approaches to standby power has been under way in the area of measurement of standby power in new products. This paper describes the activities of 4 different projects and how they have been able to share a common approach for in field store measurements. Sharing methodology and experiences has allowed each of the projects to save precious resources by preventing duplication; by not re-inventing the wheel if you like. It has also allowed them to compare and contrast the state of standby power consumption across a basket of common products and across multiple markets. The project allows for the identification of common “problem” products which further enhances the ability to share resources and prevent duplication via common problem solving.

### 2. Australian Store Survey

The Australian government decided to undertake its first store survey as part of a bigger study *Quantification of Residential Standby Power Consumption in Australia* in 2001. The store survey was a small part of the study with 100 products measured in two stores. The study also included a telephone survey and the collection of measurement data on existing products in homes. However the collection of store data was seen to be a quick and effective way to gather information on standby power and it was decided that annual store surveys would be undertaken. In 2001 there was little data about standby power so the store survey was able to both create baseline information and monitor developments in standby power in appliances.

Since this time over 7500 products have been measured, with time series data showing product trends, now available for more than 30 products types. This information has been used for policy analysis and to support actions by the Australian Government (Australia adopted IEA 1W Plan in 2002)

### 3. Asia-Pacific Partnership on Clean Development and Climate

The APP is a partnership between Australia, Canada, China, India, Japan, Korea, and the United States. The goals of the partnership are to accelerate the development and deployment of clean energy technologies; meet energy security, national air pollution reduction, and climate change goals and promote sustainable economic growth and poverty reduction. The APP was divided into several task force groupings and it is the Buildings and Appliances Task Force (BATF) that was responsible for the Alignment of National Standby Power Approaches Project.

The standby project has been led by Australia (Korea as co-leader) since 2007. Project objectives include: promoting 1 Watt as an aspirational target; developing common policies to address standby; enhance information through improved data collection and promote the use of IEC62301 as a common test method. The APP project began gathering data using store surveys in 2007 and to date data has been collected for over 4000 products across 6 APEC Economies. Four APEC economies have already planned further data collections this year.

The APP basket of Products project was based on the Australian store survey experience. The project developed common collection processes and tools and conducted training workshops to ensure each APEC economy was able to collect data for the same group of products using the same methodology.

#### *4. IEA 4E Standby Power Annex*

The IEA 4E implementing agreement is a collaborative program aiming to promote wider use of more energy-efficient electrical equipment. The program has established a number of annexes to focus attention on particular areas, one being Standby Power. The 4E Standby Annex held its first meeting November 2009. Currently Annex partners include Australia, Canada, Korea, Netherlands, Switzerland, & UK, with membership expected to grow over the coming year. The annex is undertaking projects in data collection, evaluation of standby policies, study of horizontal policy approaches, investigating network products.

Data collection is one of the primary tasks set out in the Annex goals. The Standby Power annex adopted the APP store survey methodology at the start of 2010. 4E has agreed to share data with APP via a data sharing agreement. At this early stage the annex has not collected any data separate from the APP project

#### *5. SELINA Project*

The Standby and off mode Energy Losses In New Appliances project, which was financially supported by the European Union, is a collaboration across 12 European APEC economies: Latvia, Portugal, Germany, France, Denmark, Romania, Czech Republic, Belgium, United Kingdom, Austria, Greece, and Italy. The project aim was to characterize the Off-mode and Standby energy of new products; measure retailer awareness and investigate stakeholder views on market transformation programs. The project was able to modify the APP store survey methodology and further develop the spread sheet tool into an online database accessible by each of the participants. This project collected data in 2009/10 for over 5800 products and as a result of entering into a data sharing agreement with APP was able to compare the European results with those from Australia, Korea and the USA.

It is hoped that SELINA phase 2 – NANCI project will be approved for commencement in 2011 as this will focus more on Network standby (2011). There has been an in principle agreement that the cooperation and sharing of ideas developed with the SELINA project will continue with the NANCI project if it is approved.

#### *6. The Basket of Products Project*

The basket of product project involves the gathering of a representative set of standby measurements for a common set of products. A standardised data collection instrument is provided which includes detailed instructions on information to record and the likely modes encountered. A list of core products to measure is provided and this facilitates international comparisons as well as allowing trends in standby to be tracked over time. A further 25 products have been selected as secondary products to be measured by those APEC economies that have the capacity to undertake a larger study. The instruction guide includes guidelines for nearly 50 product types. There is no limit on the number of product types that can be measured

The products included in the core basket include: Clothes washers; Microwaves; Televisions – CRT; Televisions – LCD; Televisions – plasma; DVD players; Integrated and portable stereos; Computer monitors (CRT & LCD); Printers (Laser and Inkjet); Multi-Function Devices (MFD's); and External Power Supplies.

## *7. Time line of collaboration*

- Australia Developed Store Survey Project
- APP adopted and refined store survey approach for Basket of Products Project
- APP developed internal data sharing agreement
- IEA 4E adopted APP basket of Products including data sharing agreement
- APP shared methodology with SELINA project
- SELINA project built on Methodology
- APP and 4E adopted new methodology from SELINA
- SELINA adopted data sharing agreement

## *8. Other Collaborations*

As already mentioned in addition to the actual data collection mechanism, collaboration has been extended to include data sharing protocols. This involved consideration being given to the different relationships and sensitivities between retailers, suppliers, manufactures and governments in different regions. The negotiation in this area has resulted in an agreed set of graphical representations of the data freely shared but also provides for individual APEC economies to decide how much of the raw data they wish to share and with whom on a case by case basis. It has also established a set of rules regarding the use and sharing of the data which maintains the integrity of the data and which are designed to prevent misuse of the information.

The APP and 4E Standby annex collaborate on the production of a quarterly newsletter - Load Down. This publication provides information on the latest project developments and results as well as up-coming events. The newsletter has also been able to include articles from SELINA and the SELINA website has been able to promote the newsletter.

There have been several joint meetings and workshops developed in partnership between APP, 4E standby Annex and the SELINA group. In Korea 2009 4E and APP met to discuss opportunities for collaboration. In Vienna 2010 a joint workshop was held with SELINA and in Paris in 2010 APP and 4E worked together in a workshop exploring the issues surrounding network standby. APP and the 4E standby annex have also worked in collaboration with the APEC Standby Power Project to organise the Tokyo conference “Moving Towards 1 Watt and Beyond”. Further APP and 4E Annex have been liaising with the EU Lot 26 Directive consultants on the work they are conducting into the network standby field and receiving feedback on similar work being undertaken by APP technical consultants.

## *9. Summary*

International cooperation and alignment of approaches has been fostered in the basket of products project allowing 3 international projects to collect data for new products using the one methodology. The alignment of approaches prevents duplication across the areas of program development and implementation. Collaboration assists in making prudent use of resources, time and financial investment, and allows programs and their tools to be further developed as each new partner can use resources to building block the approach rather than for reinvention. Using the same methodological approach allows for sharing and

comparison of results and by developing a common database, information from a range of sources can be pooled. The cooperative approach facilitates information exchange through co-hosting events and sharing communication tools such as newsletters and web links etc.

### *10. For More Information*

- Australian Standby Program - [www.energyrating.gov.au/standby](http://www.energyrating.gov.au/standby)
- APP Basket of Products - [www.energyrating.gov.au/standbydata/app/](http://www.energyrating.gov.au/standbydata/app/)
- 4E Standby Power Annex - <http://standby.iea-4e.org/>
- SELINA – [www.selina-project.eu/index.cfm](http://www.selina-project.eu/index.cfm)
- [Melissa@maiaconsulting.com.au](mailto:Melissa@maiaconsulting.com.au)

# **IEC 62301: Household electrical appliances - Measurement of standby power**

Technical summary paper by Lloyd Harrington, EES, Session 4 paper 2  
APEC Standby Conference, Tokyo, Japan, October 2010

## **History of Edition 1**

Work on the issue of standby commenced in TC59 back in October 1999 when TC59 set an ad-hoc working group on standby at its Kyoto meeting. Over the next 18 months the ad-hoc working group met once in 2001 (together with a number of guests from industry and government) and collected a wide range of documents and policies on the issue of standby. The ad-hoc working group concluded that the preparation of a horizontal standard to measure the standby power for a wide range of products was warranted.

Accordingly, the original proposal for a new standard on standby was prepared by the TC59 ad-hoc WG on standby. This was submitted as a new work item proposal (document IEC 59/254/NP) in May 2001. This proposal was approved (see IEC 59/270/RVN) in September 2001 (project number allocated as IEC 62301) and at its meeting in Florence in October 2001, TC59 approved the creation of Working Group 9 to continue this work to publication.

Working Group 9 finalized the committee draft at its meeting in March 2002 and this was issued in 2002 for public comment. As were a significant number of comments on the first committee draft, it was decided to issue a second committee draft in 2003. The normal procedures were then followed with a committee draft for voting (CDV) in late 2003 and a final draft international standard in early 2005. Edition 1 of IEC62301 was published in June 2005.

## **History of Edition 2**

At the Frankfurt meeting in April 2005, TC59 made the following decision:  
*WG9 for the time being should not be disbanded due to first experiences with the standard. All SCs to take the new standard into account in order to include it into their different performance standards.*

In September 2006 Working Group 9 prepared a progress report for TC59 that made a number of recommendations regarding refinements to the test procedure in IEC62301 (see IEC 59/462/INF).

At the Jeju Island meeting (Korea) in October 2006, TC59 accepted this report and also made the following decisions (refer IEC 59/468C/RM) (summarised and condensed):

- Decision 1 – SCs are to implement standby power into their product standards and seek the advice of MT9 regarding modes
- Decision 2 – WG9 to become MT9. MT9 to clarify the difference between standby mode and off mode. SCs to implement these new definitions in their standards.



- Decision 3 – prepare the amendment as proposed in 59/462/INF
- Decision 4 – MT9 to ask SCs of their needs with regard to standby and low power modes.

MT9 met in May 2007 in Frankfurt and agreed on a wide range of changes to be included in a revision of IEC62301 as a result of 59/462/INF and 59/468C/RM. Given the extensive nature of the changes required, it was agreed to issue a revision of the standard rather than an amendment as initially envisaged.

After intensive discussions within MT9, a committee draft of IEC62301 Edition 2 was released as 59/490/CD in November 2007. In parallel, document 59/491/INF was released to show the changes from Edition 1 to Edition 2.

MT9 met in May 2008 in Washington DC to formulate responses to the comments received on 59/490/CD. These were released as 59/513/INF. Given the complex nature of the comments and the need to restructure some of the document in response to the comments, the meeting decided to prepare a second committee draft rather than proceed to CDV.

The second committee draft was issued in October 2008 as 59/523/CD. The compilation of comments on this draft was prepared after a meeting in mid 2009 and released in August 2009 as 59/539/CC.

The CDV of IEC62301 was released in August 2009 as 59/540/CDV. A total of 41 comments were received on the CDV in January 2010. Most of the comments were jointly submitted by 8 European APEC economies. These comments formed the bulk of the technical feedback on the CDV. In part, the intense input from Europe appears to have been generated by a mandate issued by the European Commission to CENELEC to prepare a state of the art test method for standby power under the European Regulation EC 1275/2008. The European comments were prepared by the CENELEC Joint Working Group which consisted of members and experts from several European technical committees that mirror IEC: TC59X, TC100, TC108X and TC111.

The CDV was approved under the vote. Under the IEC rules, a CDV which has been approved must proceed to FDIS, even where this contains significant technical changes as a result of comments on the CDV.

MT9 held a meeting in late February 2010 in Brussels to consider each of the comments in detail. Responses to each of the comments were prepared by MT9 and are included in the published compilation of comments (see 59/547/RVC).

Despite the significant number of comments received on the CDV, the comments were considered to be very constructive by MT9 and it was generally agreed that the revised Edition 2 of the standard will be a more usable and stronger document as a result of these comments. The majority of the comments related to the test methodology itself and the specification of the power measurement instruments used. As these comments mostly related to detailed technical matters, MT9 felt confident that the resulting proposals in the FDIS are robust and can withstand intense scrutiny.

The majority of the comments submitted and the changes made to the CDV in the FDIS (released as 59/555/FDIS in October 2010) were either editorial in nature or can be considered refinements of the technical requirements (i.e. they clarify the requirements but did not change the overall direction of the standard). However, there were two requirements in the FDIS which could be considered as significant technical changes. These are discussed in some detail below in order to explain the nature of the changes and the thinking that underlies them.

**1/ Changes to the uncertainty requirements in Clause 4.4.1:** Edition 1 of the standard had an uncertainty requirement of 2% at the 95% confidence level for power levels over 0.5W and an absolute uncertainty of 10mW for power levels of 0.5W or less. Detailed technical submissions on the CDV showed that even commonly used power measurement instruments with good specifications were unable to meet these requirements for certain types of load, typically those with very low power factor (less than 0.2) and/or those with a very high crest factor (typically >10 or more). Experiments conducted in Europe show that although it is possible for loads with a 'peaky' current waveform to exhibit this problem, the more common examples are found where the current and voltage are both sinusoidal but out of phase (typically due to the presence of X capacitors). Very detailed investigations showed that these "difficult" loads cannot be measured with the earlier limit on measurement uncertainty, even with sophisticated laboratory instruments. The FDIS includes a proposal to increase the permitted uncertainty in accordance with a new term (Maximum Current Ratio), which is a function of the permitted crest factor of the meter, the actual crest factor of the load and the power factor of the load. The uncertainty is only increased once these effects become quite large. The other significant change is the alteration of the threshold from a relative uncertainty of 2% to an absolute uncertainty: this has been altered from 0.5W (and 10mW) to 1.0W (and 20mW). This will not have many practical implications for most measurements under this standard, as 20mW is still quite a small uncertainty for small loads. The new requirements should not be considered a relaxation of the current requirements, but more of an adjustment of the technical requirements to make the specification more practical in its application.

**2/ Changes to the stability criteria in Clause 5.3:** The changes to this clause (notably clauses 5.3.1, 5.3.2 and 5.3.3) arose indirectly from a number of comments on these clauses as well as other clauses in the CDV. In the CDV, measurements in 5.3.2 and 5.3.3 have no checks for stability. Clause 5.3.1 has a requirement of a regression slope of less than 0.01. MT9 undertook considerable analysis on a number of different types of loads and concluded that it would be extremely prudent to have some checks for stability for all measurement methodologies in the standard. The detailed sequence of steps during the measurement process was also found to be inconsistent for each of the existing measurement methods, which was considered to be undesirable. As a result, the text of all these clauses was revised to make them more similar in both structure and requirements as follows:

- There is an initial warm up period before data can be used to determine the power in the relevant mode;
- Where data is collected on a continuous basis (sampling under 5.3.1), the slope of the data used to determine the power must be <10mW per hour for loads less than or equal to 1W and <1% per hour for loads >1W.

- For the other methods, a similar principle is applied, except that two defined blocks of data in 5.3.2 (or two spot readings in the case of 5.3.3) are measured and compared to ensure that the nominal slope (or rate of change) of these measurements is within the permitted stability range.
- Because there is a higher risk in the use of the average reading method (5.3.2) and the direct meter reading method (5.3.3), the warm up periods for these approaches are longer.
- Using the sampling method (5.3.1) many products will have a total measurement period of as little as 15 minutes in order to achieve a valid reading.
- Where the requirements cannot be met by the minimum period defined, the total period is expanded until the requirements can be met.

The Final Draft International Standard (FDIS) voting closes in early January 2010. It is expected that Edition 2 of IEC62301 will be published in early 2011.

## **Detailed document history for IEC62301**

### **Edition 1 History**

Time Line for IEC62301 Edition 1

- 2001-05: New work item proposal for a measure method on standby 59/254/NP
- 2001-10: TC59 approves formation of WG9 at Firenze meeting
- 2002-03: WG9 meets to discuss content of committee draft
- 2002-07: Committee draft issued for public comment as IEC 59/297/CD
- 2002-11: WG9 finalises compilation of comments, issued as IEC 59/317/CC
- 2002-11 to 2003-02: WG9 finalised content of second CD
- 2003-03: 2nd CD issued as IEC 59/325/CD
- 2003-09: WG9 compilation of comments on 2<sup>nd</sup> CD, issued as IEC 59/353/CC
- 2003-10: TC59 considers next steps, approves release of CDV
- 2003-11: CDV released for voting and comment as IEC 59/362/CDV
- 2004-04: CDV vote closes, all P members in favour, 1 O member voted against
- 2004-07: CDV votes and compilation of comments released as IEC 59/375/RVC
- 2004-08: FDIS text prepared by WG9 based on comments on CDV
- 2004-11: French translation of FDIS received by Central Office
- 2005-01: Discussions with IEC editors regarding minor editorial and structural issues
- 2005-02: FDIS released for voting in English and French as IEC 59/409/FDIS
- 2005-05: FDIS voting closed – 19 P members voted in favour, 1 abstention
- 2005-04: FDIS voting result released as IEC 59/420/RVD – standard approved
- 2005-06: IEC62301 Edition 1 published in French and English

### **Edition 2 History**

- 2005-04: TC59 decides to retain WG9
- 2006-09: Technical recommendations for inclusion into Edition 2 - 59/462/INF
- 2006-10: TC59 makes additional key decisions for inclusion in Edition 2
- 2007-11: First committee draft of Edition 2 - 59/490/CD
- 2007-11: 59/491/INF released to show the changes from Edition 1 to Edition 2
- 2008-07: Compilation of comments on first CD issued as 59/512/CD
- 2008-08: Report from MT9 to TC59, 59/513/INF
- 2008-10: Second committee draft of Edition 2 - 59/523/CD
- 2009-08: Compilation of comments on second CD as 59/539/CC
- 2009-08: Committee draft for voting Edition 2 - 59/540/CDV
- 2010-02: MT9 meeting to prepare FDIS
- 2010-04: FDIS text submitted to Central Office
- 2010-05: Compilation of comments and voting on CDV released as 59/547/RVC
- 2010-09: French translation of FDIS completed
- 2010-10: FDIS of IEC62301 Edition 2 released – 59/555/FDIS (bilingual)

# Status and Trends in Standby Power Consumption in Japan

## Summary

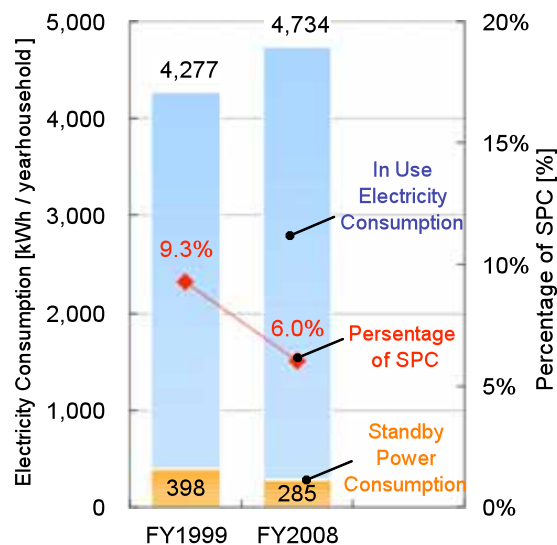
### 1. Trends in Standby Power Consumption in Japan

#### 1.1 Overview of Research Examples (case-examples) of Standby Power Consumption in Japan

In 1992, major issues regarding the Standby Power Consumption (SPC) were firstly analyzed quantitatively by Consumer-Goods Research Institute (now-defunct) in Japan. They measured 16 households, and mean SPC was 9.1% of all electricity use. From 1995 to 1996, Jyukankyo Research Institute carried out 3 survey studies on SPC. The results showed that SPC accounted for 10-15% of national electrical power consumption per year. Meanwhile, 82% of home appliances were using standby power. From 1999 to 2008, expanded and enhanced surveys were conducted by the ECCJ (Energy Conservation Center, Japan), which were adopted by the METI (Ministry of Economy, Trade and Industry).

#### 1.2 Annual Standby Power per Household

Figure 1 shows annual SPC per household. During the past decades, while the total electricity consumption per household raised to 11%, SPC per household went from 398 kWh (accounts for 9.3% of household electricity use) in 1999, to 285 kWh in 2008 (accounts for 6.0% of household electricity use) in Japan. Compared to the other APEC economies, Japan is in its unique way with a certain specific characteristics as follows. 1. People's awareness about standby power consumption 2. Voluntary efforts by Japanese Industry Associations 3. Non-existent regulations from the national government.



Source: Energy Conservation Center, Japan, "Standby Power Consumption Survey Report", March 2009

Figure. 1 Annual Standby Power per Household

### ( 1 ) People's Awareness

SPC per household was 398 kWh in 1999, nearly equivalent to 10 thousand JPY in a year. The wasteful spending made a definite impact; therefore it eventually resulted in tons of inquiries from great number of general consumers as well as forced consumers to rethink the SPC.

### ( 2 ) Voluntary Efforts by Japanese Industry Associations

Voluntary efforts by Japanese Industry Associations shall be made to reduce the SPC significantly. Since 2001, Japanese industry organizations had set the ambitious target that SPC of new home appliances might be lower than 1W or close to 0 W. All of the items had achieved the goal with ease.

### ( 3 ) Non-existent regulations by the national government

Currently, household appliances like TV and DVD, SPC of these products is taken into consideration in the development of Top Runner Standards. However there is no mandatory regulation only on SPC by the national government.

## 2. Current Status of Standby Power Consumption in Japan

The following are a few results on SPC status as well as the existing problems which were given by the ECCJ from 1999 to 2008.

### 2.1 Survey Methods

The survey studies were conducted by following methods.

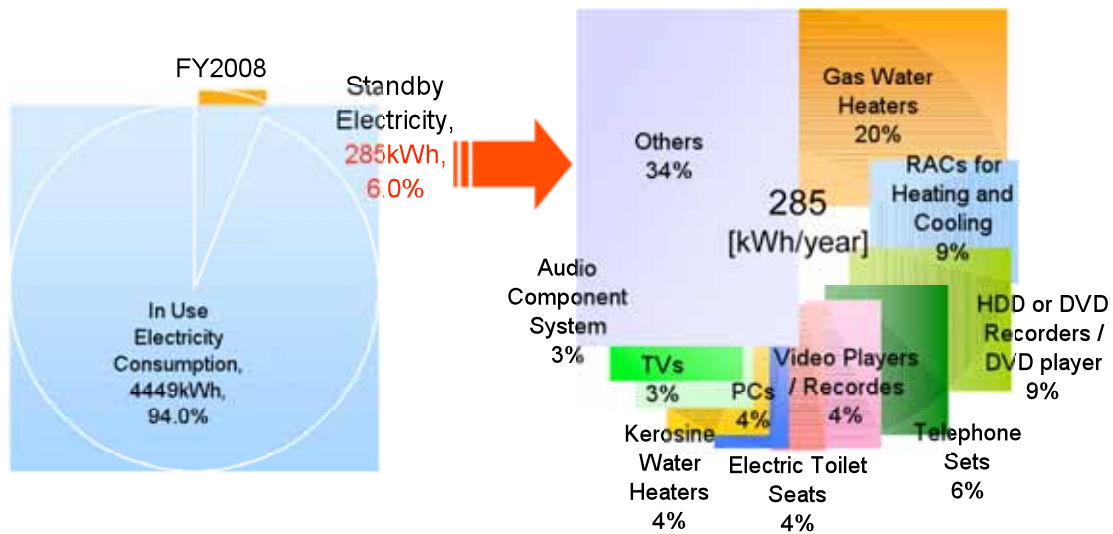
1. Measurement of appliances' SPC owned by household (every 3 years, 2722 appliances in 100 households are analyzed in 2008)
2. Questionnaire survey on the actual status of usage of appliances at home (every 3 years, 1664 households are analyzed in 2008)
3. Questionnaire survey on currently sold appliances' SPC in each mode (answered by manufacturers, about 5000 appliances are analyzed in 2008)

### 2.2 Summary of Results

Figure 2 shows standby power share per appliances. Summary of results for 2008, SPC per household was estimated approximately 285 kWh, accounted for 6.0% of household electricity use (4734 kWh per household in this year). Among them, SPC of gas water heaters, air-conditioning system (combined space heating & space cooling) and telephone equipment accounted sharply. SPC of gas water heaters accounted significantly, followed by audio & video equipment and telecommunications equipment, respectively.

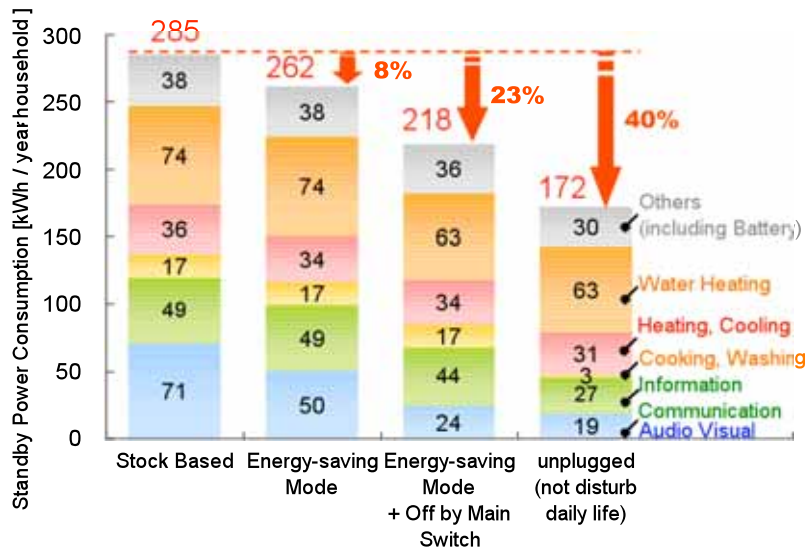
Figure 2 shows SPC reduction effect by usage. SPC decreased by 262 kWh per year by using home appliances with energy-saving mode. Moreover, if people unplugged the main power, SPC would available to be declined by 218 kWh. Furthermore, if unplugged the home

appliances what couldn't disturb daily life, SPC would be expected to achieve a further decline, with 46 kWh drop in that case.



Source: Energy Conservation Center, Japan, Standby Power Consumption Survey Report, March 2009

Figure. 2 Standby Power Share per Appliances



Source: Energy Conservation Center, Japan, Standby Power Consumption Survey Report, March 2009

Figure. 3 SPC Reduction Effect by Usage

### 2.3 Future Issues

Although the average SPC per household has decreased over the past decade, home appliances are still increasing. Meanwhile, we should focus more on interconnect problem of home appliances in case of introducing smart home technology, as well as focus our particular attention on trying to improve efficiency levels of Gas and Kerosene Appliances.

# Negative Label, Positive Step

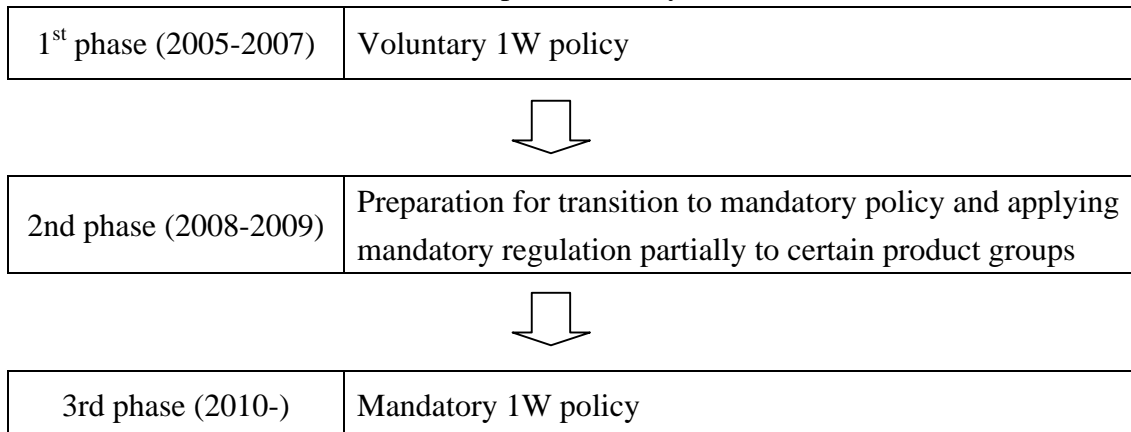
## - Standby Warning Label and Korea's 1W Policy -

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### **Korea's 1-watt plan, "Standby Korea 2010"**

In 2004 the Korean government announced its strong will to reduce the standby power by stating that "the government will offer full assistance in developing, procuring and disseminating standby power saving technologies so that by the year 2010, the standby power of all electronic products shall be reduced to below 1W." Korea established a national roadmap (Standby Korea 2010) to limit standby power below 1W. Korea used 3 kind of mandatory 1W policy measures: standby warning label, MEPS and energy efficiency 1s grade label.

#### <. Korea's 1-watt plan "Standby Korea 2010" >



### **Accomplishments of the standby warning label scheme**

Korea became the first APEC economy in the world to implement the standby warning label scheme. Through the revision of Rational Utilization of Energy Act in 2008, Standby warning label scheme was applied to TV for the first time among the 20 products covered by the e-Standby Program (August 28th 2008)



and the remaining 19 products are designated as standby warning label target products (July 1st 2010).

Once designated as standby warning label target product, relevant manufacturers or importers of such designated products must ① report the standby power and ② display warning label to those products that do not meet the required standards of standby power reductions. In the case of violating these mandatory requirements, a fine of US\$ 5,000 will be charged.



Standby warning label for products falling below standby power reduction standard (mandatory)

\* Relevant legal basis: Article 19 Rational Utilization of Energy Act, e-Standby Program Application Regulation based on Article 14 Enforcement Regulations of Rational Utilization of Energy Act (Ministry of Knowledge Economy Notification)

< Standby warning label target products >

Implementation Date	Standby warning label target products
From 28 August 2008	TV (1 product)
From 1 July 2009	Computer, monitor, printer, multi-function device, set-top box, microwave oven (6 products)
From 1 July 2010	Fax machines, copiers, scanners, video cassette recorder, home audio products, DVD players, radios, door phones, cord/cordless phones, toilet seats, modems, home gateways (12 products)

The implementation of standby warning label scheme has been successful. According to the analysis of production and sales data of 7 products designated as the standby warning label target products, performed at the end of year 2009, the market share of high standby power reduction products increased in great magnitude from 60.2% in

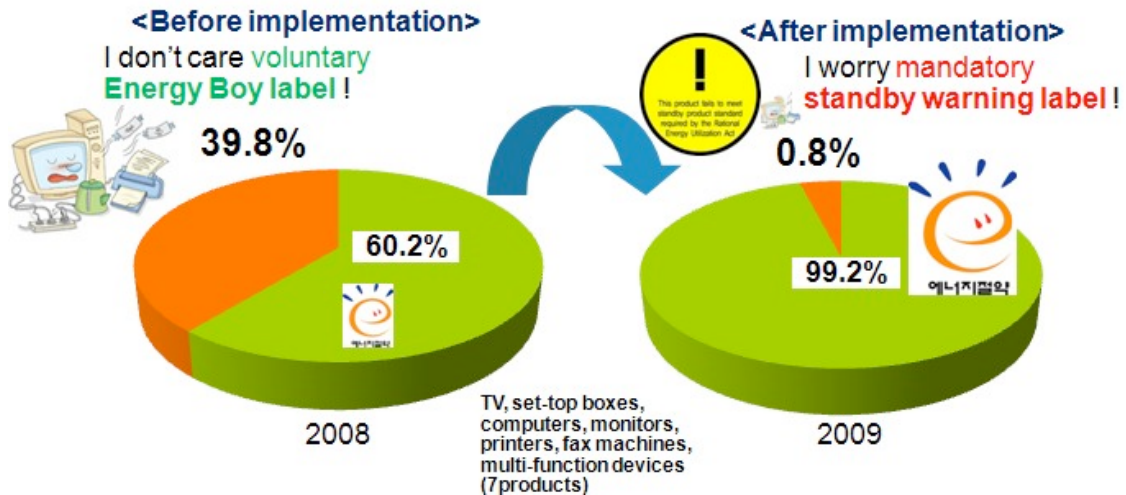
2008(TV in 2007) to 99.2% in 2009. On the other hand, the market share of these 7 products designated as the standby warning label target products with indication of warning labels only accounted for 0.8%.

< The Effects of Implementing Standby Power Warning Label Scheme >

Type	Before implementation (2008, TV in 2007)				After implementation (2009)				Date of implementation
	High standby power reduction products		Products not meeting the standby power reduction standards		High standby power reduction products		Products with standby warning label		
	Sales(units)	Market share (%)	Sales(units)	Market share (%)	Sales(units)	Market share (%)	Sales(units)	Market share (%)	
TVs	1,727,401	70.7%	714,795	29.3%	2,696,133	99.9%	2,370	0.1%	2008.8.28
Computers	2,467,250	56.1%	1,934,555	43.9%	3,619,096	99.8%	7,423	0.2%	2009.7.1
Monitors	2,113,629	66.3%	1,074,371	33.7%	2,935,024	99.8%	6,612	0.2%	2009.7.1
Printers	743,765	93.0%	56,235	7.0%	670,306	99.9%	495	0.1%	2009.7.1
Multi-function devices	1,014,086	90.5%	105,914	9.5%	851,711	90.2%	92,410	9.8%	2009.7.1
Set-top boxes	191,779	12.4%	1,350,247	87.6%	1,284,267	100.0%	-	0.0%	2009.7.1
Microwave ovens	652,530	49.7%	660,527	50.3%	973,050	99.9%	586	0.1%	2009.7.1
Total	8,910,440	60.2%	5,896,644	39.8%	13,029,587	99.2%	109,896	0.8%	

1. Before Implementation: Production and sales data of 2008 (TV in 2007)
2. After Implementation: Production and sales data of 2009
3. Source : KEMCO



< Market transformation at e-Standby Program >



As 2009 as the reference year, the market share of 12 other products (home audio and etc) in e-Standby program that operates on a random basis only accounts for 25.5%. This shows that the implementation of the standby warning label scheme is an effective energy saving policy.

These 12 products (Home gateway, copier, audio, DVD player etc) will be designated as standby warning label target products starting from July 1<sup>st</sup> 2010. After the designation, the market share of these products is expected to increase from 25.5% in 2009 to above 90% in year 2010.

< Standby  $\leq 1W$  2010 scenario >

Policy tools for $\leq 1W$		Standby	Enforce of date	Target products
e-Standby Program	Standby warning label 	$\leq 1W$ (Off or passive standby)	28 August 2008	TVs
			1 July 2009	Computers, monitors, printers, multi-function devices, set-top boxes, microwave ovens
			1 July 2010	VCRs, audios, DVD players, radios, bidets, cordless phones, door phones, modems, fax machines, copiers, scanners, home gateways
	Energy Boy label	$\leq 1W$ (Cut off Automatically)	1 July 2001	Energy saving & controlling devices
Energy Efficiency Label and Standard Program	MEPS	$\leq 0.5W$ (No load)	1 January 2009	External power supplies
	Energy efficiency 1 <sup>st</sup> grade label 	$\leq 1W$ (Off or passive standby)	1 January 2007	Washing machines, dish washers
			1 January 2008	Rice cookers
			1 July 2008	Air cleaners
			1 January 2009	Drum washing machines, electric fans
			1 January 2010	Air conditioners, household gas boilers
			1 January 2011	Dish dryers, gas water heaters

## **Standby power and power factor**

In general standby power 1W policy has been a tremendous success. However, there are still rooms for improvements. Currently, e-Standby Program's standby warning label scheme and the Energy Efficiency Label and Standard Program's 1st grade energy efficiency requirements both aim to apply standby power 1W standards to reduce significant amount of standby power. In this regard, the policy objective of reducing the standby power has been met with satisfaction.

However, there are cases where significant number of standby power related appliances' power factor is low because power factor is not considered in applying standby power reduction standards.

Therefore it is important to consider the adoption of minimum standards for power factor (ex: more than 30% or 50%) in the long term when measuring standby power so that standby power reductions lead to reduced number of power plants constructions and carbon dioxide reductions.

# Current Situation of Standby Power Standards in Thailand

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## Abstract

Standby power is the energy consumed by an appliance or piece of electronic equipment when it is not performing its primary function. The International Energy Agency (IEA) estimates that losses from standby power account for between 3 to 13 percent of residential electricity demand in developed APEC economies (AGO, 2006). The Energy Conservation Promotion Act in Thailand has been used since 1992, and it was revised in 2007. Department of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy has planned to establish minimum energy performance standards (MEPS) to be mandatory standards by collaboration with Thai Industrial Standards Institute (TISI). In addition, high-energy performance standards (HEPS) are the requirements in the Ministerial Regulations. HEPS is a voluntary programme. DEDE set drafts MEPS and HEPS for energy consumption during appliances are operating in standby and off modes for 7 appliances i.e. computers, monitors, printers, multi-function devices, scanners, televisions and home audios in 2009. Currently, standby power programme for televisions and monitors will be promoted by Electricity Generating Authority of Thailand (EGAT) in the end of year 2010.

## Keywords:

Standby power, Energy Conservation Promotion Act, MEPS, HEPS

## 1. Introduction

DEDE signed Memorandum of Understanding (MoU) with Thai Industrial Standards Institute (TISI) in 2007. The agreement is that DEDE has responsibility to determine at least 35 products of MEPS in 2011. However DEDE has made further progress. The new strategy as

MEPS is targeted to cover 50 products and Ministerial Regulations are targeted to establish 54 products between 2007 and 2011. Standby power for 7 products is also targeted in 7 of them. TISI is empowered to establish MEPS as the mandatory programme. In addition, DEDE will establish the Ministerial Regulations for specifications of high energy performance levels and implement as a voluntary programme.

DEDE set a technical committee consisting of representatives from various organisations. The committee was responsible for technical review and providing recommendations for operation team. Operational modes for those products are classified into 5 modes i.e. Active Mode, Ready Mode, Sleep / Standby Mode, Off Mode and Hard Off Mode.

- **Active Mode** is a state that the equipment performs a main function such as displaying visual and sound or printing. And in this mode maximum power are consumed.
- **Ready Mode** is a state that the equipment does not perform a main function but ready to jump into active mode. In general the consumption is reduced.
- **Sleep / Standby Mode** is a lower energy state when a user does not interact with the equipment over the set time or by command from the user.
- **Off Mode** is state of minimum energy which the equipment is plugged and can not reduced more such as when we turn off.
- **Hard Off Mode** the equipment electrically disconnects from mains. No power required.

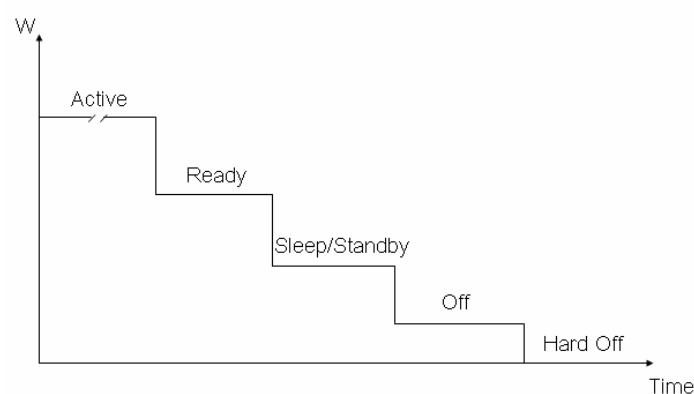


Figure 1 Operational mode of equipment

Table 1 Operational modes

Equipment	Mode of Operation
1. Computer	Active Mode, Standby Mode, Off Mode and Hard Off Mode
2. Monitor	Active Mode, Standby Mode, Off Mode and Hard Off Mode
3. Printer	Active Mode, Ready Mode, Standby Mode, Off Mode and Hard Off Mode
4. Multi-Function Device	Active Mode, Ready Mode, Standby Mode, Off Mode and Hard Off Mode
5. Scanner	Active Mode, Standby Mode, Off Mode and Hard Off Mode
6. Television	Active Mode, Standby Mode and Hard Off Mode
7. Home audio	Active Mode, Standby Mode and Hard Off Mode

## 2. Market survey

The equipment that has high sale volume is televisions, computers and home audios respectively. Downward trends of products are CRT monitors and televisions, small-size scanners, inkjet printers, and upward trends of products are LCD monitors and televisions, multi-function devices and notebooks.

## 3. Testing standard

The standard to measure standby power which is applied worldwide is IEC 62301: Household Electrical Appliances - Measurement of Standby Power, which specify about the quality of power supply, resolution and accuracy of metering devices and testing condition. In this study, we are sampling products from the market and test for standby power to represent the whole market. And we used IEC62301 as a testing standard.

## 4. Analysis of HEPS & MEPS

DEDE sets around 20 percent of current high energy efficiency products can pass HEPS, but MEPS is set around 3 percent of current low energy efficiency products will be eliminated from

the market. After testing products, the results were analysed for each product by the technical committee. Moreover, public hearing is also needed. The final conclusion for HEPS and MEPS has shown in Table 2.

Table 2 The approved criteria for standby power of 7 products

Types	Draft HEPS		Draft MEPS	
	STANDBY	OFF	STANDBY	OFF
1.1 Desktop PC	≤ 3.0	≤ 2.0	≤ 10.0	≤ 8.0
1.2 Notebook	≤ 1.0	≤ 0.75	≤ 2.0	≤ 1.6
2. Monitor	≤ 0.7	≤ 0.5	≤ 2.0	≤ 1.0
3.1 CRT TV	≤ 2.0	n.a.	≤ 15	n.a.
3.2 LCD & PLASMA TV	≤ 0.5	n.a.	≤ 1.5	n.a.
4. Home audio	≤ 1.0	n.a.	≤ 6.0	n.a.
5.1 Inkjet Printer	≤ 1.7	≤ 0.3	≤ 7.0	≤ 1.3
5.2 Mono Laser	≤ 4.0	n.a.	≤ 11	n.a.
5.3 Colour Laser	≤ 10.0	n.a.	≤ 27	n.a.
6.1 Inkjet MFD	≤ 2.0	≤ 0.4	≤ 7.0	≤ 2.0
6.2 Laser MFD	≤ 4.0	n.a.	≤ 18.0	n.a.
7. Scanner	≤ 3.0	≤ 0.3	≤ 9.0	≤ 1.0

## References

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## **“Standby Power 1-Watt” Programme in Thailand by EGAT’s Implementation.**

**By**

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As the continuous implementation of energy efficiency projects, Electricity Generating Authority of Thailand (EGAT) has initiated standby power project to raise efficiency of power using of electrical appliances while being in standby mode. The total potential saving of 12 appliances; televisions, audios, DVD players, computer screen, CPU, printer, electric fans, satellite receivers, washing machines, microwave ovens and air conditioners; is 850 GWh saving. The top 5 of most potentially appliances due to the study are televisions, audios, DVD players, monitor and CPU, respectively.

As a consequence, EGAT has commenced its standby power 1-Watt programme using voluntary labeling scheme in 2010-2014 by collaborating with the manufacturers/importers of targeting appliances; television, monitor, air conditioners, washing machine and another potential appliance; with the potential to save 132 GWh. The launch of standby power 1-Watt labeling is started in 2009 with television due to its readiness in term of technical and marketing status. In 2010, the MOU have been signed for monitor while the first launched of the appliance with the standby power labels will be in January 2011.

From the experience of the first phase implementation, the standby power 1-Watt programme implemented by EGAT has its strength as the manufacturers/importers have confidence in EGAT’s reputation for its continuously implementing in energy efficiency activities. Additionally, the regulation executed by Ministry of Energy, High Energy Performance standard (HEPs) with indication of standby power standard for high efficiency equipments, is in line with the standard and strategies of EGAT’s standby power 1-Watt programme. However, the weak point confronted in EGAT’s standby power programme is in its ‘voluntary’ qualification which could draw interests and collaboration from only manufacturers/importers with the ready-technology at the moments. The lesson learned is under considering and revising for further implementation.

## **Outline Presentation**

### **Standby Power in Thailand.**

#### **1. Rational for standby power implementation in Thailand**

- The development of technology in standby power 1-Watt imported from abroad supports the implementation of standby power programme in Thailand.

#### **2. Potential of standby power implementation in Thailand**

- Study the power consumption of electrical appliances with standby mode : before and after the adoption of standby power 1-Watt measure
- Results of the study reveals the potential of energy saving by standby power 1-Watt measure as 850 GWh in 12 appliances: televisions, audios, DVD players, monitor, CPU, printer, electric fans, satellite receivers, washing machines, microwave ovens and air conditioners 5-year standby power plan.
- Analysis the cost-effectiveness of implementing standby power 1-Watt in term of power utility, participants and society as a whole.

#### **3. 5-year standby power planning**

- The targeted appliances to launch the standby power labels in the 5-year master plan (2010-2014) due to the feasibility study are; television, monitor, air conditioners, washing machine and another potential appliance, respectively; with the potential to save 132 GWh.

#### **4. Implementation/lessons learned**

- EGAT's standby power 1-Watt programme uses voluntary labeling scheme in the beginning phase
- Strength: good collaboration with appliance manufacturers/importers  
Weakness: no concrete regulations, so only manufacturers/importers with the ready-technology have been participated to the programme.

# EU Initiatives to Tackle Power Consumption of Appliances in Standby Modes

In the context of ErP Preparatory Studies, Lot 26 -- Networked Standby

## 1. CONTEXT

The term “networked standby losses” is a relatively new construct. It derives primarily from the previous TREN Lot 6 Study. This study distinguished between the (passive) “standby mode” and the “networked standby mode” in order to acknowledge the somewhat higher power requirements of products that feature remote network reactivation and/or network integrity communication functions. Whereas simple standby functions consume only about 1 Watt, it was considered that networked standby functions demand more energy in the range of 2 to 10 Watts and, for certain product configurations, even more.

## 2. PLANNING

Following the standardised Method for the Evaluation of Energy-using Products (MEEuP), Tasks 1 through 5 have been completed to date, covering the definition of the relevant terms, analysis of the market and consumer use patterns, as well as the technical analysis of existing products and the definition of base cases (further details below). The Draft Task 4 (Technical analysis of existing products) and Task 5 (Base cases) Reports have been published on the project website ([ecostandby.org](http://ecostandby.org)) and comments are welcome on these documents.

Looking forward, the Draft Final Report (encompassing Tasks 1 through 7) is to be published in November 2010 and the Final Stakeholder Meeting is to take place in January 2011. Following input received at this meeting, the Final Report will be completed and published in February 2011, marking the end of the project.

## 3. DEFINITIONS

The definition of “networked standby mode” is a functional definition, i.e. it describes a set of functionalities which must be achieved for a device to be considered in the mode.

First, the definition of a “mode” is “The condition of a device with respect to:

- A specific set of functionality (in the discussion are also duty cycles);
- A measurable average power consumption.”

The primary definition of “networked standby mode” derives from TREN Lot 6:

*When the EuP is in Lot 6 standby according to (iii.) and offers either a remote network and/or network integrity communication, then the product is considered to in networked standby mode.*

For the purposes of this study, the adopted definition for “networked standby mode” is a condition during which the equipment is directly or indirectly connected to the mains power source and provides the following functions:

- Reactivation via network; this function means analyzing the incoming signals on one or more communication paths external to the equipment in order to initiate the reactivation of the equipment.
- Network integrity communication; this function applies additionally for more complex network types and means maintaining the external communication paths.
- Reactivation, information and status display; this means that standby functions according to EC 1275/2008 may also be provided during networked standby mode.

#### 4. APPROACH

The functionality required to provide the user with the desired quality-of-service is the foundation for all other calculations throughout the analyses undertaken within the study. If a device which is in networked standby mode is not providing a beneficial network service, it should be powered down into a lower-power state.

In a home environment, examples of desired functionalities which require networked standby mode include:

- A user wishing to access his or her files remotely (either from a distant location via the Internet, or from a different location within his or her residence via the LAN).
- A service provider who must push a system update to a home gateway, a complex set-top-box or other customer premises equipment.

Examples of similar functionalities can be seen in an office environment. A network administrator may need to push updates to the various systems connected to the network, thereby requiring that they be reactivated via a network signal.

The assessment of the environmental impact and improvement options for networked standby deals with a high level of complexity. There are many variables to consider in such an assessment including:

- Various types of products and their typical use environment (e.g. Home Desktop PC or Office Workgroup Printer);
- The product’s performance, network configurations, and mode options in conjunction with respective power consumption (e.g. power consumption in idle mode and availability of a low power mode that supports remote access and reactivation);

- Product use patterns according to different types of users or Quality of Service requirements (e.g. individual demand for remote access and reactivation);
- Technical progress in the next years with respect to all power modes (e.g. potential, low-power idle modes);
- Product stock developments (installed base in EU-27) and new products (e.g. multifunctional devices, convergence of functionality, standard network technologies).

Against this background we have developed a simplified assessment model that supports a comparable analysis of networked standby aspects on the technical, user and market level. The basic concept of that model is a comparison of annual energy consumption development per mode and per product group. Additionally, the Network Availability Concept was developed for the purpose of this study and integrates three variables:

- The capability of a networked product for remote access and reactivation;
- The response time of a networked product;
- The actual resume time to application (this could include average booting time),

For the purpose of this study we introduce four Network Availability Scenarios, as follows:

- High Network Availability (HiNA)
  - Wake-up signal occurs randomly and the initiator expects a full functionality of the receiving product;
  - Typical products (applications) are networking-type customer premises equipment such as home gateways, telephone systems, complex set-top-boxes and server-type products.
- Medium Network Availability (MeNA)
  - Remote access and reactivation is less random, can be planned or at least delays can be taken into consideration by the initiator of the trigger signal.
  - Resume time to application varies between periods of immediate (in milliseconds) and fast reaction (<<10 seconds).
  - Examples of typical products include Desktop PCs and to some extent of client-type such as office workgroup printers or DVD/BluRay player with fast play/quick start function (active standby high).
- Low Network Availability (LoNA)
  - Resume time requirement (speed) is of less concern for the customer or user.
  - Resume time to application varies between periods of fast (<<10 seconds) and longer reaction (>>10 seconds).
  - Products featuring low network availability are typically client-type and to some extent of server-type products (at the presented time this scenario is limited to PCs and PC peripheral devices).
- No Network Availability (NoNA)

- The concept of NoNA has been included in order to show product and user behavior that still prevails today. It implies periods where the device will not be accessible via the network.

To achieve the different network availability scenarios discussed above, various power modes can be used, ranging from active modes to soft-off modes, with or without wake-on-LAN capability.

## 5. CURRENT UNDERSTANDING

The technical analysis has shown that different product groups use different power modes to achieve similar levels of network availability. As an example, Notebook PCs typically use a rather low power mode to achieve the needed networked standby functionality, whereas home entertainment equipment tends to use higher power modes to achieve such functionality.

In order to undertake a consistent analysis across the many variables included in the study (year, network availability scenario, product group, etc.) two base cases were selected, namely the LoNA 2010 scenario and the MeNA 2020 scenario. Please note that both scenarios are not “real-life” scenarios due to our assessment concept. A real-life scenario would distinguish different network availability levels between individual products and product groups. Networking products would demand high network availability while some client-type products might only require low or no network availability. This simplification is required in order to make a coherent analysis possible.

A scenario for 2010 low network availability (LoNA 2010) seems to be a justified reference point for the base case. This scenario reflects a situation where medium and high network availability is less often employed. Most products are put into a low power mode (standby/off) when not actively used. The LoNA 2010 scenario aggregates a total of 21 product cases. This is a sufficient number of products for the base case assessment and we estimate about 75% of the possible product scope for networked standby.

For 2020, we selected a scenario of medium network availability (MeNA 2020). The MeNA 2020 scenario considers that most products will remain in a power state that allows relative fast resume time to application.

Comparing scenarios of the same level of network availability in 2010 and 2020 (e.g. LoNA 2010 vs MeNA 2020) shows an overall improvement in total power consumption. This is a result of our general assumption that there will be a general improvement in efficiency across all products and power modes by 2020. However, the selected base case indicating a shift to medium network availability results in an overall increase in annual energy consumption. One reason for this increase is the shift to medium network availability. Another reason is the increased stock of some product groups.

In order to improve energy efficiency with respect to networked standby, a consistent utilization of functional low power modes is clearly an option. In certain cases, however, these low-power modes do not exist for particular products, preventing them from entering a lower-power mode while still supplying the desired service. Secondly, the use of such functional low power modes has to be controlled by an advanced power management scheme. With respect to the individual product cases

it also becomes apparent that the overall product performance, which is characteristically reflected by the power demand of active and idle, will influence the power consumption levels in support of higher network availability.

The BAT analysis (Task 6) and the improvement options (Task 7) will strengthen the points of proper power management and of implementing (new) network availability states, which are not effectively constant idling. When idle mode is the only or the most convenient mode to satisfy the user requirements (be it real, instant network access or the faint possibility of a remote access at some undefined point) we are approaching the worst case scenario (HiNA) with a tremendous increase in energy consumption.

**Learn more and download full Task Reports at [ecostandby.org](http://ecostandby.org).**

# AUSTRALIA'S POLICY PLANS FOR HOME ENTERTAINMENT PRODUCTS AND 1 WATT STANDBY

## Introduction

The Australian government has recently released a product profile focusing on a set of Home Entertainment products. It is an initial document for consultation with industry stakeholders on the potential for energy efficiency improvements and the scope of different international policy approaches. Australia also intends to shortly release a Regulatory Impact Statement (RIS) on the implementation of a horizontal 1 Watt standby policy. A RIS, which is a regulatory requirement, is prepared to provide government with feedback on proposed regulation, which in this case, is to improve existing levels of energy efficiency of standby mode (and off mode) in residential products and appliances that are not already covered by energy efficiency regulation.

This paper summarises the current potential of policy approaches for home entertainment products (HEP) and progress towards a horizontal 1 Watt standby policy.

## Home Entertainment Products

### **Background**

Over the past 10 years the Equipment Energy Efficiency <sup>1</sup> (E3) Committee has been tracking the energy usage, in particular standby power consumption of all appliances offered for sale in retail outlets across Australia. Additionally E3 has commissioned two intrusive surveys of standby consumption in households (2001 and 2005) and a telephone survey of 800 households (2001) to determine appliance ownership and usage. This research has been the backbone of standby policy development in that finally Australian Governments has meaningful data on the extent of standby power consumption in Australian households. In New Zealand homes energy use has been tracked for over 10 years through the Household Energy End-Use Project (HEEP) <sup>2</sup> study. More recently, the Energy Efficiency and Conservation Authority (EECA) TV Usage and Purchasing Survey 2009 <sup>3</sup>, has given a greater insight into the penetration and usage of both televisions and peripheral devices in New Zealand.

Leading on from earlier research, the Ministerial Council on Energy (MCE) in 2002 released the policy document *Money Isn't all You're Saving* outlining Australia's Standby Power Strategy 2002–2012. The strategy outlined the products and appliances that require “immediate” or

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<sup>1</sup> Formerly known as the National Equipment and Energy Efficiency Committee (NAEEEC)

<sup>2</sup> BRANZ Energy Use in New Zealand Households: A report on the 10 year analysis for the Energy End-Use Project (HEEP) study.

<sup>3</sup> EECA TV Usage and Purchasing Survey Preliminary Report.



“subsequent” action in the standby power program. Initially stereo equipment was among a group of products identified for immediate action and with the rapid proliferation of DVD and home theatre products, these were added shortly thereafter. Part of this action included the development of “product profiles” to “provide an overview of the product in terms of its standby characteristics, the purpose and functionality of their standby function, market status, ownership levels and trends in sales and product types.” (MCE 2002)

Product profiles for these appliance groups were released for comment during 2003 and 2004. Industry feedback indicated that the preferred approach for these products was regulatory action.

A report<sup>4</sup> was commissioned in 2006 to consider a range of policy options including Minimum Energy Performance Standards (MEPS) to achieve a regulatory outcome on a range of products, together to be called Home Entertainment Products (HEP) and this was followed by a cost benefit analysis of the MEPS options<sup>5</sup>. The introduction of a HEP MEPS was then delayed while consideration was given to including HEP in a broad One Watt standby MEPS regulation. However, the energy use of HEP while in operation is becoming more significant as average time of use of many HEP is increasing.

### **Market Profile and Energy Use**

A recent report commissioned by the Australian Government “*Home Entertainment Products: Product Profile*”<sup>6</sup> estimates the energy impact of HEP and provides evidence through business as usual (BAU) modelling that significant energy savings are possible when compared to assumptions derived from existing International Programmes.

The scope of this product profile includes many common HEP, excluding TVs, which are already subject to Energy Labelling and MEPS. The devices covered include the following:

- Simple set-top boxes (STBs)
- Complex STBs
- Video Players
- Video Recorders
- Home Theatre System Players
- Home Theatre Recorders
- Audio Amplifiers
- Games Consoles

Complex STBs provided by Pay TV operators are subject to regulatory action via a Code of Conduct negotiated between government and the major operators.

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<sup>4</sup> “A draft proposal for: Minimum Energy Performance Standards for Home Entertainment Equipment” November 2006

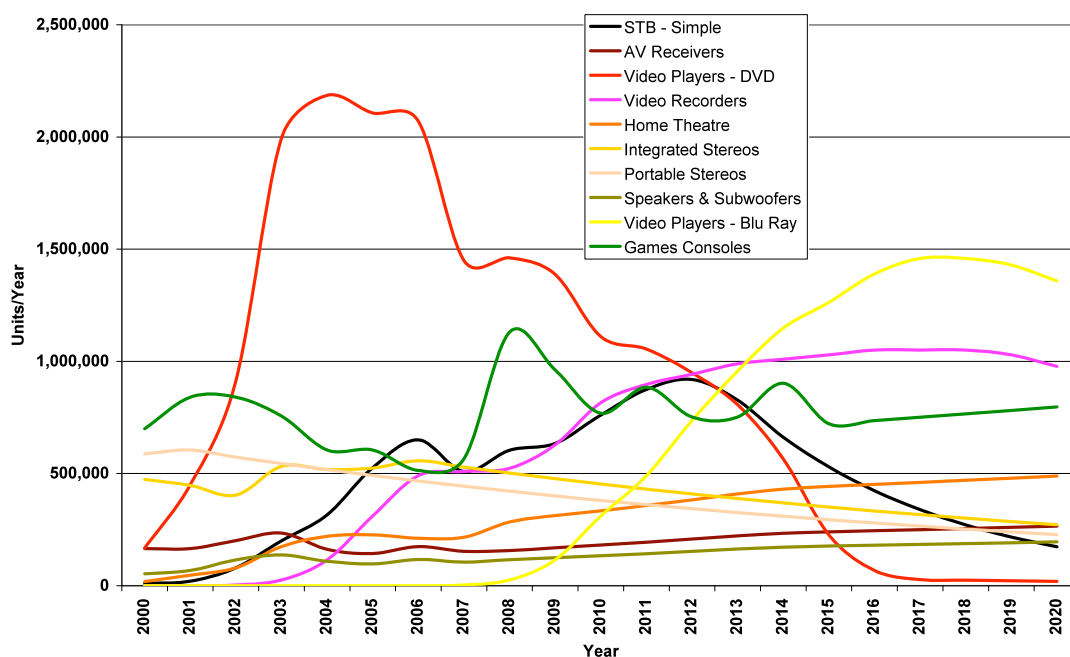
<sup>5</sup> “Committee Cost-Benefit Analysis: Minimum Energy Performance Standards and Alternative Strategies for Home Entertainment Products” April 2007

<sup>6</sup> *Home Entertainment Products: Product Profile*, Prepared for The Department of the Climate Change and Energy Efficiency on behalf of The Equipment Energy Efficiency Program by EnergyConsult and Digital CEnergy Australia.

Some form of HEP is present in almost every Australian home. Most homes will own multiple units including perhaps audio components, a portable stereo, a games console as well as one or more DVD player. Technology in this area has changed rapidly in the last five years and the sales of new products have experienced rapid growth, expanding the ownership of this type of equipment, while the sale of other equipment has significantly declined.

Figure 2 gives the annual sales for a range of HEP types, both past sales and forecast. The chart shows sales can exceed one million units p.a. and that some product sales can rise rapidly and falls away to nothing within the space of fifteen years.

**Figure 1: Annual Historical (2000 – 2008) and Forecast (>2008) Sales for Home Entertainment Products**



Source: Gfk Australia 2000 – 2008, Forecast by EnergyConsult post 2008

The annual sales of all home entertainment product types have grown rapidly since 2000, with the exception of portable stereos which have fallen slightly. Over five million units are now sold annually, with the single most popular product currently being DVD players. The result is an extremely high penetration of HEP and, as will be shown later, a significant and growing proportion of residential energy use is being devoted to these products.

Energy usage for the HEP addressed in this report is currently estimated to be responsible for at least 5% of household energy usage (based on EES 2008), making it greater than clothes washers, dishwashers and dryers in Australia. Globally, the IEA estimates that overall, home electronics and ICT products accounted for 15% of global residential energy consumption (700TWh), and that energy use from these devices will increase threefold by 2030, and is likely to comprise the biggest end-use category in many APEC economies before 2020<sup>7</sup>. The products considered here are a part of this overall category.

<sup>7</sup> *Gadgets and Gigawatts: Policies for Energy Efficient Electronics*. Includes consumption of TVs and PC equipment

## Power Consumption Trends

The power consumption of all HEP in active standby in 2008/09 ranged from half a watt to over 100 watts, with an average of 20.0 watts. These figures are consistent with those recorded in the previous store surveys. Average active standby has increased slightly over the years; however there is no statistical significance in this growth and may be a result of increasing sample size.

The average active standby power active standby results are presented <sup>8</sup> in Figure 2. The survey results also shows that only around 10% of products consume less than 5 watts in active standby, and over 50% consume more than 15 watts. The entry of new product types that have high active standby power consumption is likely to contribute to the increasing average active standby power consumption trend shows in Figure 2.

**Figure 2: Average Active Standby Consumption: Home Entertainment Products**

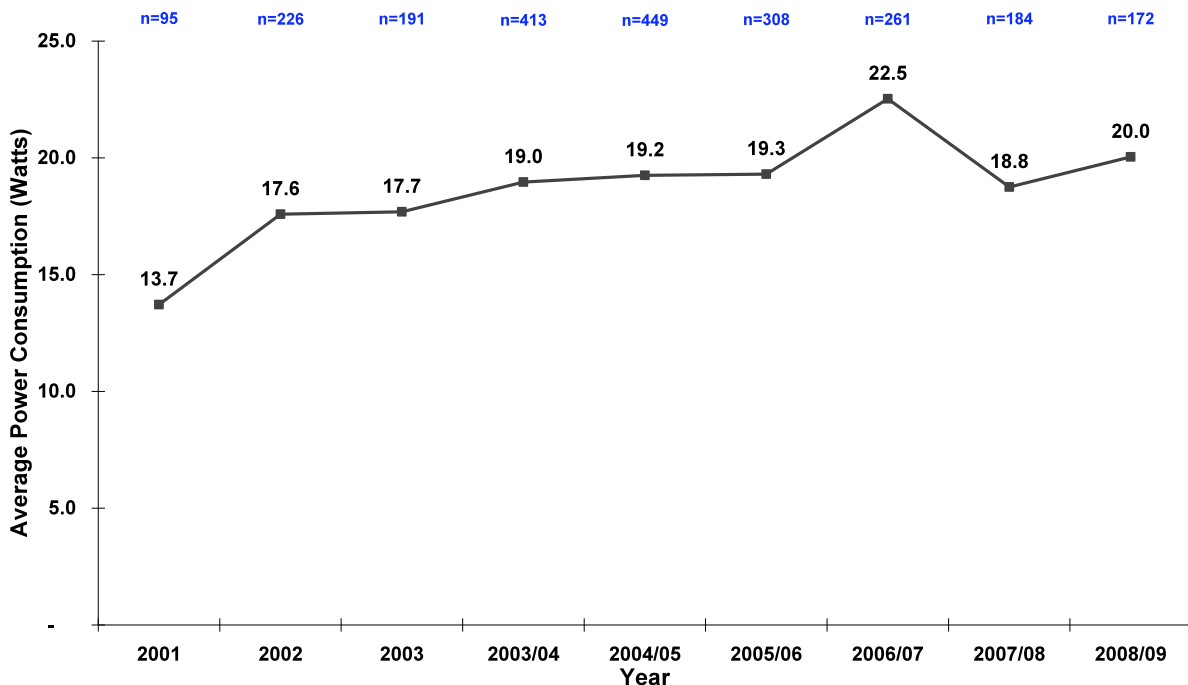
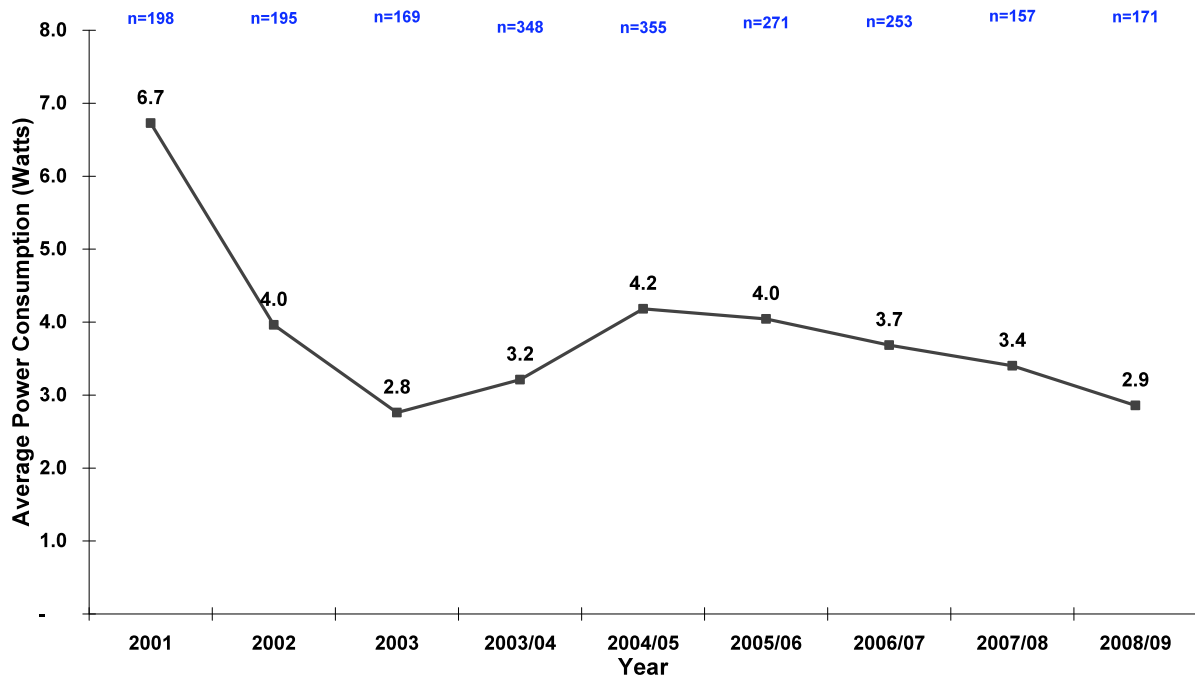


Figure 3 displays the average passive standby results from the store surveys since 2001. Passive standby consumption for the home entertainment group of products ranges from zero to nearly 50 watts. The majority of appliances consume less than 2 watts in standby with nearly three quarters consuming less than 3 watts. Average passive standby has decreased significantly from 2001 and fell below 3 watts last year.

<sup>8</sup> Figure 3 to Figure 7 exclude Games Consoles

**Figure 3: Average Passive Standby Consumption: Home Entertainment Products**



All available information indicates that the technology to improve the energy efficiency of HEP is available and currently being used in the market place. Table 1 and Table 2 demonstrate that for all HEP tested in the 2008/09 store survey there is a large variation in active and passive standby consumption. The gap between the best and worst performing models was at its largest for home theatre systems at over 60 watts. Analysis also showed that there was not a relationship between price and energy consumption.

**Table 1: Summary of Store Survey Measurement Ranges 2008/09**

Home Entertainment Product	Active Standby		Passive Standby		Off Mode	
	Max	Min	Max	Min	Max	Min
AV Receivers	58.6	15.6	1.5	0.1	1.1	0
Home Theatre Systems	78.0	16.7	22.3	0.1	NA	NA
Integrated Stereos	41.9	3.8	16.6	0.1	11.5	0
Portable Stereos	10.3	2.4	3.4	0.9	NA	NA
Sub Woofers & Speakers	22.6	1.4	6.4	0.1	10.5	0
DVD Players	14.4	3.3	5.3	0.1	0.8	0
DVD Recorders	24.6	10.	4	21.1	1.	2
Hard Disk Recorders	28.7	9.4	15.8	1.3	NA	NA
Blu Ray Players	17.9	14.6	0.6	0.4	NA	NA
<b>Total for all HEP</b>	<b>78.0</b>	<b>1.4</b>	<b>22.3</b>	<b>0.1</b>	<b>11.5</b>	<b>0.0</b>

**Table 2: Summary of Store Survey Average Measurement Ranges 2008/09**

Home Entertainment Product	Mean Active Standby	Mean Passive Standby	Mean Off Mode
AV Receivers	44.2	0.4	0.2
Home Theatre Systems	35.0	2.5	0
Integrated Stereos	20.1	3.1	<1
Portable Stereos	5.5	2.1	1.6

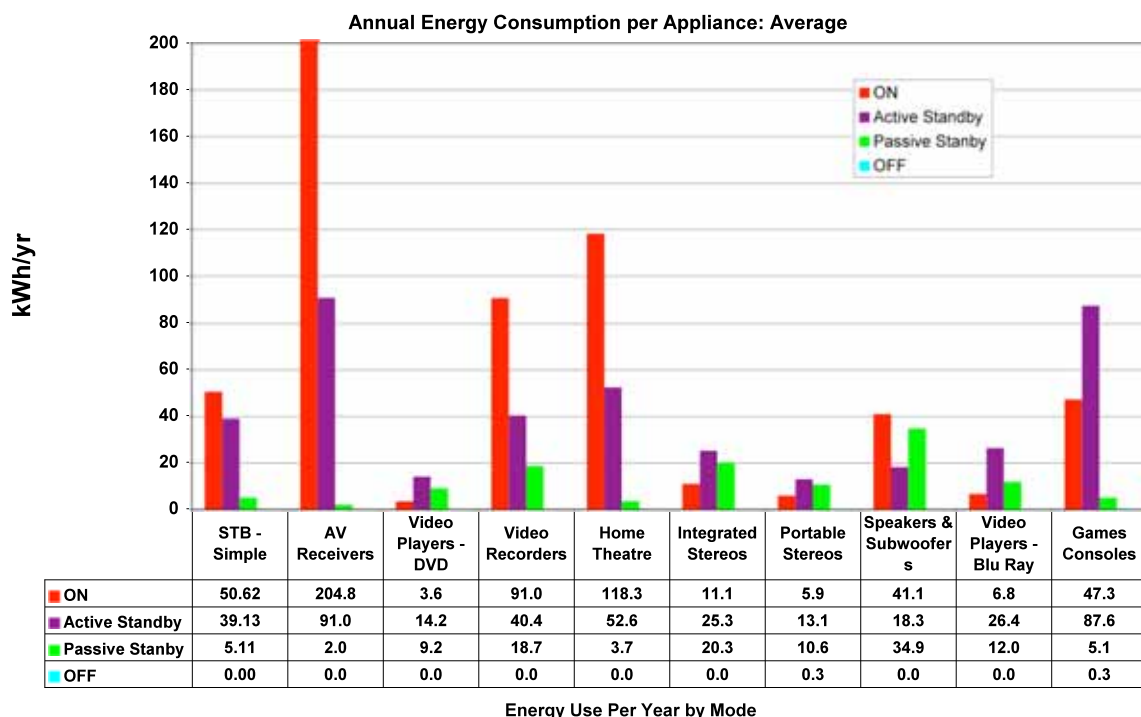
Home Entertainment Product	Mean Active Standby	Mean Passive Standby	Mean Off Mode
Sub Woofers & Speakers	10.7	1.2	0
DVD Players	7.9	1.5	0.1
DVD Recorders	16.9	4.5	NA
Hard Disk Recorders	22.5	6.2	NA
Blu Ray Players	15.8	<1	NA
Set Top Boxes- Simple	10.5	6.6	NA
<b>Total for all HEP</b>	<b>20.0</b>	<b>2.9</b>	<b>1.4</b>
Games Consoles(1)	30	NA	NA

There are several options for improving HEP standby efficiency. The difference in the best and worst consuming models already in the market are significant and indicate the technology exists to reduce energy usage in the poorest performers. Automatic power down systems could alleviate the high active standby consumption issues.

### Total Energy Consumption

The European Union Code of Conduct (CoC) for STBs has based its energy targets on nine hours of operation per day, as at the heart of all video recorders is a digital tuner so it is reasonable to assume this usage for the base energy consumption is appropriate. This means that the energy consumed in ‘on’ mode exceeds the energy consumed in standby modes for some product groups, as illustrated in Figure 4.

Figure 4: Annual Energy Consumption by Mode and Product Type in Australia

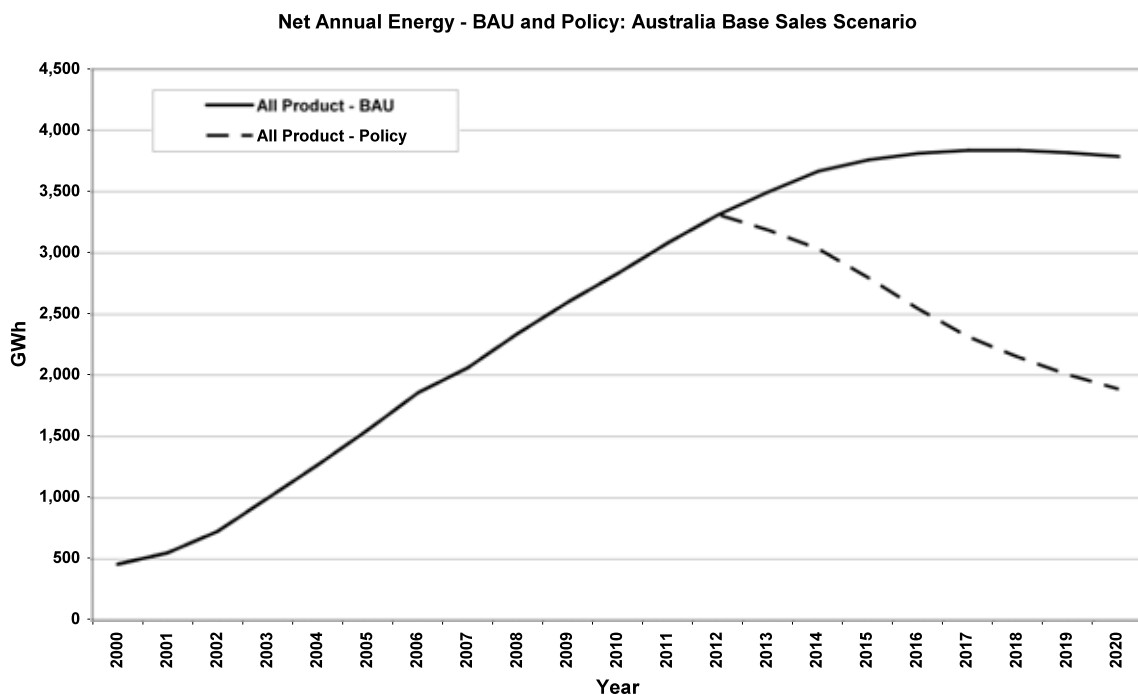


Note: This chart is not representative of the average national share of each product’s energy use by mode.

## Estimated Impacts

The modelling in this report shows that the potential of energy efficiency is significant. The total energy consumption attributed to HEP could be reduced by 1,900 GWh pa and GHG emissions by 1.4 Mt CO<sub>2</sub>-e pa in Australia by 2020; by comparing the BAU energy use scenario with the energy efficiency scenario (based on measures derived from existing international programmes). The potential impact of improved HEP efficiency shown in Figure 5 is based on comparing international programmes and associated assumptions with the BAU scenario.

**Figure 5: BAU vs. Assumed Energy Use Values Derived From Existing International Programmes – Energy Consumption for Home Entertainment Products**



## 1 Watt Horizontal Standby

### Background

A plan was proposed by the Australian government in March 2004 for reducing standby power of various products. However, comments on this plan suggested that mandatory regulations might better meet the Australian government efficiency goals. The proposed plan has been enlarged to cover all products that use standby power that are not covered by existing or proposed regulation.

Energy efficiency measures for standby power are part of the Equipment Energy Efficiency Program (E3) — E3 is an initiative of the MCE comprising ministers responsible for energy from all states and territories. Minimum Energy Performance Standards (MEPS) set performance requirements for an energy-using device that effectively limits the maximum amount of energy that may be consumed by a product in performing a specified task. The

program prevents the sale of appliances and equipment that have a relatively poor energy efficiency performance. MEPS and labelling is a key element of Australia’s response to climate change and are used to achieve other energy related policy objectives. The MEPS program currently covers 15 appliances and equipment types and a further 29 products are being considered for addition to the program.

A RIS is currently prepared for public comment by the Equipment Energy Efficiency (E3) Committee, in accordance Australian Government guidelines. It will seek feedback on proposed regulations to improve existing levels of energy efficiency of standby mode (and off mode) in residential products and appliances that are not already covered by energy efficiency regulation.

### **Product Scope**

The proposed regulation would apply to all relevant equipment and appliances used throughout Australia. The equipment covered includes, but is not limited to, the products listed in Table 3.

**Table 3: Products Potentially Covered by Horizontal Standby Policy**

<b>Standby Products</b>	
Breadmakers Clock	Radios
Espresso Coffee Machines	Burglar Alarms
Gas Cooktops and Ovens	Motion Sensors and Sensor Lights
Microwave Ovens	Smoke Alarms
Rangehoods	Remote Garage Door Openers
Electric Space Heaters	

Standby mode permits the activation of equipment by remote switch (including remote control, internal sensor, or timer) and provides continuous function such as information or status displays, including clocks; and sensor-based functions. In the off mode power can be used while the product is connected to a mains power source even though it is not providing a standby function.

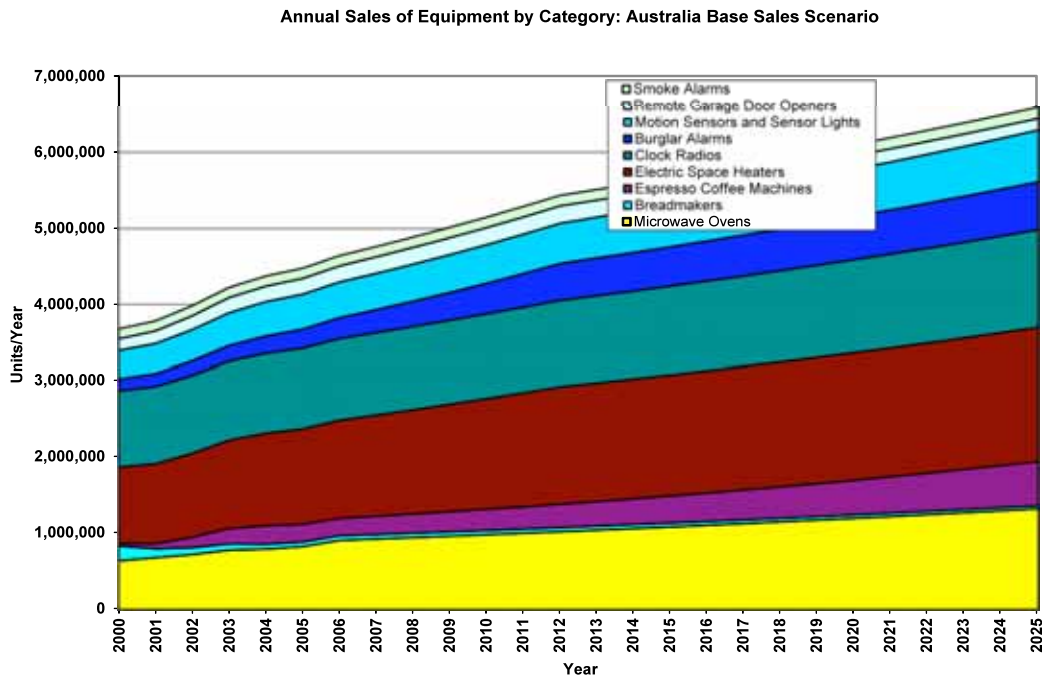
This RIS summarises the arguments and analysis for introducing nationally consistent energy efficiency regulations.

The E3 Committee will seek stakeholder views about the regulatory proposal and the analysis contained in this RIS, and based on the analysis and consultation with stakeholders E3 intends to put to the MCE in late 2011 a recommendation. It is anticipated that the regulatory proposal (if accepted) would commencing not earlier than October 2013, and seek to improve existing levels of energy efficiency of standby mode (and off mode) in residential products and appliances that are not already covered by energy efficiency regulation. This recommendation aims to redress the continued sale of inefficient products and appliances throughout Australia. The proposed regulation would be based on internationally accepted test methods as a means of ensuring the proposed regulation is cost effective.

## Market Profile and Energy Use

In 2010 there are an estimated 49 million products being used in Australian households and another 7.2 million operated in New Zealand that use standby power and are not covered by energy efficiency regulation. By 2025 the number of products is expected to grow to 69 million and 10 million, respectively. The growth in sales by product category is illustrated Figure 6..

**Figure 6: Annual Sales of Product by Category – Australia**

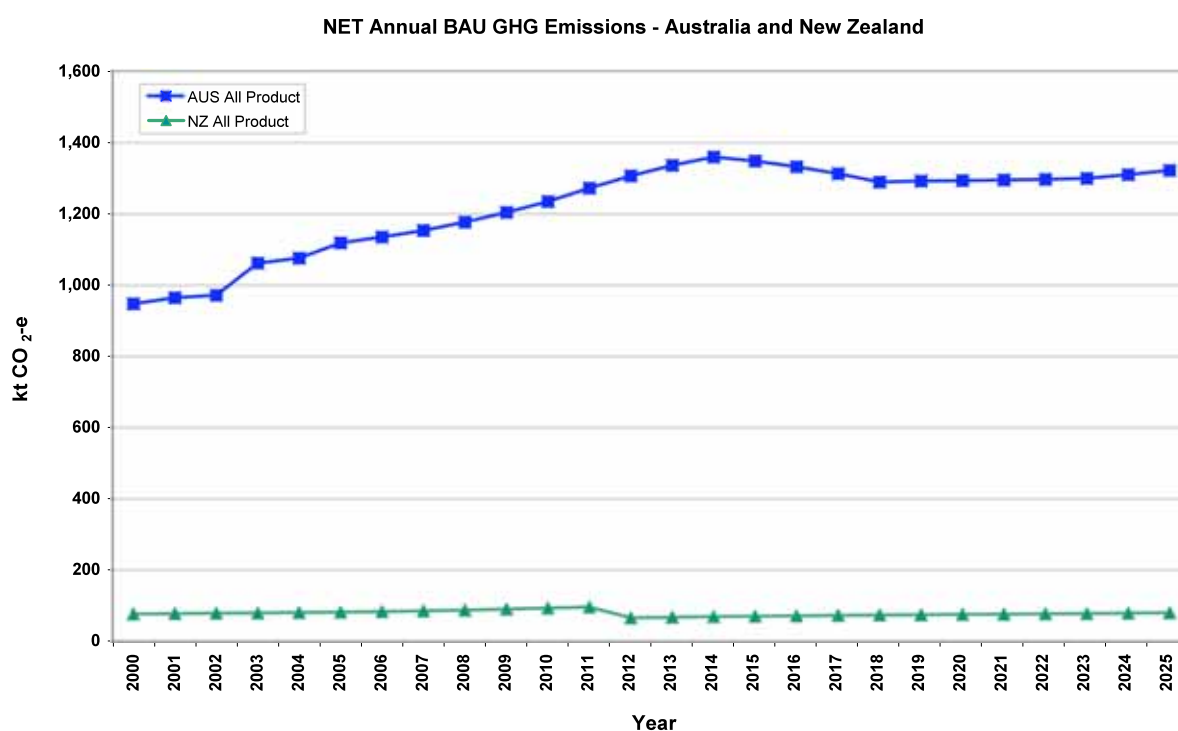


Standby power consumption contributes significantly to Australia’s greenhouse emissions and is now one of the largest electrical end-uses in the residential sector (approximately 10%), roughly equivalent to the energy consumption of refrigerators and freezers, products that are regulated. Currently the share of overall household electricity consumption associated with standby power of those products considered in the scope of the RIS is expected to rise from 2.1% in 2010 to 2.25% in 2020.

Figure 7 provides the estimated annual BAU GHG emissions by the products considered by this RIS in Australia and New Zealand to 2025.



**Figure 7: Annual Greenhouse Emissions by Products included in Scope - Standby Modes**



There are technical and market reasons for this increase in standby power consumption and the overall energy use. Some of the trends leading to the increase and significance of standby power are:

- **Increasing types of products purchased** which are connected to power and have standby power usage – results from the 2005 intrusive survey ([EES 2006](#)) shows on average 67 different individual products per household that are on mains power.
- **Increasing sales of these products**– the industry sourced data shows that sales of products using standby power covered by this RIS have grown from 3.7 million p.a. in 2000 to 4.7 million pa in 2010 in Australia.
- **Average standby power consumption is increasing**– the data from monitoring product standby power shows that over the last 10 years in Australia average passive standby power has remained largely constant, while average active standby power is increasing.

### **International Approach's**

Several other international policies exist or are under considerations that aim to address standby power. Some of the latest key developments internationally include the following:

- EU – the European Commission has implemented a policy mandating a [maximum standby power](#) use as part of the [EuP Directive](#) (2005/32/EC) on Energy Using Products. They have estimated that the EU could save 47 TWh/yr in 2020 by implementing the standby power directive. This would represent savings of 55% of the energy used in standby from business-as-usual ([EC 2007](#), Table 8.6).

- USA – California Energy Commission began introducing mandatory limits on standby power-consumption for various consumer-electronic devices from 2006
- Canada – has introduced amendments to the Energy Efficiency Act to regulate standby power. The first standards requiring standby power limits for consumer electronics will come into effect in 2008. More stringent standards will follow in late 2010. The new standby limits are equivalent to those in the State of California’s energy legislation.
- Korea - In 2005, Korea updated their Energy-saving Office Equipment & Home Electronics Program, announcing their plan to implement the IEA standby power target of 1W in Korea by 2010 via dis-endorsement labels.

Another international program that targets standby power is the ENERGY STAR program, created by the [US Environmental Protection Agency](#) in 1992, of which Australia and New Zealand are international ENERGY STAR partners for office and home entertainment equipment. ENERGY STAR is a voluntary program whereby conforming products are required to meet ENERGY STAR criteria, which are identical in Australia and New Zealand to those in the United States. These criteria currently refer only to standby modes, although the latest criteria for monitors and imaging technologies include criteria for in-use mode. However, ENERGY STAR does not cover many of the products which are to be covered by the Horizontal Standby policy, so has minimal relevance to the proposed policy.

### **Introduction of the MEPS**

E3 Committee expect to recommend MEPS not be introduced any earlier than 1 October 2013 to enable the Australian and New Zealand -based industry time to specify the MEPS requirements to overseas manufacturing operations

E3 Committee will engage through the Australian and New Zealand standards processes to consider exemptions for specific product groups/technologies should the proposed performance levels have an adverse impact on competition in specialist market segments.

The maximum power levels for the MEPS are based on the EU regulations due to commence in 2012, where devices that have a display function are required to have a maximum standby power of 1 Watt, while those without a display are required to have a maximum standby power of 0.5 Watt. The proposed MEPS levels are also consistent with the policy announcements or programs of Canada, Korea, and the USA. A summary of the proposed maximum levels that would apply by product function and mode is shown in Table 4.

**Table 4: Proposed MEPS: Maximum Power Levels**

<b>Proposed MEPS in 2013</b>		
	<b>Standby</b>	<b>Off<sup>†</sup></b>
Products with a display	1 watt	0.5 watts
Products with a reactivation function only	0.5 watt	0.5 watts

† Applies only if the product includes an OFF function.

Note: All product must have a standby or off mode unless not appropriate.

The proposed MEPS include requirements for maximum power levels for standby and OFF modes where the product has an OFF function. In addition, products are required implement power management so that they automatically power down to passive standby after a period of inactivity.

When compared to the BAU case, the proposed MEPS must benefit Australia by improving the efficiency of energy use over the long term and this improvement must more than offset any additional purchase price for the more energy efficient product. It has the potential to reduce energy use by over 620 GWh and GHG emissions by 480Kt CO<sub>2</sub>-e annually by 2025. This will assist Australia meet international obligations through reduced emissions and/or by lowering the cost of abatement.

The Table below demonstrates the potential cumulative Australian GHG emissions reduction of 3.7Mt CO<sub>2</sub>-e by 2025.

**Table 5: Summary of the cost-benefit analysis of MEPS (relative to BAU).**

<b>Measure</b>	<b>Unit</b>	<b>Scenario 1 (base sales )</b>
<b>Cumulative Values from 2013-2025</b>		
Energy Saved compared to BAU	GWh	4,441
GHG Emission Reduction compared to BAU	Kt CO <sub>2</sub> -e	3,749
Total Benefit	\$M	\$950.8
Total Cost	\$M	\$41.5
Net benefit	\$M	\$909.3
Benefit Cost Ratio		22.9

Notes: NPV discount rate: Australia 7.5%, Benefits include energy cost savings post 2025

## Conclusions

### **Home Entertainment Products**

The E3 committee in Australia will undertake consultations and may decide to proceed with the development of a Regulatory Impact Statement (RIS) for Consultation. Such a Consultation RIS will detail proposals for improving energy efficiency of these products, along with the cost/benefit analysis for proceeding with the proposals. Such a Consultation RIS will also seek further feedback from stakeholders

#### **1 Watt Standby**

It is planned to release a RIS for Consultation for a horizontal 1 Watt Standby policy in early 2011. This will enable consultation with stakeholders on the options and potential impacts of the proposed regulation.

# Certification and labeling of low-power modes in Chile

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## Introduction

Chile has a mandatory energy-efficiency labeling system for electric appliances, based on international standards (IEC) and the European labeling format. Certification follows ISO/CASCO procedures.

The main entity in charge of labeling is the Superintendence of Electricity and Fuels (Superintendencia de Electricidad y Combustibles – SEC, [www.sec.cl](http://www.sec.cl)), currently under the Ministry of Energy. It developed the labeling program together with the National Energy Efficiency Program (Programa País de Eficiencia Energética – PPEE, [www.ppee.cl](http://www.ppee.cl)), also currently under the same Ministry. Standards are published by the National Standards Institute (Instituto Nacional de Normalización – INN, [www.inn.cl](http://www.inn.cl)).

## Certification and labeling of low-power modes

The standards for measurement and labeling that apply to low-power modes are:

- NCh3042.Of2007 (IEC 62301:2005), Household electrical appliances - Measurements of stand by power
- NCh3107.Of2008, Household electric appliances - Energy efficiency in stand by mode - Labelling

For labeling, the following values are considered:

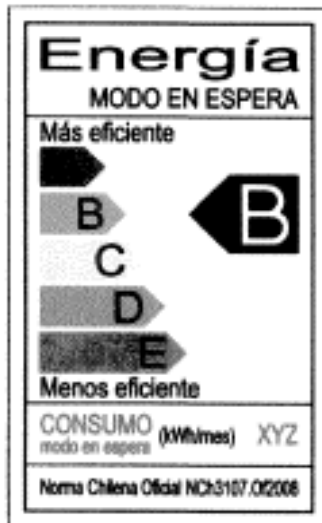
*Table 1: Energy efficiency classes in stand-by mode*

Energy efficiency class	C Consumption in stand-by mode (W)
A	$C \leq 1$
B	$1 < C \leq 3.4$
C	$3.4 < C \leq 5.8$
D	$5.8 < C \leq 8.2$
E	$8.2 < C$

Source: NCh3107.Of2008, Household electric appliances - Energy efficiency in stand by mode - Labelling

These values follow the Brazilian labeling program.

An example of the label is shown below.



Currently only three products have certification and labeling requirements for low-power modes (only stand-by is considered):

- Microwave ovens (in force since March 1, 2010)
- Set-top boxes (in force since October 1, 2010)
- TV (in force since October 1, 2010)

TVs and microwave ovens were chosen due to their high prevalence (and microwave ovens because they already had safety certification), while set top boxes were chosen in anticipation of the introduction of digital TV.

See accompanying files for the details of the protocols used.

Currently there are no products under study for certification. MEPS for stand-by power are still not under discussion.

## Standby Power Policy in China

In 2000, China Standard Certification Center (CSC) introduced standby power concept into China and carried out a series of activities to promote the development of standby power. Since then, a serial measure is launched to reduce China's standby power consumption. The main policies include launching China's voluntary endorsement EE labelling program, publishing National Energy Efficiency Standard, and implementing China Government Procurement programme.

### 1. Energy efficiency labeling program

In 2002, CSC implemented a standby power certification program for TVs based on the experience abroad. From early 2008, China Quality Certification Center (CQC) began to implement the China's voluntary endorsement EE labelling program. Until now, 9 types of products have been included in the standby power certification program. They are TVs, printers, faxes, copiers, computers, monitors, multifunction devices, projectors and external power supplies.

### 2. National Energy efficiency standards (MEPs)

On July 18th, 2005, China issued the Limited values of energy efficiency and evaluating values of energy conservation for Color TVs. This standard requests the color TVs in the market have the limitative standby power value of 9w. It was implemented since March 1st, 2006. It's a mandatory energy efficient standard. It has a provision that 3 years later since the publishing of the standards, the limitative standby power value is 5w.

The Limited value of energy efficiency and evaluating values of energy conservation for external power suppliers was issued in May 2007; the Limited values of energy efficiency and evaluating values of energy conservation for monitors, copiers and induction cookers were published and implemented in 2008. Limitative standby power value was set.

Totally, there're 5 categories products' MEPs with standby requirements being implemented in China.

### 3. Government procurement

On December 17, 2004, MOF and NDRC jointly issued the *Procurement Policy for Energy Efficient Products*. According to this policy, Government agencies at all levels (public sector non-profits units and organizations) are required in the procurement process to give priority to products certified as energy-efficient. The List of Energy-Efficient Products for the Government procurement scheme draws on China national energy conservation certification results. At present, CQC is responsible for the producing of the Energy-Efficient Product list. In August 2010, a newest government procurement list was issued; there are 7 types of products with standby power requirement in the list. They are color TVs, computers, printers, copiers, faxes, external power suppliers and monitors. Among these products, 4 categories are requested to be purchased compulsorily, including television, computer, printer, and monitor.

## Low Energy Networks: Policy Directions within a Standby Framework

Technical summary paper by Lloyd Harrington, EES, Session 7 paper 2  
APEC Standby Conference, Tokyo, Japan, October 2010

The issue of excessive standby power was identified more than 20 years ago and continues to be a concern because energy policies have still not curbed the continuing energy excesses in electronic products. The number of products that consume power in low power modes is growing as electronic controls permeate product designs and electronic “information based” products become ubiquitous. This issue is only exacerbated by the increasing prevalence of network connected products.

Networks were originally confined to computers and Information Technology equipment (primarily computers). However, over the past 5 years, the growth of networks has been remarkable and this is set to continue rapidly into the future. Mobile products and wireless applications, which both use different types of networks, are growing quickly and becoming ubiquitous. There is also growth in the area of networked audio-visual equipment. There are also a range of other normal household appliances are starting to get network capability, so networks in general is an area of growing policy concern. It is conceivable that within 10 years nearly all products will be connected to some form of network. The main drivers for this are dramatically improved functionality, so this will be strongly driven irrespective of other factors. Unless network design and operation builds in the concepts of energy efficiency and management it could be an energy disaster.

For the purposes of this paper, the following definitions apply:

- **Networked products:** appliances or equipment that are connected to a network but that have a main function that is not network infrastructure (e.g. a computer, television, servers) – also called edge devices
- **Network equipment:** products whose main function is the provision of network infrastructure and transmission of packets of data between edge devices (e.g. modems, routers, switches, access points)

Network connectivity is not well-addressed in most existing policies that deal with low power modes of products. This policy gap appears to have occurred for a variety of reasons: the technology of networks is unfamiliar to many energy policy analysts and experts; there are significant complexities in network technologies and their associated protocols; networks are evolving rapidly on many parallel fronts and the number and type of products with network capabilities is expanding rapidly. However, there are a few examples where products with network capability have been successfully regulated or included in voluntary programs in recent years.

The main concern of network designers and developers of information equipment connected to networks is that the network function works fast and effectively – energy is usually a low (or even negligible) priority. Historically, the need to address excessive energy has rarely been given a high priority during the design of networks. And once protocols are designed and implemented, it can then be a huge effort to “retrofit” power management requirements into these protocols, as a large number of stakeholders are involved in, and affected by, such changes. So the unfortunate reality is that it is hard to get power management included into the design of network

protocols and hardware specifications and even harder to get them retrofitted once these have been implemented.

There is a real fear on the part of network professionals that desirable innovation in network design may be unintentionally stifled if ill-targeted or poorly implemented energy requirements were to be imposed. The challenge for energy policy makers is to overcome that perception through better and more consistent communication, together with a focus on energy issues during the early development phase and revision process for network protocols. Effective energy management can require changes to a number of elements within the network such as the physical layer, data link, network, transport and/or application layers, which makes the focus for policy somewhat diffuse.

This is further complicated by the issue that network connectivity inherently involves multiple devices and therefore some interdependency of devices (which can induce higher energy consumption in other devices on the network), complicating effective energy policy development and implementation. This is especially the case for legacy devices, which may remain connected to the system for many years after new hardware or network protocols are introduced.

Changes to specifications for hardware and software are important areas for energy saving. But there are many internal (often proprietary) approaches that can further reduce energy consumption, and these need to be encouraged through intelligent application of energy policy.

Analysis of network issues showcases the need for global cooperation and policy alignment in this area, both between APEC economies and across product types as well as between energy & network professionals. It is critical for efficiency policy to be fully up-to-date and engaged with the topic so that efficiency is seen as a partner to technological progress, not as an impediment to it. Networks pose challenges to energy efficiency in terms of apparent complexity and their relative freshness to the efficiency policy arena, but these can be overcome with the plan of action that is outlined in the presentation.

It only makes sense to address the topic of networks within an integrated approach to two larger overlapping topics: low-power mode policy generally (which includes “standby”), and policy responses to digital networks. Armed with sound information and a clear policy framework to address energy used in networks, the objectives of efficient networks and elimination of excessive standby power can be achieved. For the purposes of this discussion, network mode means any mode (active or low power) where there is a network function present and operating.

Specifying power management requirements for networked products is a complex technical subject. Many of the most important types of equipment commonly used in networks are not covered by current program requirements for low power modes. The default “normal operation” at present is that network equipment remains continuously in active modes, which makes specifying mandatory low power mode requirements largely irrelevant in any case. A few current programs, however, are addressing issues related to networks and power management, which offer foundations to build improved global cooperation. In an effort to foster the possibility of aligned standby



power polices, program managers need to adopt common fundamental definitions. The APP/4E report titled *Standby Power and Low Energy Networks – issues and directions*, released in September 2010, defines the concepts of mode and function and suggests that ultimately existing energy standards be the repository for these global definitions. This report can be obtained from <http://www.energyrating.gov.au/library/details2010-network-standby.html>

The key components of an effective policy to achieve low energy networks and eliminate excessive standby power are proposed within an implementation framework of:

1. Guiding principles for good network design
2. Incorporating power management as the default
3. Capping power for network functions to existing reasonable levels within the technology bounds
4. Setting power limits for all secondary functions through a horizontal standby requirement.

Guiding principles for good network design can be set out as:

- Network Connected Devices – Initial EE Policy Objectives
  - Governments should ensure that electronic devices enter low-power modes automatically after a reasonable period when not being used (power management).
  - Governments should consider limits on energy consumption in low-power modes for networked products and develop technically feasible options where these are warranted.
  - Governments should ensure that network-connected electronic devices minimise total energy consumption, with a priority placed on the establishment of industry-wide protocols for power management.
  - Energy efficiency specifications should not require a particular hardware or software technology.
  - Requirements for networked products need to be generic and performance based.
- Network Connected Devices – Initial Hardware Objectives
  - All digital network technologies should actively support power management and should follow standard (international) energy management principles and designs.
  - Connection to a network should not impede a device from implementing its own power management activities.
  - Devices should not impede power management activities in other devices connected to the network.
  - Networks should be designed such that legacy or incompatible devices do not prevent other equipment on the network from effective power management activities.
  - Network connections should have the ability to modulate their own energy use in response to the amount of the service (level of function) required by the system.

This new framework, made up of the 4 key elements above, for the construction of a more global standby policy to enable coverage of network connectivity is advocated. This approach will also help improve existing standby policy as products become

more complex. It has at its foundation a “functional approach” to define limits for low power modes. These can allow policies to be moderately aggressive without compromising product functionality or usability.

These requirements have to be combined with power management to be effective.

The integration of horizontal requirements with existing requirements for product energy efficiency is also discussed. This can be readily achieved by independent application of horizontal requirements and existing energy efficiency requirements for products that are already regulated. Alternatively, low power mode energy can be combined with active mode energy over a defined duty cycle in a so-called vertical approach.

A range of projects that aim to improve knowledge and understanding of issues surrounding energy and networks are recommended are set out in the presentation. Good information is essential in order to develop good policy. The proposed work program will identify those areas where resources are required to facilitate the development and implementation of technical standards and to inform the creation of sound policy approaches to support low energy options within networks.



# Asia-Pacific Economic Cooperation

APEC International Conference Proceedings - Alignment of Standby Power Approaches

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