



EE Standards and Labeling Programs in Thailand

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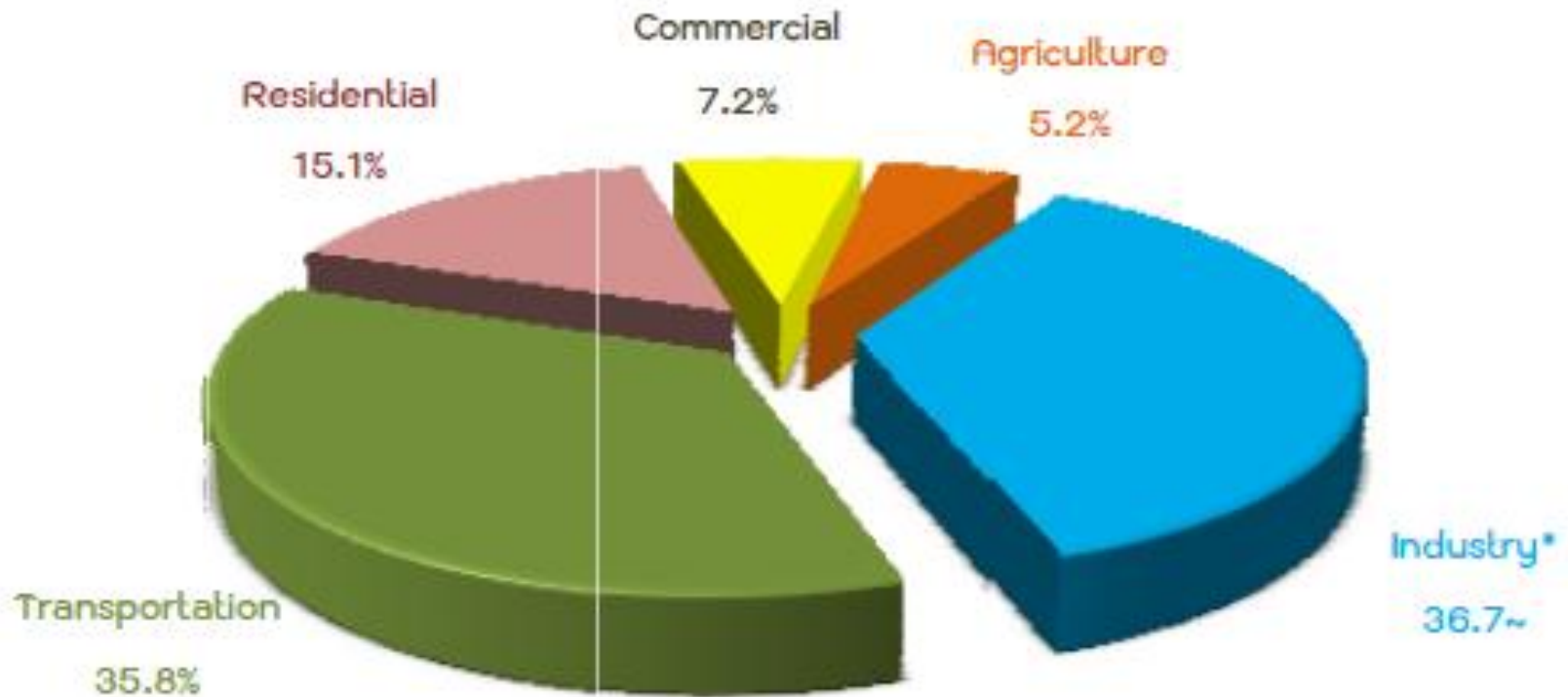
Outline

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1. Thailand Energy Situation and Policy
2. Framework of EE S&L
3. Promotion of EE Labels
4. Certification Process for Certification Marks
5. Financial Incentive Programs

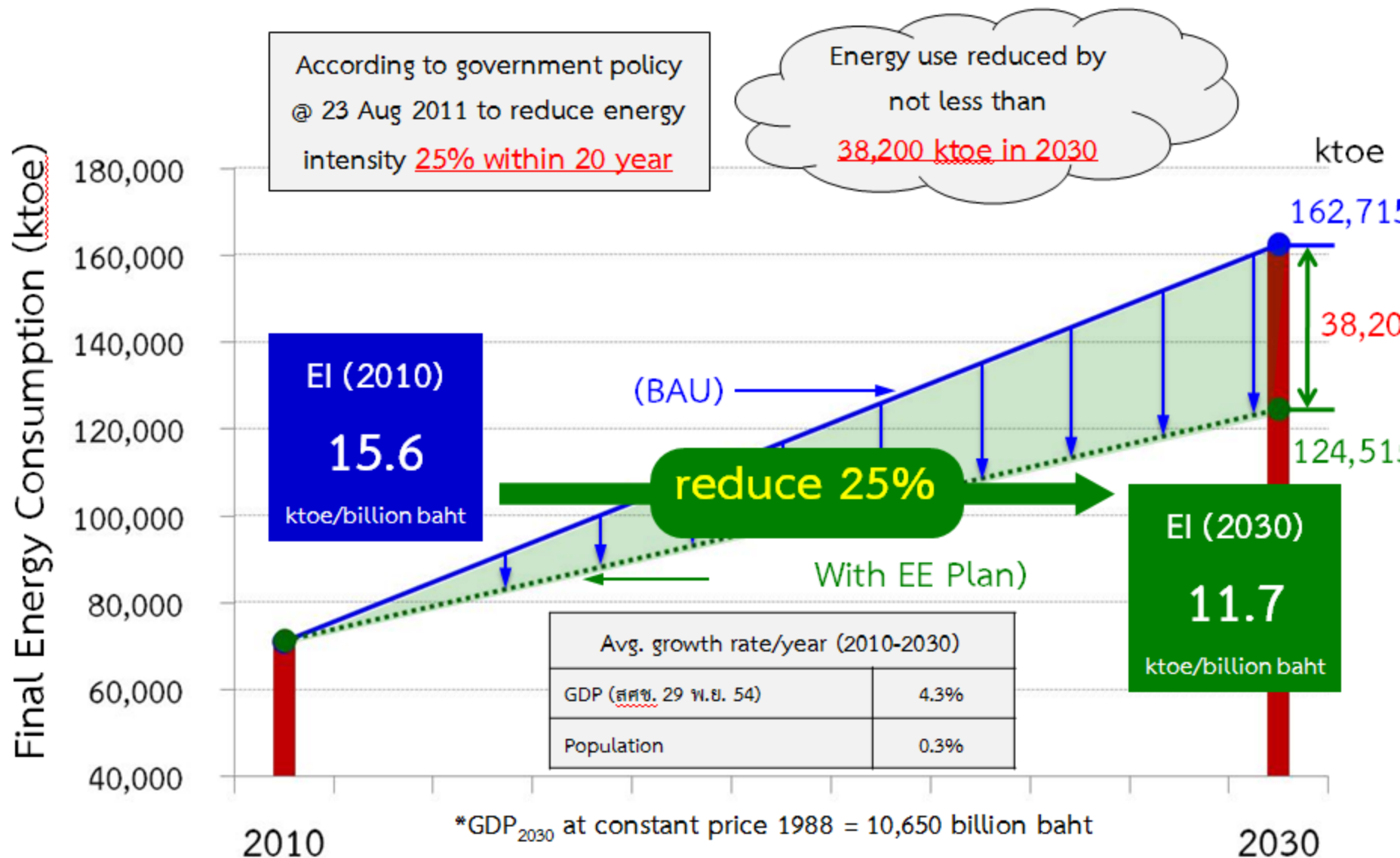
Thailand Energy Statistics 2012

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New Thailand 20-Year Energy Efficiency Development Plan (2011 – 2030)



Thailand Energy Efficiency S&L Structure

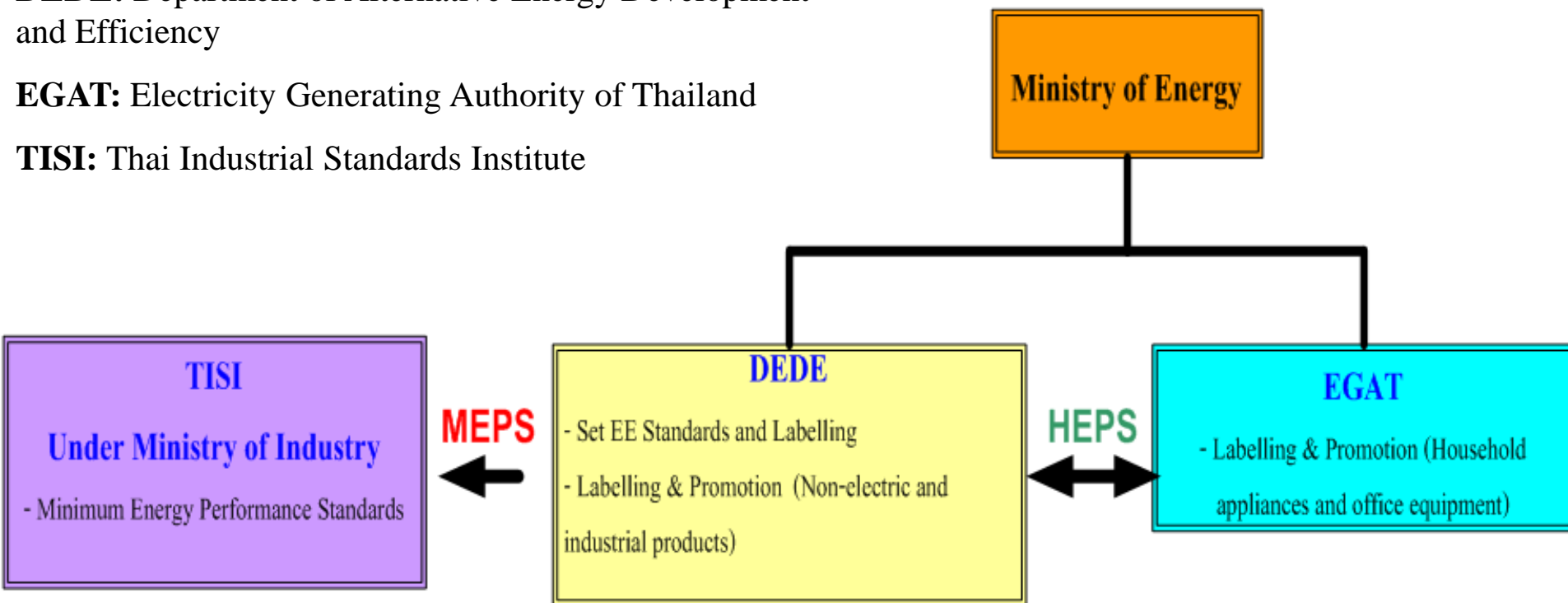
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Abbreviations

DEDE: Department of Alternative Energy Development and Efficiency

EGAT: Electricity Generating Authority of Thailand

TISI: Thai Industrial Standards Institute



Framework of EES&L measures

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MEPS: Minimum Energy Performance Standard

- Both voluntary and mandatory program
- Collaboration between DEDE and TISI
- Draft Standards are set up by DEDE, but they are regulated by TISI.



voluntary certification mark



mandatory certification mark

HEPS: High Energy Performance Standard

- Voluntary program
- Collaboration between DEDE and EGAT
- Standards are set up by DEDE, and labelling programs are responsible by DEDE and EGAT



Energy Conservation Promotion (ECP) Act

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- ECP Act was enacted in 1992.
- ECP Act B.E. 2550 (2007) (Issue NO.2) has been effective since June 2008.

ECP Act, Section 23

8

In order to conserve energy in machinery or equipment and to promote the use of energy-efficient materials or equipment, the Minister, by and with the recommendation of the National Energy Policy Council, shall have the power to issue Ministerial Regulations on the following:

- (1) the establishment of energy efficiency standards of machinery or equipment;
- (2) the determination of machinery or equipment, according to which category, size, amount of energy consumption, power rating and level of energy efficiency, that are considered as high-efficiency machinery or equipment;
- (3) the determination of materials or equipment to conserve energy, according to which category, quality and standard, that are considered as energy-efficient materials or equipment;
- (4) the requirement for the manufacturers and the distributors of machinery or equipment to illustrate the level of energy efficiency.

ECP Act, Section 40

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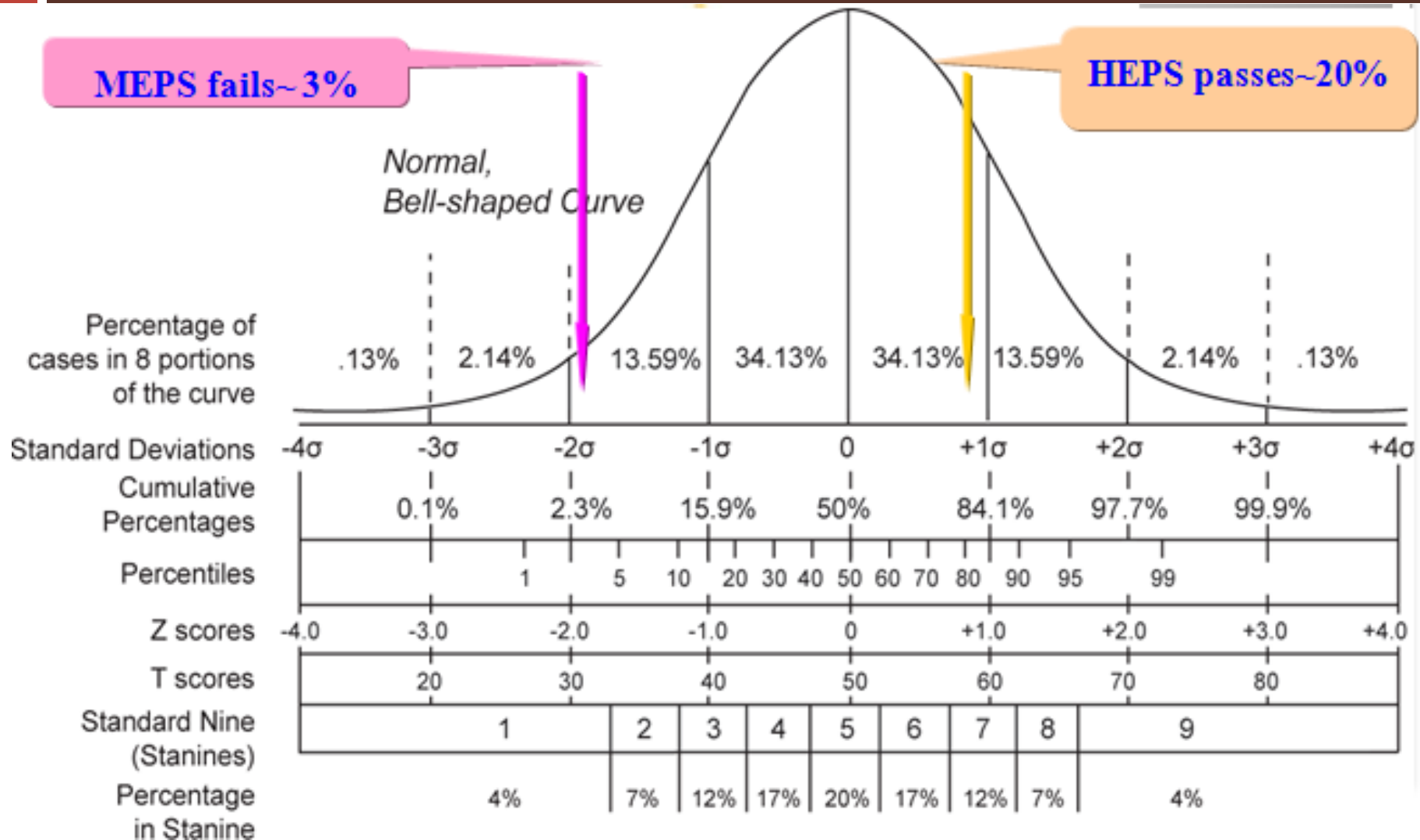
The producer or distributor of high efficiency machinery or equipment, or materials to be used in the energy conservation programmes shall have the right to request for promotion and assistance as follows:

- (1) exemption from paying surcharges under this Act;
- (2) grant or subsidy from the Fund under Section 25.

Owners of factories, buildings, or government agencies and state enterprises which are not required to have energy conservation programmes under Clause one hereof, but desire to make provisions for energy conservation purpose, shall have the right to request for promotion and assistance under Clause one hereof. (ECP Act B.E. 2535)

The criteria of MEPS and HEPS

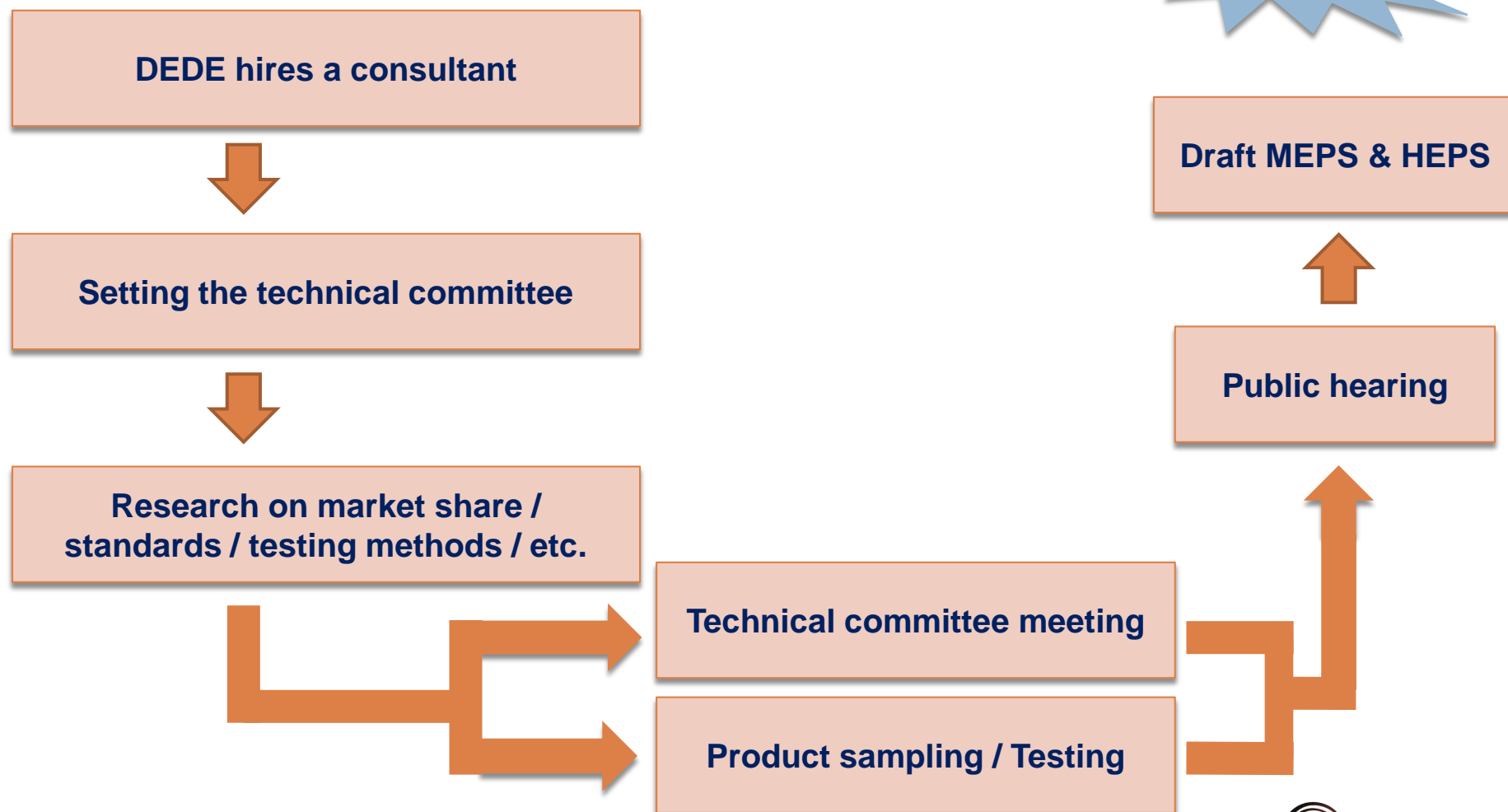
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The Process of Setting Draft MEPS & HEPS

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1 Year



Ministerial Regulation & Ministerial Announcement Draft HEPS to be legislated

12

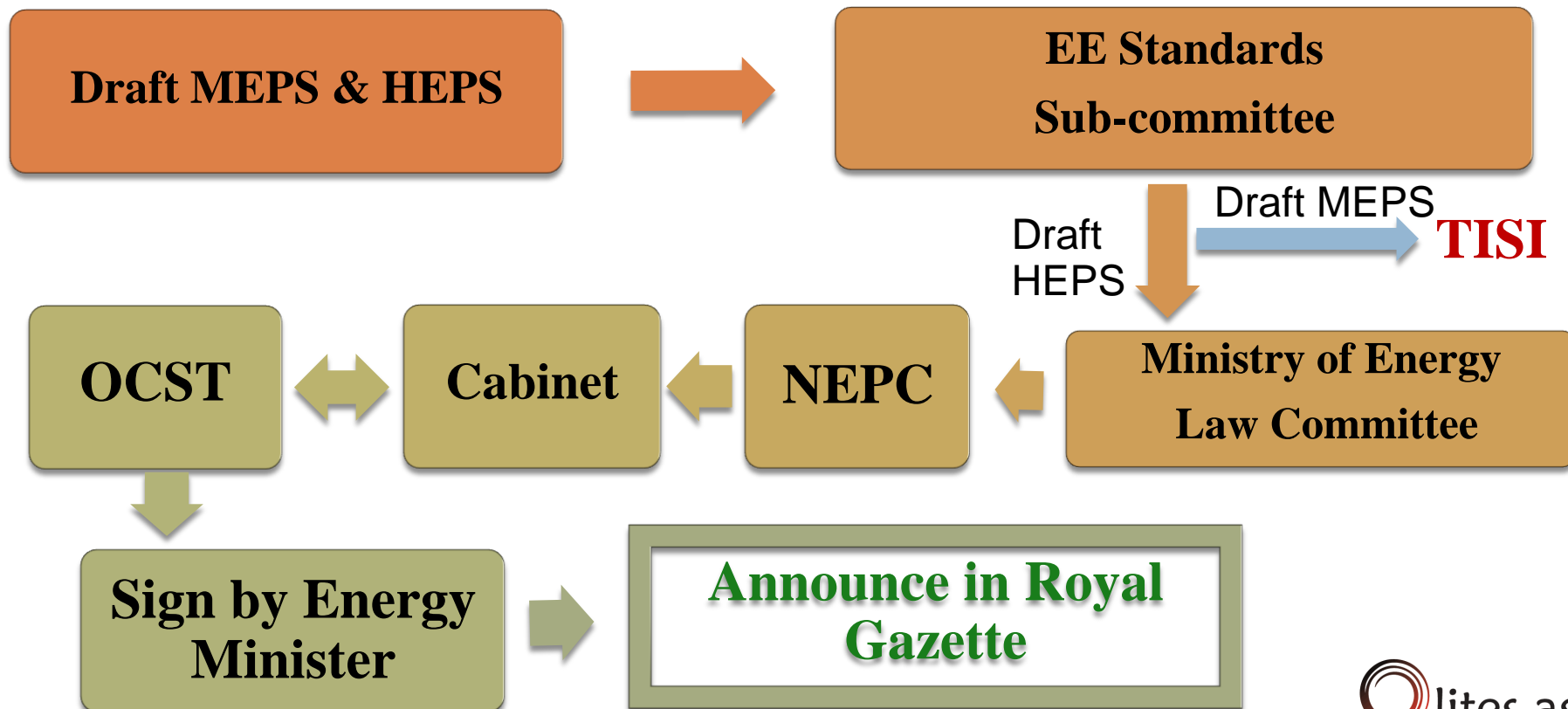
2-3 Year

Approved by:

TISI : Thai Industrial Standards Institute

NEPC: National Energy Policy Committee

OCST: Office of the Council of State of Thailand



MEPS & HEPS

MEPS



- 1) Air Conditioners
- 2) Refrigerators
- 3) Self-ballasted lamps
- 4) Single-capped fluorescent lamps
- 5) Double-capped fluorescent lamps
- 6) 3-Phase motors
- 7) LPG stoves
- 8) Insulator
- 9) Diesel engines

Mandatory

Voluntary



HEPS

- 1) Air Conditioners
- 2) Refrigerators
- 3) Electric fans
- 4) Rice cookers
- 5) Chillers
- 6) Window glass
- 7) Electric water heaters
- 8) Electric pots

Voluntary

EE labeling by EGAT (Labeling No.5)

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- 1) 1994 - Refrigerators
- 2) 1995 - Air conditioners
- 3) 1996 - Compact fluorescent lamps
- 4) 1998 - Low loss magnetic ballasts
- 5) 2001 - Electric fans
- 6) 2003 - Electric rice cookers
- 7) 2003 - Lighting fixtures
- 8) 2009 - T5 fluorescent lamps
- 9) 2009 - T5 electronic ballasts
- 10) 2009 - Oscillating fans
- 11) 2010 - Standby power for televisions
- 12) 2010 - Standby power for computer monitors
- 13) 2010 - T5 luminaires
- 14) 2011 - Electric pots
- 15) 2012 – Electric water heaters
- 16) 2012 – Ventilation fans
- 17) 2012 – Electric irons
- 18) 2012 – Washing machines (Top loading)



Compact Fluorescent Lamps, CFL : 1996

Efficacy Requirement – Lumen/Watt



Input power range (W)	Day Light > 4,400 K	Warm White $\leq 4,400$ K
5 – 8	45	50
9 – 14	50	55
15 – 20	55	60
21 – 24	60	60
25 – 60	60	65

Compact Fluorescent Lamps:1996

● Testing Room



Input Control



Lumen
Maintenance



Lumen Output

Electromagnetic Ballasts: 1998

Energy Efficient Ballast Labelling Programme

- 'Safety Ballasts No 5'
 - Lower heat loss → Lower temperature
 - Diminish fire risk, and
 - Reduce heat load in air-conditioning rooms
- Ballast loss < 6 W with allowable minimum currents
 - Loss in standard ballasts = 10 W

Ballast	36 W	18 W
Electric current	≥ 0.398 A	≥ 0.343 A



Brand:
Model:
For thin tube (Watts):



Lighting Luminaire: 2004



High Efficiency Luminaire Labelling Programme

- Reduce number of fluorescent lamps by 30%
 - 3 → 2
 - Maintaining lumens and light quality
 - 9 Manufacturers participating in the programme



Lighting Output Ratio (%):
Energy cost (Baht / m² / 100 lux / yr):
Brand:
Model:



Fluorescent lamp T5: 2009



Testing standard: TIS 236-2548

Testing Details	Unit	28 W		14 W	
		≥ 5,000 K	< 5,000 K	≥ 5,000 K	< 5,000 K
1. Flux (Rated Value)	lumen	2,600	2,660	1,120	1,200
2. Efficiency (at 100 hr)	Lumen/W	≥ 92	≥ 95	≥ 80	≥ 85
3. Lumen maintenance after 2,000 hr	%	≥ 92	≥ 92	≥ 92	≥ 92
4. Color Rendering Index :CRI	-	≥ 82	≥ 82	≥ 82	≥ 82
5. Mercury contain(RoHS)	mg	≤ 5	≤ 5	≤ 5	≤ 5
6. Life time	hr	≥15,000	≥15,000	≥15,000	≥15,000

Energy efficiency criteria for electronic ballast for T5: 2009



item	description	28 W	14 W
1.	Input power -single lamp -double lamps	$\leq 31 \text{ W}$ $\leq 61 \text{ W}$	$\leq 17 \text{ W}$ $\leq 33 \text{ W}$
2.	Constant light output at voltage change +10%	$\pm 3\%$	$\pm 3\%$
3.	Power factor (PF)	≥ 0.95	≥ 0.95
4.	Total Harmonic Distortion (THDi)	$\leq 10\%$	$\leq 10\%$
5.	Electrical circuit (for double lamp)	parallel/series	parallel/series
6.	Ballast lumen factor	≥ 0.95	≥ 0.95
7.	Life time	$\geq 5 \text{ ๕}$	$\geq 5 \text{ ๕}$
8.	Tested under De-activated lamp protection according to TIS 885-2551	pass	pass
9.	Endurance $T_c=90^\circ\text{C}$	pass	pass
10.	Current Crest factor	≤ 1.7	≤ 1.7
11.	Preheat Start	Preheat	Preheat
12.	Reference Standard	TIS.1955-2542	TIS.1955-2542





(Luminaire for T5) : 2010



Energy efficiency criteria

Louver Luminaires for T5	Lighting Out Ratio:LOR (%)	* Uniformity	*Unified Glare Rating (UGR)	*Illuminanc e (Lux)
2 x 28 W	≥ 85	≥ 0.7	< 19	≥ 500

*calculate by DIALUX program



Compact Fluorescent Lamps

➤ Together in conservation...



Famous footballers as project promoters



Campaigns of Labeling No.5



วันนี้...
ทำร่วมรายการ แจกฟรี
หลอดตะเกียบ เบอร์ 5
แล้วหรือยัง...

แจกฟรี **800,000** หลอด



ให้แก่ผู้ใช้ไฟฟ้าทุกจังหวัดทั่วประเทศ
ส่งถึงบ้านทางไปรษณีย์

เพียงส่งใบแจ้งหนี้หรือใบเสร็จค่าไฟฟ้า หรือค่าน้ำประปา (ในปี 2550) ที่ผู้ไปรษณีย์ได้กลับบ้าน

โดยเขียนว่า "ร่วมรายการแจกหลอดตะเกียบฟรี" และไม่ติดฉลากขอ

ภายในวันดี 5 พฤศจิกายน 2550 ยิ่งส่งมาก ยิ่งมีสิทธิลุ้นมาก

ผู้ลงทะเบียนใช้ไฟฟ้าครัวเรือน 10,000 หลอด (ยกเว้น 50,000 หลอด)



โครงการส่งเสริมการใช้ไฟฟ้าอย่างประหยัด

การไฟฟ้าส่วนภูมิภาคทั่วประเทศ

มีนาคม 2551

ขอเชิญผู้ลงทะเบียนใช้ไฟฟ้าครัวเรือน



ขอสงวนสิทธิ์ในจำนวน 50,000 หลอด (25,000 หลอด)

กระทรวงพลังงาน
Ministry of Energy

กฟผ.



การไฟฟ้าส่วนภูมิภาค

Delivery free CFL 800,000
lamps to end user

Campaigns of Labeling No.5

หลอดตะเกียบเบอร์ 5
ประหยัดค่าไฟฟ้า 80 %

เพียงหลอดละ
55 บาท (13 วัตต์)
58 บาท (20 วัตต์)

มีจำหน่ายที่

กฟผ. | กระทรวงพลังงาน
MINISTRY OF ENERGY

รักษ์พ่อ
ได้พลังงานจากหลอดตะเกียบ

EGAT yellow box
for low price of CFL
55 baht for 13 W
58 baht for 20 W

เดี๋ยวนี้ใครๆก็กลมเกลียว

ใครๆก็ใช้เพื่อความกลมเกลียว
หลอดตะเกียบเบอร์ 5 ชนิดเกลียว
ประหยัดถึง 80% (เมื่อเทียบกับหลอดไส้)
อายุการใช้งานนาน 6,000 ชั่วโมง

หลอดเกลียวเบอร์ 5
สวยงามจริง...คุ้มค่าจริง...



จำหน่ายที่ :



makro

POWER MALL



คิดถึงคุณค่า คิดถึงเบอร์ 5 ตั้งแต่เริ่มต้น



Advertising Campaign



Engineering Estimate of DSM Program Impacts by EGAT

Achieved to date (as of Dec 2012)			
Program	MW	GWh	CO ₂ (Ton)
Lighting	928.4	5,120.6	3,127,030
- Fluorescent Tube (T8)	401.5	1,957.5	1,446,682
- Fluorescent T5 Program ¹	122.3	557.8	296,964
- FTL (T5)	87.7	398.7	217,265
- ElecTronic Ballast T5	34.7	159.1	79,699
- CFL(before labeling)	10.0	57.2	42,295
- CFL(labeling 2008)	376.4	2,440.1	1,268,380
- Low-Loss Ballast	18.2	90.8	59,986
- HPSV Street Light	-	17.2	12,723
Refrigerator	583.0	3,704.1	2,429,964
- 1 door	399.2	2,795.2	1,961,684
- 2 doors	183.8	908.9	468,280
Air Conditioner	1,188.5	7,313.3	4,262,260
Fan	51.5	449.3	228,487
Double oscillating fan	2.9	6.6	3,554
Rice cooker	19.9	26.5	13,546
Motor	0.2	1.2	909
Comercial	2.6	10.3	7,583
Standby - TV	0.7	2.3	1,279
Standby - Computer screen	-	2.3	1,241
Total	2,777.6	16,636.5	10,075,853

Cost Effectiveness of DSM Program

- Estimated Total DSM Expenditures to Date

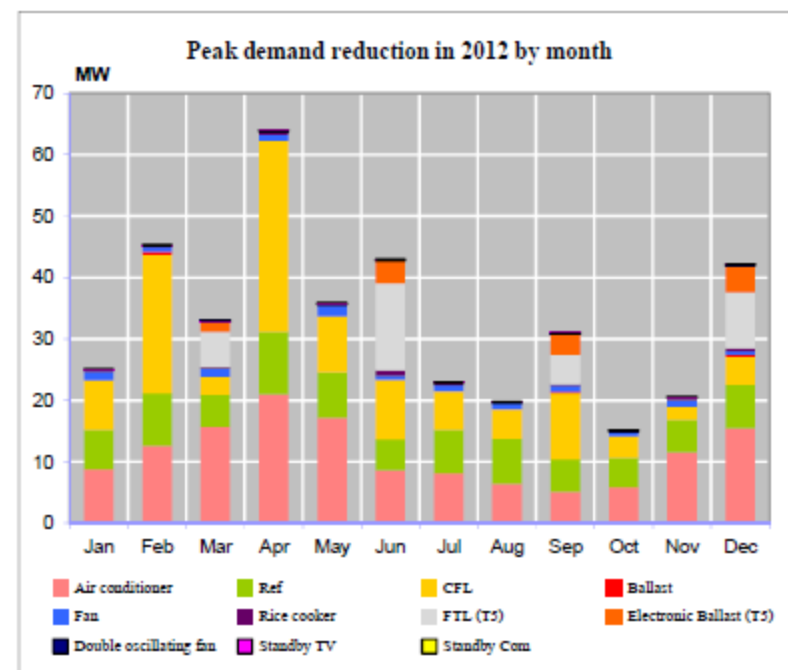
4,588.6 Million baht

- Cost of Peak Demand Saving

1,652.0 Baht/kW

- Cost of Energy Saving

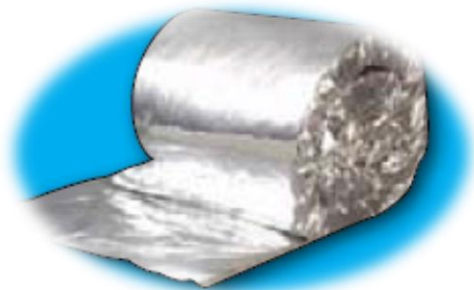
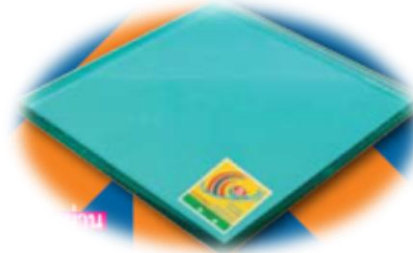
0.28 Baht/kWh



EE Labeling by DEDE

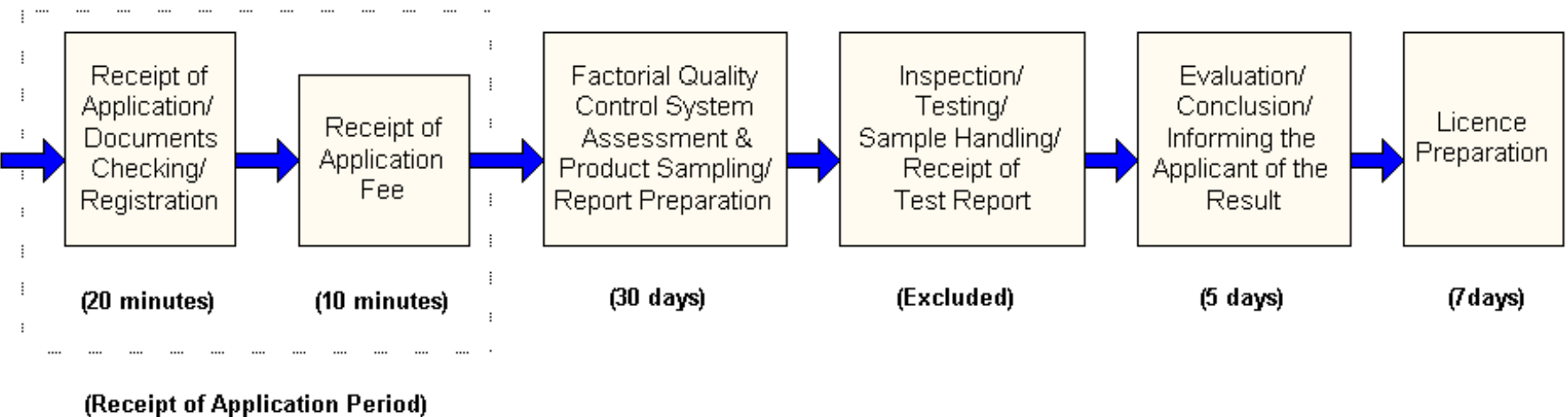
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1. LPG Stoves
2. Insulator
3. Window Glass
4. VSD
5. Diesel Engines
6. Gasoline Engines
7. 3-Phase Motors



Product Certification Process for Certification Marks

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voluntary certification mark



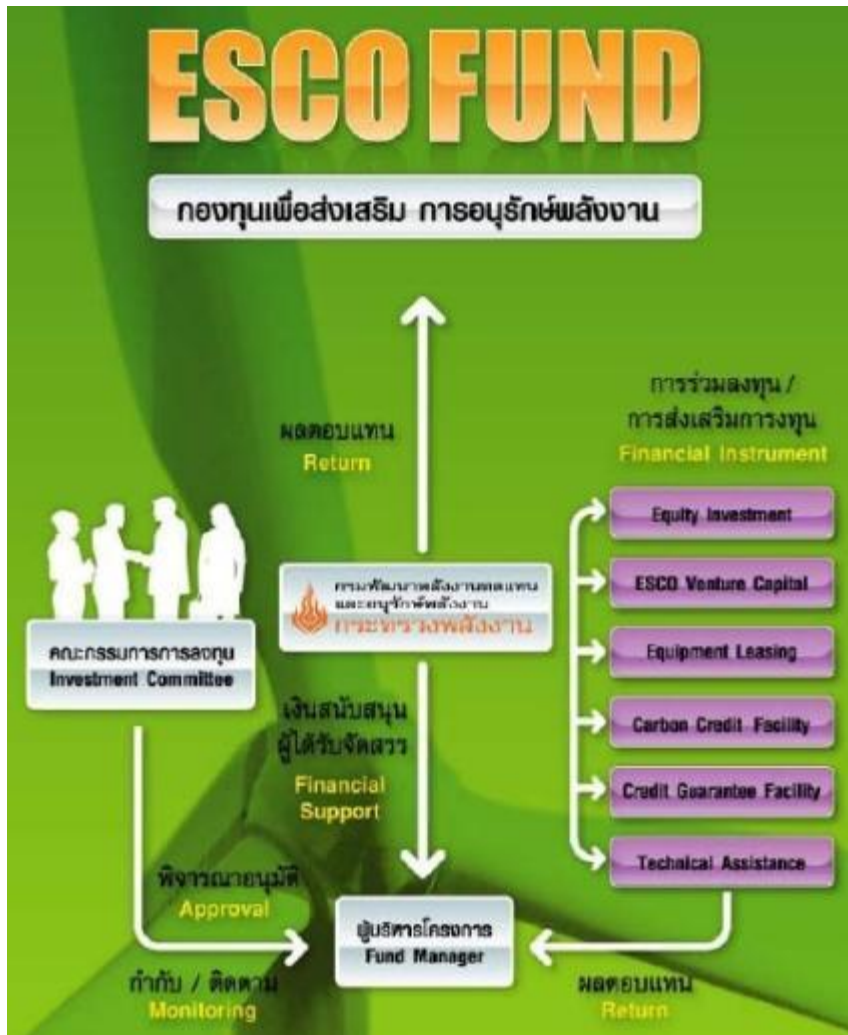
mandatory certification mark

Financial Incentives

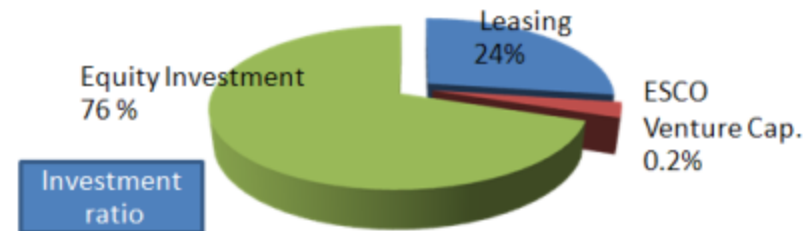
- Gov. co-investment program (ESCO Fund)
- Revolving Fund Program for EE&RE Projects
- Tax Incentives
- Direct Subsidy



1. Gov. Co-Investing Scheme → ESCO Fund



- **1,000 million Baht** allocated from Gov's ENCON FUND
- **2 Fund Managers** assigned & given 2 years window of investment
- **5-7 years of investment** with mutual agreed exit clause
- **10-50% equity** holding with **max. of 50 million Baht**



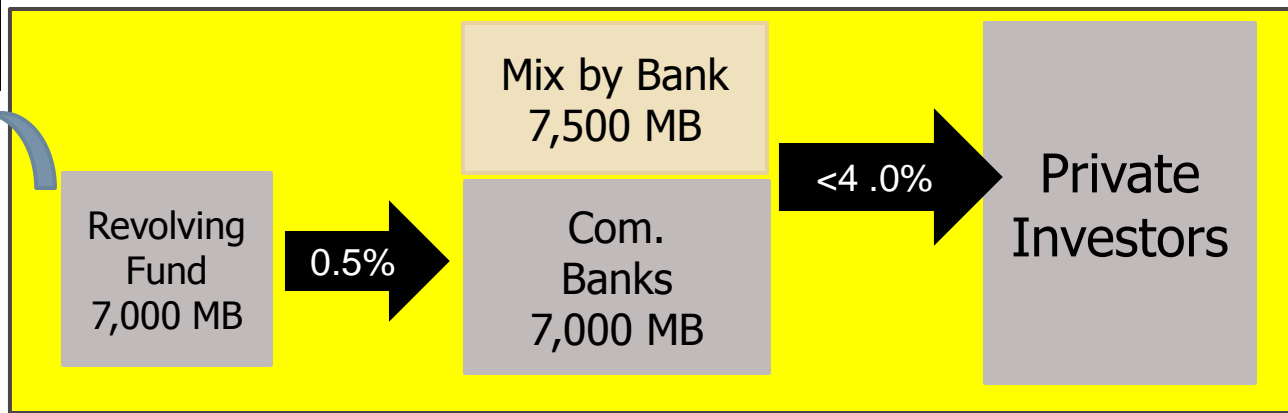
Equipment Leasing

- 100% of total cost with max. 10 mill. Baht
- interest rate 4-6 % (negotiable)
- Max. leasing period 5 years
- Apply for ESCO with share saving contract

2. Soft Loans → Revolving Fund

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- **7,000 mill.Baht** allocated from Gov's **ENCON FUND** & 95% subscribed
- 2-Stepped Loan **mix w/ Bank's Money (approx. 1:1)**
- **Max. Interest Fix at 4%** (Bank pay 0.5% Int. to Encon Fund)
- **Max. 7 yr. loan period**
- **Max. 50 Mill.Baht / project**
- 11 major banks are participating





3. Tax Incentive

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1. Tax Incentive for EE products

<http://www.energy-tax.com/>

- Cooperation program with Revenue Dept.
- **25% tax credit** from purchasing of EE products
- 19 products are announced for tax incentive; Mostly **label 5 products**



4. Direct Subsidy 20:80

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- For EE measures
- **Subsidy 20% of EE measures,**
 - **maximum 3 million baht (\approx USD 97,000)**
minimum 50,000 baht (\approx USD 1,600)
- To buy EE products
- Payback period ≤ 7 years





*Thank
you...*