工業技術研究院
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Asia ESCO Conference 2010

The Management Mechanism for Energy Efficiency of Chiller Units in Taiwan

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- Current Situation in Taiwan
- Proposal for the Mandatory Mechanism
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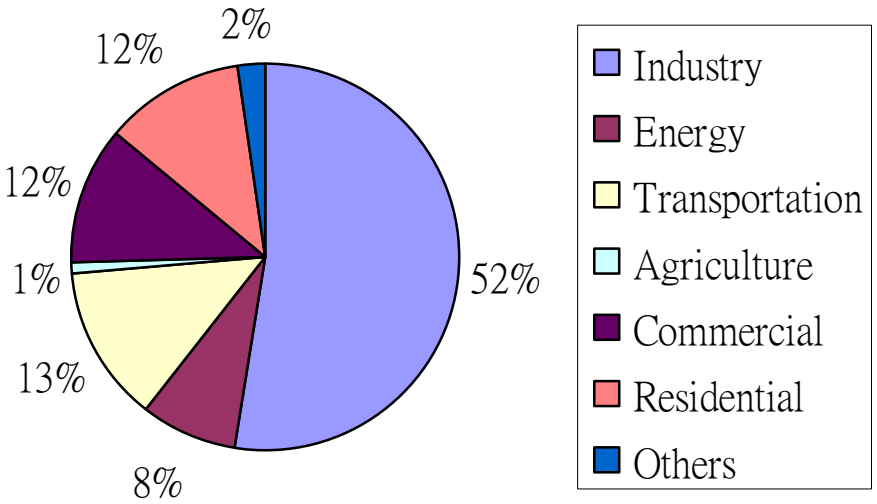
Energy Situation in Taiwan

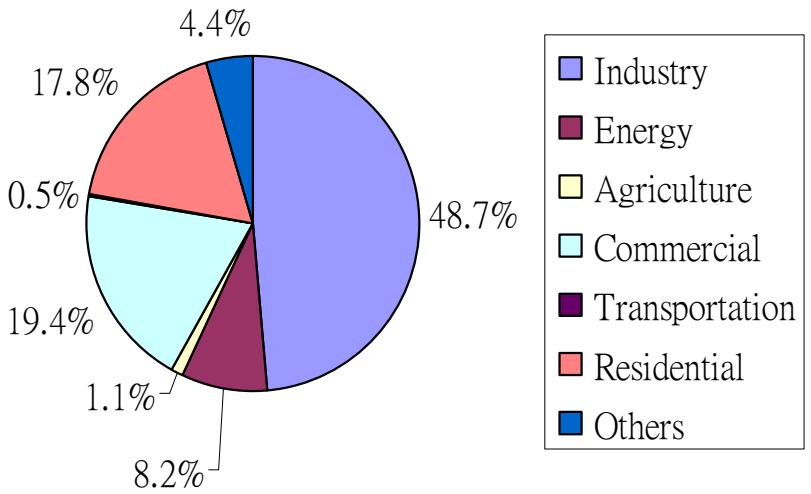
- More than 99% of energy was imported.
- In 2008, the final energy consumption for Industry sector is 52%, Residential and Commercial sectors 24%; Transportation sector 13%.
- **In 2008, the electricity consumption for Industry sector is 49%, Residential and Commercial sector 37%.**

Overall energy consumption in 2008



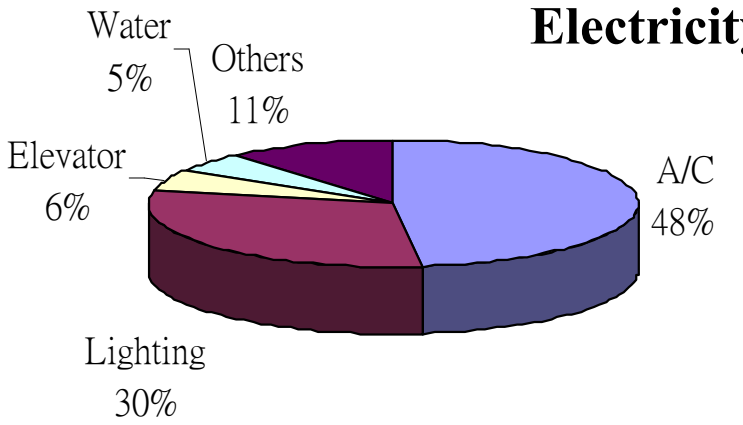
11.77 millions KLOE

Overall electricity consumption in 2008

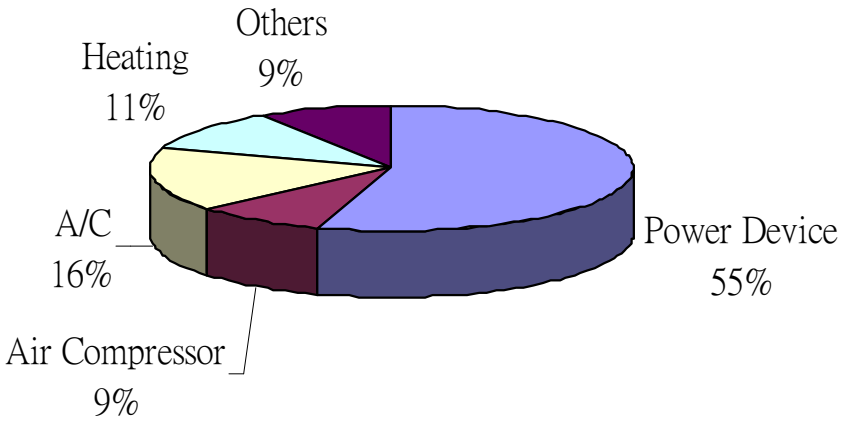


22.98 billions kW-h

Electricity Consumption in Taiwan



Electricity Consumption in C&R Sector



Electricity Consumption in Industry Sector

Background

- The Chiller Energy Efficiency Standard has been enforced in 2003 and upgraded in Jan.1, 2005
- To effectively implement the control mechanism, Bureau of Energy of MOEA ask EEL of ITRI assistance to promote and implement the control mechanism .
- To comply with the government energy conservation goal, and provide assistance to domestic chiller makers to up-grade their technologies, EEL further authorized Taiwan Refrigerating and Air-Conditioning Engineering Association (TRACEA) to promote and implement the control mechanism under voluntary base from 2003.

Energy Efficiency Standards

Stages			1st Stage		2nd Stage	
Date			2003.01.01		2005.01.01	
Type		Cooling Capacity	EER kcal/hr-W	COP W/W	EER kcal/hr-W	COP W/W
Water-cooled	Volumetric	<150 RT	3.50	4.07	3.83	4.45
		≧150 RT <500 RT	3.60	4.19	4.21	4.90
		≧500 RT	4.00	4.65	4.73	5.50
	Centrifugal	<150 RT	4.30	5.00	4.30	5.00
		≧150 RT <300 RT	4.77	5.55	4.77	5.55
		≧300 RT	4.77	5.55	5.25	6.10
Air-cooled	All		2.40	2.79	2.40	2.79

Standard：CNS 12575-2007

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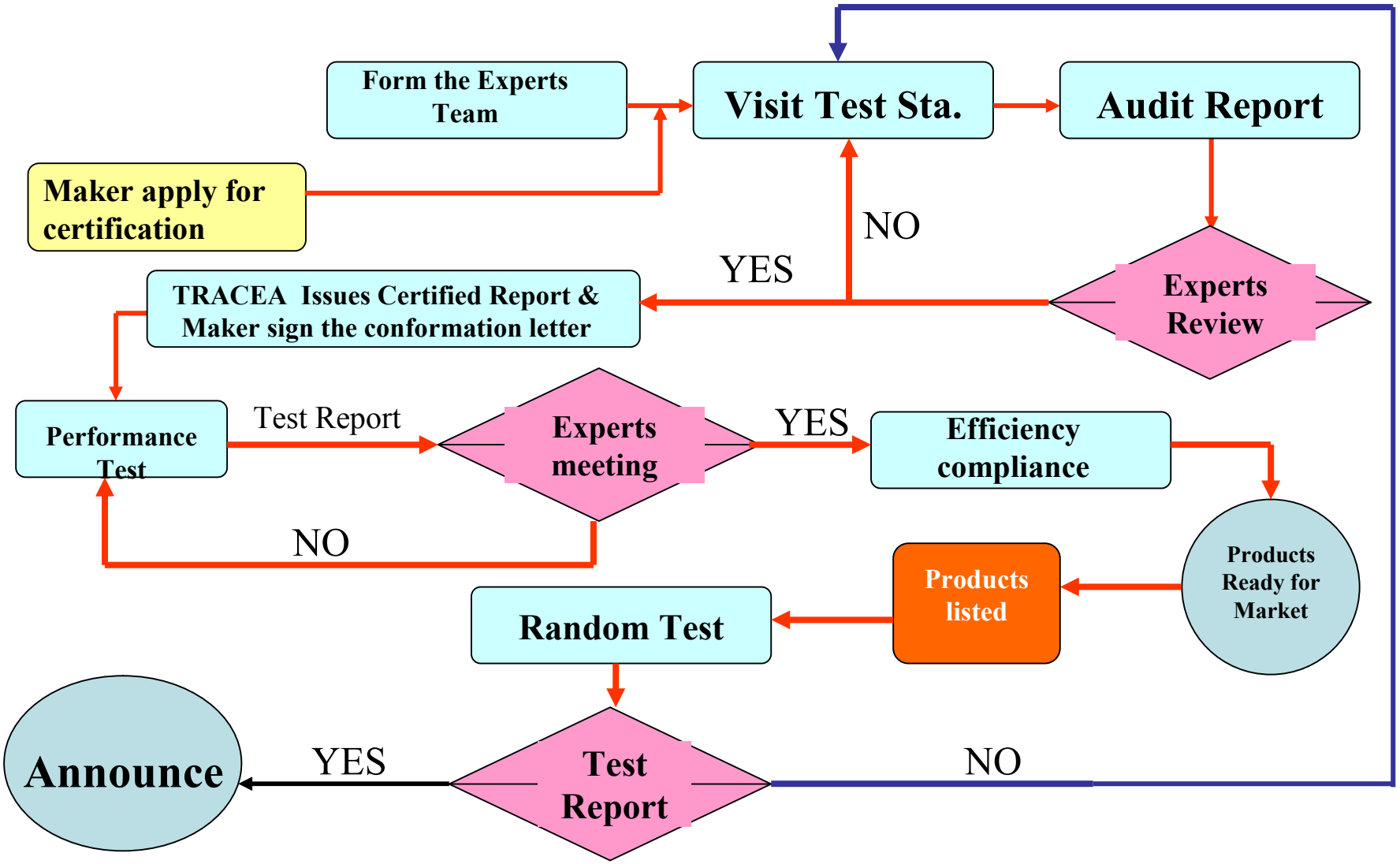
Guideline for Implementation

- **Accreditation** to manufacturer's testing facility, **Authorization** to their own testing report, and **Assessment** after receiving the testing report. **(3A)**
- Review the manufacturers test laboratory for their QA system, test methods and procedure, test personnel qualification, operation procedure, instruments calibration records.
- Authorize manufactures to test their chiller energy efficiency by themselves.
- Submit the test report to TRACEA for control, the manufactures may label their chillers with certified tag and deliver to it's the clients.
- An experts team formed by TRACEA may draw the products and send to a TAF (Taiwan Accreditation Foundation) certified laboratory for re-testing in random base.

Implementation Process



Implementation Procedure

- Organizing the chiller energy efficiency control experts team.
- Chiller manufactures apply to inspect and certify their test station.
- Arrange the expert team for test station visiting and inspectation, it will be a one day visit, include documents review & approval, shop inspect and chiller test witness.
- After the visit and review, the expert team will write the visit report and comments; and decide if they need for second visit. Final review shall be either documents review or shop review.
- Expert team held meeting to approve test report.
- Authorize the manufactures toy test theirs chiller energy efficiency by themselves, then submit the test report to TRACEA for control, the manufactures are award a certification to identify their qualification, the manufactures can label their tested products with certified tag and deliver to it's the clients .

Implementation Procedure(cont.)

- The products with certified tag means its energy efficiency meets the national standard and allow to sell. The TRACEA may periodically publish the testing result.
- **Afterward audit and random inspection** :

  1. Random draw inspection;
  2. By application (Users or Hostile competitors)
- Random inspection may send to TAF certified laboratory for test and comparison.

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Certification of Testing Facilities

中央空調用冰水機性能測試站合格證書

工業技術研究院
Industrial Technology
Research Institute

(98)台冷冰證字第 048 號

所屬中央空調用冰水機性能測試站

於民國　年　月　日經中央空調用冰水機效率管制推動委員會審查合格，符合「中央空調用冰水機能源效率自願性管理計畫」各項品質管制之要求。

測試站規格如下：

型　　式：☑ 水冷式　☑ 氣冷式

測試能力：8 冷凍噸(RT)　至　60 冷凍噸(RT)

有效期限：98 年 11 月 18 日　至 101 年 11 月 18 日

台灣區冷凍空調工程工業同業公會理事長　高劉銘　高劉銘

工業技術研究院能源與環境研究所所　長　董靜宇　董靜宇

中　華　民　國　九十八　年　十一　月　十八　日

工業技術研究院
Industrial Technology
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Certification of Energy Efficiency

冰水機能源效率合格證明

xxxxxxx 證字第_____號

(製造廠名稱)	
產品型號	
製造號碼	
壓縮機型號與數量	
壓縮機製造號碼	
冷凍能力實測值	RT
能源效率值(COP)	
測試日期	
測試報告編號	

中央空調用冰水機能源效率自願性管理計畫
指導單位：經濟部能源局
推動單位：工業技術研究院能源與環境研究所
台灣區冷凍空調工程工業同業公會

冰水機能源效率合格證明

xxxxxxx 證字第_____號

符合「中央空調用冰水機能源效率自願性管理計畫」之要求

指導單位：經濟部能源局
推動單位：工業技術研究院能源與環境研究所
台灣區冷凍空調工程工業同業公會

發行日期：中華民國　年　月　日

註：此份證明將於測試報告送至公會審核後發給，並由廠家黏貼於冰水機上。

Current Status of Voluntary Mechanism

- 23 testing facilities in 13 local manufacturers have been awarded the certification. 15 testing facilities for 5 foreign manufacturers were also passed the assessment and got the certification.
- These manufacturers can test their own chiller units and submit the testing reports to TRACEA for their review and got the passing stick to put on their chiller units.
- There are more than 2000 units has been awarded the labeling sticks by the end of last year (2009).

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Shifting from Voluntary to Mandatory

- The revised Energy Management Law was released in June of 2009.
- ITRI has set up the testing facilities with testing capacity 2000 RT for water-cooled and 200 RT for air-cooled units.
- It means that we have set up the enough capability to test most of the local or imported chiller units.

Proposal for Mandatory Mechanism

- Similar procedures as the voluntary mechanism (**3A**)
  - **Accreditation** to manufacturer's testing facility
  - **Authorization** to their own testing report
  - **Assessment** after receiving the testing report
- Multi-level of energy efficiency
- Standard type – post on the website in advance.
- Non-standard type – post on the website after get the testing report

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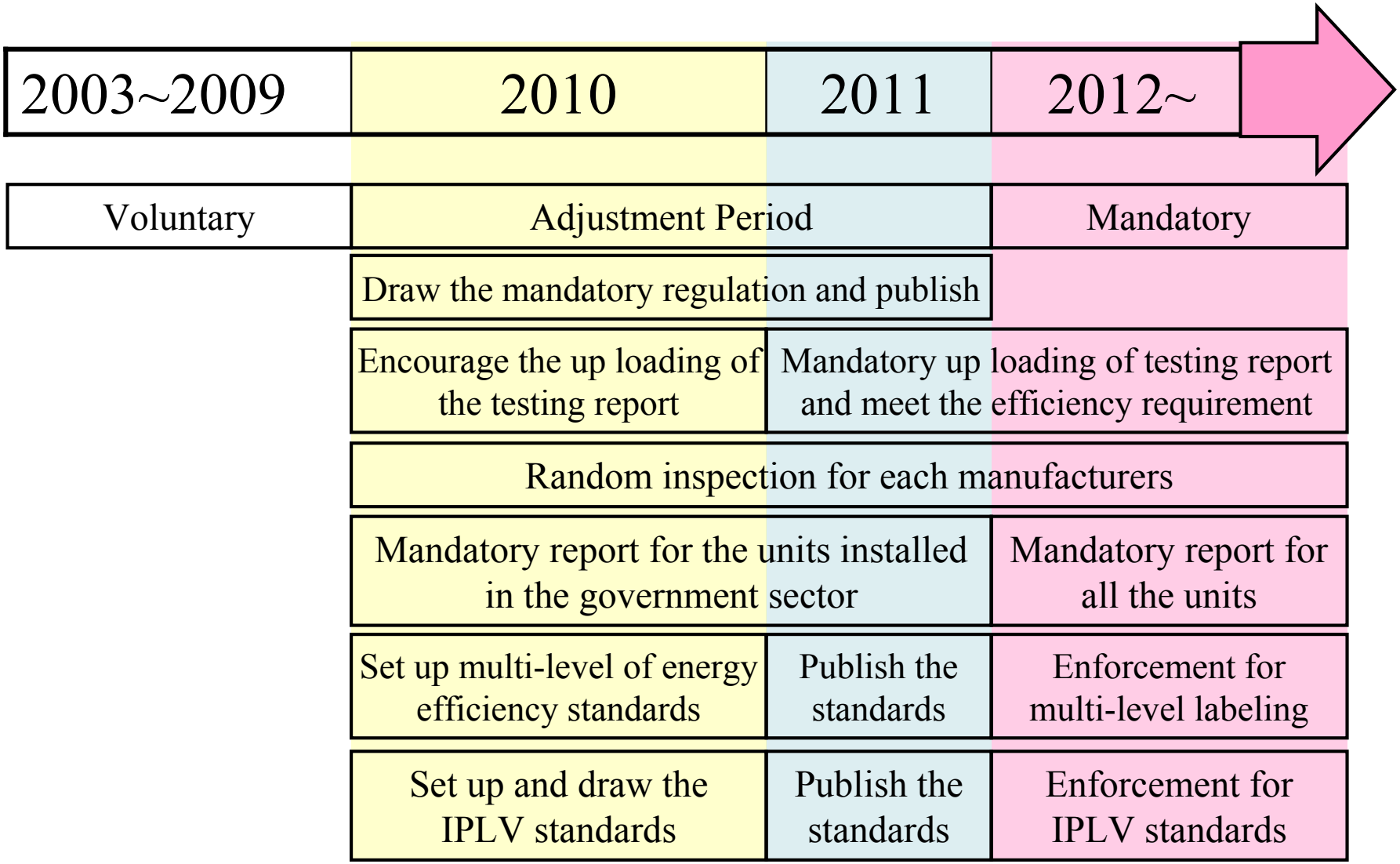
Proposed Schedule



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Conclusion Remarks

- The enforcement of the mandatory mechanism is one of the strategies to meet the target for energy conservation. It also can upgrade the technology for local manufacturers and increase the capability of global competition.
- Gradually shifting from voluntary to mandatory can reduce the impact for local manufacturers.
- Multi-level and IPLV are still under reviewing process. We will come out a suggestion for government reference before the enforcement of mandatory mechanism.

Thanks for Your Attention

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