

# Unlocking Energy Efficiency Potential: Thailand's Policies Perspective

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Development and Efficiency (DEDE)

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SIEW 2017 – Marina Bay Sands, Singapore

**1**

- **Thailand's Energy Efficiency Situation**

**2**

- **Energy Efficiency Plan (EEP 2015)**

**3**

- **Energy Efficiency Policies and Measures**



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Energy Development and Efficiency

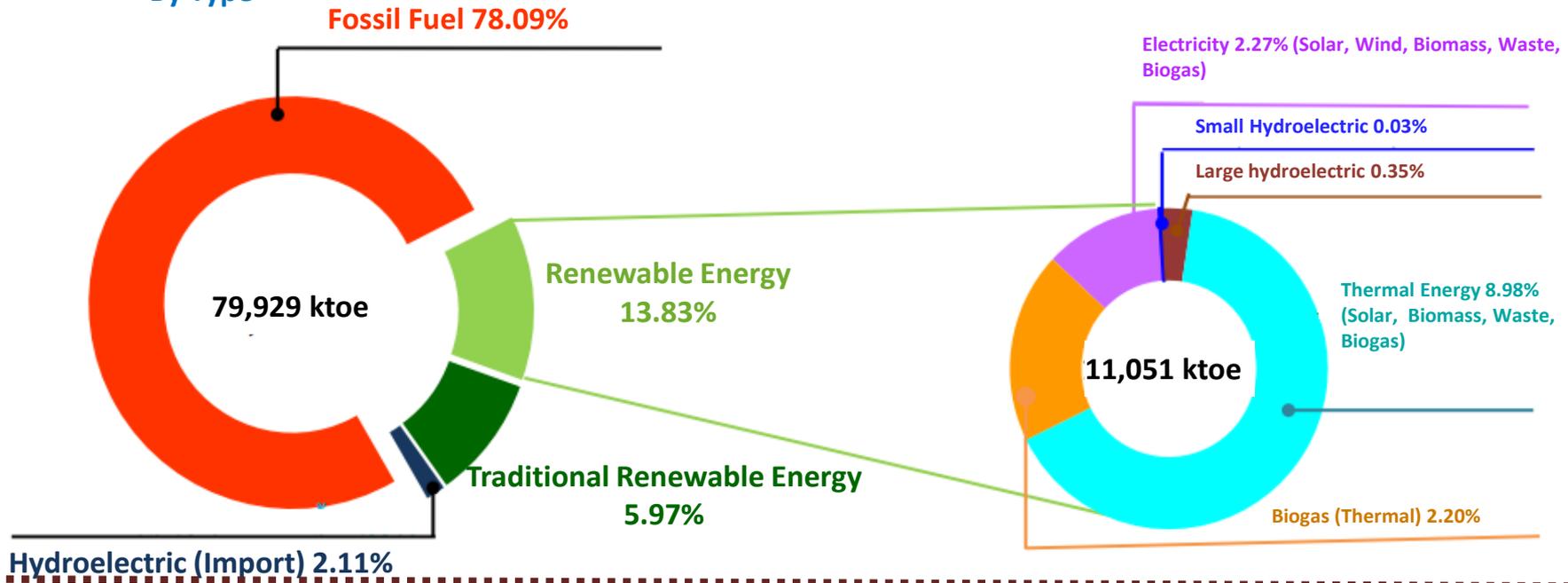
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# Thailand's Energy Efficiency Situation

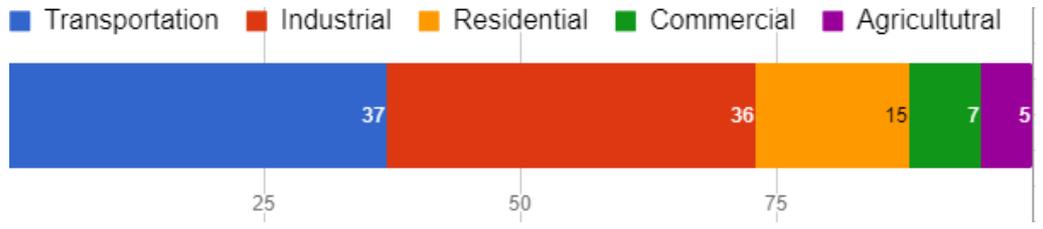
# Thailand Energy Situation 2016

Source: Thailand's Energy Situation 2016, DEDE

**Final Energy Consumption By Type**



**Final Energy Consumption By Sector (%)**



# Thailand Integrated Energy Blueprint (2015)

Integration



Harmonized Time Frame



Better Balanced Focus

**Security**   **Economy**   **Ecology**

**PDP**

POWER DEVELOPMENT PLAN  
แผนพัฒนากำลังผลิตไฟฟ้าของประเทศไทย\*

**EEP**

ENERGY EFFICIENCY PLAN  
แผนอนุรักษ์พลังงาน\*

**AEDP**

ALTERNATIVE ENERGY DEVELOPMENT PLAN  
แผนพัฒนาพลังงานทดแทนและพลังงานทางเลือก

**GAS**

GAS PLAN  
แผนบริหารจัดการก๊าซธรรมชาติ

**OIL**

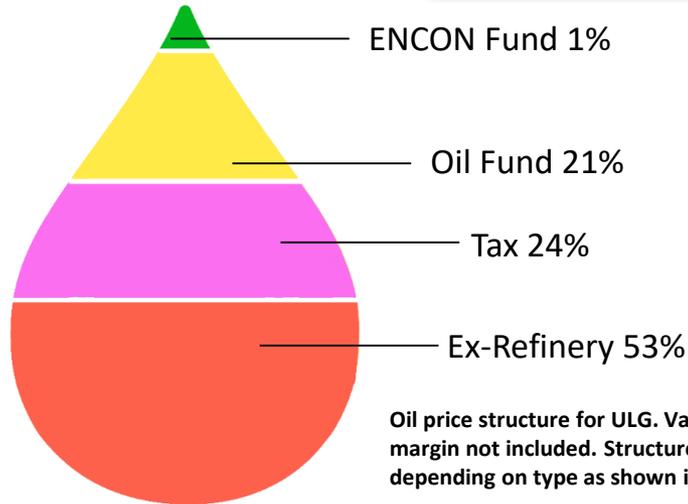
OIL PLAN  
แผนบริหารจัดการน้ำมันเชื้อเพลิง

## Main Concept EEP2015

- Reduce energy intensity (EI) by 30% within 2036 (Base year 2010)
- Equivalent to reduction of EI from 8.54 ktoe per billion Baht (2010) to 5.98 ktoe per billion Baht (2036) [currently at 8.22]
- Approximately 56,000 ktoe in energy saving in 2036
- Combination of compulsory, voluntary and complementary measures



## Energy Conservation Fund (ENCON Fund)



- Established by Energy Conservation Promotion Act B.E.2535
- To provide funding for energy conservation promotion to help realize EEP2015
- Funded by levy from petroleum products at 0.25 Baht (1 Cent) per liter
- Earning of around 25M USD per month, with current balance (as of October 2017) of 1,250M USD

UNIT:BAHT/LITRE	EX-REFIN. (AVG)	TAX B./LITRE	M. TAX B./LITRE	OIL FUND	CONSV. FUND	WHOLESALE PRICE(WS)	VAT	WS&VAT	MARKETING MARGIN	VAT	RETAIL
ULG	15.6875	6.5000	0.6500	6.3100	0.2500	29.3975	2.0578	31.4553	2.5277	0.1769	34.16
GASOHOL95 E10	16.7176	5.8500	0.5850	0.3500	0.2500	23.7526	1.6627	25.4153	1.5277	0.1069	27.05
GASOHOL91	16.4871	5.8500	0.5850	0.3500	0.2500	23.5221	1.6465	25.1686	1.5060	0.1054	26.78
GASOHOL95 E20	17.7485	5.2000	0.5200	-3.0000	0.2500	20.7185	1.4503	22.1688	2.2161	0.1551	24.54
GASOHOL95 E85	22.6869	0.9750	0.0975	-9.3500	0.2500	14.6594	1.0262	15.6855	4.0696	0.2849	20.04
H-DIESEL	15.9238	5.8500	0.5850	0.0100	0.2500	22.6188	1.5833	24.2021	1.4840	0.1039	25.79
LPG	20.7216	2.1700	0.2170	-6.5965	0.0000	16.5121	1.1558	17.6679	3.2566	0.2280	21.15

As of October 17<sup>th</sup>, 2017

Unit: Baht



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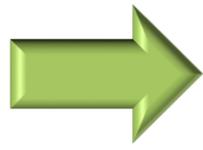
# **Energy Efficiency Plan (EEP 2015)**



# EEP 2015 Overview

Goal to reduce **Energy Intensity** by **30%** in **2036**,  
 down to 5.97 ktoe/billion Baht

EEDP 2011 - 2030  
 = 25% Reduction

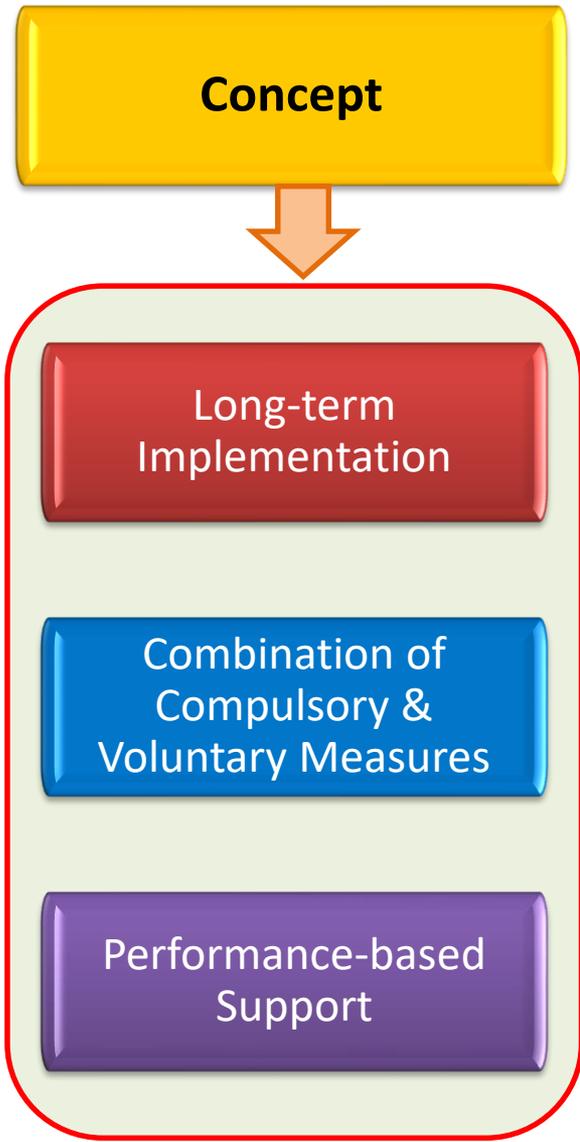
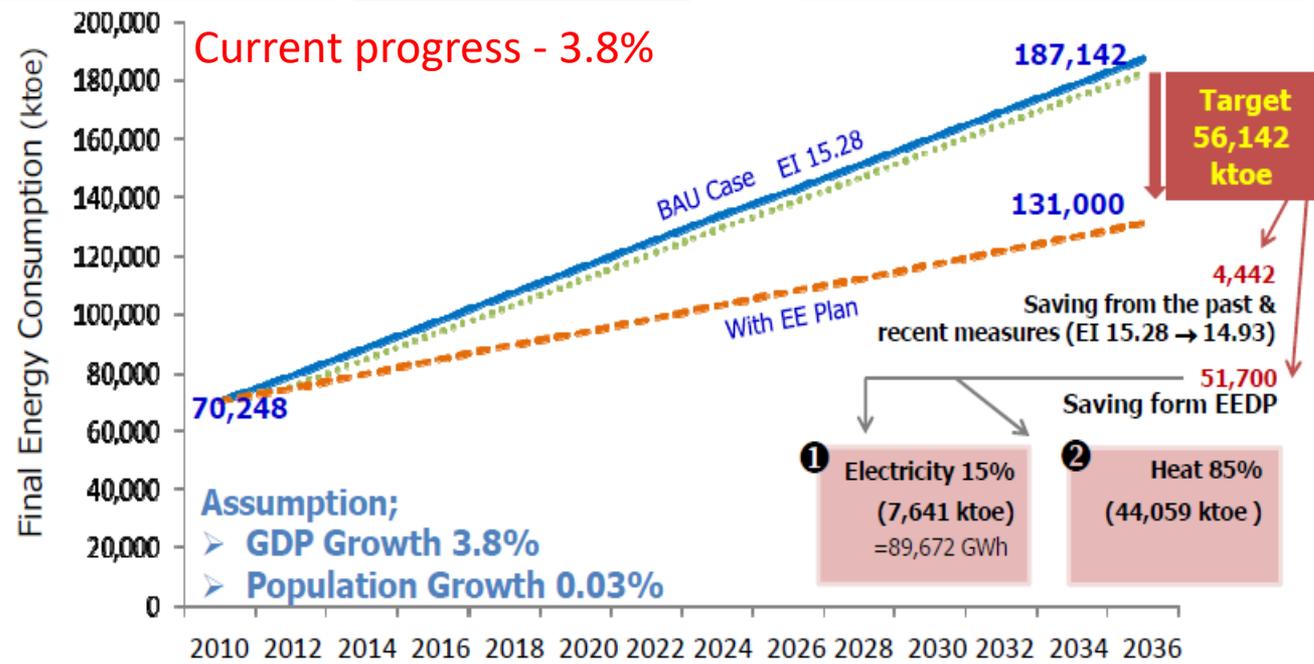


EEP 2015 - 2036  
 = 30% Reduction

EI<sup>base2010</sup> = 8.54  
 ktoe/billion baht

EI<sup>Actual2015</sup> = 8.22  
 ktoe/billion baht

EI<sup>Goal2036</sup> = 5.97  
 ktoe/billion baht





## 3 Strategies – 10 Measures

### Compulsory

- EE 1 : Energy Management system in designated factory/building
- EE 2 : Building Energy Code
- EE 3 : Energy Standard and Labeling (HEPS/MEPS)
- EE 4 : Energy Efficiency Resources Standard (EERS)

### Voluntary

- EE 5 : Financial Incentive
- EE 6 : Promotion of LED (Light Emitting Diode)
- EE 7 : Promotion of EE in Transport Sector
- EE 8 : Research and Development in Energy Efficient Technologies

### Complementary

- EE 9 : Human Resources Development
- EE 10 : Promotion of Public Awareness on Energy Conservation

# EEP 2015 Measures Summary

Unit: ktoe

Measures/Sector	Industrial	Building	Residential	Transportation	Total	%
EE1 : Energy Management system in designated factory/building	4,388	768			5,156	10.0
EE2 : Building Energy Code		1,166			1,166	2.3
EE3 : Energy Standard and Labeling (HEPS/MEPS)	749	1,648	1,753		4,149	8.0
EE4 : Energy Efficiency Resources Standard (EERS)	202	184	114		500	1.0
EE5 : Financial Incentive	8,895	629			9,524	18.4
EE6 : Promoting LED	281	424	286		991	1.9
EE7 : Promotion of EE in Transport Sector				30,213	30,213	58.4
<b>Total</b>	14,515 (28.1%)	4,819 (9.3%)	2,153 (4.2%)	30,213 (58.4%)	51,700	100.0

Industry Sector still be key player for target achievement



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# **Energy Efficiency Policies and Measures**

## **Compulsory Measures**

# Energy Efficiency Plan: Rules and Regulations

## Energy Conservation and Promotion (ECP) Act. B.E. 1992 (revision B.E.2007)

Effective from 06/2008



### Decree on designated building

Effective from 12/12/1995

### Decree on designated factory

Effective from 17/07/1997

### Ministerial Regulations

#### Energy Management in designated buildings and factories

Effective from 20/11/2009

#### Persons Responsible for Energy (PRE)

Effective from 31/07/2009

#### Energy Management Auditors

Effective from 11/05/2012

#### Building Energy Code

Effective from 20/06/2009

#### High Energy Efficiency Standard for Equipments and Machinery

Effective from 08/04/2009

1992

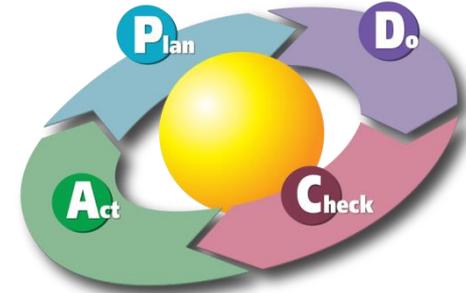
- Focus on Engineering Solutions
- Low attention on Value of People

2007

- Introduce EMS
- Systematic approach of energy conservation

# Regulation - Designated Building and Factory

**Electricity Meter** > **1,000 kW** or  
**Transformer** > **1,175 kVA** or  
**Use energy** > **20 million MJ/year**



Type	Designated Factory/Building	
Electrical Meter	< 3,000 kW	≥ 3,000 kW
Transformer size	< 3,530 KVA	≥ 3,530 KVA
Energy Used	< 60 million MJ/ year	≥ 60 million MJ/ year
Number of Energy Manager	1	2 At least one is senior

1. Do energy management system (EMS)
2. Appoint Person Responsible for Energy (PRE)

Currently 8,000 designated factories and buildings



## BEC Regulation

To prescribe types and sizes of buildings and also standards, rules and procedures for designing of energy conservation building.

New or retrofitted buildings being constructed which have total area of all stories equal to **2,000 m<sup>2</sup>** or more must be designed under the energy conservation requirements.

Currently mandatory only for government buildings. Voluntary for others.



1.Hospital



2.Education



3.Office



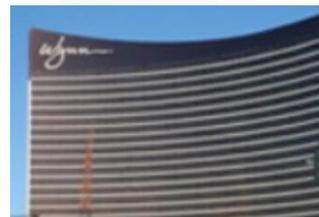
4.Condominium



5.Convention Hall



6.Theater



7.Hotel



8.Entertainment



9.Department Store



## MEPS: Minimum Energy Performance Standards

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



voluntary certification mark  
16 Products



mandatory certification mark  
2 Products

## HEPS: High Energy Performance Standard

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



19 Products



8 Products



Insulator



Glazing Panes



VSD



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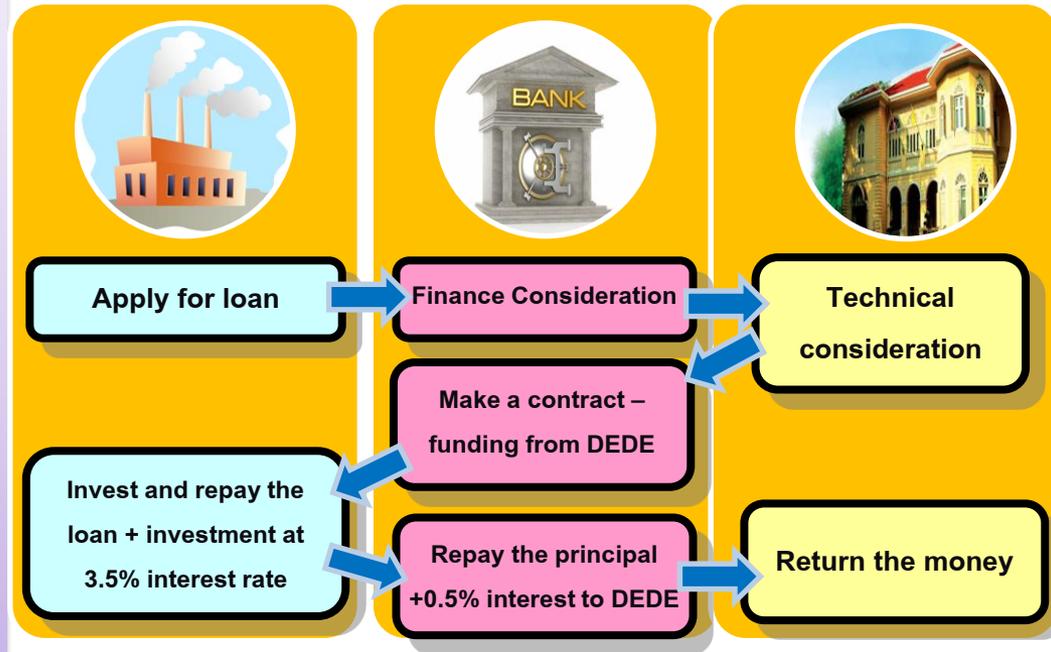
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# **Energy Efficiency Policies and Measures**

## **Voluntary Measures**

## Criteria:

- Available for factories/buildings/project developers for both EE and RE (RE ~ 37%)
- DEDE loans the funding via financial institutions to familiarize the bank with EE/RE investment
- Maximum loan of no more than 50M baht with interest rate of no more than 4%
- Payback period of 7 years
- **New period: 2016-2019 = 4.5 Billion Baht, interest rate of 3.5%, payback period of 5 years**



Phase	# of projects	Total investment (Mbaht)	Investment via ENCON Fund (Mbaht)	Investment via bank (Mbaht)	Energy saved (ktoe)	Energy saved (Mbaht)
1	78	3,427	1,902	1,525	98	1,805
2	83	3,330	1,735	1,595	99	1,713
3	98	5,878	2,702	3,176	93	2,329
4	12	1,282	377	905	13	421
5	24	2,042	489	1,554	17	539
<b>Total</b>	<b>295</b>	<b>15,959</b>	<b>7,205</b>	<b>8,755</b>	<b>320</b>	<b>6,806</b>



# EE5: Energy Service Company (ESCO)

## Summary

- Turnkey solution for energy-related measures
- Low-risk (ESCO guarantees energy saved under Energy Performance Contract (EPC))
- Standardized Measurement and Verification

Collaboration between DEDE and FTI since 2007



## Result

(2552 – 2558)

- ✓ 560 EPC-based projects
- ✓ 24,796 Mbaht in investment
- 5,222 Mbaht saving per year
- ✓ 60 registered ESCO created
- ✓ ESCO Association established in 2013
- ✓

- ❖ Develop Code of Practice to standardized ESCO
- ❖ Develop M&V standard to ensure appropriate measurement and verification for ESCO business
- ❖ Capacity Building and establish networking between stakeholders (ESCO Fair, Business Matching, Training)
- ❖ ESCO Pilot projects for government buildings sector



## Measure Overview:

Set up to joint capital promote investment in energy conservation and renewable energy development projects



Phase 1 Oct 2008 – Sep 2010  
 Phase 2 Oct 2010 – Mar 2013  
 Phase 3 Mar 2013 – Jul 2014

2015 ongoing (April 2015 – April 2017)  
**500 million Baht**  
 Allocated from Gov's ENCON FUND

	All 3 Phases		
	FM1	FM2	Total
No. of project	81	45	126
Total Investment (MB)	3908.46	1040.23	4938.69
Inv. from ESCO Fund (MB)	524.25	370.92	895.17
Saving (ktoe)	21.99	18.73	40.72
Energy Saving (MB)	662.59	362.76	1025.35



มูลนิธิพลังงานเพื่อสิ่งแวดล้อม

**2 Fund Managers**

# Direct Subsidy

## Project feature:

- Subsidy **20-30%** of **capital investment** for high efficient equipment/ machineries
  - Max. **3** million baht
  - Min. **0.05** million baht
- To buy EE products
- Payback period < **7** years

20% for Db/Df  
30% for SME

Standard Measure

Advanced Technology

- Chillers
- High-Efficiency Motors
- VSD for Pump

- Ozone
- Heat Pump
- VSD Chillers

	2010-2011	2012	2013	Total
Target	Industry, Building, Agriculture	Industry, Building, Agriculture	SMEs	
No. of project	232	247	115	594
No. of Measure	316	362	190	1,462
Supported (MB)	127.5	166.5	25.7	319.7
Saving (ktoe)	10.6	14.2	2.1	26.90
Total Investment (MB)	n/a	n/a	n/a	2,106.7
Saving (MB/Yr)	n/a	n/a	n/a	847.1

2015 on going  
**500** million Baht  
Allocated from Gov's  
ENCON FUND

80  
20



# **Energy Efficiency Policies and Measures**

## **Complementary Measures**



## Capacity Buildings

1. Train PREs
2. Promote highly efficient technologies and materials
3. Promote Best Practice for energy conservation

### Bureau of Human Resource Development



## Mini - Plant



**For actual Hand-on Experience**



เครื่องอัดอากาศ (Air-Compressor)



พัดลมและเครื่องสูบน้ำ (Revolution machinery (Fan & Pump))



หม้อไอน้ำและชุดแยกขอมบตัวติดไอน้ำ (Boiler and Stream trap training unit)



เตาเผา (Combustion Furnace)

## Technologies Demonstration

### Energy Display Center

**54 technologies showcased**

- 37 Industrial sector technologies
- 10 Commercial building technologies
- 7 Residential sector technologies
- 20,000 visitors per year



### Advance Technology Demonstration Project Phase 3

**Focus on new and highly efficient technologies with small coverage publicly.**

**A total of 3 technologies in 5 establishment**

- Subsidize 40% of the cost
- Max subsidy = 6 million Baht
- Energy saving of at least 15% for manufacturing process or 20% for utility system



**Adsorption Chiller**



**Once-through Boiler**



## “Thailand Energy Awards”

- Awareness Raising
- Participation
- Public Relation
- Increase Visibility

## “ASEAN Energy Awards”





**Thank You**