Existing Legislation in Thailand and its relevance to development of ETS

Department of Alternative Energy Development and Efficiency (DEDE)

Mr. Wisaruth Maethasith
Engineer
Bureau of Energy Regulation and Conservation

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

กระทรวงพลังงาน
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1. **Thailand's Energy Efficiency Situation**
2. **Law and Regulation Framework under Energy Conservation and Promotion Act**
3. **Relevance to the Emission Trading Scheme (ETS)**

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Thailand's Energy Efficiency Situation

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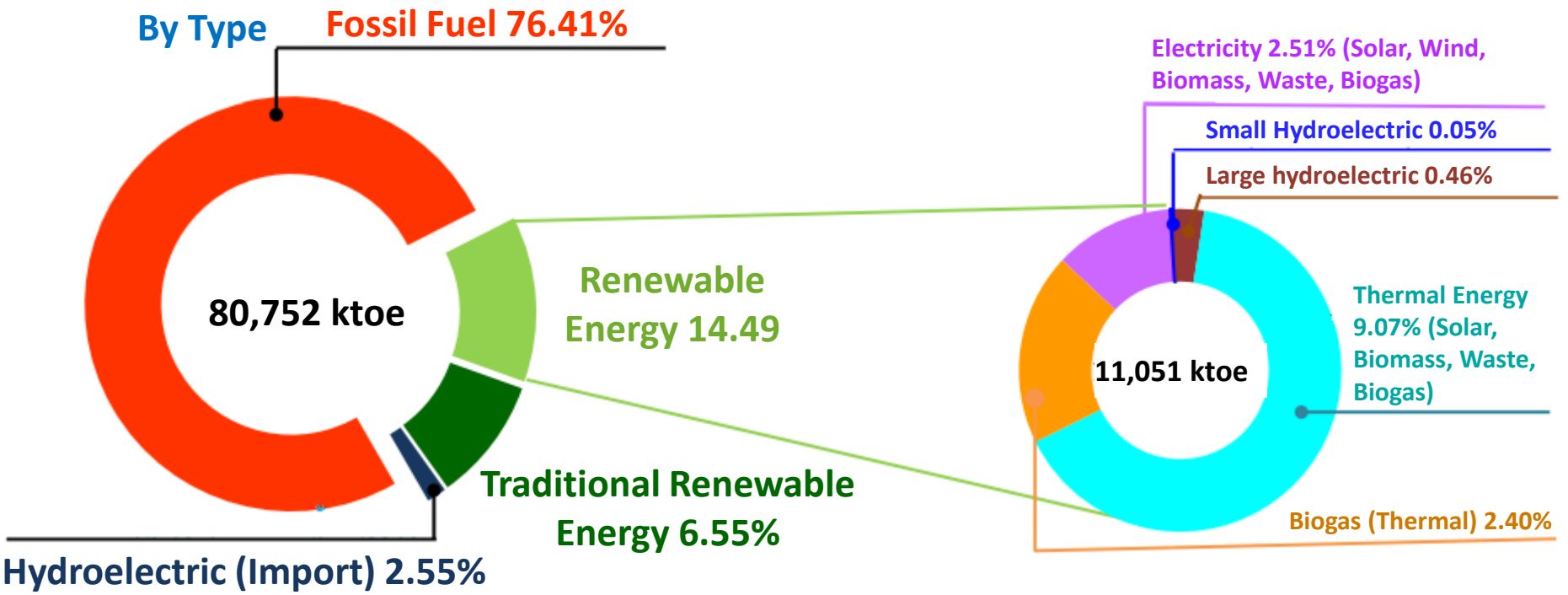
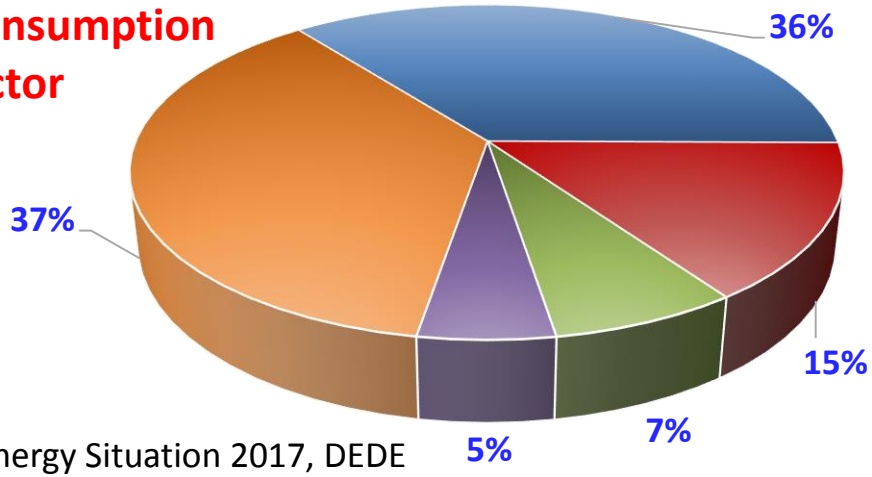
Thailand Energy Situation 2017

Final Energy Consumption By Type



Final Energy Consumption by Sector



Source: Thailand's Energy Situation 2017, DEDE

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Thailand Integrated Energy Blueprint (2015)

Integration | Harmonized Time Frame | Better Balanced Focus

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PDP EEP AEDP GAS OIL

TIEB

THAILAND INTEGRATED ENERGY BLUEPRINT

Security Economy Ecology

PDP — POWER DEVELOPMENT PLAN
แผนพัฒนากำลังผลิตไฟฟ้าของประเทศไทย*

EEP — ENERGY EFFICIENCY PLAN
แผนอนุรักษ์พลังงาน*
Approved: August 13th, 2015

AEDP — ALTERNATIVE ENERGY DEVELOPMENT PLAN
แผนพัฒนาพลังงานทดแทนและพลังงานทางเลือก

GAS — GAS PLAN
แผนบริหารจัดการก๊าซธรรมชาติ

OIL — OIL PLAN
แผนบริหารจัดการน้ำมันเชื้อเพลิง

EEP 2015 Overview

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

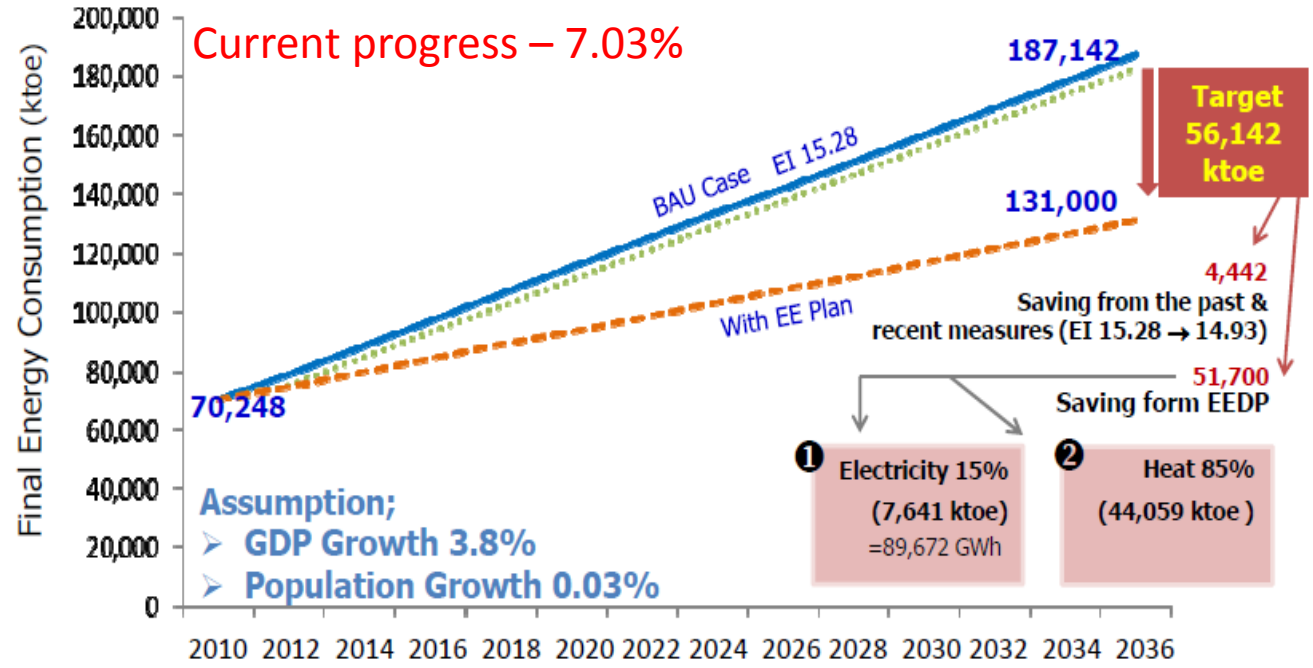
EEDP 2011 - 2030
= 25% Reduction

EEP 2015 – 2036
= 30% Reduction

$EI^{base2010}$ = 8.54 ktoe/billion baht

$EI^{Actual2017}$ = 7.94 ktoe/billion baht

$EI^{Goal2036}$ = 5.97 ktoe/billion baht



Concept

- Long-term Implementation
- Combination of Compulsory & Voluntary Measures
- Performance-based Support

EEP 2015 Strategies & Measures

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
Total	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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Law and Regulation Framework under Energy Conservation and Promotion Act

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Energy Efficiency Plan: Rules and Regulations

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

Effective from 06/2008

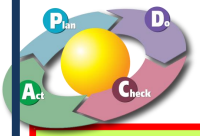
Decree on designated building

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

Online Energy Management Report – E-Form

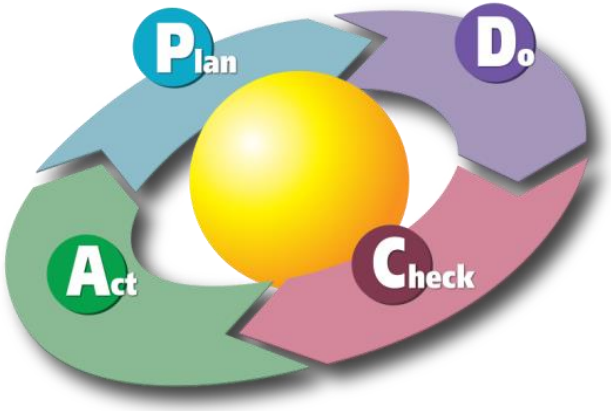
Classification of designated factories/buildings

Criteria	Designated Factories/Buildings	
	Group 1	Group 2
Installed electric meter (total)	Between 1000 – 3000 kW	More than 3000 kW
Installed transformers (total)	Between 1,175 – 3,530 kVA	More than 3,530 kVA
Total annual energy consumption	Between 20 – 60 TJ/year	More than 60 TJ/year

Legal responsibilities of designated factories/buildings

1. Appoint Person Responsible for Energy (PRE)
   - At least 1 PRE for Group 1
   - At least 2 PREs for group 2, in which one must be senior PREs.

Current status (as of November 2018):
5,939 designated factories
3,094 designated buildings
9,033 in total



Person Responsible for Energy (PRE)

Duties of Person Responsible for Energy (PRE)

1. Maintain and monitor efficiency of machines and equipment periodically
2. Improve energy use following energy conservation measures
3. Help owner to conduct energy management system
4. Help owner to follow the order of Director General of Department of Alternative Energy Development and Efficiency (DEDE)

2 Main types of Person Responsible for Energy (PRE)

1. Conventional PREs (C-PRE)
2. Senior PREs (S-PRE)

At least 1 PREs for Group 1
At least 2 PREs for group 2, in which one must be S-PRE.

Types of PREs	Factories	Buildings
C-PREs	8,132	5,904
S-PREs	3,190	984

Number of PREs as of November 2018

Online Energy Management Report – E-Form

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Legal responsibilities of designated factories/buildings

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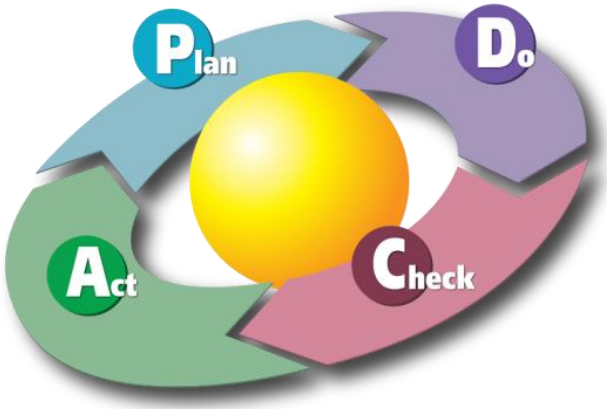
2. Conduct energy management system as described in regulation and submit an annual report to DEDE every March.

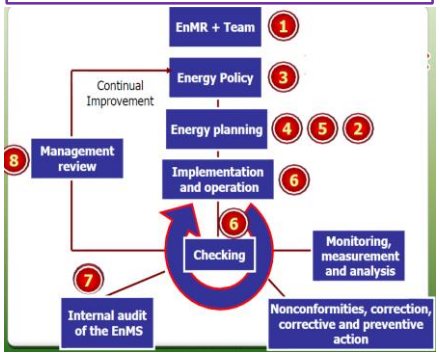
- The report can now be submitted online, which reduces the paperwork required and allows more sophisticate data analysis

- The data includes energy consumption (thermal and electrical), equipment, energy conservation measures implemented and more

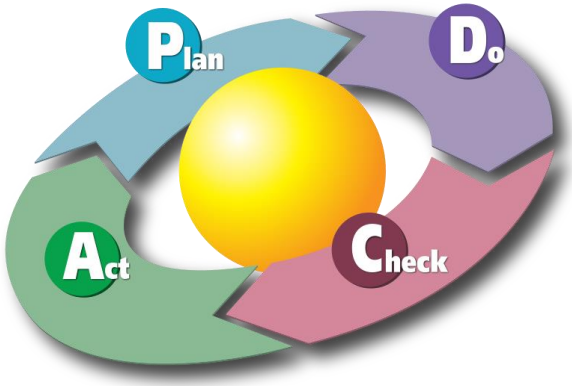


Energy Management System

ISO 50001
Energy Managment System



8 Steps in Energy Management System



1. ESTABLISHMENT OF EM TEAM
2. PRELIMINARY ASSESSMENT OF EM SITUATION
3. FORMULATION OF EE&C POLICY
4. EVALUATION OF ENERGY SAVING POTENTIAL
5. SETTING OF TARGET AND PLAN FOR EE&C
   MEASURES (PRIORTIZATION, TIME FRAME, REPONSIBLE PERSON, BUDGET)
6. IMPLEMENTING AND MONITORING
7. INTERNAL AUDIT
8. MANAGEMENT REVIEW FOR IMPROVEMENT

C-PRE & S-PRE are involved in all steps

Thailand's Energy Auditing System

1. Factory/building's owner

1. Appoint PREs

2. Conduct Energy Management

3. Submit Energy Report

Employ Energy Auditor

2. Energy auditor

4. Audit and certify energy report

5. Create Energy Audit report

6. Submit Energy Audit report to the client

7. Certify the Energy Audit report and submit the Energy Report and Energy Audit report to DEDE every year

Submit within March

Report the inspection result to factory/building's owner

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Status: Energy auditor license

A total of 241 Energy auditor licenses have been issued.

- 68 licenses for legal entity
- 124 licenses for individuals
- A total of 1,116

Relevance to the Emission Trading Scheme (ETS)

Energy Baseline for buildings: EnPI: BEEinO

Designated Buildings > 1,175 kVA

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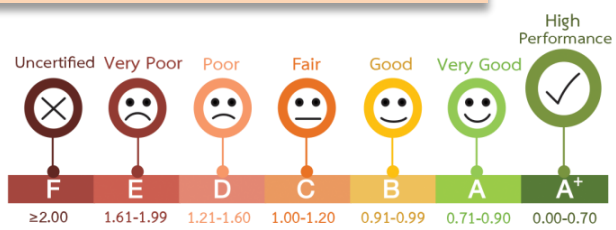
PEECB

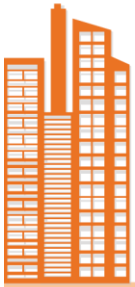
NEW BUILDING (As Design)		EXISTING BUILDING (In Operation)
Building Energy Code (BEC)	CERTIFICATE	Building Energy Efficiency in Operation (BEEinO)
Mandatory	PARTICIPATION	Voluntary (toward mandatory)
Design Performance (Regulation)	INDICATOR	Energy Performance Indicator (EnPI)
YEAR 2009	ENFORCEMENT	Testing & Demonstration

2E BUILDING

THAILAND
Building Energy Efficiency : In Operation



- Whole Building Energy Consumption
- OTTV RTTV
- Performance of A/C
- Lighting Efficiency

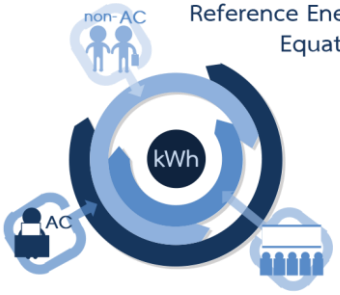


Data Analysis to Calculate Reference Energy Consumption

Related Parameters

1. Air conditioning system
   - Air conditioned area
2. Lighting system
   - Total ulitized area
3. Machine and equipment
   - Number of building users

Reference Energy Equation

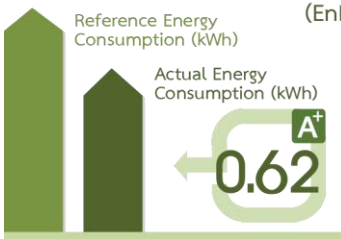


Apply actual parameters of the building into reference energy equation.

5 specific equations for :

1. Office building
2. Hotel building
3. Hospital building
4. Department store building
5. Educational building

Building Energy Performance Indicator (EnPI)



Comparing the reference energy consumption from reference energy equation with actual energy consumption to find EnPI by using equation

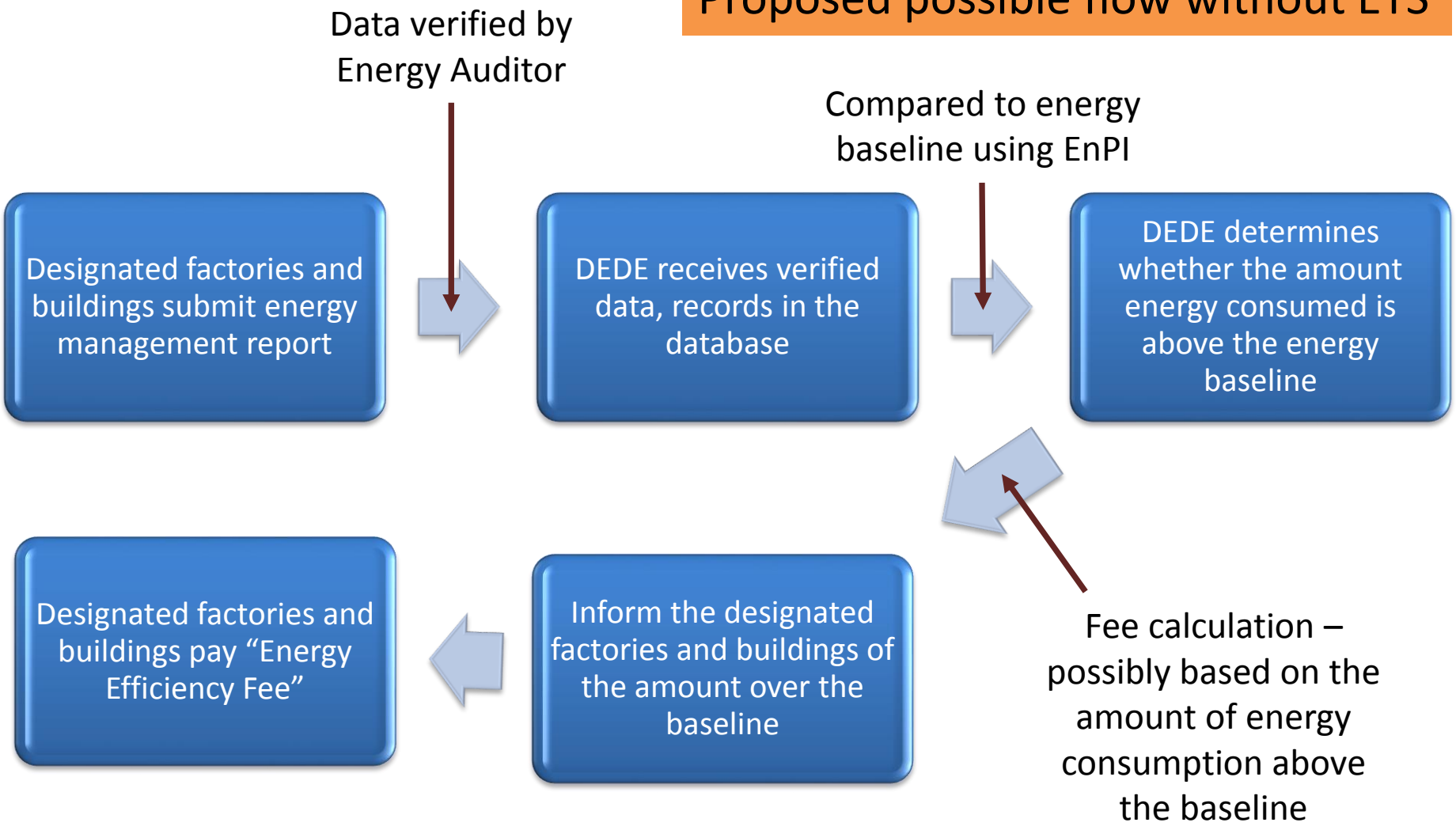
Building Energy Performance Indicator (EnPI) =

$$\frac{\text{Actual energy consumption (kWh/y)}}{\text{Reference energy consumption (kWh/y)}}$$

Apply the EnPI to get energy efficiency rating (BEEinO).

Application of Energy Management System toward ETS

Proposed possible flow without ETS



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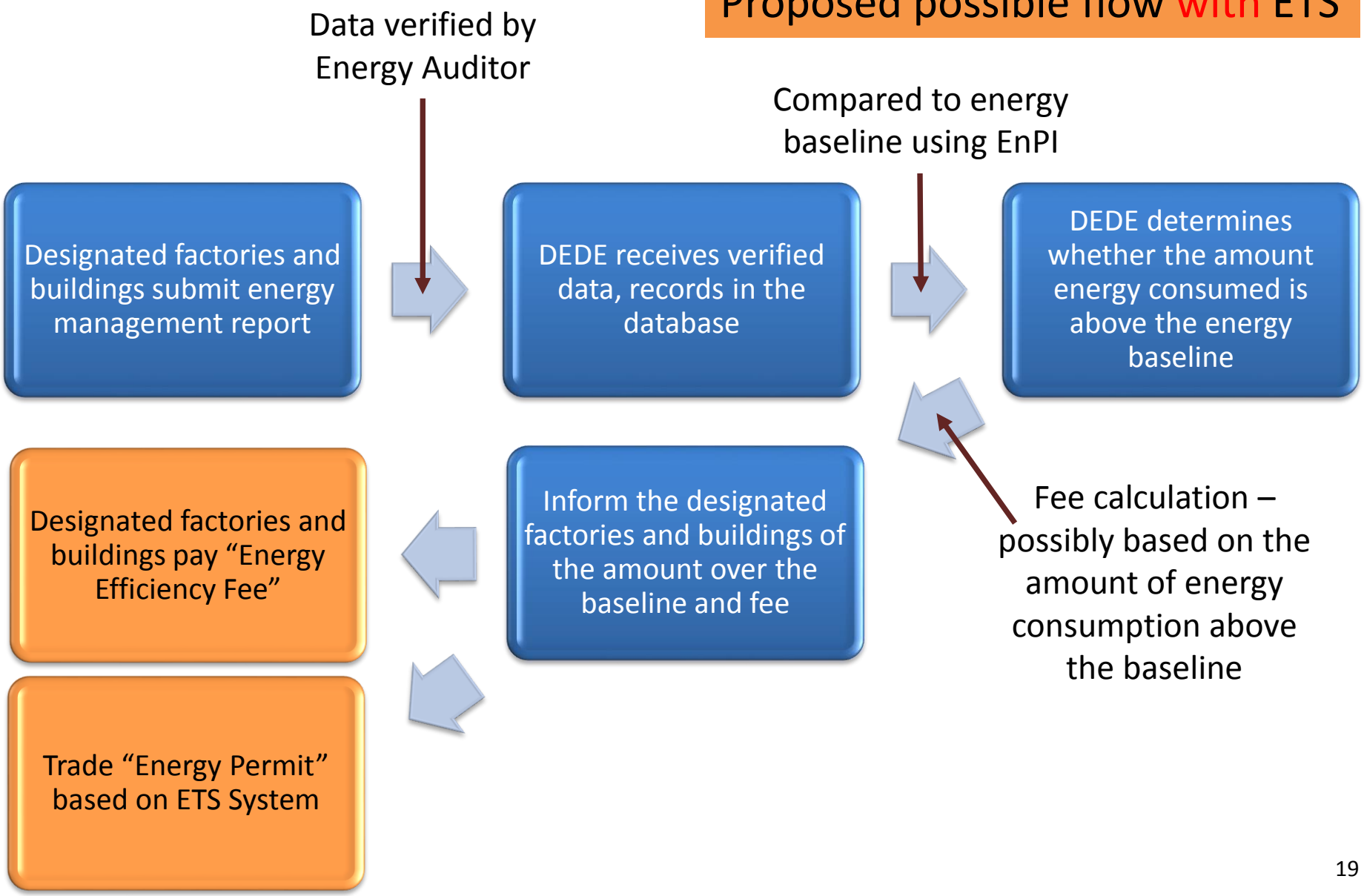


Thank You