Asia-Pacific
Economic Cooperation

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Economy Update - Chinese Taipei

Purpose: Information
Submitted by: Chinese Taipei

**50th Expert Group on Energy Efficiency and
Conservation Meeting
Moscow, Russia
6-7 October 2017**

經濟部能源局
Bureau of Energy

50ᵗʰ Meeting of the APEC Expert Group on Energy Efficiency & Conservation (EGEE&C), Moscow, Russia.

ECONOMY UPDATES for Chinese Taipei

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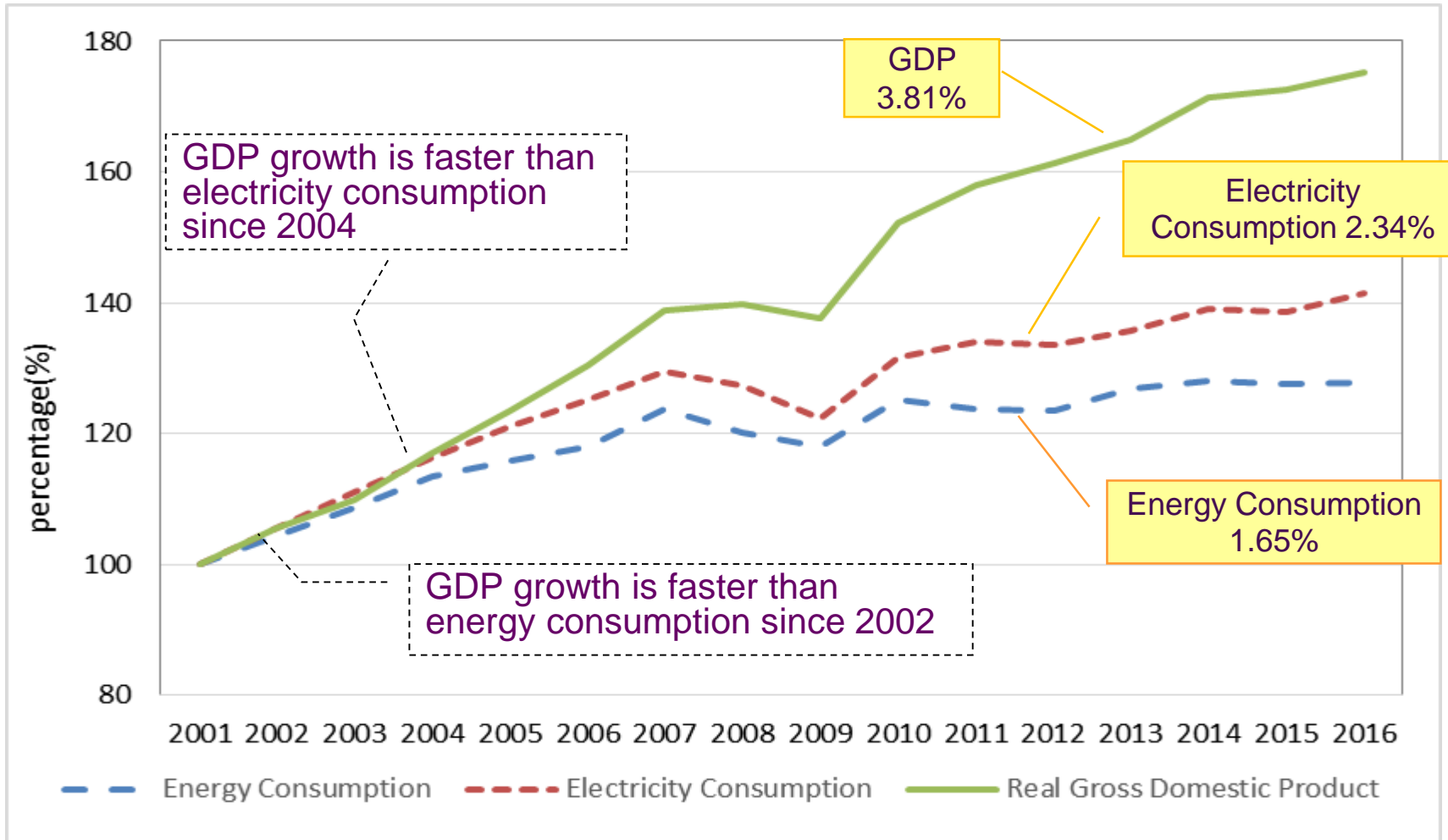
Chinese Taipei

Oct. 6-7, 2017

1. Energy Situation

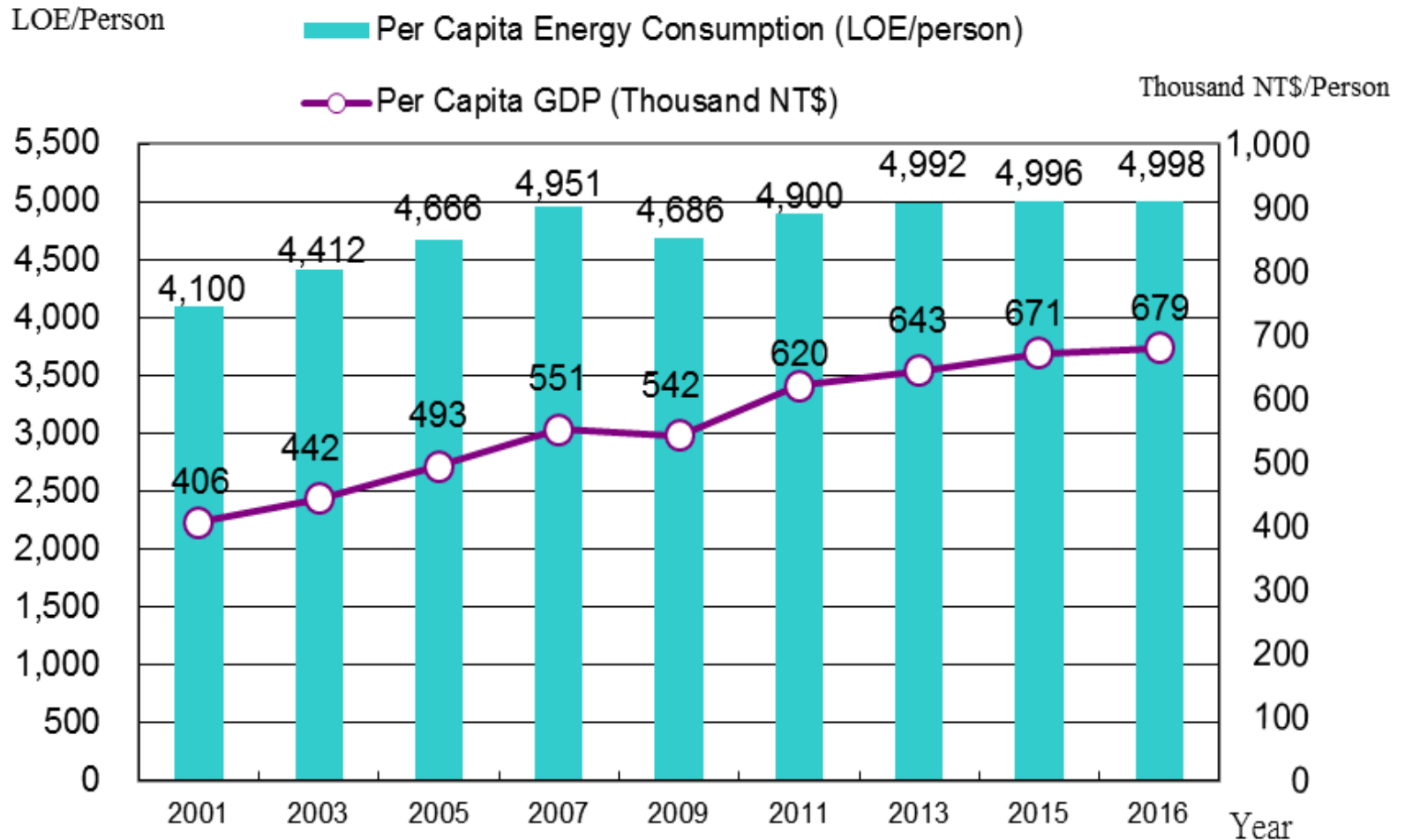## ◆ Trend of GDP, Energy and Electricity Consumption Growth

GDP
3.81%

GDP growth is faster than electricity consumption since 2004

Electricity Consumption 2.34%

Energy Consumption 1.65%

GDP growth is faster than energy consumption since 2002

Legend: Energy Consumption — Electricity Consumption — Real Gross Domestic Product

Source：Energy Statistics 2017, Bureau of Energy, Chinese Taipei.

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◆ Trend of Per Capita Real GDP and Per Capita Energy Consumption

LOE/Person

- Per Capita Energy Consumption (LOE/person)
- Per Capita GDP (Thousand NT$)

Thousand NT$/Person

Year	2001	2003	2005	2007	2009	2011	2013	2015	2016
Per Capita Energy Consumption (LOE/person)	4,100	4,412	4,666	4,951	4,686	4,900	4,992	4,996	4,998
Per Capita GDP (Thousand NT$)	406	442	493	551	542	620	643	671	679

Source ： Energy Statistics 2017, Bureau of Energy, Chinese Taipei.

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◆ Trend of Energy Productivity and Energy Intensity

Decrease by 2.26% per annum since 2005
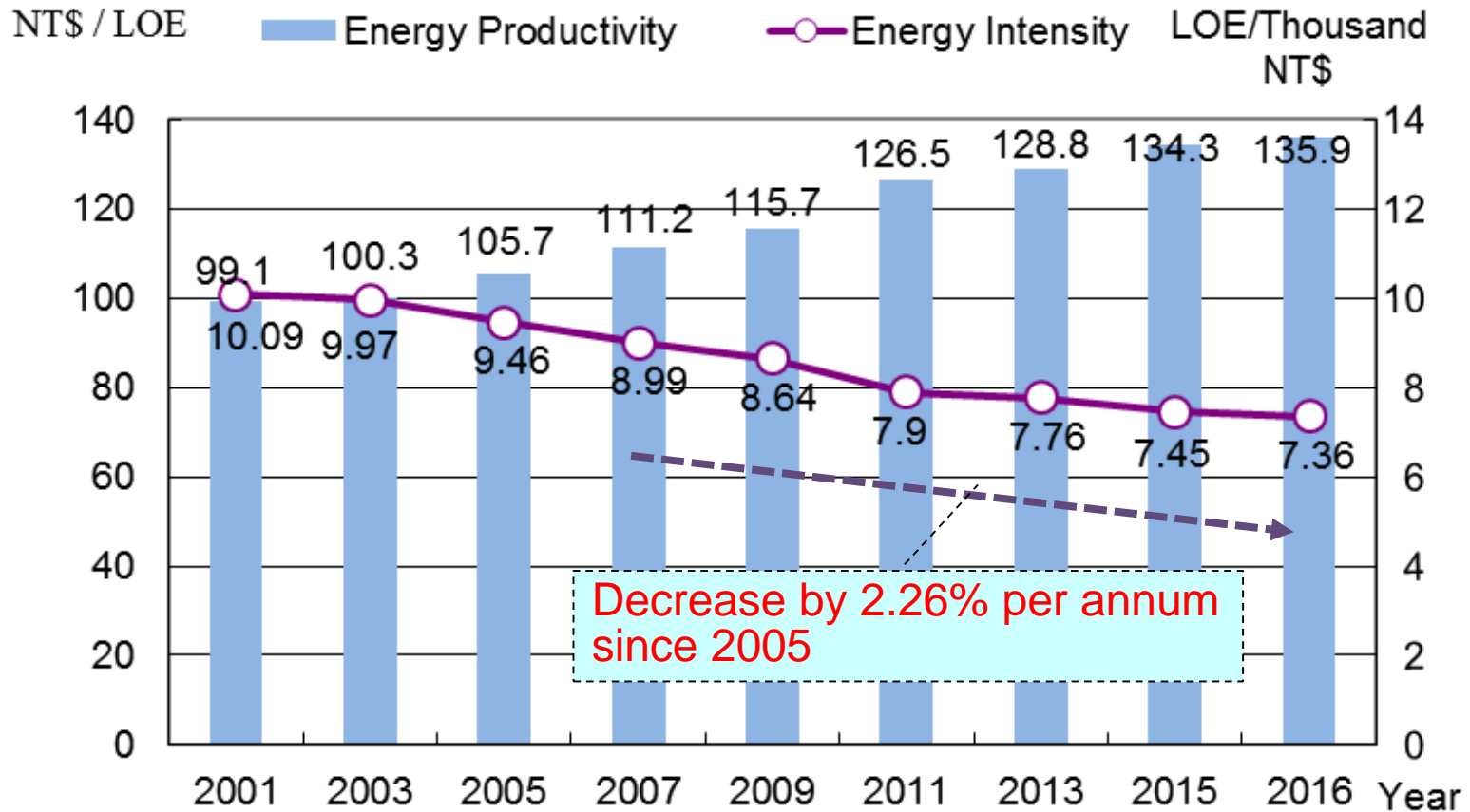
2. Energy Policy Framework

2. Energy Policy Framework *(1/5)*

◆ The Overall Goal on Energy Conservation and GHGs Emission Reduction

(1)   The Aim of Energy Conservation

To annually increase more than 2% of energy efficiency next eight years, and make energy intensity decrease by 20% or above in 2015 comparing with 2005; moreover, to make energy intensity decrease by 50% or above in 2025 by means of technological breakthroughs and supporting measures.
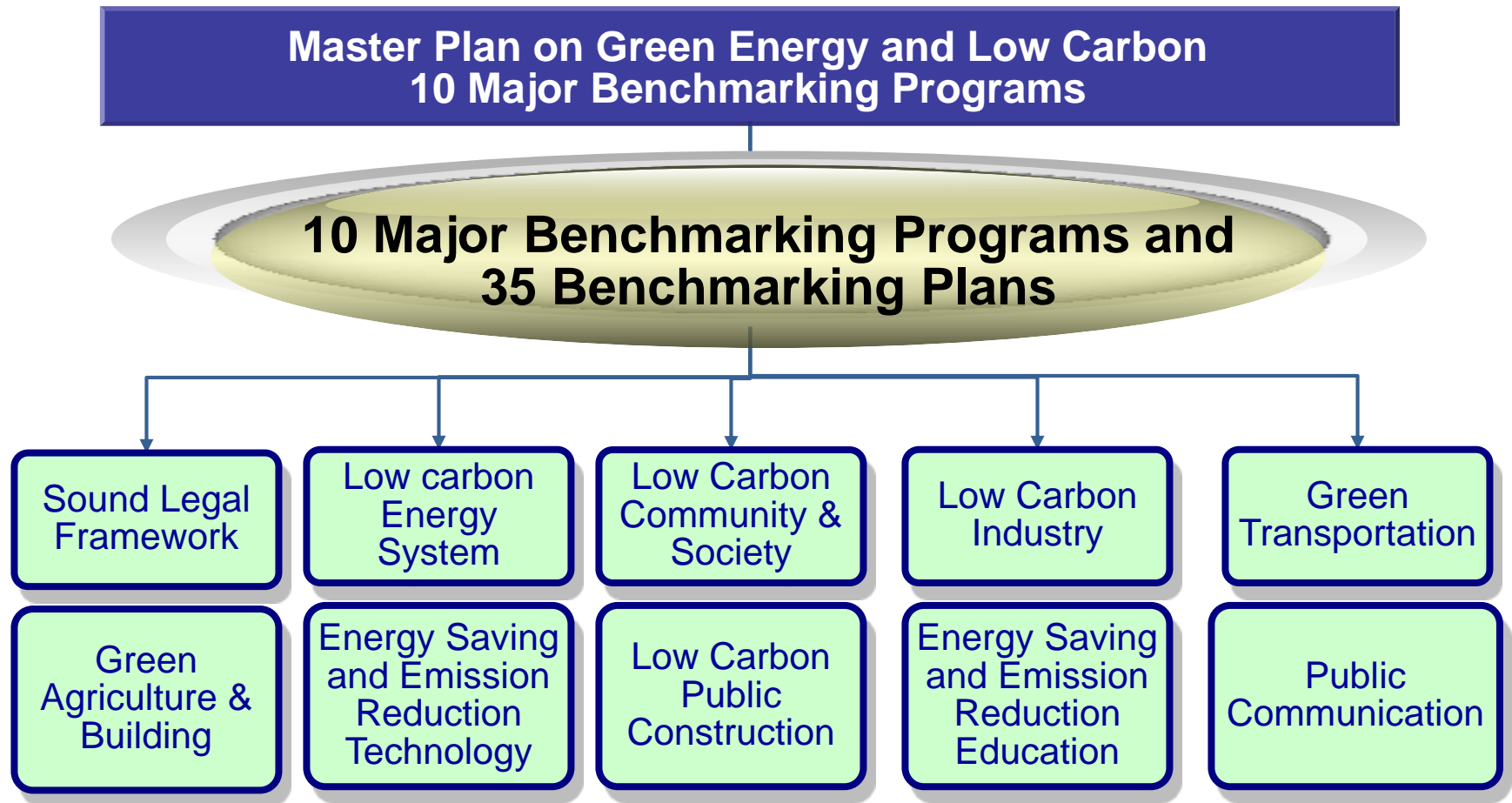
(2)   The Aim of Carbon Reduction

Reduce national carbon dioxide emissions, that is, the amount of emissions in 2020 decrease to the amount in 2005, and decrease the amount of carbon dioxide emissions in 2025 to the amount in 2000.

Source： Policy & Program 2017, Bureau of Energy, Chinese Taipei.

2. Energy Policy Framework *(2/5)*

◆ Master plan on Green Energy and Low Carbon

**Master Plan on Green Energy and Low Carbon
10 Major Benchmarking Programs**

**10 Major Benchmarking Programs and
35 Benchmarking Plans**

Sound Legal Framework	Low carbon Energy System	Low Carbon Community & Society	Low Carbon Industry	Green Transportation
Green Agriculture & Building	Energy Saving and Emission Reduction Technology	Low Carbon Public Construction	Energy Saving and Emission Reduction Education	Public Communication

Source ： Policy & Program 2017, Bureau of Energy, Chinese Taipei.

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2. Energy Policy Framework *(3/5)*

◆ The Effect of Implementation and Important Milestones

➢ Finish "Plan for departments'CO_2 Emission reduction in 2020 and 2050"

➢ Establish "Energy conservation & carbon reduction service group"

➢ Plan to finish "Our overall strategy-oriented energy efficiency and strengthen the methods" and "Specific measures of energy conservation & carbon reduction in residential, commercial and transport sector"

➢ Finish "Strengthen the operating mechanism for Executive Yuan's Energy Conservation & Carbon Reduction Promotion Board"

Source : Policy & Program 2017, Bureau of Energy, Chinese Taipei.

2. Energy Policy Framework *(4/5)*

◆ The Effect of Implementation and Important Milestones

➢ Create a new era of renewable energy --

- The density of installing solar water heating systems ranks 5th in the world

- Manufacturing for large-scale wind turbines (2MW) ranks 8th in the world

- Fully promote Biodiesel from B1 to B2 (add 2 % of biodiesel to diesel oil).

- Build a world-class scale, The largest solar power plant in Chinese Taipei with installed capacity to 4.6MW.

Source： Policy & Program 2017, Bureau of Energy, Chinese Taipei.

2. Energy Policy Framework *(5/5)*

◆ The Effect of Implementation and Important Milestones

➤ Move toward to low-carbon society and general carbon reduction --

- Power-saving competition: since 2008 until November 2011, people saved 13.8 billion degrees (quite 1.86 times of Taipei households' annual electricity consumption in 2000).

- Low-carbon island in Penghu, and four large low-carbon model of urban development.

- By September 2011, complete replacing 690,000 LED traffic lights.

- Implement labeling energy efficiency classification and promote the peremptory norms for specific energy users to conserve energy (such as air-conditioning shall not leak).

Source： Policy & Program 2017, Bureau of Energy, Chinese Taipei.

3. Energy Efficiency Management

Mandatory Energy Efficiency Management Programs

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Policy	MEPS	Energy Efficiency Grade Labeling
Promoting Date	December, 1999	July, 2010
Purpose	Manufacturers and importers are obliged to apply in advance for compliance certification	Provide consumers with useful information when they choose among various models
Item	22 product categories	14 product categories
Product	1. Air Conditioners (change EER to CSPF) 2. Refrigerators 3. Dehumidifiers 4. Fluorescence Lamps 5. Ballast for Fluorescent Lamps 6. Compact florescent lamps 7. Fluorescent Lamps with embedded ballasts 8. Incandescent bulbs 9. Electric Hot Water Pots 10. Electric Storage Tank Water Heaters 11. Warm-Hot Water Dispensers 12. Chilled-Warm-Hot Water Dispensers **13. Warm-Hot Drinking Water Dispensers** **14. Chilled-Warm-Hot Drinking Water Dispensers** 15. Vehicles 16. Motorcycles 17. Fishing vessel engines 18. Low-voltage single-phase induction motors 19. Low-voltage three-phase squirrel-cage induction motors 20. LED Lamps 21. Air-condition systems 22. Boilers	1. Air Conditioners (2010.7.1) 2. Refrigerator/Freezer (2010.7.1) 3. Automobiles (2010.7.1) 4. Motorcycles (2010.7.1) 5. Dehumidifiers (2011.3.1) 6. Self-ballasted fluorescent lamps (2011.7.1) 7. Instantaneous Gas Water Heaters (2012.12.6) 8. Gas Stoves(2012.12.06) 9. Electric hot water pots (2015.01.01) 10. Electric Storage Tank Water Heaters (2015.10.01) 11. Warm-Hot Water Dispensers (2016.12.01) 12. Chilled-Warm-Hot Water Dispensers (2016.12.01) **13. Warm-Hot Drinking Water Dispensers (2018.01.01)** **14. Chilled-Warm-Hot Drinking Water Dispensers (2018.01.01)**

Voluntary Energy Efficiency Management Program

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Policy	Energy Conservation Label
Promoting Date	December, 2001
Purpose	Encourage consumers to buy high-efficiency products and to enhance market penetration of high-efficiency products
Item	49 product categories
Product	1. Air Conditioners 2. Refrigerators 3. Dehumidifiers 4. Circulation Fans 5. Washing Machines 6. Clothes Dryers 7. Fluorescence Lamps 8. Hand Dryers 9. Hair Dryers 10. Warm-Hot Water Dispensers 11. Chilled-Warm-Hot Water Dispensers 12. Chilled-Warm-Hot Drinking Water Dispensers 13. Warm-Hot Drinking Water Dispensers 14. Vehicles 15. Motorcycles 16. Fluorescent Lamps with embedded ballasts 17. Gas burning cooking appliances 18. Instantaneous Gas Burning Water Heaters 19. Electric Cookers 20. Electric Storage Tank Water Heaters 21. Electric Hot Water Pots 22. Exit Lights and Emergency Direction Lights 23. Televisions 24. Displays 25. DVD Recorder and Player 26. Indoor Light Fixtures 27. Integrated Stereos 28. Compact Fluorescent Lamps 29. Copy machines 30. Printers 31. Air Cleaners 32. Luminaires for road and street lighting 33. Ventilating Fans for Bath Room Use 34. Ventilating Fans for Window Type 35. Notebook Computers 36. Desktop Computers 37. Air Source Heat Pump Water Heater 38. Range Hoods 39. Microwave Ovens 40. Axial flow Fans 41. Centrifugal fan 42. Ballast for Fluorescent Lamps 43. Electric Ovens 44. Electric Storage Tank Boiling Water Heaters 45. LED planar lamp 46. LED Lamps 47. VFI UPS **48. High bay Luminaire (2017.02.01)** **49. Downlights and Recessed luminaires (2018.05.01)**

Mandatory Energy Efficiency Management Programs

MEPS &
Energy Efficiency Grade Labeling System

MEPS for Drinking Water Machine

➢ History:

Warm-Hot & Chilled-Warm-Hot Drinking Water Dispenser standard will take effect in **Jan. 01 2018**.

➢ Test method:

CNS 3910 Drinking Water Dispenser for piping water supply under 60L/h with electric heater for hot water and refrigeration/TE system for chilled water

➢ Energy Efficiency Standard: (MEPS) ⊖→

	Warm-Hot Type Normalized Standing Loss per 24h $E_{st,24(kWh)}$	**Chilled-Warm-Hot Type** Standing Loss per 24h $E_{24(kWh)}$
MEPS	$0.053 \times V_1 + 0.750$	$0.09 \times V_{eq} + 0.45$

Notes:

$V_{eq} = V_1 \times K_1 + (V_2 \times K_2)/3$

V_1 is the nameplate values of hot-water tank(unit：liter); $K_1 = (T_h - T_{amb}) / (100 - T_{amb})$

V_2 is the nameplate values of iced-water tank(unit：liter); $K_2 = (T_{amb} - T_c) / (T_{amb})$

Testing and calculation of normalized standing loss per 24h ($E_{st,24}$) & standing loss (E_{24}) shall comply with CNS 3910 in Chinese Taipei.

Drinking Water Dispensers
(will take effect in **Jan. 01 2018**)

◆ Energy efficiency grade labeling requirements for Warm-Hot Type

Energy Efficiency Rating	Normalized Standing Loss per 24h, Est,24 (kWh)
Class 1	$E_{st,24} \leqq 0.032V+0.450$
Class 2	$0.032V+0.450 < E_{st,24} \leqq 0.037V+0.525$
Class 3	$0.037V+0.525 < E_{st,24} \leqq 0.042V+0.600$
Class 4	$0.042V+0.600 < E_{st,24} \leqq 0.048V+0.675$
Class 5	$0.048V+0.675 < E_{st,24} \leqq 0.053 \times V+0.750$

◆ Energy efficiency grade labeling requirements for Chilled-Warm-Hot Type

Energy Efficiency Rating	24-hr Energy Consumption E_{24} (kWh)
Class 1	$E_{24} \leqq 0.054 \times V_{eq} +0.270$
Class 2	$0.054 \times V_{eq} +0.270 < E_{24} \leqq 0.063 \times V_{eq} +0.315$
Class 3	$0.063 \times V_{eq} +0.315 < E_{24} \leqq 0.072 \times V_{eq} +0.360$
Class 4	$0.072 \times V_{eq} +0.360 < E_{24} \leqq 0.081 \times V_{eq} +0.405$
Class 5	$0.081 \times V_{eq} +0.405 < E_{24} \leqq 0.09 \times V_{eq} +0.45$

Electric Refrigerators and Freezers

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➤ Revised energy efficiency grade labeling regulation will take effect in **Jan. 01 2018,** but MEPS will keep as the same as carried out in 2011.

➤ Test and calculate actual energy factor (E.F.) values of refrigerator according to CNS 2062. (*EF=V_{eq} / energy consumption for 30 days*)

➤ MEPS

Product class	MEPS for EF(L/kWh/month)
Fan-circulation type refrigerator-freezers for V<400L (automatic defrost)	$EF=V/(0.037V+24.3)$
Fan-circulation type refrigerator-freezers for V≥400L (automatic defrost)	$EF=V/(0.031V+21.0)$
Direct cooled refrigerator-freezers for V<400L (manual defrost)	$EF=V/(0.033V+19.7)$
Direct cooled refrigerator-freezers for V≥400L (manual defrost)	$EF=V/(0.029V+17.0)$
Refrigerators	$EF=V/(0.033V+15.8)$

➤ Energy efficiency grade labeling regulation

| Product class	Grade 5	Grade 4	Grade 3	Grade 2	Grade 1
Fan-Type & Direct - Cooled Type	MEPS ≤ EF< MEPS×115%	MEPS×115% ≤ EF< MEPS×130%	MEPS×130% ≤ EF< MEPS×145%	MEPS×145% ≤ EF< MEPS×160%	EF ≥ MEPS×160%
Refrigerator only	MEPS ≤ EF< MEPS×118%	MEPS×118% ≤ EF< MEPS×136%	MEPS×136% ≤ EF< MEPS×154%	MEPS×154% ≤ EF< MEPS×172%	EF ≥ MEPS×172%

➢ Energy Consumption Comparison for MEPS & the energy efficiency grade labeling standard
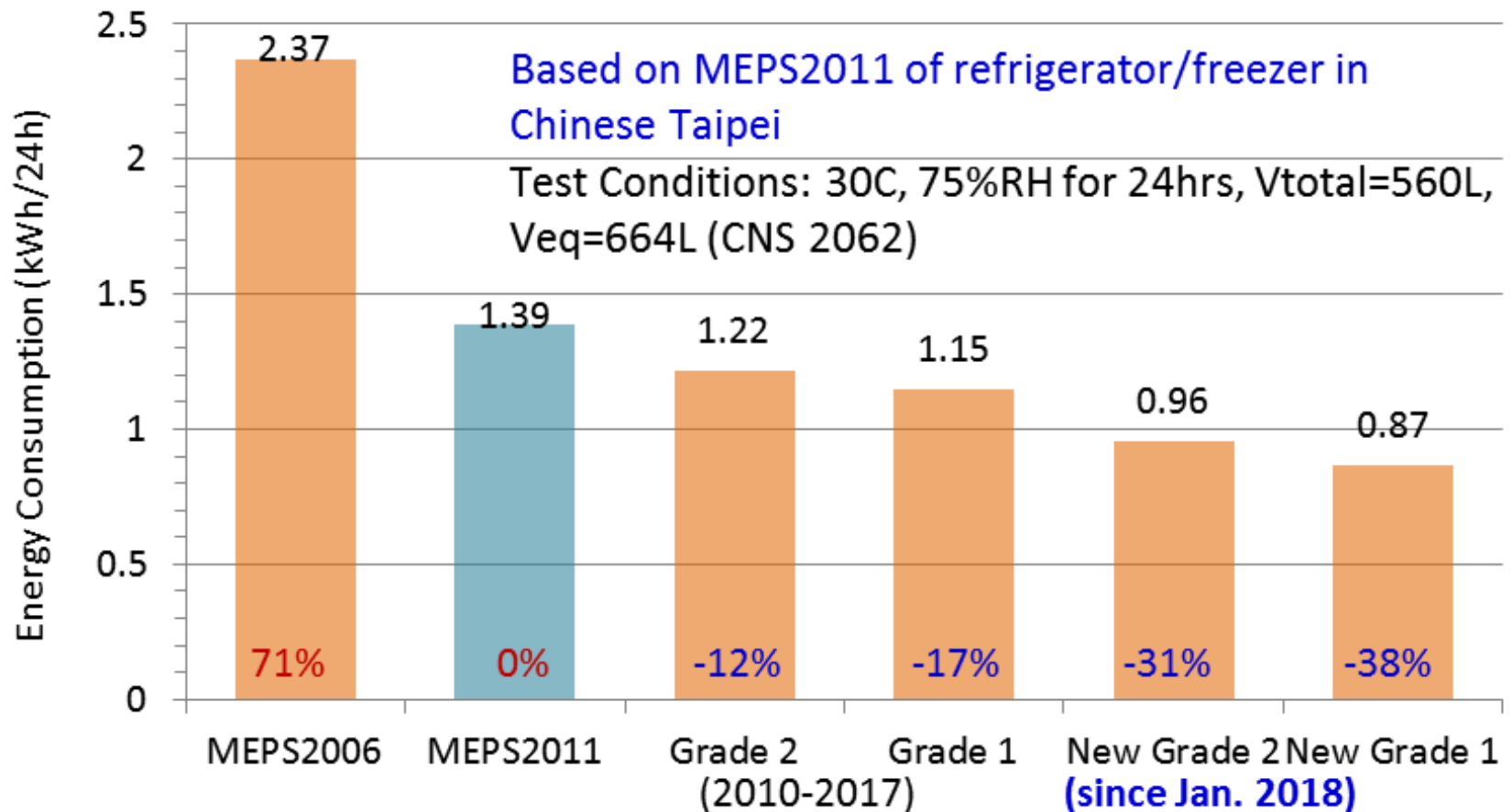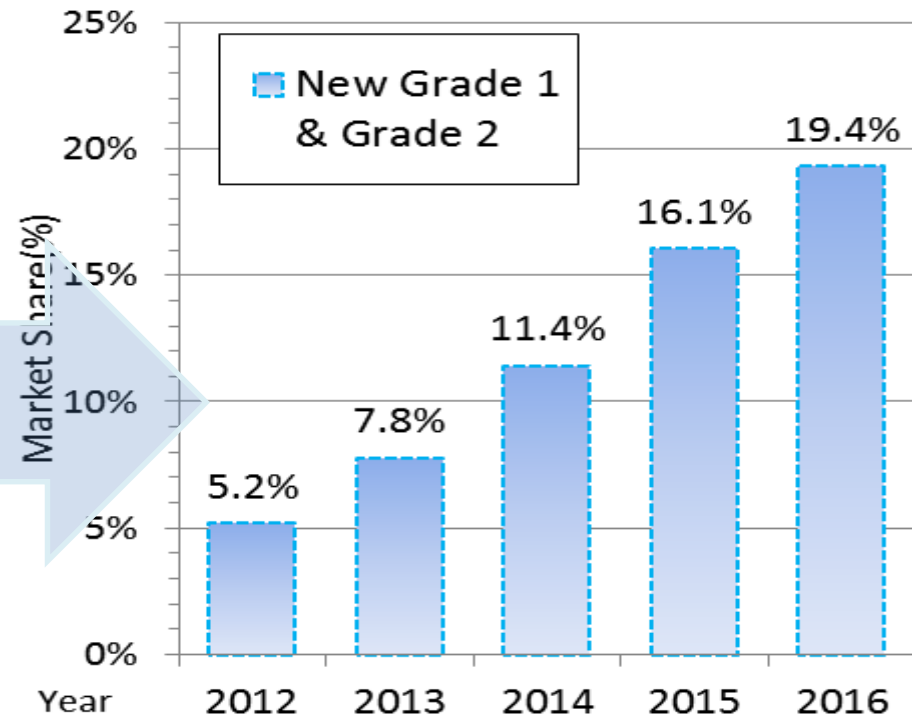
Electric Refrigerators and Freezers

➢ Market share for new Grade 1 & Grade 2 of revised energy efficiency rating standard in Chinese Taipei
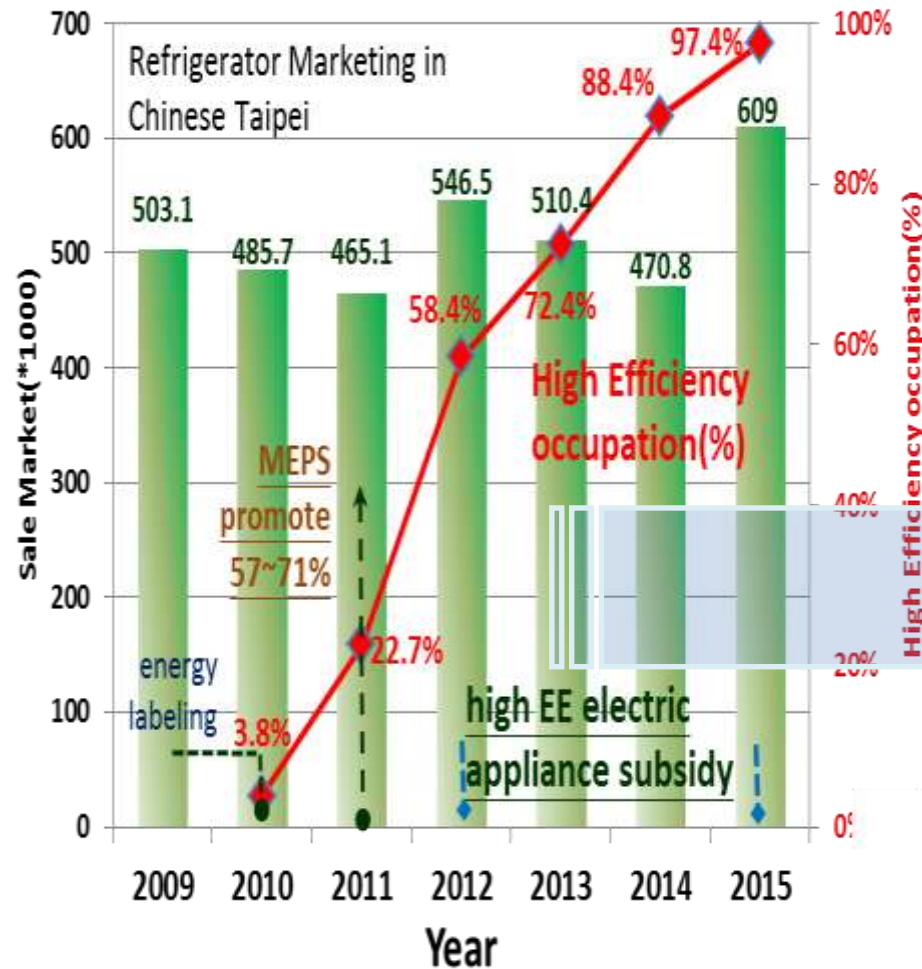
Current Program (2010~2017)
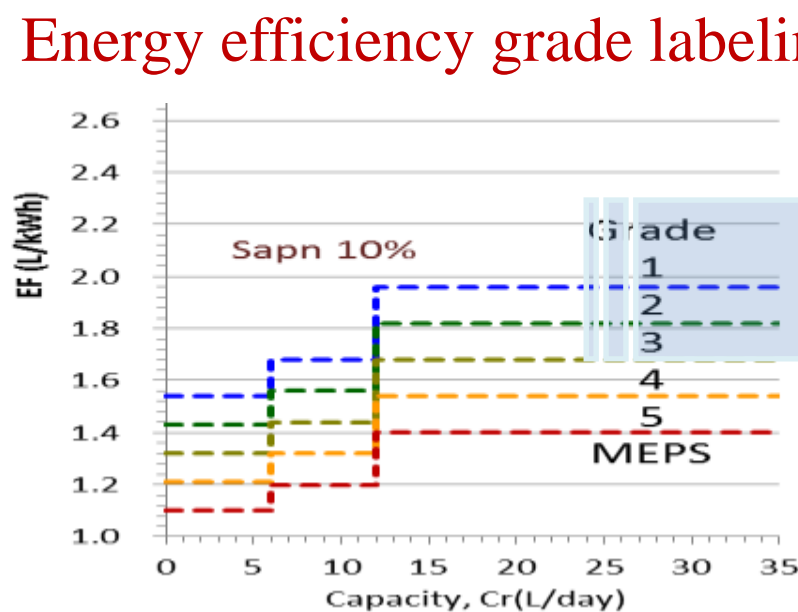
Revised Program (2018~)

Dehumidifier

➢ Revised energy efficiency grade labeling regulation will take effect in **Jan. 01 2018,** but MEPS will keep as the same as carried out in 2011.

➢ Test and calculate actual energy factor (E.F.) values of dehumidifier according to CNS 12492 (*EF= Capacity / energy consumption*)
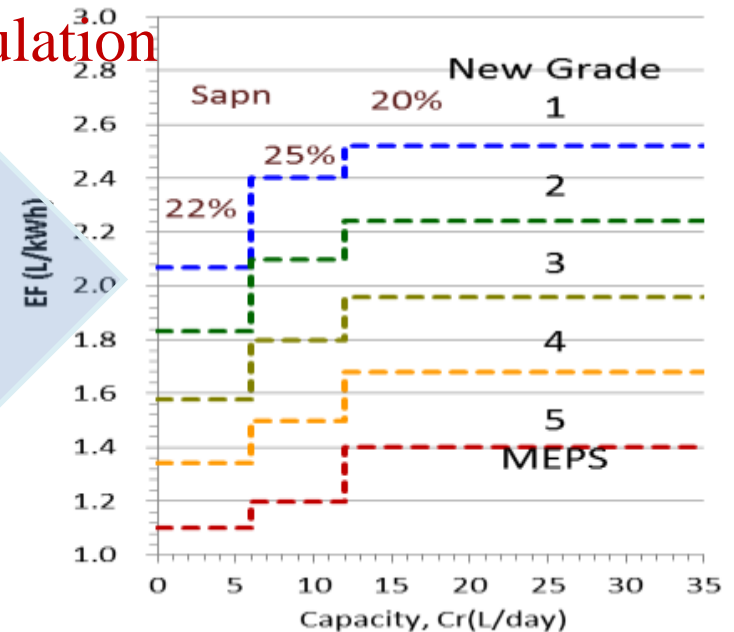
➢ MEPS

Rated Capacity Cr (L/day)	MEPS for EF (L/kWh)
Cr $\leqq$ 6	1.10
6 < Cr $\leq$ 12	1.20
Cr > 12	1.40

➢ Energy efficiency grade labeling regulation

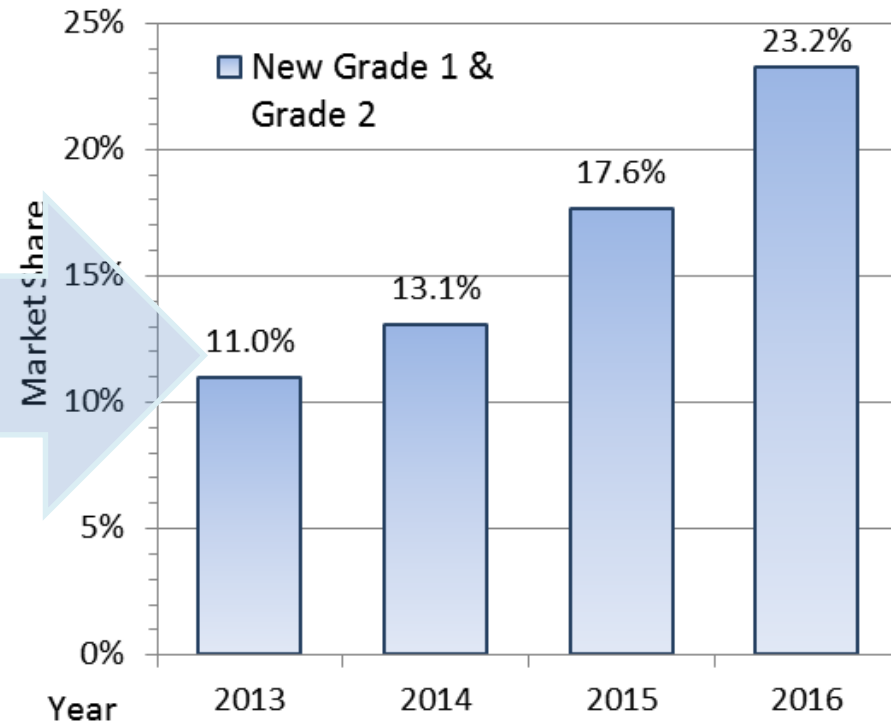Current Program (2010~2017)   Revised Program (2018~)

Dehumidifier

➢ Market share for new Grade 1 & Grade 2 of revised energy efficiency rating standard in Chinese Taipei

Current Program (2010~2017)

Revised Program (2018~)

Energy Conservation Labeling

High bay Luminaire

➢ **Scope of Application:**

  1) Ordinary downward-projecting type of suspended or ceiling-mounted lamps that have been verified by this Office, and the rated total light flux should be over 4,000 lumen (lm).

  2) Comply with CNS 14335 and CNS 14115

➢ **History:**

  Announced on Sep. 10,2016. Valid until Feb. 01, 2017

➢ **Requirement:**

- The tested energy efficiency value shall be over 95% of the indicated value and shall meet the following requirements:

  Tested Energy Efficiency Value (lm/W) = Tested Total Light Flux (lm) / Total Input Power (W)

  (1) Where the total light flux of the lamp is below 20,000lm, then it shall be over 110.0 (lm/W)

  (2) Where the total light flux of the lamp is more than 20,000lm, then it shall be over 80.0 (lm/W)

- Other generality requirements

Downlights and Recessed luminaires

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➤ **Scope of Application:**

1) Conform to CNS 14335, 14115 and 15592 or other standards approved

2) Downlights: ceiling mounted or downward hanging light with barrel or column looks

➤ **History:**

Announced on Mar. 23, 2017. Valid until May 01, 2018

➤ **Requirement:**

- The tested energy efficiency value shall be over 95% of the indicated value and shall meet the following requirements:

Tested Energy Efficiency Value (lm/W) = Tested Total Light Flux (lm) / Total Input Power (W)

(1) Actual luminaire efficiency value: 95% or more than the rating and greater than 110.0 (lm/w).

(2) Other generality requirements

Electric Refrigerator/Freezer
(Fan-type refrigerator-freezer , Direct cooling-type , Refrigerator only)

➢ Introduction:

The test conditions and method for measuring the Energy Factor (E.F.) shall meet the requirements of the CNS 2062.

➢ History:

Revision Promulgated and in effected May 31, 2017.

Efficiency Criteria (~New Grade 1 & 2 for Energy efficiency grade labeling)

Type	E.F.(V/Kwh/month)
Fan-type refrigerator-freezer with equivalent interior capacity less than 400 liter	E.F.=(V/(0.037×V+24.3)×1.45
Fan-type refrigerator-freezer with equivalent interior capacity greater than 400 liter	E.F.=(V/(0.031×V+21.0)×1.45
Direct cooling-type refrigerator-freezer with equivalent interior capacity less than 400 liter	E.F.=(V/(0.033×V+19.7)×1.45
Direct cooling-type refrigerator-freezer with equivalent refrigerated capacity greater than 400 liter	E.F.=(V/(0.029×V+17.0)×1.45
Refrigerator only	E.F.=(V/(0.033×V+15.8)×1.54

Dehumidifier

➢ **Introduction:**

The test conditions and method for measuring the Energy Factor (E.F.) shall meet the requirements of the CNS 12492.

➢ **History:**

Revision Promulgated and in effected May 24, 2017.

Efficiency Criteria (~New Grade 1 & 2 for Energy efficiency grade labeling)

Rated Capacity Cr (L/day)	EF (L/kWh)
Cr $\leqq$ 6	1.83
6 < Cr $\leq$ 12	2.10
Cr > 12	2.24

Thank you for your attention