



**Asia-Pacific  
Economic Cooperation**

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2017/EWG/EGEEC/WKSP2/008

## **Minimum Energy Performance Standard Regulation on Distribution Transformers in Viet Nam**

Submitted by: Viet Nam



**Workshop on Reducing Losses in Power  
Distribution Through Improved Efficiency of  
Distribution Transformers**

**Jeju, Korea  
28 March 2017**



Asia-Pacific  
Economic Cooperation



## Reducing Losses in Power Distribution through Improved Efficiency of Distribution Transformers (EWG 05 2015A)

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# MEPS Regulation on Distribution Transformers in Viet Nam

28 March 2017 | Jeju Island, Korea

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ORGANISERS:




International Copper  
Association Southeast Asia  
Copper Alliance



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# Energy labeling program in Viet Nam

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## Legal documents

- Law No 50/2010/QH12 on Energy conservation and efficient use, effective on 28 June 2010.
- Decree 21/2011/NĐ-CP, Regulation and measures to implement the Law on Energy conservation and efficient use, effective on 29/3/2011.
- Decree 134/2013/NĐ-CP, Regulation on penalty in energy efficiency and conservation.
- Circular 07/2012/TT-BCT, regulates and guides to register for energy labeling of appliances and equipment.

# Energy labeling program in Viet Nam

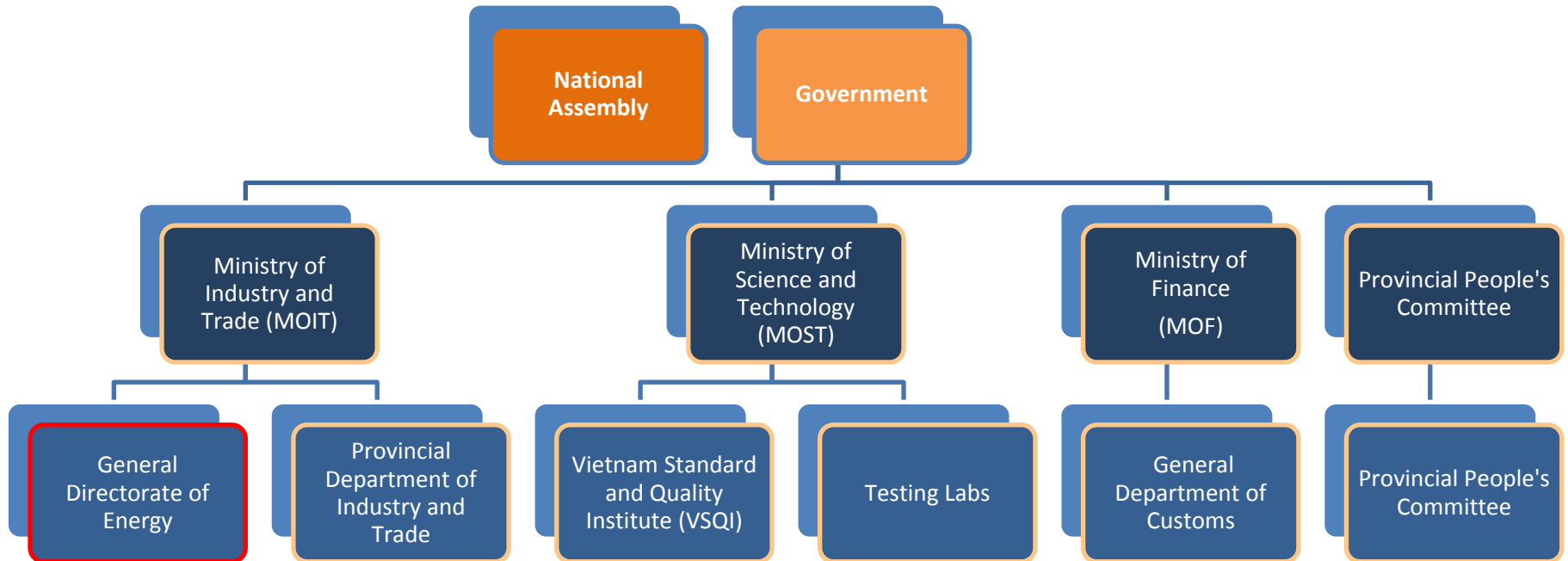
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- Decision 51/2011/QĐ-TTg & Decision 03/2013/QĐ-TTg stipulates the list of equipment subject to energy labeling program, application of MEPS and the roadmap.
- Decision 68/2011/QĐ-TTg, regulates state procurement of energy labeling products.
- Decision 78/2013/QĐ-TTg, stipulates the list of equipment and roadmap for rejecting lower than MEPS appliance/equipment

# Energy labeling program in Viet Nam

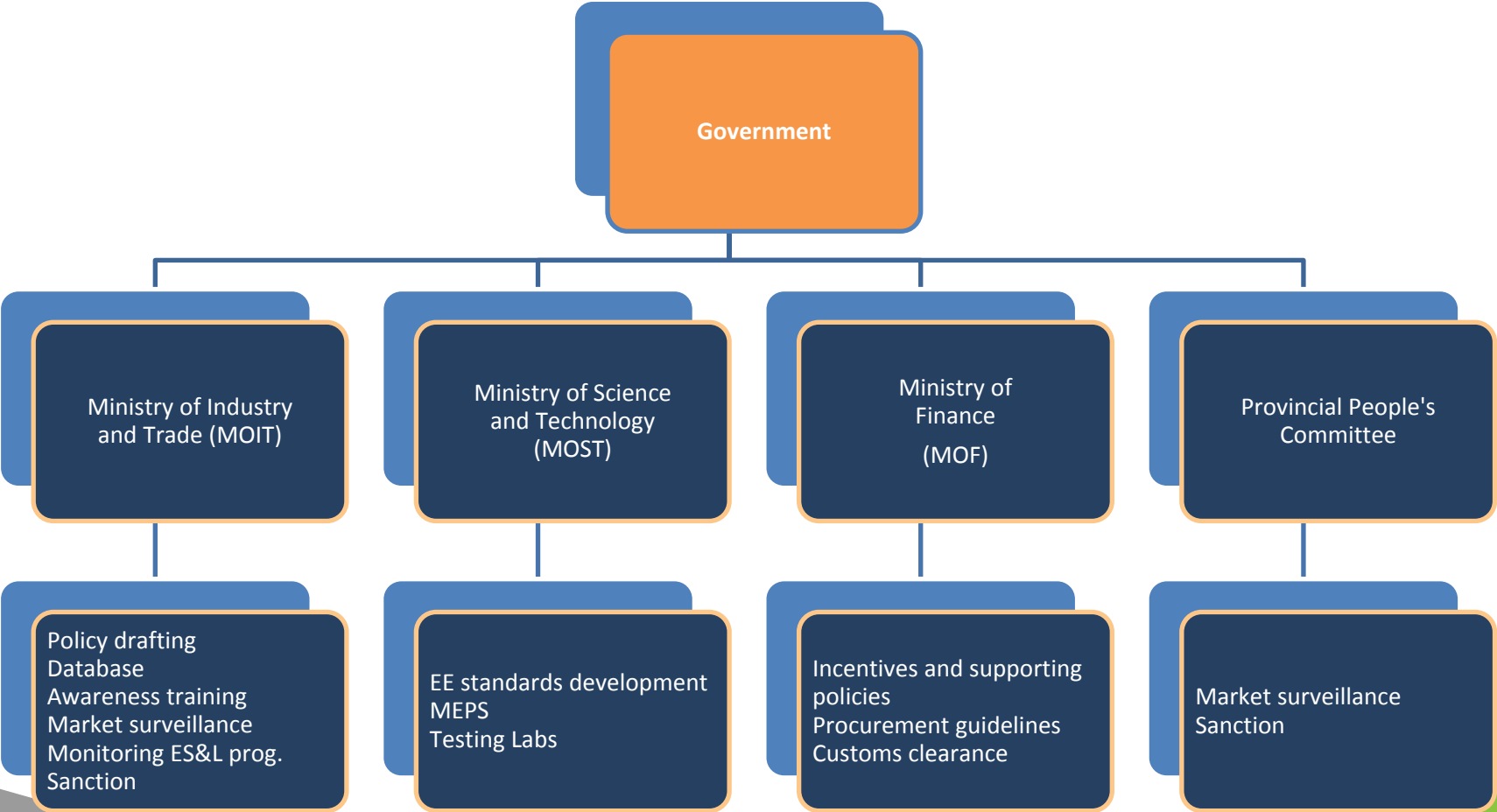
## Structure and Responsibility

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# Energy labeling program in Viet Nam

## Structure and Responsibility



# Energy labeling program in Viet Nam


## List of products

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### Group 1: Household appliances

- Tubular fluorescent lamp, compact fluorescent lamp
- Ballast
- Air conditioner, refrigerator
- Washing machine
- Rice cooker
- Electric fan
- Television

*(Decision 51/2011/QD-TTg)*






# Energy labeling program in Viet Nam

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## Group 2: Office and commercial equipment

- Copier
- Computer monitor
- Printer
- Commercial refrigerated cabinet

*(Decision 51/2011/QD-TTg)*



# Energy labeling program in Viet Nam

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## Group 3: Industrial equipment

- Three-phase distribution transformer
- Three phase asynchronous motor

## Group 4: Transportation vehicle

- Cars having up to 7 seats

*(Decision 51/2011/QD-TTg)*



# Energy labeling program in Viet Nam

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## Group 1: Household appliances

- LED lamps
- Storage water heater

## Group 2: Office and commercial equipment

- Laptops

*(Revised draft of Decision 51/2011/QD-TTg)*



# Energy labeling program in Viet Nam

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## Group 3: Industrial equipment

(No change)

## Group 4: Transportation vehicle

- Cars having up to 9 seats and motobikes

*(Revised draft of Decision 51/2011/QD-TTg)*



# Energy labeling program in Viet Nam

No	Product	Number of TCVN	Title	Label
<b>Group 1: Household appliances</b>				
1	Tubular Fluorescent Lamps	TCVN 8249:2013	Tubular Fluorescent Lamps – Energy Efficiency	Endorsement
2	Compact fluorescent lamps	TCVN 7896:2015	Compact fluorescent lamps – Energy efficiency	Comparative
3	Electromagnetic Ballasts for fluorescent lamps	TCVN 8248:2013	Electromagnetic Ballasts fluorescent lamps – Energy Efficiency	Endorsement
4	Electronic ballasts for fluorescent lamps	TCVN 7897:2013	Electronic ballasts for fluorescent lamps – Energy efficiency	Endorsement

# Energy labeling program in Viet Nam

No	Product	Number of TCVN	Title	Label
<b>Group 1: Household appliances</b>				
5	Air conditioners	TCVN 7830:2015	Air conditioners – Energy efficiency ratio Air conditioners – Methods for determination of energy efficiency	Comparative
6	Refrigerator, refrigerator-freezer	TCVN 7828:2013 TCVN 7829:2013	Refrigerator, refrigerator-freezer – Energy efficiency ratio Refrigerator, refrigerator-freezer – Methods for determination of energy efficiency	Comparative
7	Electrical washing machine	TCVN 8526:2013	Electrical washing machine – Minimum energy performance and method of determination	Comparative

# Energy labeling program in Viet Nam

No	Product	Number of TCVN	Title	Label
<b>Group 1: Household appliances</b>				
8	Electric rice cookers	TCVN 8252:2015	Electric rice cookers – Energy efficiency	Comparative
9	Electric fans	TCVN 7826:2015 TCVN 7827:2015	Electric fans – Energy efficiency ratio Electric fans – Methods for determination of energy efficiency	Comparative
10	Television sets	TCVN 9536:2012 TCVN 9537:2012	Television sets – Energy efficiency Television sets – Method for determination of energy efficiency	Comparative
11	LED lamps	On going		
12	Storage water heater	On going		

# Energy labeling program in Viet Nam

## Group 2: Office equipment and commercial

11	Copiers	TCVN 9510:2012	Copiers – Energy efficiency	Endorsement
12	Computer monitors	TCVN 9508:2012	Computer monitors – Energy efficiency	Endorsement
13	Printers	TCVN 9509:2012	Printers – Energy efficiency	Endorsement
14	Commercial refrigerators	TCVN 10289:2014 TCVN 10290:2014	Commercial refrigerators - Energy efficiency Commercial refrigerators – Method for determination of energy efficiency	Comparative



# Energy labeling program in Viet Nam

Group 3: Industrial equipment				
15	Distribution transformer	TCVN 8525:2015	Distribution transformer – Minimum energy performance and method of determination	Endorsement
16	Three-phase asynchronous squirrel cage electrical motors	TCVN 7540-1:2013 TCVN 7540-2:2013	Three-phase asynchronous squirrel cage electrical motors – Part 1: Minimum energy performance	Endorsement
			Three-phase asynchronous squirrel cage electrical motors – Part 2: Methods for determination of performance	

# Energy labeling program in Viet Nam

<b>Group 4: Transportation vehicle</b>				
17	Cars having up to 7 seats	TCVN 9854:2013	Road vehicles – Passenger cars – Limit of fuel consumption and method for determination	
18	Cars having up to 9 seats	On going		
19	Motorbikes	On going		

# Energy labeling program in Viet Nam

## List and number of energy labeled models

No.	Equipment/appliance	2012	2013	2014	2015
1	Transformer	29	109	117	252
2	Lighting Fixture	8	1	23	20
3	CFL	17	295	152	140
4	FL	13	62	16	61
5	Ballast	23	216	76	112
6	Electric fan	272	1,119	324	872
7	Refrigerator	0	312	400	356
8	Air-conditioner	162	534	332	480
9	Washing machine	84	143	159	246
10	Rice cooker	52	977	623	827
11	Motor	5	27	71	127
12	Television	0	251	325	360
13	Monitor			38	367
14	Copier			24	87
15	Printer			36	235
16	Commercial refrigerated cabinet				5
	<b>Total (unit)</b>	<b>665</b>	<b>4,046</b>	<b>2,716</b>	<b>4,547</b>

# Situation of distribution transformers in Viet Nam

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- *Source: Survey report from ICA Viet Nam*
- Manufacturers of distribution transformers
  - North: 6 (EEMC, HEM, TBT, VEE, Hanaka, ABB)
  - South: 2 (EMC, Thibidi)
- Importers
  - Vietnam Shihlin Electric & Engineering Co., Ltd
  - Siemens Viet Nam
  - Schneider Electric Vietnam

# Situation of distribution transformers in Viet Nam

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- Consumers
  - EVN (Electricity Corporation Viet Nam) – key consumer
  - Factories, hotels, office buildings, etc. having active power more than 40 kVA

# Situation of distribution transformers in Viet Nam

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- EVN is in charge of production, transmission, distribution, business of electricity in national electric supply network
- EVN comprises of
  - EVN NPC (the north power company)
  - EVN CPC (the centre power company)
  - EVN SPC (the south power company)
  - EVN Hanoi (the north power company)
  - EVN HCMC (the north power company)

# Situation of distribution transformers in Viet Nam

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- EVN having
  - Length of medium voltage lines: 148,053 km
  - Length of low voltage lines: 254,264 km
  - Total number of DT: 261,643 units
  - Total capacity: 41,015 MVA





# Key contents of TCVN 8525:2015

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- Scope
  - Three phase distribution transformers (oil-immersed type and dry type )
  - Rated capacity up to 4 000 kVA
  - Rated voltage up to 35 kV
  - Rated frequency of supply network is 50 Hz.
- Exemption
  - Several special distribution transformers.

# Key contents of TCVN 8525:2015

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- Normative references
  - TCVN 6306-1 (IEC 60076-1), Power transformers – Part 1: General
  - TCVN 6306-11 (IEC 60076-11), Power transformers - Part 11: Dry-type transformers
- Terms and definitions
  - Energy efficiency: Ratio, in percentage, of output active power to input active power of distribution transformers, at load factor of 50 % and power factor of 1.

# Key contents of TCVN 8525:2015

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- Technical requirements
  - Performance requirements specified in TCVN 6306-1 (IEC 60076-1) and TCVN 6306-11 (IEC 60076-11).
  - Energy efficiency requirement: Table 1 for oil-immersed and Table 2 for dry.

# Key contents of TCVN 8525:2015

Table 1 for oil-immersed distribution transformers

Rated power, kVA	Minimum energy performance MEPS (%)
≤ 25	98,40
31,5/32	98,50
50	98,66
75	98,77
100	98,87
125	98,92
160	98,97
180	99,01
200	99,06
250	99,10
315/320	99,16
400	99,19
500	99,21

# Key contents of TCVN 8525:2015

Table 1 for oil-immersed distribution transformers

Rated power, kVA	Minimum energy performance MEPS (%)
560	99,22
630	99,26
750	99,28
800	99,30
1 000	99,32
1 250	99,35
1 500	99,37
1 600	99,39
2 000	99,41
2 500	99,42
3 000	99,44
3 200	99,46
3 500	99,48
4 000	99,50

# Key contents of TCVN 8525:2015

- Test method
  - TCVN 6306-1 (IEC 60076-1) and TCVN 6306-11 (IEC 60076-11).
  - Energy efficiency is calculated by:

$$E_{50\%} = \frac{0,5 \cdot S}{0,5 \cdot S + 0,25 \cdot P_k + P_0} \times 100 \%$$

where

$E_{50\%}$  - EE, in percentage, of DT at load factor of 50% and power factor of 1.

$S$  – rated power of DT, in kVA

$P_k$  – load loss of DT, in kW

$P_0$  – no load loss of DT, in kW

(correction to reference temperature of 75°C is needed)

# Achievement

## List and number of energy labeled models

No.	Equipment/appliance	2012	2013	2014	2015
1	Transfomer	29	109	117	252
2	Lighting Fixture	8	1	23	20
3	CFL	17	295	152	140
4	FL	13	62	16	61
5	Ballast	23	216	76	112
6	Electric fan	272	1,119	324	872
7	Refrigerator	0	312	400	356
8	Air-conditioner	162	534	332	480
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10	Rice cooker	52	977	623	827
11	Motor	5	27	71	127
12	Television	0	251	325	360
13	Monitor			38	367
14	Coppier			24	87
15	Printer			36	235
16	Comercial refrigerated cabinet				5
	<b>Total (unit)</b>	<b>665</b>	<b>4,046</b>	<b>2,716</b>	<b>4,547</b>



Thank you!

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