

Energy Efficiency Indicators in Indonesia

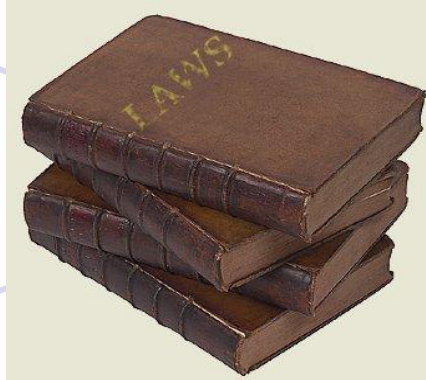
Indarti

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Capacity Building Workshop for ASEAN Region

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OUTLINE

- I. Energy and National Welfare**
- II. Energy Efficiency Indicators**
- III. Barriers**
- IV. Plans to Improving Energy Efficiency Indicator**

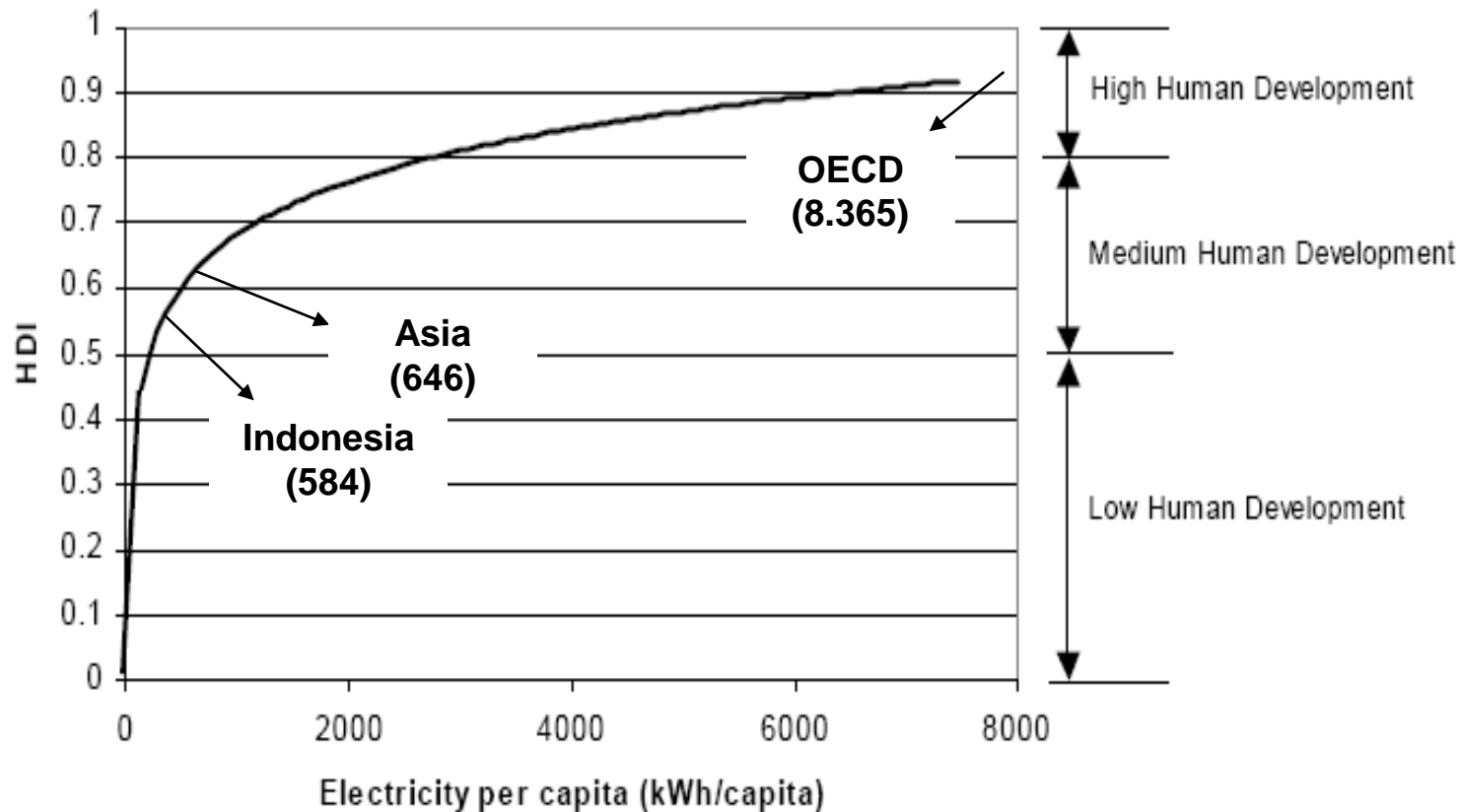
1. Energy and National Welfare



Energy and National Welfare

Energy is an important factor in increasing the welfare of a nation

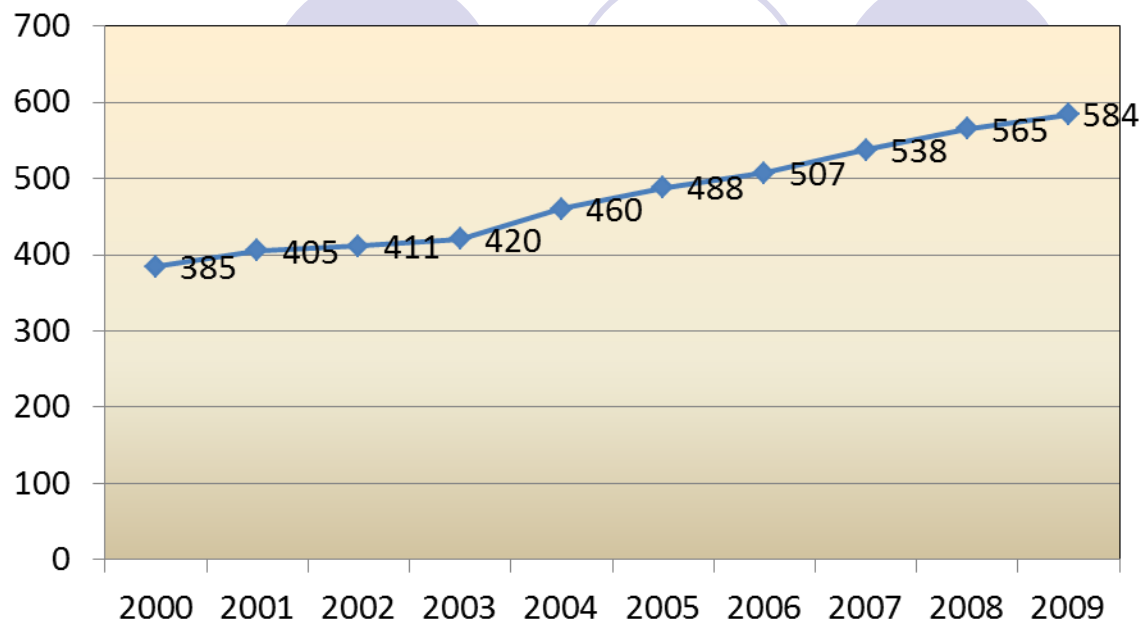
Graph on Relations Human Development Index (HDI) and Electricity Consumption per Capita



- HDI is calculated based on data that can describe the four components, namely the achievement of longevity, literacy rate, average old school and purchasing power
- Indonesia is ranked 107 out of 177 countries in UNDP's HDI published in 2009

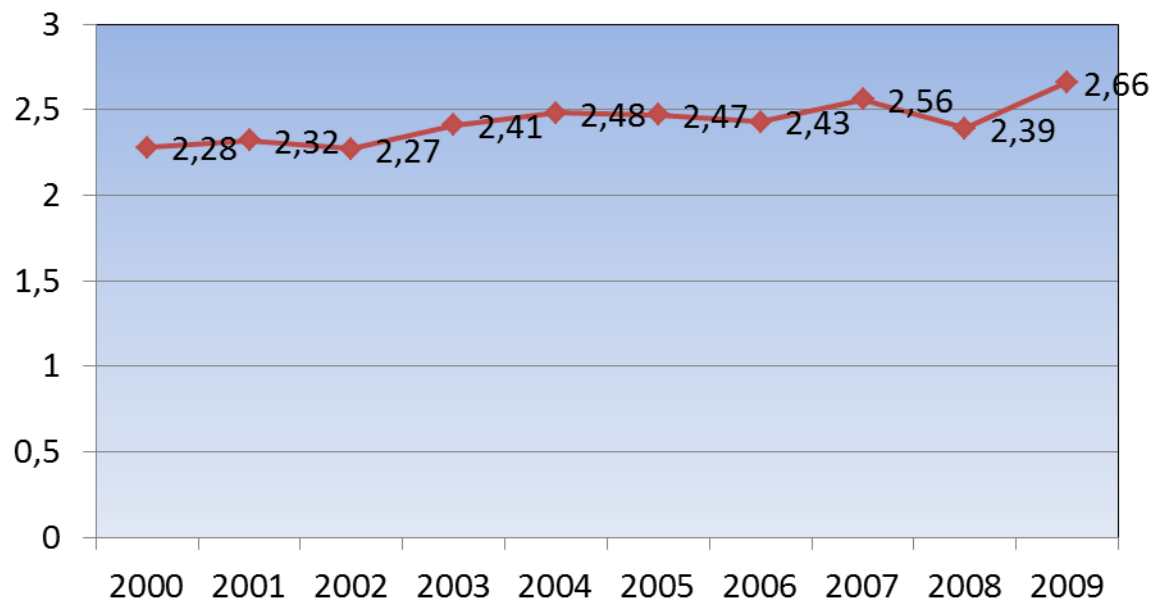
- Electricity per capita increase significantly
- Growth of Electricity consumption is 6% per year and population is 1,3% per year

Electricity per Capita (kWh/Capita)



- Generally, trend of final energy consumption per capita is increased
- Growth of final energy consumption is 3% per year

Final Energy Consumption per Capita (BOE/Capita)



2. Energy Efficiency Indicators



Measuring Energy Efficiency

There are two energy indicators used to measure energy efficiency in Indonesia.

- Energy elasticity, is the ratio between growth of energy consumption with economic growth.

A smaller elasticity number indicates that a country is using its energy more efficiently.

Target is to achieve energy elasticity less than 1 in year 2025

- Energy intensity is the ratio between the total energy consumption per Gross Domestic Product (GDP).

The lower energy intensity number indicates that a country is using its energy more efficiently.

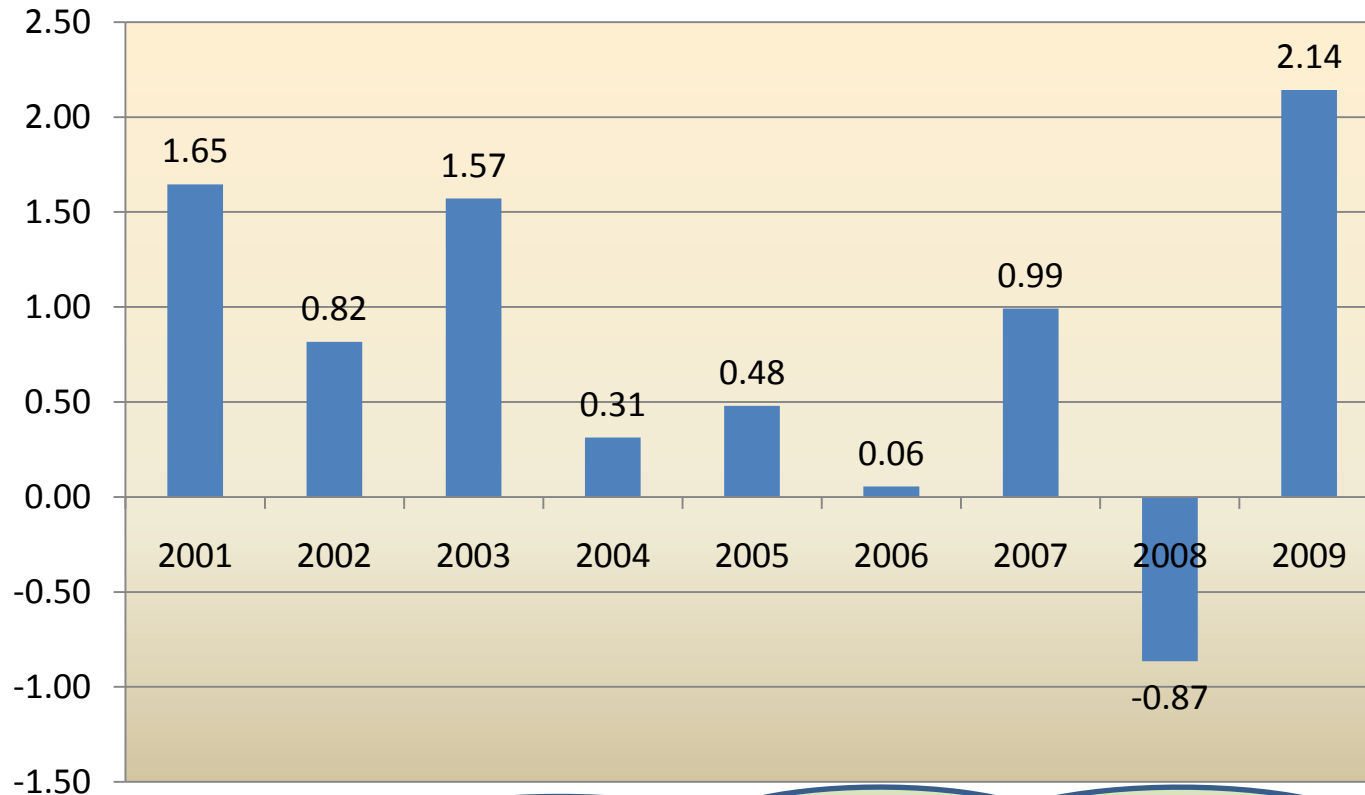
Target is to decrease energy intensity 1% per year until year 2025

Benefit of The Energy Efficiency Indicators

- To provide **policy makers** with a stronger foundation to carry out **analysis** and **make decisions**
- **To monitor** energy efficiency program to evaluate if the **targeted** can be achieved.

Energy Elasticity

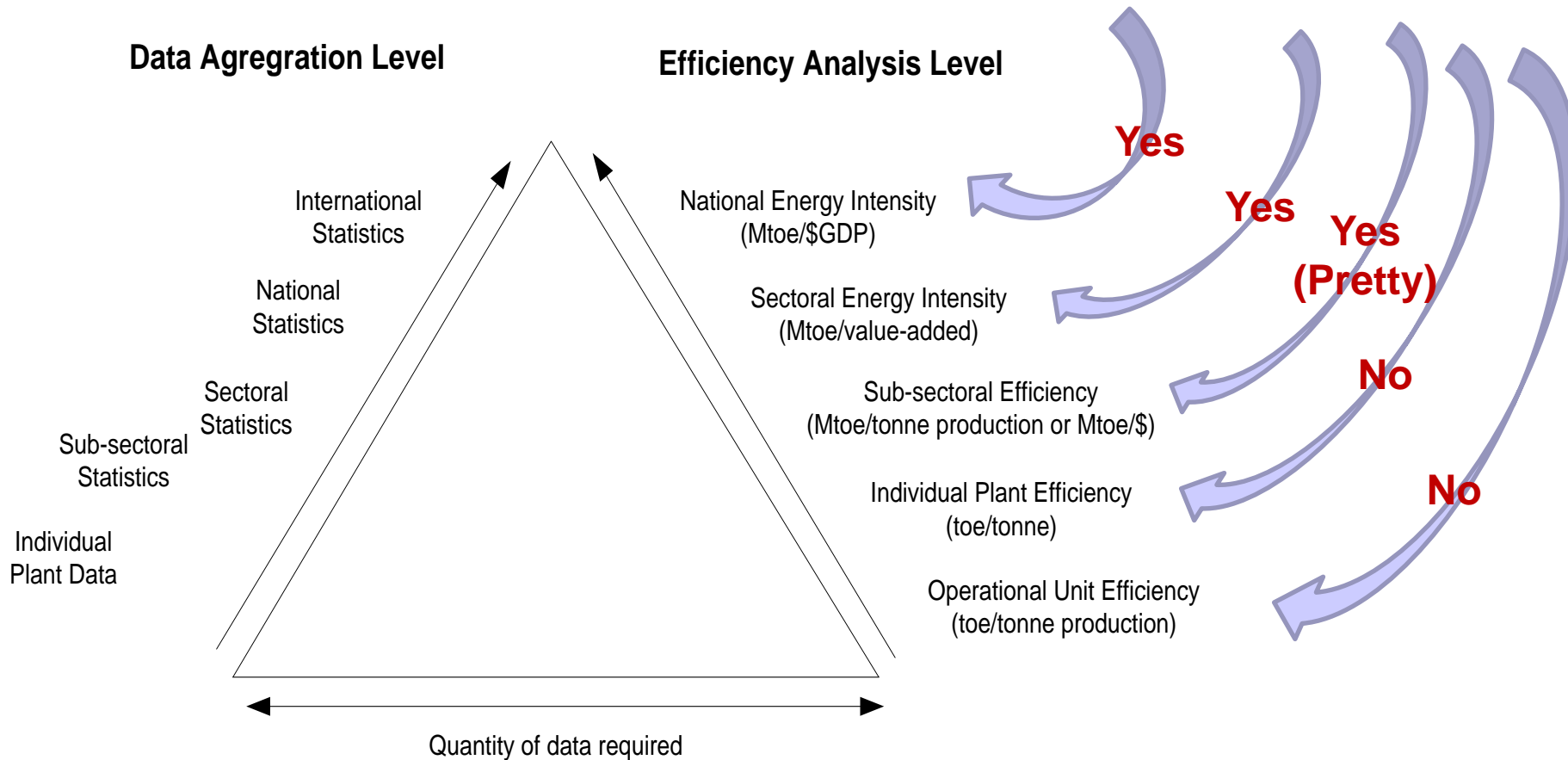
Energy Elasticity, 2001-2009



Energy elasticity is depend on economic condition, industrial structure and demand structure so the value is fluctuate year by year. In 2004-2006 energy elasticity is very low due to increasing of energy prices and in 2008, it is related to the global economic crisis

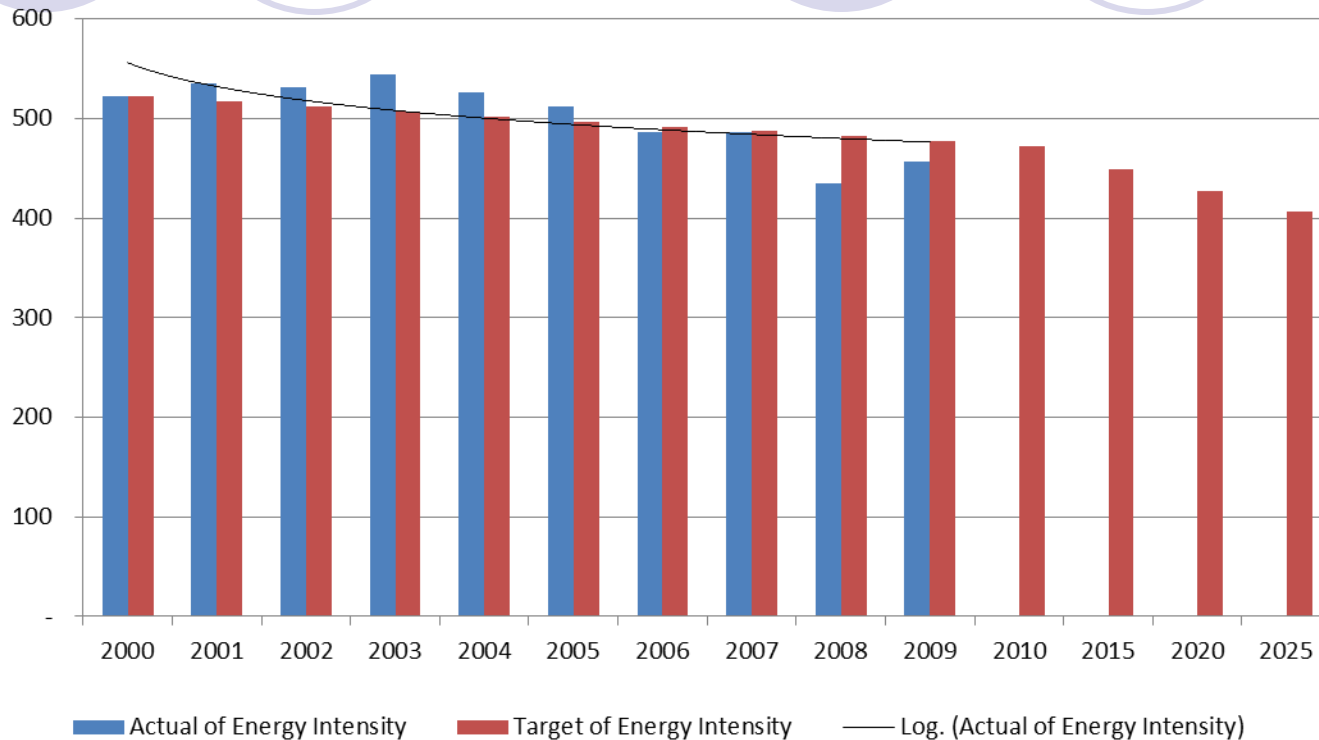
Energy Intensity Pyramid

Is there in Indonesia ?



National Level

National Energy Intensity in 2000-2025 (BOE/Rp. Billion)



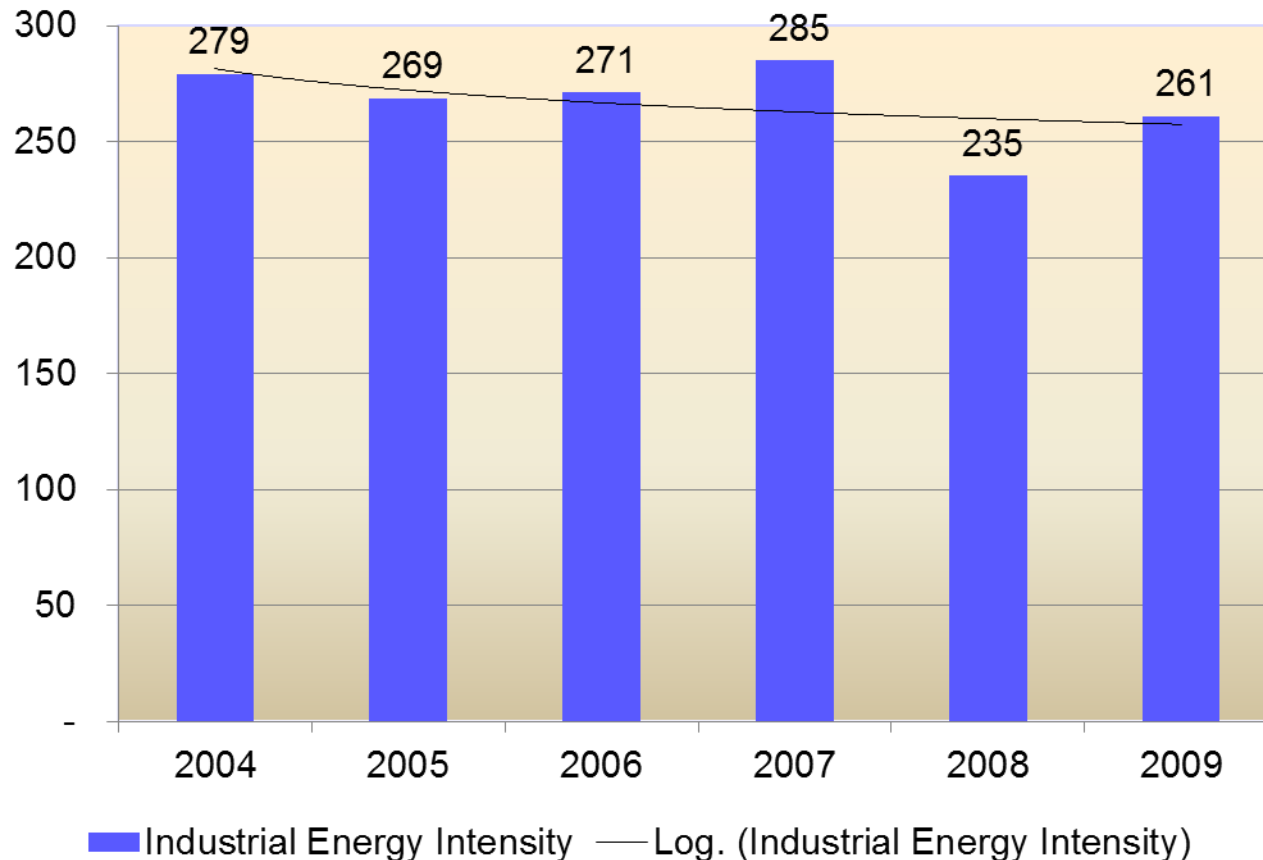
In 2000-2009, the national energy intensity is decreased. In 2001-2005 the target was not reach. The target achieved after 2005 related to government policy to increase energy prices.

Sectoral Level (1)

1) INDUSTRIAL SECTOR

In the year of 2004-2009, energy consumption in industrial sector more efficient indicated by decreasing of energy intensity

**Energy Intensity in Industrial Sector in 2004-2009
(BOE/Rp. Billion)**

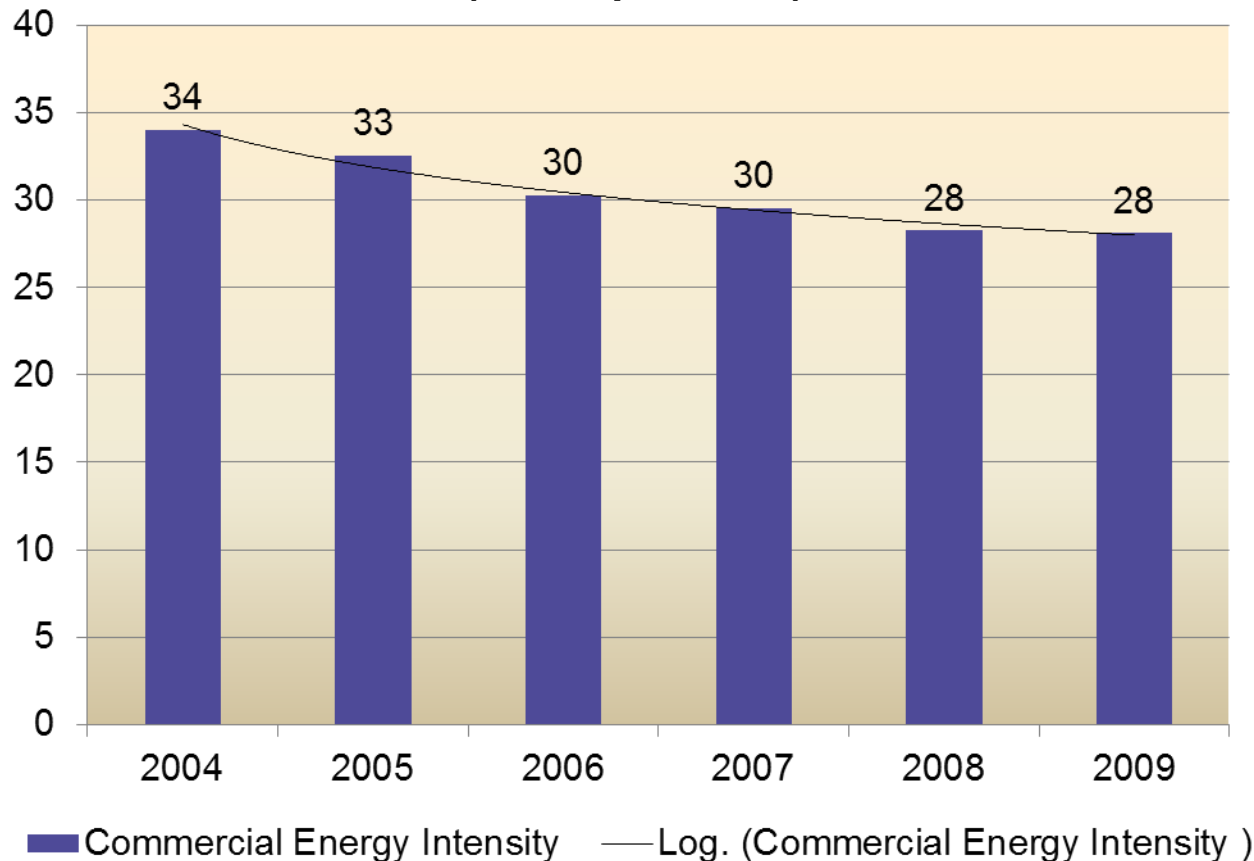


Sectoral Level (2)

2) COMMERCIAL SECTOR

In 2000-2009, energy consumption in commercial sector more efficient indicated by decreasing of energy intensity

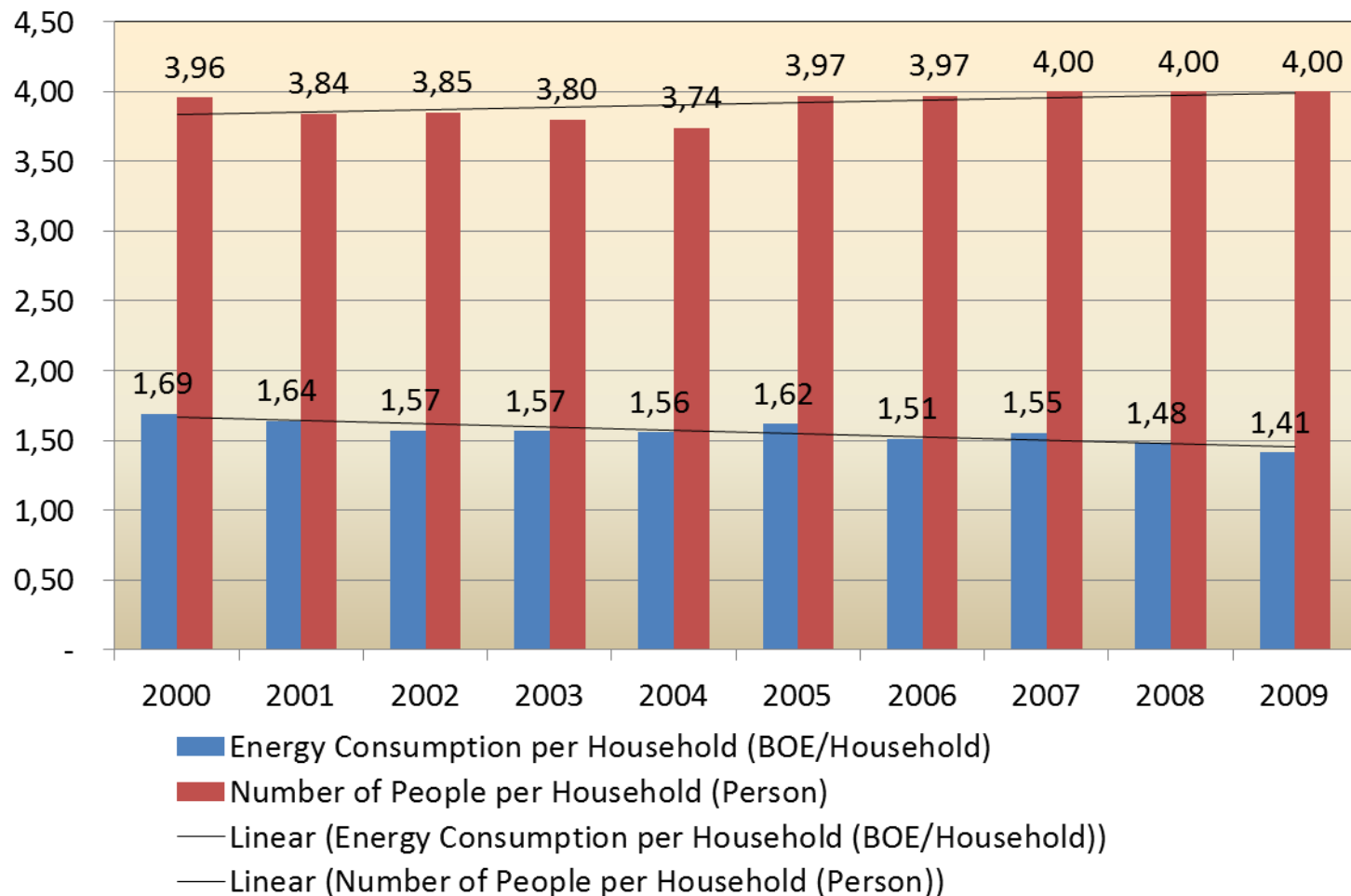
**Energy Intensity in Commercial Sector during 2004-2009
(BOE/Rp. Billion)**



Sectoral Level (3)

3) RESIDENTIAL SECTOR

In 2000-2009, energy usage in the household sector **more efficient** indicated by **decreasing energy consumption per household**. Meanwhile, **the number of persons per household was increased**.

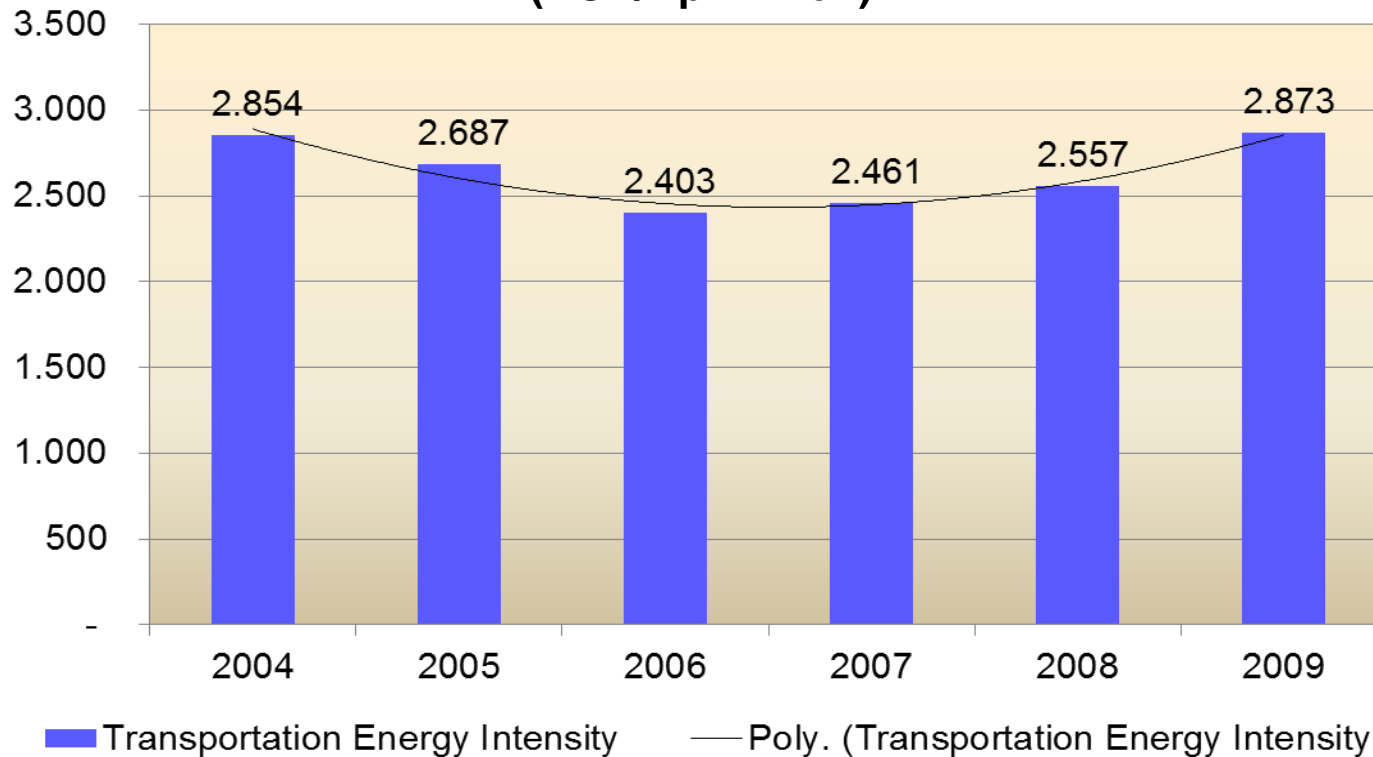


Sectoral Level (4)

4) TRANSPORTATION SECTOR

The level of energy efficiency in transportation sector is fluctuative. Energy intensity in transportation sector is more influenced by energy use in private vehicles which is not directly generate GDP. Energy consumption in the transportation sector decreased in 2006 and increase again due to rising of energy prices

**Energy Intensity in Transportation Sector during 2004-2009
(BOE/Rp. Billion)**



Sub Sectoral Level (1)

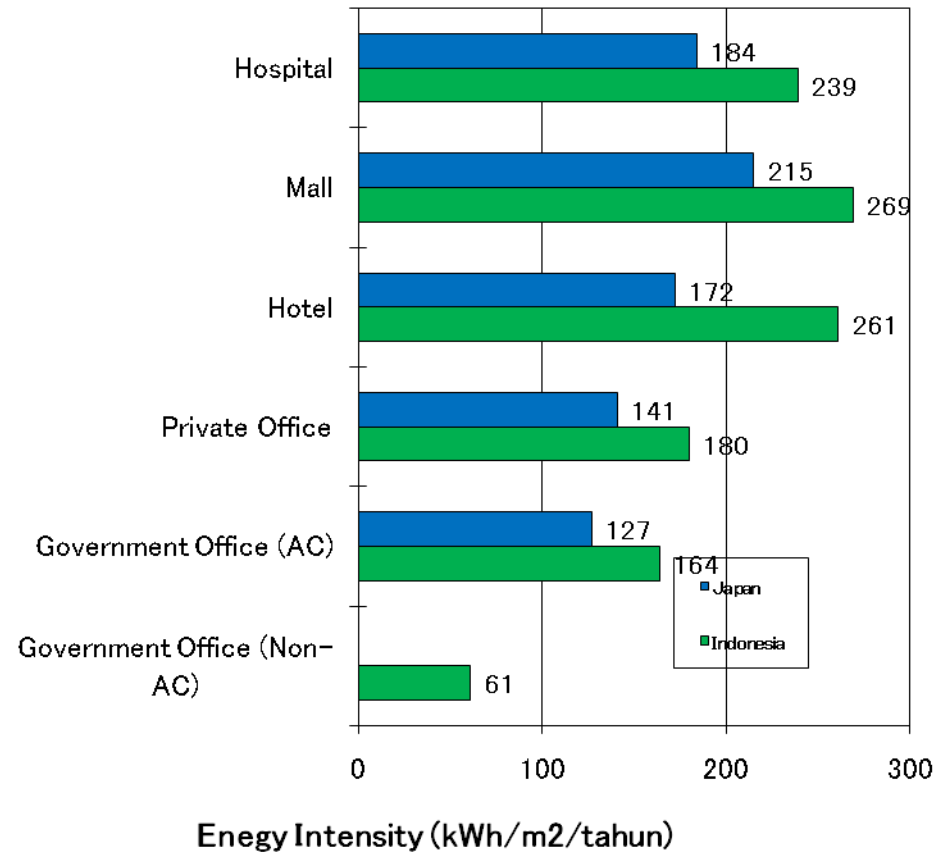
Sector	Sub Sector	Unit	Data
Industrial	Iron and Steel, Cement, Textile, Chemical, etc	Energy/production (kWh/ton, Kcal/kg clinker, etc)	<ul style="list-style-type: none"> Available Based on result of energy audit In 2003-2010, energy audit services implemented in 452 industries and buildings
Commercial	Hotel, Shopping Center, Private Office, Hospital, Government Office, etc	Energy/floor area (kWh/m ²)	
Residential	High income, medium income, low income, etc	Energy/number of household (BOE/household)	Not available
Transportation	Passanger vehicle, non-passanger vehicle	Energy/distance (liter/km)	Not available

Sub Sectoral Level (2)

Comparison of Energy Intensity for Industrial Sector in Several Countries

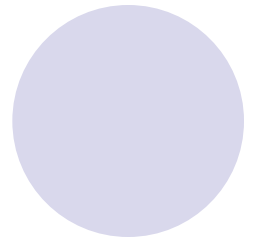
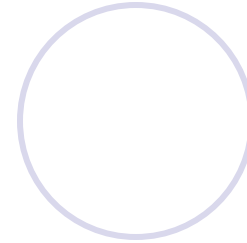
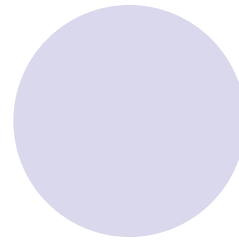
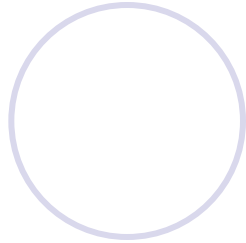
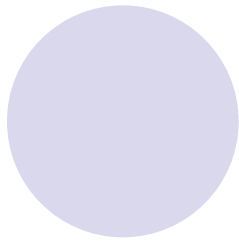
Comparison Energy Intensity for Building Sector indonesia-Japan

TYPE OF INDUSTRIES	COUNTRY	ENERGY INTENSITY
Steel and Iron	Indonesia	650 kWh/Ton
	India	600 kWh/Ton
	Japan	350 kWh/Ton
Cement	Indonesia	800 Kcal/kg clinker
	Jepang	773 Kcal/kg clinker
Ceramic	Indonesia	16,6 GJ/Ton
	Vietnam	12,9 GJ/Ton
Glass	Indonesia	12 MJ/ton
	Korea	10 MJ/ton
Textile	Indonesia	Spinning : 9,59 GJ/Ton
		Weaving : 33
	India	Spinning : 3,2
		Weaving : 31



Source : Energy audit 2003-2010 and Study on Energy Conservation in Indonesia 2009 (Cooperation MEMR (Indonesia) – JICA (Japan))

Potential Energy Saving is 20% to 35%.



3. Barriers





Barriers

(Why Aggregate Indicators)

- **Difficult to obtain accurate demand data**
 - Usually demand data are “sales data” from national oil and gas company, and electricity company
 - Survey results have low accuracy and consistency
- **No detail breakdown of energy consumption data in each of the final sector**
 - Statistic Handbook provided only total energy final and primary energy consumption
 - National Statistic Bureau data have breakdown but accuracy and consistency is low
- **Energy audit data is not representative for all industries and commercial sectors.**

Indonesia Energy Balance Table 2009

Kboe

	Hydro Power	Geothermal	Biomass	Coal	Briquette	Natural Gas	Crude Oil	Fuel	LPG	Other Petroleum Product	Electricity	LNG	Total
1 Primary Energy Supply	28,688	14,973	279,251	234,318	0	406,622	337,584	151,618	6,509	-28,369	0	-185,692	1,245,502
a. Production	28,688	14,973	279,251	1,077,390	0	459,444	346,469		0	0	0	0	2,206,216
b. Import	0	0		289	0	0	119,600	129,437	7,819	7,363	0	0	264,507
c. Export	0	0		-831,600	0	-52,822	-133,282	-2,045	0	-35,732	0	-185,692	-1,241,173
d. Stock Change	0	0		-11,761	0	0	4,796	24,226	-1,310	0	0	0	15,952
2 Energy Transformation	-28,688	-14,973	-107	-153,852	220	-288,526	-331,173	182,980	18,750	54,291	96,117	185,692	-279,270
a. Refinery	0	0	0	0	0	-2,781	-331,173	247,165	6,555	54,291	0	0	-25,943
b. LPG Plant	0	0	0	0	0	-4,457	0	0	7,983	0	0	0	3,527
c. LNG Plant	0	0	0	0	0	-219,382	0	0	4,213	0	0	185,692	-29,477
d. Coal Processing Plant	0	0	0	-258	220	0	0	0	0	0	0	0	-38
e. Power Plant	-28,688	-14,973	-107	-153,852	0	-61,907	0	-64,186	0	0	96,117	0	-227,338
- State Own Utility (PLN)	-25,982	-9,135	0	-90,739	0	-47,870	0	-62,476	0	0	73,945	0	-162,256
- Independent Power Producer (Non-PLN)	-2,707	-5,838	-107	-62,855	0	-14,037	0	-1,710	0	0	22,172	0	-65,082
3 Own Use and Losses	0	0	0	0	-1	0	-6,411	-635	0	0	-12,427	0	-19,474
a. During Transformation	0	0	0	0	-1	0	-6,411	0	0	0	-3,203	0	-9,615
b. Transmission & Distribution	0	0	0	0	0	0	0	-635	0	0	-9,224	0	-9,860
4 Final Energy Consumption	0	0	279,145	80,466	219	118,096	0	333,962	25,259	25,922	83,690	0	946,759
a. Industry	0	0	44,496	80,466	219	89,101	0	49,952	955	0	28,323	0	293,512.887
b. Transportation	0	0	0	0	0	56	0	226,454	0	0	68	0	226,578.475
c. Household	0	0	233,261	0	0	130	0	24,255	23,433	0	33,682	0	314,759.457
d. Commercial	0	0	1,388	0	0	730	0	6,990	871	0	20,494	0	30,473.181
e. Other Sector	0	0	0	0	0	0	0	26,311	0	0	0	0	26,311.219
7 Non Energy Use	0	0	0	0	0	28,434	0	0	0	25,922	0	0	54,356.235

NO SECTOR
BREAKDOWN

Source: Energy Statistic of the Data and Information Centre (Pusdatin), MEMR

4. Plans to Improving Energy Efficiency Indicator



Action for Improving Energy Efficiency Indicator

1. Coordinate with the Agency for National Statistics Bureau to **conduct surveys** of energy consumption per sub-sector
2. **Mandatory reporting** of energy usage for intensive energy users (referring to Government Regulation No. 70/2009 on Energy Conservation) and government office (referring to the Presidential Instruction No. 13/2011 on Energy and Water Saving)
3. **Benchmarking** for Energy Efficiency Indicators

