



Industrial Technology Research Institute
Energy & Resources Laboratories

WTO Workshop on Labeling

Mandatory Minimum Energy Efficiency Requirements and Voluntary Energy Labeling Programme

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Industrial Technology Research Institute, Taiwan**

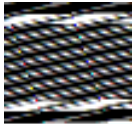
October 21~22, 2003, Geneva, Switzerland



Energy Commission
Ministry of Economic Affairs

Bureau of Stds., Met. & Insp.
Ministry of Economic Affairs

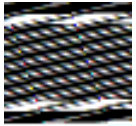




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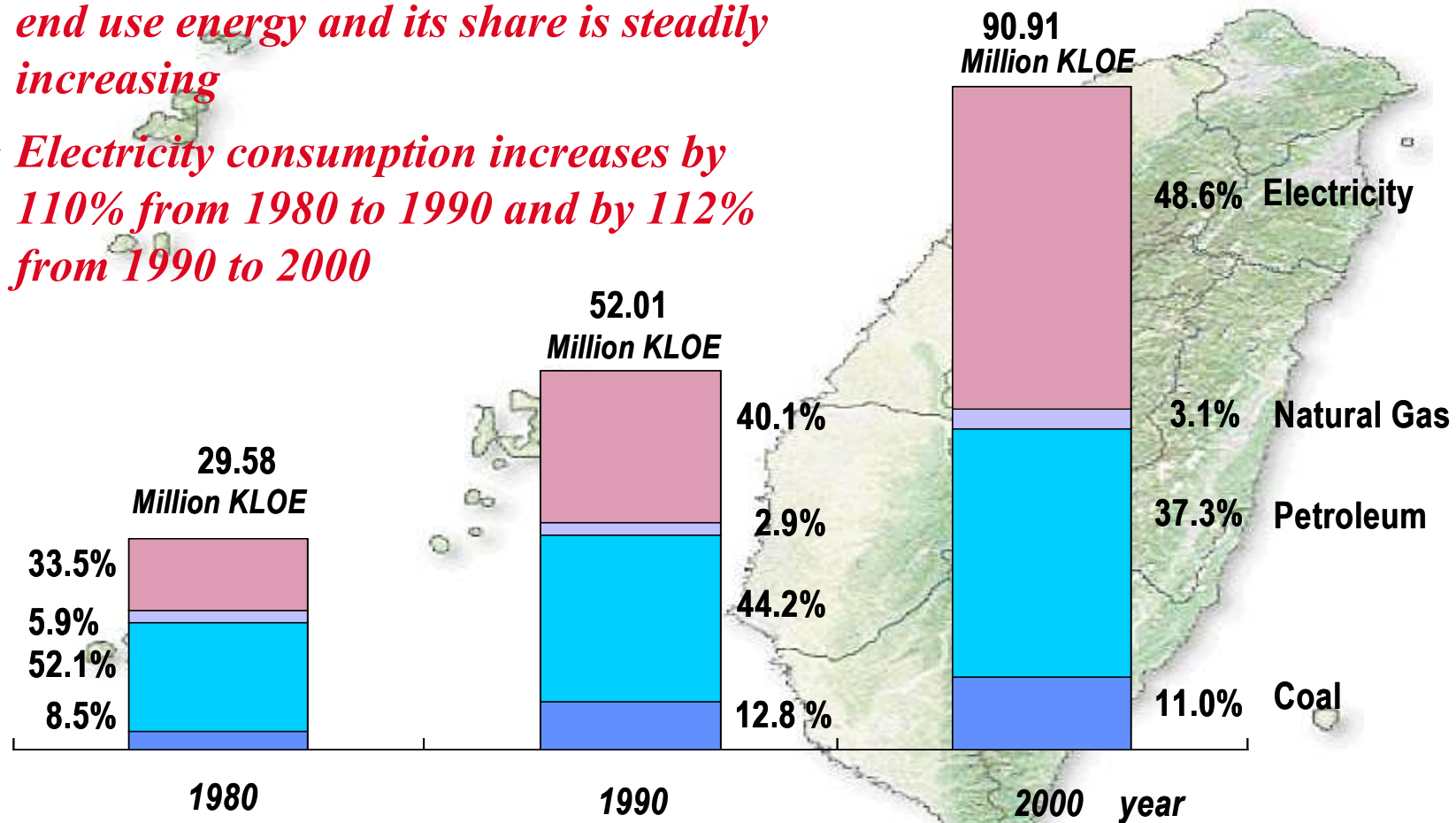
- 📄 **Energy Demand & Supply Background**
- 📄 **Energy Efficiency & Conservation Strategy**
 - ✉ **Mandatory Minimum Energy Efficiency**
 - ✉ **Voluntary Energy Labeling**
- 📄 **Discussion**
- 📄 **Conclusions**

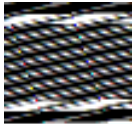




✉ Structure of End Use Consumption in Energy Forms

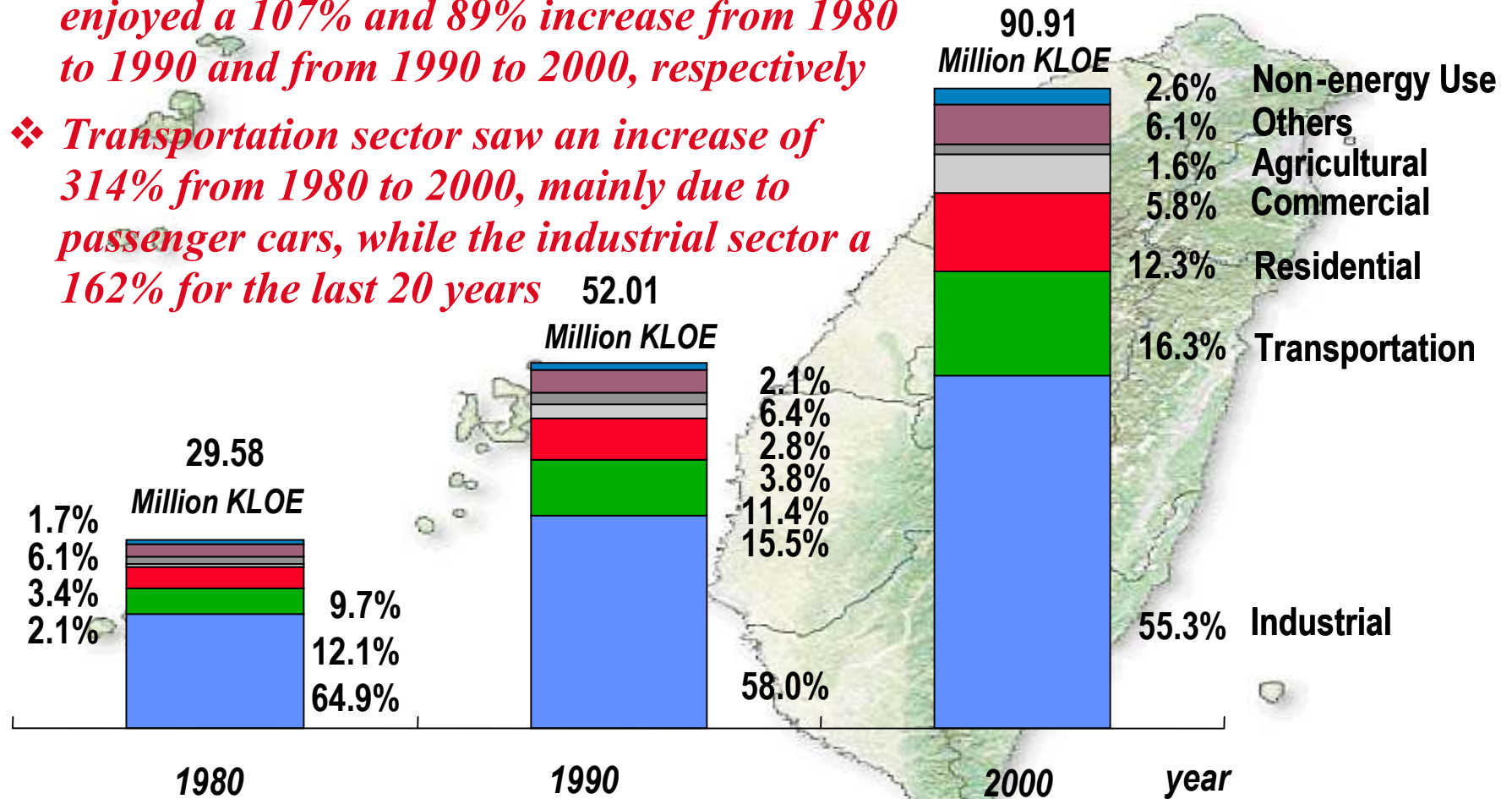
- ❖ *Electricity has become the main form of end use energy and its share is steadily increasing*
- ❖ *Electricity consumption increases by 110% from 1980 to 1990 and by 112% from 1990 to 2000*





✉ Structure of End Use Consumption by Sectors

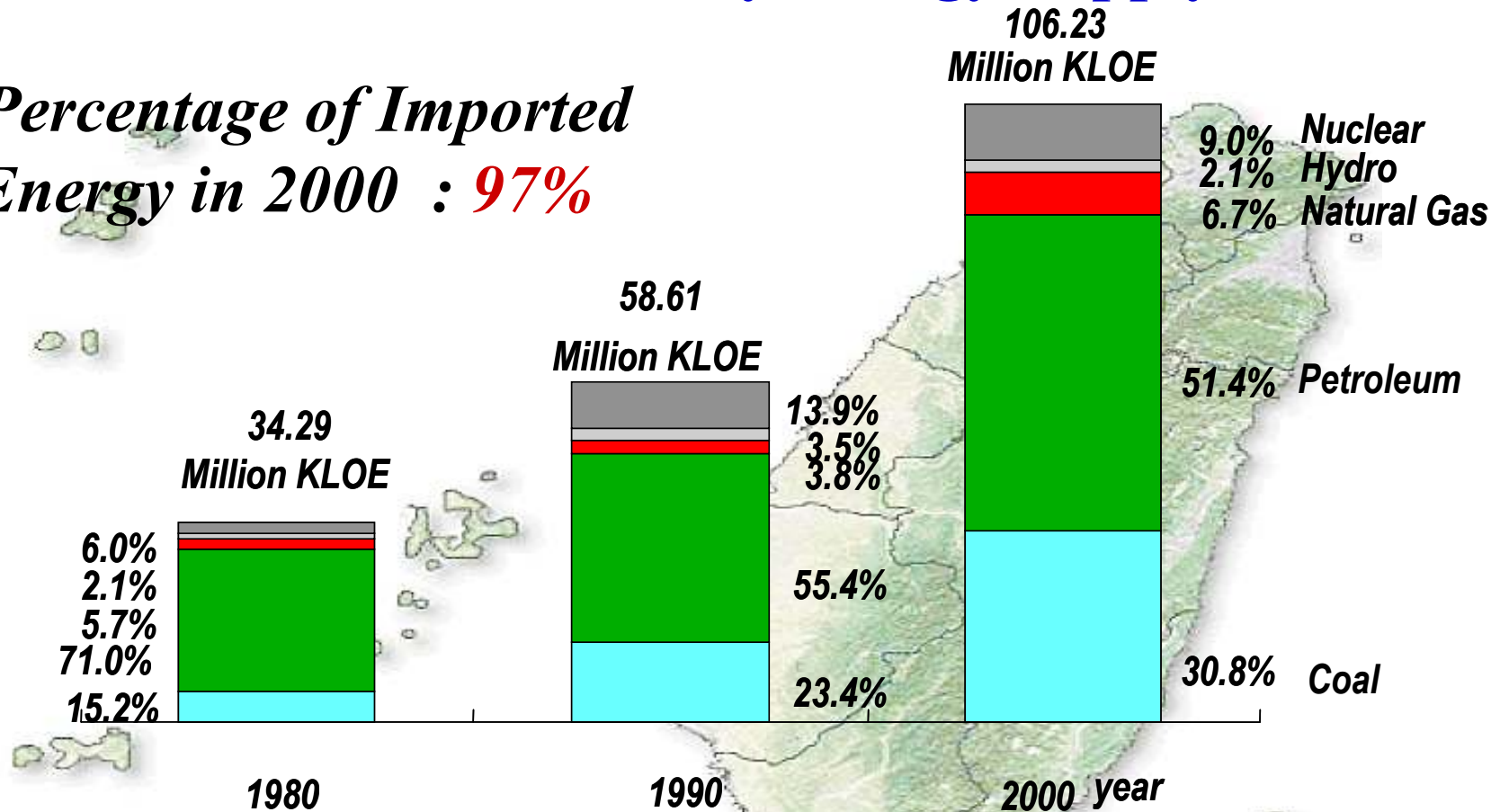
- ❖ Residential sector, mainly an electricity user, enjoyed a 107% and 89% increase from 1980 to 1990 and from 1990 to 2000, respectively
- ❖ Transportation sector saw an increase of 314% from 1980 to 2000, mainly due to passenger cars, while the industrial sector a 162% for the last 20 years





✉ Structure of Overall Primary Energy Supply

❖ *Percentage of Imported Energy in 2000 : 97%*



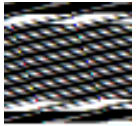
Dependence on imports:

86.4%

93.4%

97.1%





Energy Demand & Supply Background

- **Over 97% of energy (oil, LNG, coal and etc.) was imported from overseas in 2000**
- **Electricity has been the main end use energy, followed by petroleum, since 1990s**
- **Rotating electricity rationing must be invoked occasionally in the summer times, mainly due to the usage of A/C equipment (estimated at 35% to 40% of the peak load)**
- **While the share of petroleum is decreasing, the absolute supply is increasing due mainly to the ownership of cars**

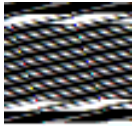




Energy Demand & Supply Background

- The high energy demand and supply situation, driven by the economic and social development, has put tremendous environmental and budgetary pressure on the government; political tension sometimes arises as a result
- A lack of fossil-based or renewable-based natural energy resources, perilously manifested by the overwhelming import of energy, means *the Secure Supply of Energy* would be the paramount objective of our energy policy and that *Energy Efficiency & Conservation is one of the KEYS to tame the beast !*

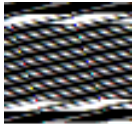




Energy Efficiency & Conservation Strategy

- The energy policy, first publicized in the 1960s, leads to the enactment of the *Energy Management Law* in 1980 (but only until after two oil crises)
- The Law contains the following specific articles on the regulation of energy efficiency:
 - ✉ *Mandatory energy efficiency requirements for energy consuming goods and equipment*
 - ✉ *Mandatory fuel economy standards for tools of transportation*

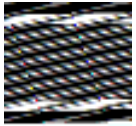




Energy Efficiency & Conservation Strategy

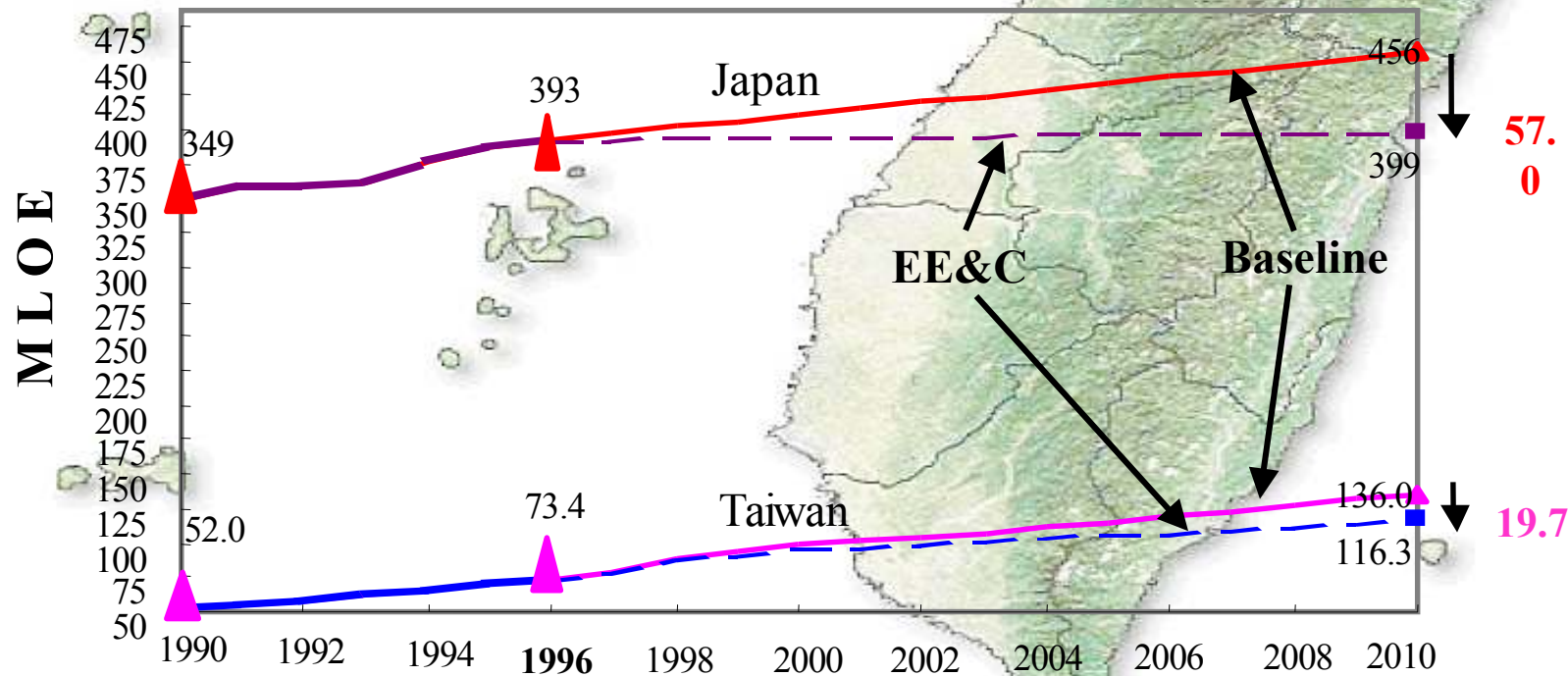
- The continuing growth of energy demand in residential, commercial and transportation sectors naturally leads to mandating minimum energy efficiency requirements and fuel economy standards for **white goods, cars & light trucks** and **motor bikes** under the Energy Management Law
- The purpose is to manage the growth in a sustainable way (the EE&C scenario) to *enhance the secure supply of energy*, to *safeguard the environment*, and to *increase economic competitiveness*

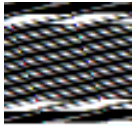




Energy Efficiency & Conservation Strategy

➤ In 1999, again only after a major crisis, the Golf War, that an EE&C scenario was adopted, setting a target of 19,730 KLOE energy saving by 2010 vis-à-vis a baseline





Mandatory Minimum Energy Efficiency

- Mandatory minimum energy efficiency and fuel economy requirements were first set for **air-conditioners, induction motors, refrigerators, vehicles and fluorescent lamps** in 1980, 1981, 1984, 1987 and 2000, respectively
- The mandatory regime for the white goods is reviewed periodically and updated jointly by the **Energy Commission (EC)** and the **Bureau of Standards, Metrology and Inspection (BSMI)**, while the regime for vehicles is managed by EC





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A Novel Air-Con Exhibition

OR

A Modern Work of Art



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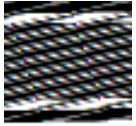




Mandatory Minimum Energy Efficiency

- Manufacturers and importers are obliged to apply **in advance** for compliance certifications, and compliance with minimum energy efficiency and fuel economy requirements is mandatory before the regulated items can be put into market
- The testing procedures are in accordance with the **Chinese National Standards (CNS)** and, in the case for cars, **FTP 75** (a US testing protocol), and are embedded in relevant goods & commodities inspection regulations

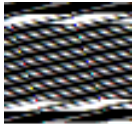




Mandatory Minimum Energy Efficiency

- The energy efficiency testing can only be conducted in the ***BSMI Laboratory*** and three BSMI-authorized laboratories, namely, ***Taiwan Electric Research & Testing Center***, ***Industrial Technology Research Institute*** and ***Electronics Testing Center, Taiwan***
- The testing for fuel economy compliance is carried out by two EC-authorized laboratories, the ***Industrial Technology Research Institute*** and ***Automotive Research & Testing Center***





Mandatory Minimum Energy Efficiency

Air Conditioner Label Samples

日立窗型冷氣機

機 型	RA-250T
電 源	單相, 220 V, 60Hz
冷 力 (kcal/h)	2500
額定電流 (A)	5.4
起動電流 (A)	23
冷 媒 (kg)	R-22, 0.70
製造號碼	122227

配線圖

2KC08514-A

日立窗型冷氣機 ISO

第 I 類電器	型 號	RA-250T
	類 別	單體式, 氣冷式, 冷氣, 除濕
	電 源	單相, 220V, 60Hz
冷 力 (kcal/h)		2500
能 力 (kW)		(2.8)
能源效 率 (kcal/hw)		2.27
率 比 值		(2.64)
運轉電流 (A)		5.4
消耗電功率 (kW)		1.101
起動電流 (A)		23
冷 媒 (kg)		R-22, 0.70
製品重量 (kg)		41
製品尺寸 (W×H×D)(mm)		560×370×730
製造年份		民國 91 年
製造號碼		122227

合格編號 FR78004

台正字第3201號
統一編號: 8359416007
檢內登字第445004號

製造廠商: 台灣日立股份有限公司
地址: 台北市南京東路三段63號
電話: (02) 25083311
生產地: 中華民國 2KB07565-X

Refrigerator Label Sample

KOLIN 歌林電冰箱

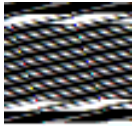
種 型	類 號	冷 藏 機
		KR-F110
有 效 內 容 積		
標 有 效 內 容 積		94 L
額 定 電 壓		110 V
額 定 頻 率		60 Hz
額 定 耗 電 功 率		70 W
冷 劑 名 稱		R134a
冷 劑 封 入 量		60 g
總 重 量		22 kg
消 耗 電 量		26 Kwh/月
能 源 因 數 值		3.6 L/Kwh/月
製 造 年 度		中華民國 89年
生 產 國 別		韓國
製 造 號 碼		009KR 00979

製造廠商: L.G. Electronics Inc.
進口商: 歌林股份有限公司 TEL: (02) 2314-3151
台北市重慶南路一段86號10樓

歌林股份有限公司
台北市重慶南路一段86號10樓 TEL: (02) 2314-3151 中華民國

檢磁 3894A747

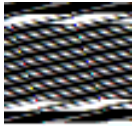




Mandatory Minimum Energy Efficiency

- The compliance certification for energy efficiency & electric safety together can normally be completed in 3~4 weeks for a fee of approximately US\$ 2900 ~ 4400 (NT\$ 100,000 ~ 150,000)
- Market spot checks after certification are enforced by BSMI to ensure continuing compliance
- BSMI welcomes bi-lateral and multi-lateral *Mutual Recognition Arrangements (MRAs)* with Counterparts of WTO Members on energy efficiency and electric safety testing

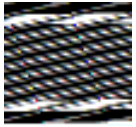




Mandatory Minimum Energy Efficiency

- The fuel economy & pollution control testing together can normally be completed in 2 weeks for fees of approximately US\$ 740/vehicle (NT\$ 20,000/vehicle) and US\$ 420/bike (NT\$ 10,000/bike), respectively
- Market spot checks after certification are enforced through the pollution control program headed by the **Environmental Protection Administration (EPA)** to ensure continuing compliance

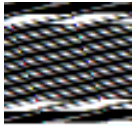




Mandatory Minimum Energy Efficiency

- It was estimated in 2002 the mandatory minimum energy efficiency requirements on air-conditioners, refrigerators, fluorescent lamps and induction motors together reduce the peak load demand of electricity by 148.2 MW and save 1.08 billion kWh of electricity annually
- The mandatory fuel economy standards on vehicles and motor bikes were estimated to save 97 million liters of gasoline annually
- The energy saving also translates into reduced environmental degradation and enhanced social benefits

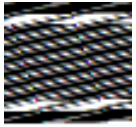




Voluntary Energy Labelling

- In addition to the mandatory regime, two endorsement labels concerning with energy efficiency & conservation, the *Energy Conservation* and the *Energy Star*, were launched in 2001 and 2002, respectively, by EC and EPA
- The Energy Conservation label deals specifically and only with energy efficiency, currently covering air-conditioners, TVs, dehumidifiers, clothes washers & dryers, refrigerators, electric fans and fluorescent lamps from a total of 18 manufacturers with 152 registered products so far





Voluntary Energy Labelling

- The Energy Star is a joint program with the US EPA, covering now **7 types of office equipment**, with energy efficiency as one of the evaluation criteria for endorsement

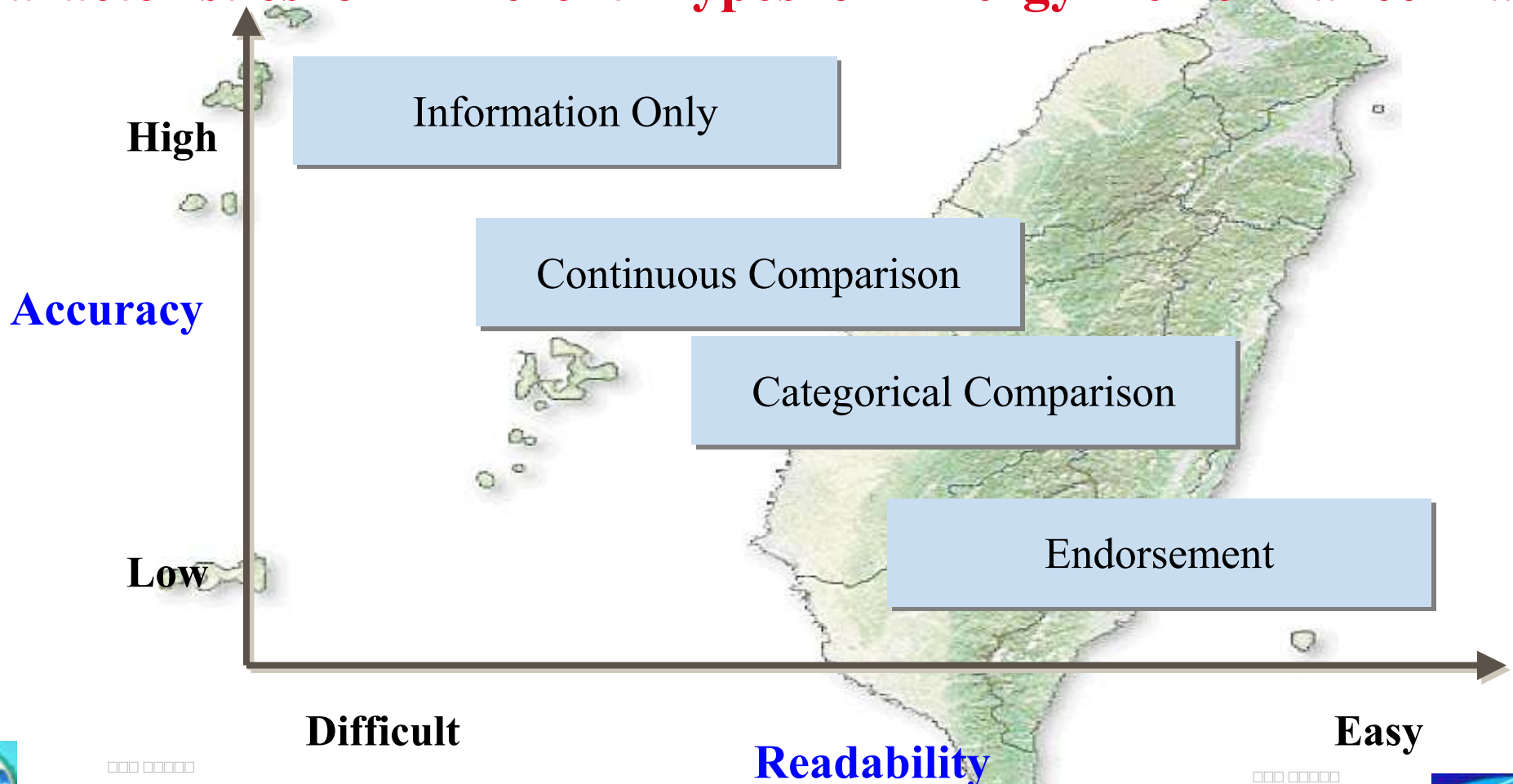


Voluntary Energy Labelling

- The Energy Conservation label, like the Energy Star, is an *endorsement label*, meaning it doesn't carry energy efficiency levels of or relative energy/money saved by the registered products, but endorses the registered products for their good energy efficiency performance
- In fact, for those registered products also covered under the mandatory minimum energy efficiency regime, their energy efficiency performance is **15% ~ 45%** higher than their mandatory minimum requirements

Voluntary Energy Labelling

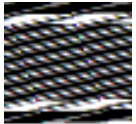
Characteristics of Different Types of Energy Performance Label



Voluntary Energy Labelling

- Because the Energy Conservation Label is a voluntary one, successful implementation depends on **education & promotion** to raise the public awareness, **champions** in the market and the adoption of **prioritized purchase** of the registered products by the private and public sectors
- The labelling programme may also be a precursor to expand or revise the current mandatory regime
- After a year and a half, market survey has shown 31.6% of consumers know and understand the label; an estimated saving of 10.3 million kWh of electricity was achieved for 2002





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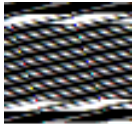


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節能標章網站
省能高效率, 消費新主張

歡迎註冊
申請字冊
節能產品
相關網站
留言板

最新掌握 節能標章 最新新聞

節能資訊

「節能標章專區」內容更新

經濟部標章委員會為肯定省能技術於商品之應用, 藉以市場導向的機制, 激勵廠商投入高能效率產品的研發, 積極推動節能標章之認證, 11月23日將於國際會議中心「九十年經濟部節約能源博覽大會」會場開辦「節能標章專區」, 供社會大眾及廠商了解節能標章出來, 以及節能標章申請作業方式, 為目前最熱之節能標章政策提供親身, 並藉出現場名廠標之專訪大方宣揚此項節約能源重要工作。

節能標章推廣產品效率標準之研訂

節能標章審議委員會將於12月14日由經濟部標章委員會舉行, 進行國內第一波節能標章推廣產品效率標準之研訂, 經核定公告後將開始受理申請。

<http://www.energylabel.org.tw>

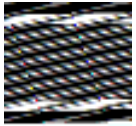
產品公司	型號	能效等級
AW-C182
SR-3435D
SR-2555D
AD-163E



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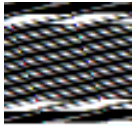




Voluntary Energy Labelling

- The Energy Conservation labelling programme is currently managed by the Industrial Technology Research Institute under the auspices of the Energy Commission
- Energy performance testing for the labelling certification can be conducted at the three BSMI-authorized testing laboratories, or a third-party laboratory accredited by the **Chinese National Laboratory Accreditation (CNLA)**

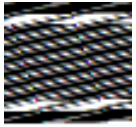




Discussion

- **Energy efficiency and conservation is regarded as a policy of no regret and has the following overarching benefits:**
- ✉ **mitigate the global climate change by reducing CO₂ emission per unit output**
 - ✉ **enhance protection of the environment through deferred new power plant installations**
 - ✉ **strengthen the long-term secure and stable supply of energy**
 - ✉ **increase the overall economic efficiency**

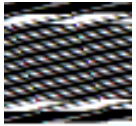




Discussion

- **Mandatory minimum energy efficiency performance and (voluntary) energy labelling are increasingly being employed by WTO Members to achieve the above universal benefits and Member-specific objectives**
- **Moreover, there is a trend now to have the mandatory and/or voluntary regimes coordinated on a regional scale, e.g. **EU, North America, the Pacific Rim (APEC)** and etc.**
- **In the case of APEC (a group of 21 Economies), the coordination of energy standards and labeling has been an important organizational task for the last 5 years**



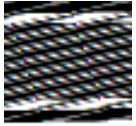


Discussion

➤ APEC studies have found, while enormous benefits can be obtained from various energy efficiency strategies and programs, to increase the trade of energy-efficient products the following issues must be addressed:

- ✉ the transparency of regulatory information
- ✉ the capacity building, especially for developing economies
- ✉ the harmonization (alignment) of test procedures (regulatory requirements may be economy-specific)
- ✉ the Mutual Recognition Arrangement



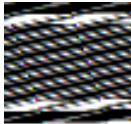


Discussion

➤ **APEC Leaders and Energy Ministers have endorsed actions to address the above issues and the collective achievements so far are:**

- ✉ **studies on trade flow and existing regulatory regimes**
- ✉ **workshops and seminars on the setup of testing laboratories and the design of regulatory programs**
- ✉ **information center (clearing house) where energy efficiency measures and programs on priority items are maintained and updated (<http://www.apec-esis.org>)**
- ✉ **step-by-step approach on alignment of test procedures**





APEC-ESIS.ORG

Asia-Pacific Economic Cooperation (APEC)
Energy Standards Information System (ESIS)

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- ▶ Link to EU JRC web site.
- ▶ Link to CLASP web site.
- ▶ Link to APEC and Energy.

▶ Related Sites

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The APEC Energy Standards Information System (ESIS) is a new APEC-funded initiative to develop a comprehensive web site on testing standards, MEPS, and labeling requirements for countries in the Asia-Pacific region.

Click on the map or select from the Quick Search menu to the left to get the latest information on testing standards, MEPS, and Labeling in any APEC country.

(Each bullet represents a country. Point to a bullet and wait a few moments for the name of the country to appear.)

What's New

Hot Off the Press: *China Green Lights Newsletter*
August saw the launching of the new *China Greenlights International*

Subscribe Now!

Subscribe now and you will get regular updates on energy standards developed in the APEC region, as well as notification of updates to the APEC ESIS web site.
[Click here to subscribe.](#)

News & Announcements

Chinese Taipei and U.S. support ESIS

Chinese Taipei has agreed to fund further development of the APEC Energy Standards Information System for 2003. The grant for US\$ 35,000 will ensure

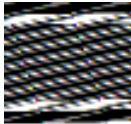
Quick Fact


Standby Waste

Typically between 5% and 10% of a household's electricity use is by appliances when they are switched on but not performing their main function. Simple design changes can make a significant difference to this standby energy use at next to no cost.
[read more >>](#)

Questionnaire







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COUNTRY FACT SHEET : Chinese Taipei

Overview of Testing Standard, MEPS, Labeling :

Domestic political tensions will remain high with the approach of the December 2001 Legislative Yuan (parliamentary) election. The economy is not expected to pick up until the second half of 2002. Consumer prices will rise by an average of 1.2% in 2002, increasing further to 2.5% in 2003. Despite being weak for much of 2001, the New Taiwan dollar should strengthen in 2002-03. The current-account surplus will fall from US\$10.2bn (3.6% of GDP) in 2001 to US\$6.5bn (2.1% of GDP) in 2003.

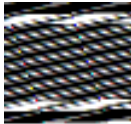
The Energy Commission in the Ministry of Economic Affairs (MOEA) has developed MEPS for a number of products. In most cases the energy tests are detailed in Chinese National Standards (CNS) of Chinese Taipei, and the MEPS requirements are published by MOEA. The Bureau of Commodity Inspection and Quarantine is also involved in the implementation of the program.


Summary Table of Standards :

Yv = Yes, voluntary; Ym = Yes, mandatory;
U = under consideration; N = none

Equipment Type	Sub Equipment	MEPS	Labeling	National Test STD.	Reference Test STD.
Air Conditioners					
	Room AC (Window type)	Ym	Yv Yv	CNS 14464 CNS 3615-95 CNS 7183	
	Room AC (Split type)	Ym	Yv Yv	CNS 14464 CNS 3615-95 CNS 7183	
	Room AC (packaged Terminal)	Ym	Yv	CNS 14464 CNS 3615-95 CNS 7183	
Boilers					







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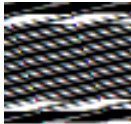
EQUIPMENT FACT SHEET

Summary Table of Equipment : Air Conditioners

Yv = Yes, voluntary; Ym = Yes, mandatory; U = under consideration; N = none

Economy	Sub Equipment	MEPS	Labeling	National Test STD.	Reference Test STD.
Australia					
	Central AC (Split type)	Ym	Yv	AS/NZS 3823.1.1-1998 AS/NZS 3823.1.2-2001 AS/NZS 3823.3:2002	ISO 13253 ISO 5151
	Central AC & Heat Pumps	Ym	Yv	AS/NZS 3823.1.1-1998 AS/NZS 3823.1.2-2001 AS/NZS 3823.3:2002	ISO 13253 ISO 5151
	Room AC (Split type)		Ym Yv	AS/NZS 3823.1.1-1998 AS/NZS 3823.1.2-2001 AS/NZS 3823.3:2002	ISO 13253 ISO 5151
Canada					
	Central AC (Split type)	Ym	Yv Yv	CAN/CSA-C 273.3-M 91	ARI 210/240-94 ASHRAE 37-1988
	Central AC & Heat Pumps	Ym	Yv Yv	CAN/CSA C 656-M 92	ARI 210/240-94 ASHRAE 37-1988
	Room AC (Window type)	Ym	Ym Yv	CAN/CSA-C 368.1-M90	ASHRAE 90-1-1989
	Room AC (Split type)	Ym	Ym Yv	CAN/CSA-C 368.1-M90	ASHRAE 90-1-1989
	Room AC (packaged Terminal)	Ym	Yv	CAN/CSA-C 744-93	ARI 310/380-93 (CSA C744-93)
China					
	Central AC & Heat	U	U		





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ESIS
Asia-Pacific Economic Cooperation (APEC) Energy Standards Information System (ESIS)
Standards & Labeling UPDATE
October 2003

Free Subscription

Subscribe now and you will get regular update and news on energy standards and labeling programs developed in the APEC region. To subscribe to *Standards and Labeling Update*, visit the ESIS web site at <http://www.apec-esis.org>. To submit news or information, email to the editor at pdp@dem.dk.

Feature News

About APEC ESIS and *Standards and Labeling Update*



APEC launched the Energy Standards Information System (ESIS) in 2002 as a new initiative to track information on energy

performance testing protocols, minimum energy performance standards (MEPS), and labeling requirements for appliances and equipment in APEC economies. Chinese Taipei is the primary sponsor in 2003, with additional support from the United States. The web site and database are managed by Danish Energy Management A/S, in cooperation with the Collaborative Labeling and Appliance Standards Program (CLASP) and Industrial Technology Research Institute, and with assistance and input from a network of international consultants. *Standards and Labeling Update* is developed by APEC EWG Expert Group on Energy Efficiency & Conservation.



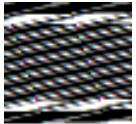
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➤ **What's New on ESIS**

◆ **APEC Announces Seminar on Energy Labeling**

This seminar will be held in Kaohsiung, Chinese Taipei from 17-19 November 2003. For all those involved in energy performance labeling, this is a great opportunity to make your programmes more effective by ... [Click here to see details](#)

◆ **Hot Off the Press: China Green Lights Newsletter**

August saw the launching of the new China Greenlights International Newsletter. The newsletter editors hope to allow developers and participants in other [Click here to see details](#)

◆ **ASEAN Studies European Labeling Experience**

There will soon be a regional labeling scheme to certify energy-efficient equipment in ASEAN. Following a mandate given by the ASEAN Energy Ministers [Click here to see details](#)

◆ **Authoritative Report on Standards and Labeling in North America**

The North American Energy Working Group (NAEWG) has an official report on energy-efficiency standards and labeling in North America. Released in December 2002, [Click here to see details](#)

◆ **New Thai Working Group on Energy Standards and Labeling**

Thailand has established a new Working Group on Energy Standards and Labeling to coordinate promotion and implementation of energy standards and labeling program [Click here to see details](#)

◆ **Specifications for Energy-Efficient Equipment in the U.S.**

The Consortium for Energy Efficiency (CEE) is a U.S. non-profit organization that works with stakeholders to develop energy-efficiency targets and specification [Click here to see details](#)

◆ **Australia Compares Its Energy Efficiency Program to the World**

On 25 March 2003, the National Appliance and Equipment Energy Efficiency Committee (NAEEEC) held its sixth annual stakeholder forum [Click here to see details](#)

◆ **Standby Power Working Group**

A meeting of the TCER standby working group (AWCP) met in Europe in March to discuss a



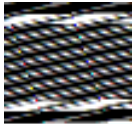
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◆ New Standards

- GB12021.2-2003
- GB19043-2003
- GB19044-2003
- AS/NZS 3823.3:2002
- AS/NZS 4783.2-2002
- NOM-015-ENER-2002
- NOM-016-ENER-2002
- TIS 2134-2545 (2002)

◆ Standard Under Consideration

Australia

- MEPS for Cooktops & Ranges/Ovens
- MEPS for Fluorescent Lamps
- Label for Magnetic Ballasts For Fluorescent Lamps
- Label for Electronic Ballasts For Fluorescent Lamps
- Label for Televisions
- Label for VCRs and/or DVDs
- Label for 3-Phase Induction Motors

Canada

- Label for Fans
- Label for Group-source Heat Pumps
- Label for Compact Fluorescent Lamps

Chile

⋮

◆ Standard Under Revision

Australia

- MEPS for Central AC & Heat Pumps
- MEPS for Magnetic Ballasts For Fluorescent Lamps
- MEPS for Electronic Ballasts For Fluorescent Lamps
- MEPS for 3-Phase Induction Motors
- Reference test std. for Central AC (Split type)
- Reference test std. for Central AC & Heat Pumps
- Reference test std. for Room AC (Split type)

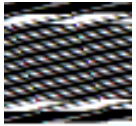
China

- MEPS for Room AC (Window type)
- MEPS for Room AC (Split type)
- MEPS for Rice Cooker
- MEPS for Fans
- MEPS for Televisions
- MEPS for Clothes Washers
- Reference test std. for Room AC (Window type)
- Reference test std. for Room AC (Split type)

Hong Kong, China

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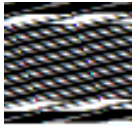




Conclusions

- Taiwan, like many WTO Members, has implemented mandatory minimum energy efficiency and voluntary energy labeling programs, and details can be found via <http://www.bsmi.gov.tw> (a link to a WTO TBT page is present) and <http://www.energylabel.org.tw>
- The current WTO TBT Agreement is comprehensive in its scope, and its principles in addressing TBT issues are in line with study findings and professional outlook (e.g. <http://www.apec-esis.org>)

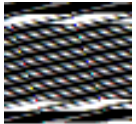




Conclusions

- **WTO TBT Committee may increase its interaction and coordination with other regional and international bodies to foster capacity building for developing economies**
- **A workshop such as this one is certainly helpful in clarifying Members' concerns and sharing the information on the state of the issue in question**
- **Taiwan, as a WTO Member, would play a constructive role on fulfilling the obligations under the TBT Agreement, e.g. on the exchange of information and capacity building in energy labelling**





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Thank You for Your Attention

ACKNOWLEDGEMENT

WTO TBT Committee

Energy Commission

Bureau of Standards, Metrology and Inspection



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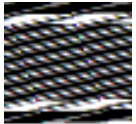
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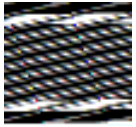




Minimum Energy Efficiency Performance

Type of Air-conditioner		E.E.R kCal/W-hr (BTU/W-hr)	COP	
Effective Date: 2002/1/1				
Window Type	Cooling Capacity less than 2000 kCal/hr (2.3 kW)	2.34 (9.24)	2.71	
	Cooling Capacity between 2000 kCal/hr (2.3kW) And 3550 kCal/hr (4.1kW)	2.38 (9.44)	2.77	
	Cooling Capacity more than 3550 kCal/hr(4.1 kW)	2.24 (8.89)	2.60	
Split Type	Cooling capacity less than 3550 kCal/hr (4.1kW)	General	2.55 (10.12)	2.97
		Inverter (60 Hz)	2.38 (9.44)	2.77
	Cooling Capacity more than 3550 kCal/hr (4.1 kW)	General & Inverter (60 Hz)	2.35 (9.32)	2.73

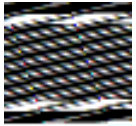




Minimum Energy Efficiency Performance

Packaged Air Conditioner	E.E.R kCal/W-hr (BTU/W-hr) (Effective Date: 2002/1/1)	COP
Air Cooled (power consumption >3 kW)	2.44 (9.68)	2.84
Water Cooled	3.17 (12.58)	3.69





Minimum Energy Efficiency Performance

❖ E.F (Energy Factor)

Phase	Refrigerator Type	EF, L/kW·h/month	Effective Date
I	Fan Cooled R-F	$E.F = \frac{V}{0.061V + 40.0}$	2000/7/1
	Natural Cooled R-F	$E.F = \frac{V}{0.053V + 30.9}$	
	Refrigerator (No Freezer)	$E.F = \frac{V}{0.053V + 24.7}$	
II	Fan Cooled R-F below 400 liters	$E.F = \frac{V}{0.058V + 38.3}$	2003/1/1
	Fan Cooled R-F above 400 liters	$E.F = \frac{V}{0.054V + 35.2}$	
	Natural Cooled R-F below 400 liters	$E.F = \frac{V}{0.050V + 29.6}$	
	Natural Cooled R-F above 400 liters	$E.F = \frac{V}{0.046V + 27.2}$	
	Refrigerator (No Freezer)	$E.F = \frac{V}{0.050V + 23.7}$	

$$V = V_R + K \times V_F$$

V Effective Volume of the R-F

V_R Effective Volume of the Fresh Food Compartment

V_F Effective Volume of the Freezer

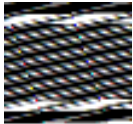
$K = 1.56$, 2-star class

$K = 1.67$, super 2-star class

$K = 1.78$, 3- or 4-star class

R-F: Refrigerator-Freezer

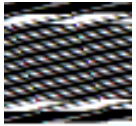




Minimum Energy Efficiency Performance

Rated Output		Pole	Synchronous speed (rpm)	Full-load Efficiency η (%)		Effective date
kW	HP _(reference)			60Hz	Total Enclosure	
0.37	0.5	2	3600	66.0	66.0	2002/7/1
0.55	0.75			68.0	68.0	
0.75	1			72.0	72.0	
1.5	2			81.5	81.5	
2.2	3			82.5	81.5	
3	4			82.5	81.5	
3.7	5			85.5	82.5	
4	5.5			85.5	82.5	
5.5	7.5			86.5	85.5	
7.5	10			87.5	86.5	
11	15			88.5	87.5	
15	20			88.5	88.5	
18.5	25			89.5	89.5	
22	30			89.5	89.5	
30	40			90.2	90.2	
37	50			91.0	91.0	
45	60			91.7	91.7	
55	75			91.7	91.7	
75	100			92.4	91.7	
90	125			93.6	92.4	
110	150	93.6	92.4			
132	175	94.1	93.6			
160	215	94.1	93.6			
200	270	94.5	94.1			

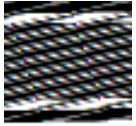




Minimum Energy Efficiency Performance

Rated Output		Pole	Synchronous speed (rpm) 60Hz	Full_load Efficiency η (%)		Effective date
kW	HP _(reference)			Total Enclosure	Open Drop Protection	
0.37	0.5	4	1800	68.0	68.0	2002/7/1
0.55	0.75			70.0	70.0	
0.75	1			80.0	80.0	
1.5	2			81.5	81.5	
2.2	3			85.5	84.0	
3	4			85.5	84.0	
3.7	5			85.5	85.5	
4	5.5			85.5	85.5	
5.5	7.5			87.5	86.5	
7.5	10			87.5	87.5	
11	15			89.5	89.5	
15	20			89.5	89.5	
18.5	25			91.0	90.2	
22	30			91.0	91.0	
30	40			91.7	91.7	
37	50			91.7	91.7	
45	60			92.4	92.4	
55	75			93.0	93.0	
75	100			93.6	93.0	
90	125			93.6	93.6	
110	150	94.1	94.1			
132	175	94.1	94.1			
160	215	94.1	94.1			
200	270	94.5	94.5			

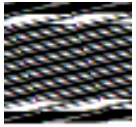




Minimum Energy Efficiency Performance

Rated Output		Pole	Synchronous speed (rpm)	Full_load Efficiency η (%)		Effective date
kW	HP _(reference)			60Hz	Total Enclosure	
0.37	0.5	6	1200	66.0	66.0	2002/07/01
0.55	0.75			68.0	68.0	
0.75	1			77.0	77.0	
1.5	2			84.0	82.5	
2.2	3			85.5	84.0	
3	4			85.5	84.0	
3.7	5			85.5	85.5	
4	5.5			85.5	85.5	
5.5	7.5			87.5	86.5	
7.5	10			87.5	88.5	
11	15			88.5	88.5	
15	20			88.5	89.5	
18.5	25			90.2	90.2	
22	30			90.2	91.0	
30	40			91.7	91.7	
37	50			91.7	91.7	
45	60			92.4	92.4	
55	75			92.4	92.4	
75	100			93.0	93.0	
90	125			93.0	93.0	
110	150	94.1	93.6			
132	175	94.1	93.6			
160	215	94.1	93.6			

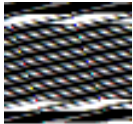




Minimum Energy Efficiency Performance

Rated Output		Pole	Synchronous speed (rpm) 60Hz	Full_load Efficiency η (%)		Effective date
kW	HP (reference)			Total Enclosure	Open Drop Protection	
0.37	0.5	8	900	66.0	66.0	2002/7/1
0.55	0.75			68.0	68.0	
0.75	1			70.0	70.0	
1.5	2			80.0	82.5	
2.2	3			81.5	84.0	
3	4			81.5	84.0	
3.7	5			82.5	85.5	
4	5.5			82.5	85.5	
5.5	7.5			82.5	86.5	
7.5	10			86.5	87.5	
11	15			86.5	87.5	
15	20			87.5	88.5	
18.5	25			87.5	88.5	
22	30			89.5	89.5	
30	40			89.5	89.5	
37	50			90.2	90.2	
45	60			90.2	91.0	
55	75			91.7	92.4	
75	100			91.7	92.4	
90	125			92.6	92.4	
110	150	92.6	92.4			

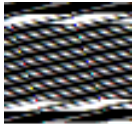




Minimum Energy Efficiency Performance

Type	Fluorescent Tubes	Rated Power (W)	Fluorescent Efficiency (lm/W)						Effective Date	
			General Types			Triple-Wave Range Types				
			D	N(CW)	W,WW	EX-D	EX-N (EX-CW)	EX-W, EX-W W		
Pre-heat Starting Type	Straight Tube	10	10	44	45	47	45	50	53	2001/1/1
		15	11~15	48	52	55	59	63	65	
		20	16~20	60	67	71	71	74	77	
		30	21~30	63	70	74	76	80	84	
		40	31~40	72	78	81	84	88	90	
	Annular	20	20,18	45	47	50	51	53	57	
		22	22,19	45	47	50	51	53	57	
		30	30,28	47	52	55	57	58	60	
		32	32,30	53	56	59	65	67	69	
		40	40,38	63	68	71	62	71	74	
Instant Starting Type	20	16~20	55	68	71	62	71	74		
	40	31~40	75	76	77	75	81	84		
	60	51~60	62	67	72	67	72	75		
	110	100~110	80	82	86	85	87	91		
Ave. color rendering properties (Ra)			69	67	50	80				



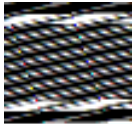


Minimum Energy Efficiency Performance

Displacement (cm ³)	Fuel Economy standard (km/liter)	
	Passenger cars (sedans & station wagons)	Commercial vehicles & Light trucks* (effective 2004/7/1)
≤ 1200	15.4	10.6
> 1200 ≤ 1800	11.6	8.7
> 1800 ≤ 2400	10.5	8.1
> 2400 ≤ 3000	9.4	7.1
> 3000 ≤ 3600	8.5	6.4
> 3600 ≤ 4200	7.8	5.9
> 4200	7.2	5.4

*Light truck with Weight ≤ 2500 Kg

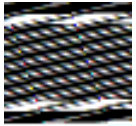




Minimum Energy Efficiency Performance

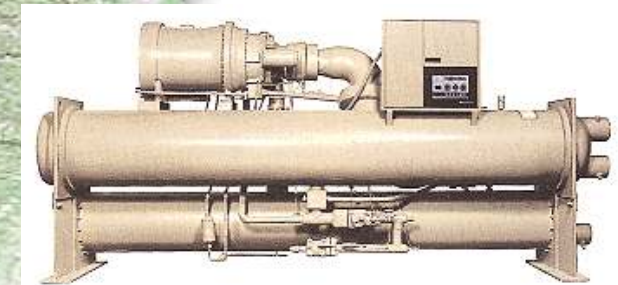
Displacement (cm ³)	Fuel economy standard (Km/liter)
≤ 50	50.0
> 50 ≤ 100	42.0
> 100 ≤ 150	39.0
> 150 ≤ 400	29.2
> 400 ≤ 650	19.7
> 650 ≤ 1000	17.0
> 1000	15.8

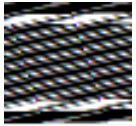




Minimum Energy Efficiency Performance

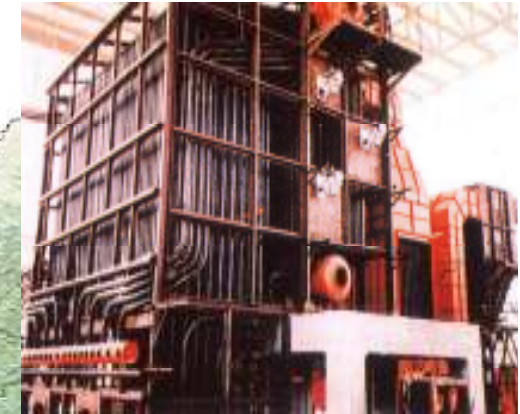
Type		Cooling Capacities	EER (kCal/h/W)	COP	EER (kCal/h/W)	COP
Water Cooled	Volumetric Compressors	<150 RT	3.50	4.07	3.83	4.45
		150 RT	3.60	4.19	4.21	4.90
		>500 RT	4.00	4.65	4.73	5.50
	Centrifugal Compressors	<150 RT	4.30	5.00	4.30	5.00
		150 RT	4.77	5.55	4.77	5.55
		>300 RT	5.25	6.10	5.25	6.10
Air Cooled	All Range	2.40	2.79	2.40	2.79	





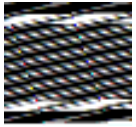
Minimum Energy Efficiency Performance

Item	Capacity (ton/hr)	Efficiency Standard (%)
Water-Tube Oil-Fired Boiler	≥ 30	92.5
	$\geq 10 < 30$	91
	$\geq 5 < 10$	89.5
	< 5	88.5
Water-Tube Gas-Fired Boiler	≥ 30	93.5
	$\geq 10 < 30$	92.5
	$\geq 5 < 10$	91.5
	< 5	90.5
Smoke-Tube Oil-Fired Boiler	≥ 30	90
	$\geq 10 < 30$	89
	$\geq 5 < 10$	88
	< 5	87
Smoke-Tube Gas-Fired Boiler	≥ 30	92
	$\geq 10 < 30$	91
	$\geq 5 < 10$	90
	< 5	89



Note: This Efficiency Standard is applicable to steam boilers oil- or gas-fired, but not for through flow boilers.



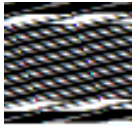


Voluntary Energy Labelling Programme

Electric Fans

Type	Fan dia. (cm)	Energy factor (m ³ /min/W)
Auto-revolving hanging fan	35	1.01
	40	1.07
Floor fan	30	0.81
	35	0.87
	40	0.92
	50	0.91
	60	0.87
Ceiling fan	60	0.87
	90	1.15
	120	1.46
	130	1.45
	140	1.45
	150	1.47
Table-top fan	18	0.64
	20	0.66
	23	0.66
	25	0.67
	30	0.79
	35	0.86
	40	0.91

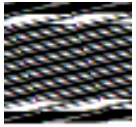




Voluntary Energy Labelling Programme

- I. Dehumidifiers: dehumidification energy factor $E.F \geq 1.0$ liter/kWh
- II. Clothes Dryers: cycle energy factor $E.F \geq 1.7$ kg/kWh
- III. Clothes Washers: energy consumption ≤ 0.015 kWh/kg, complete wash
- IV. TVs: stand-by power ≤ 1 W; switching to stand-by after 20 minutes without signal
- I. Fluorescent Lamps: lighting efficiency ≥ 90 lm/W @ average color rendering property ≥ 80 , for products consuming more than 32 watts of electricity





Voluntary Energy Labelling Programme

I. Air-conditioners: $EER/EER_{min} \geq 1.15$

II. Refrigerators: $E.F/E.F_{min} \geq 1.15$

