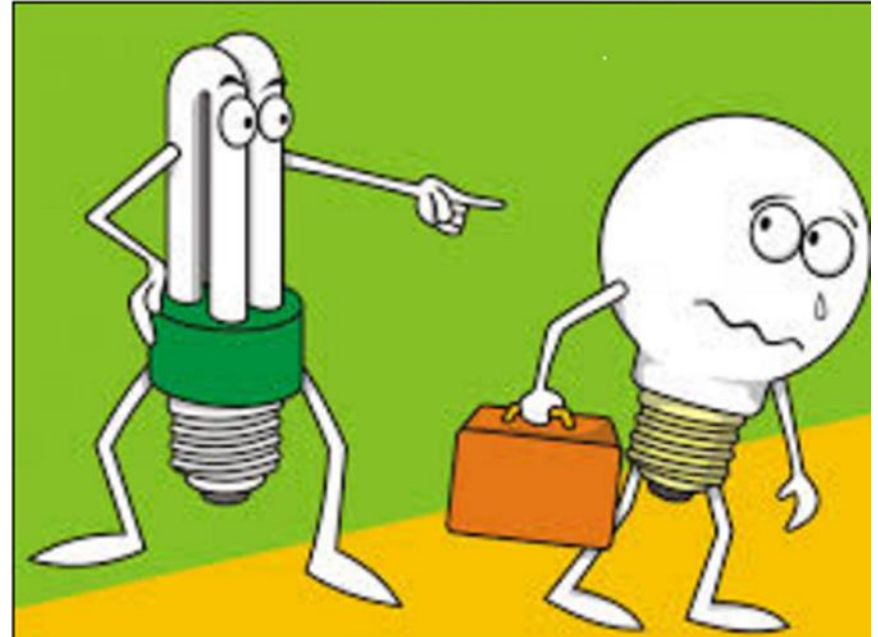

Energy Efficiency 101

Energy Utilization Management Bureau
Department of Energy



Energy Efficiency and Conservation

- Energy Efficiency means using less energy to provide the same service e.g. CFL vs incandescent bulb – CFL uses much less electrical energy to produce the same amount of light.

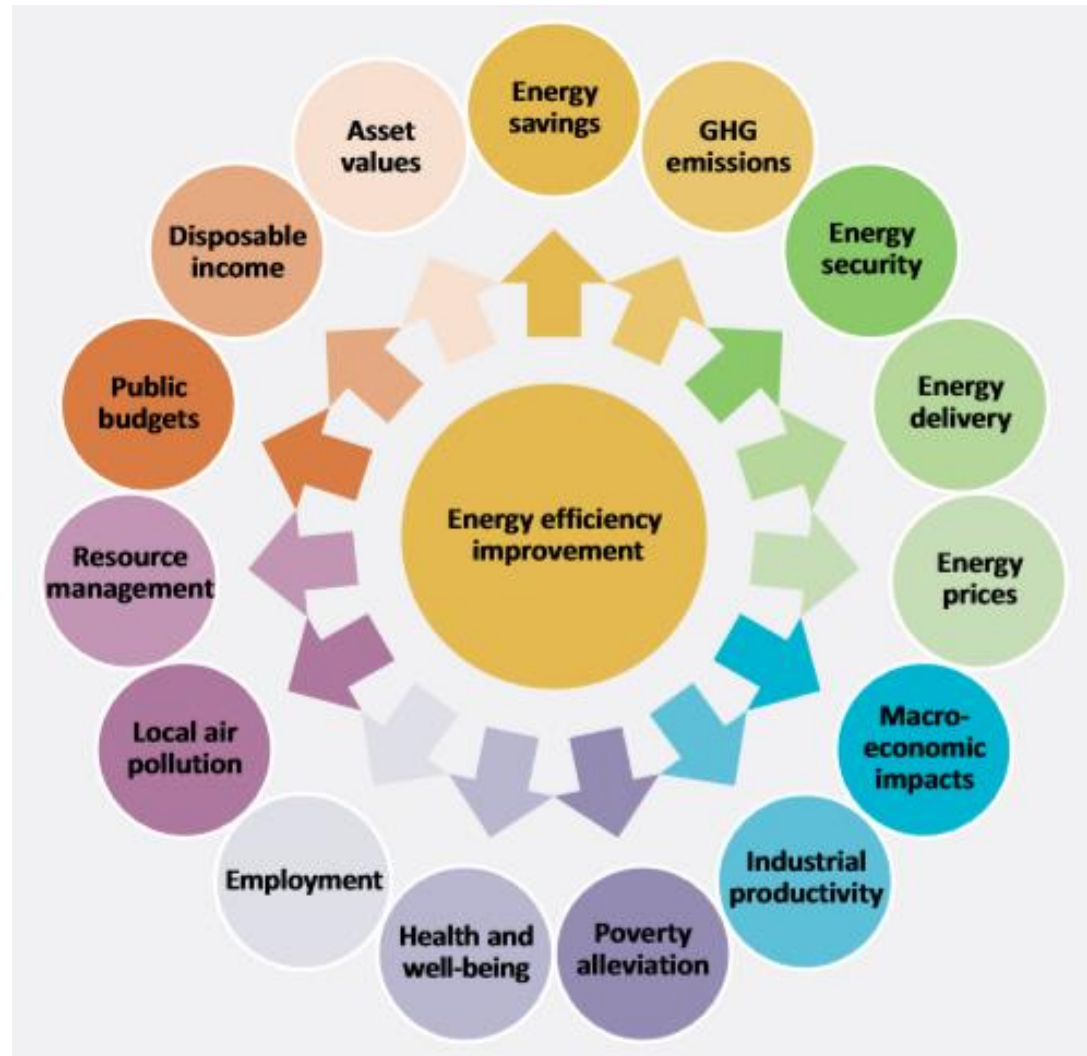


Energy Efficiency and Conservation

- Energy Conservation – a broader term which can also include foregoing a service rather than changing the efficiency with which it is provided e.g. walking to the shops rather than driving there; turning off the light bulb



The Many Benefits of Energy Efficiency & Conservation



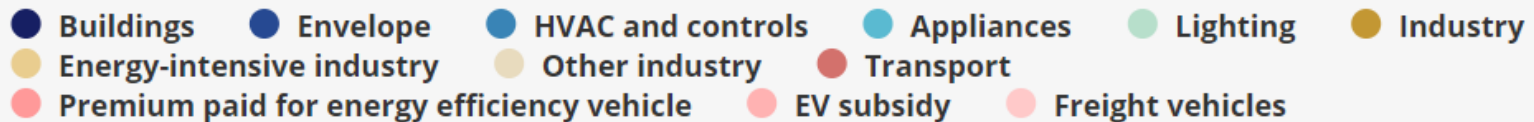
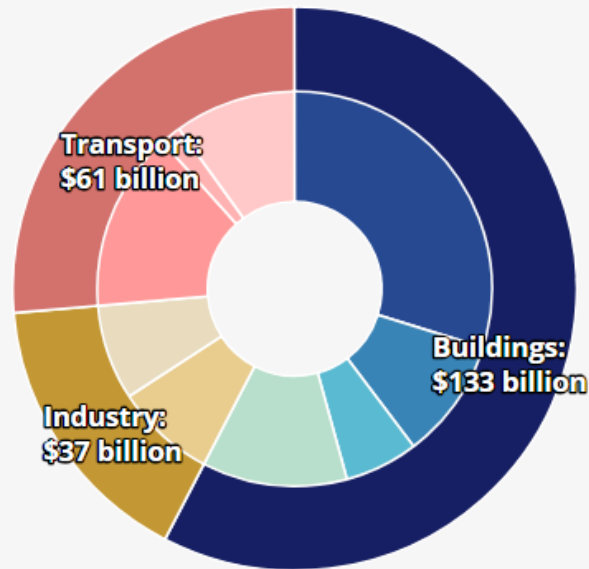
Source : IEA. Energy Efficiency 2017



Energy Efficiency is an Investment

Investment in energy efficiency

\$231 billion total, 2016



Energy Efficiency 2017, IEA

Source : IEA. Energy Efficiency 2017



Energy Efficiency is an Investment

- Increasing energy efficiency often costs money up-front but in many cases this capital outlay will be paid back in the form of reduced energy costs within a short time period.

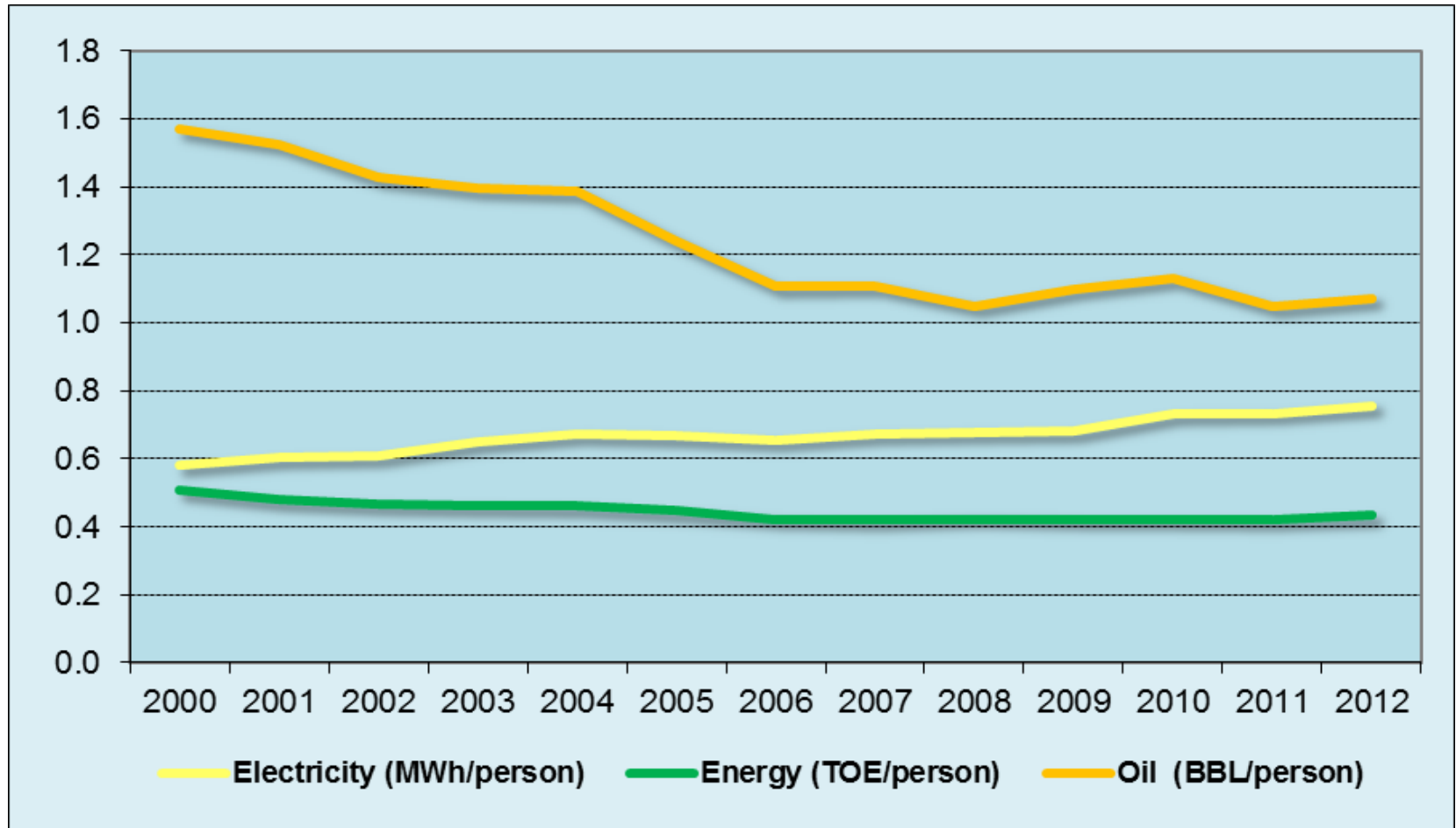


(1) National Indicators

- Energy use per production value (constant prices)
- Energy use per GDP (constant prices)
- Energy use per capita
- Energy use per income

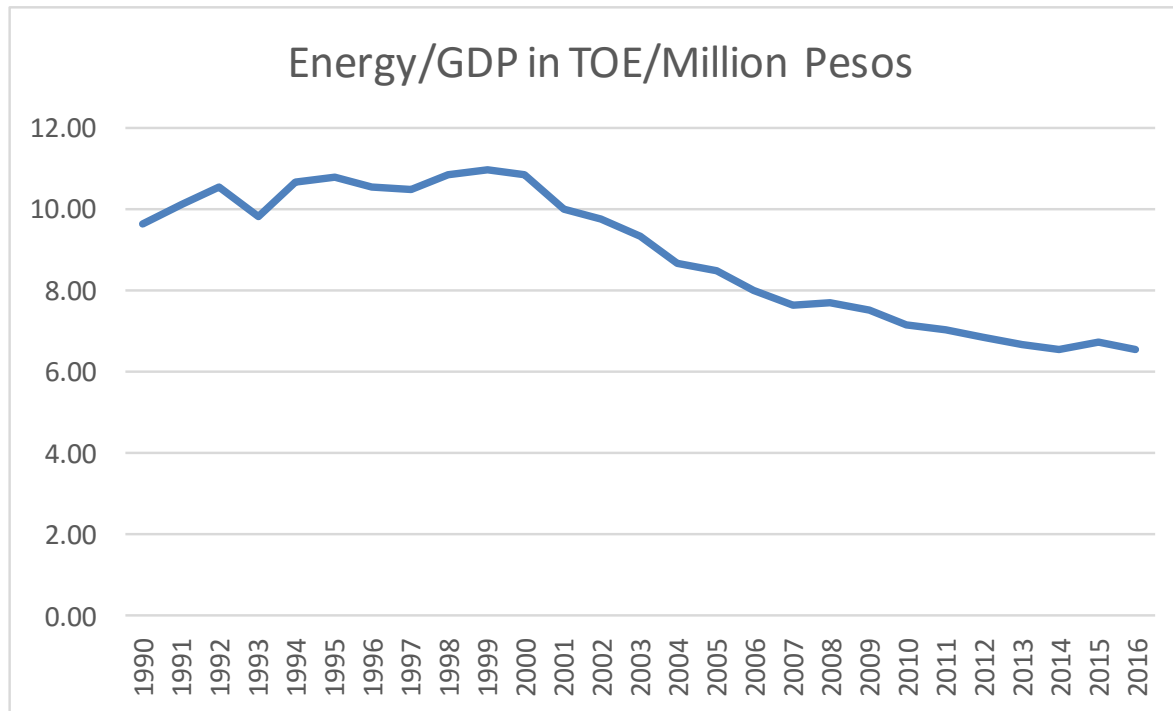


Selected Energy Indicators



Lower Specific Energy Consumption

The country's specific energy consumption (TOE/Million Pesos GDP) has gone down by 32.3 % from 9.7 in 1990 to 6.55 in 2016.

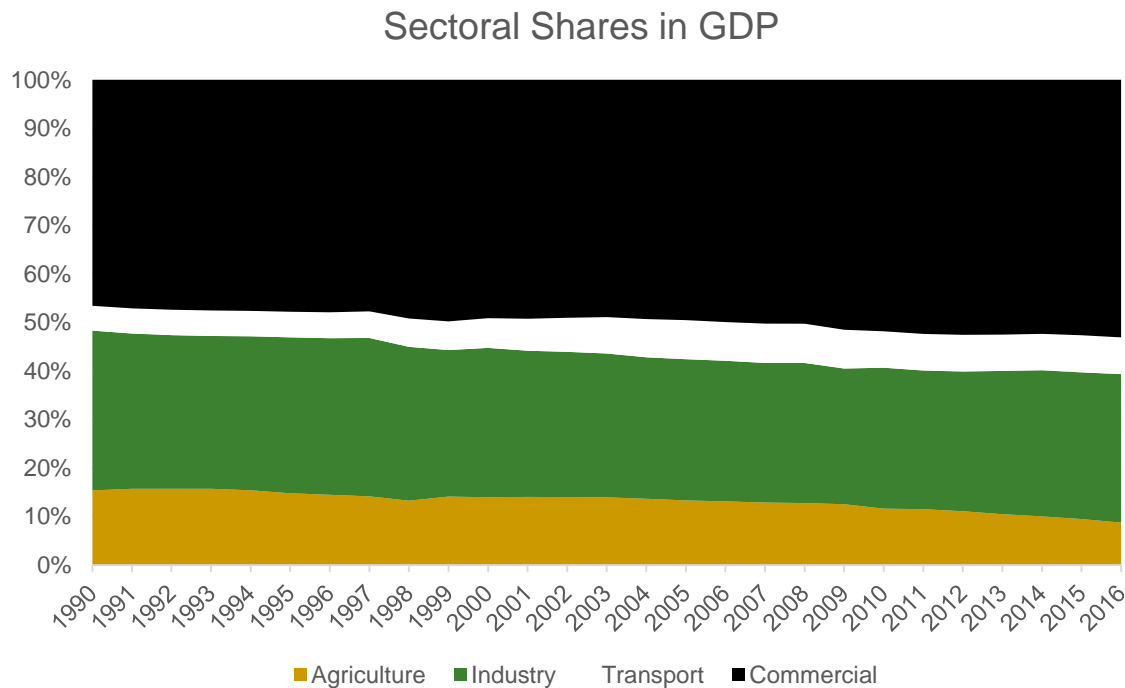


The reduction is attributed to our economic structure that has been dominated by the Services sector during the period.

The resurgence of the manufacturing sector is expected to reverse the trend.



Economic Structure lowers SEC



During the period 1990-2016, the Commercial or Services sector dominated the economic output from 46.6% to 53.1%.

The energy-intensive Industry sector on the other hand reduced its share from ___ to 36.6% in 2016

The Manufacturing resurgence program of the country is e



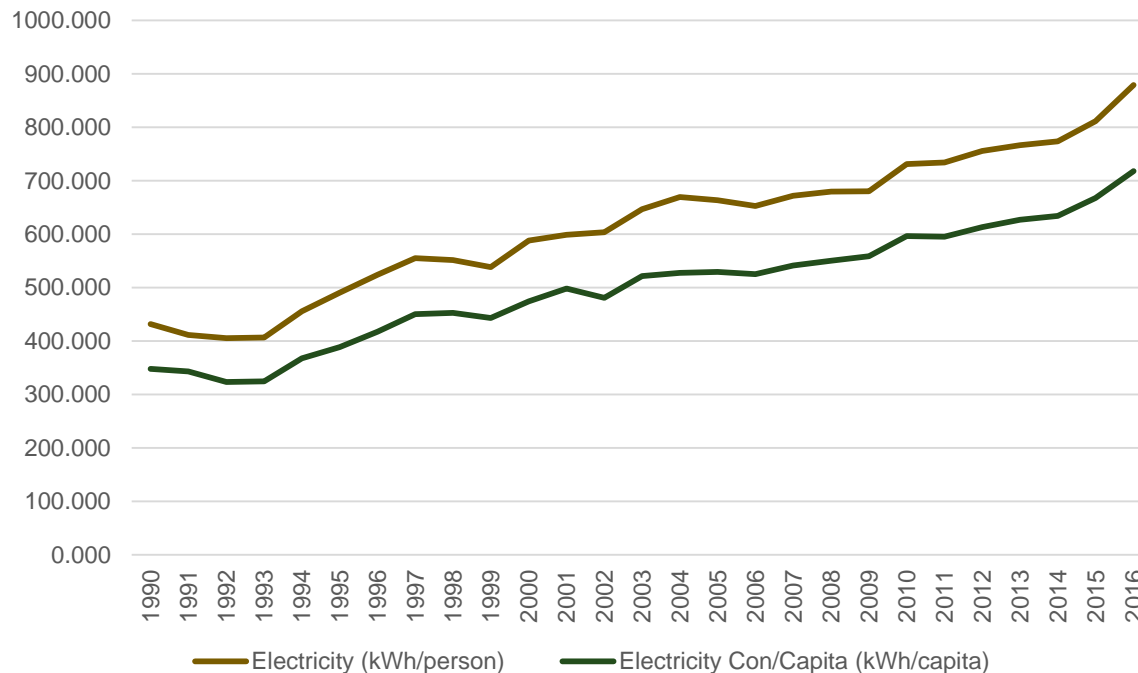
Electricity Consumption Doubles, kwh/person

Electricity consumption and generation on a per capita basis doubled during the 1990-2016 period.

From a low of 346 kwh/person in 1990, the consumption of electric power registered at 718 kwh per capita in 2016

The increase in electricity consumption goes with the country's higher electrification level as well as urbanization

Power Generated vs Power Consumed



The National Energy Efficiency & Conservation Program

Government	<ul style="list-style-type: none">• Government Energy Management Program, GEMP (National)• Mainstreaming of EE in the LGU level (Local)
Commercial	<ul style="list-style-type: none">• Development of Minimum Energy Performance in Building
Industrial	<ul style="list-style-type: none">• Energy Management System Program (ISO 50001)• Energy Service Company (ESCOs)
Household	<ul style="list-style-type: none">• PESLP: Standard & Labeling Program (MEPs for Home Appliances & Devices)
Transport	<ul style="list-style-type: none">• PESLP: Standard & Labeling Program (VFEL for Passenger Cars)
Power	<ul style="list-style-type: none">• Performance Assessment and Audit of Power Plants, Transmission and Distribution Facilities• Smart Grid

GEMP Mandates



Administrative Order Nos.
103, 110, 110-A, 126, 183

- Institutionalize a Government Energy Management Program, GEMP
- Reduce consumption of electricity and petroleum products by at least ten percent (10%)
- Install energy efficient lighting system
- Replace air-conditioning with adequate ventilation
- Adhere to the government's energy management /conservation program



Tasks of NGA

- Designate Energy Conservation Officer
- Formulate Annual Energy Efficiency and Conservation Programs
 - Reduce electricity use by 10%
 - Reduce fuel use by 10%
- Submit Monthly Report of Consumption and Savings



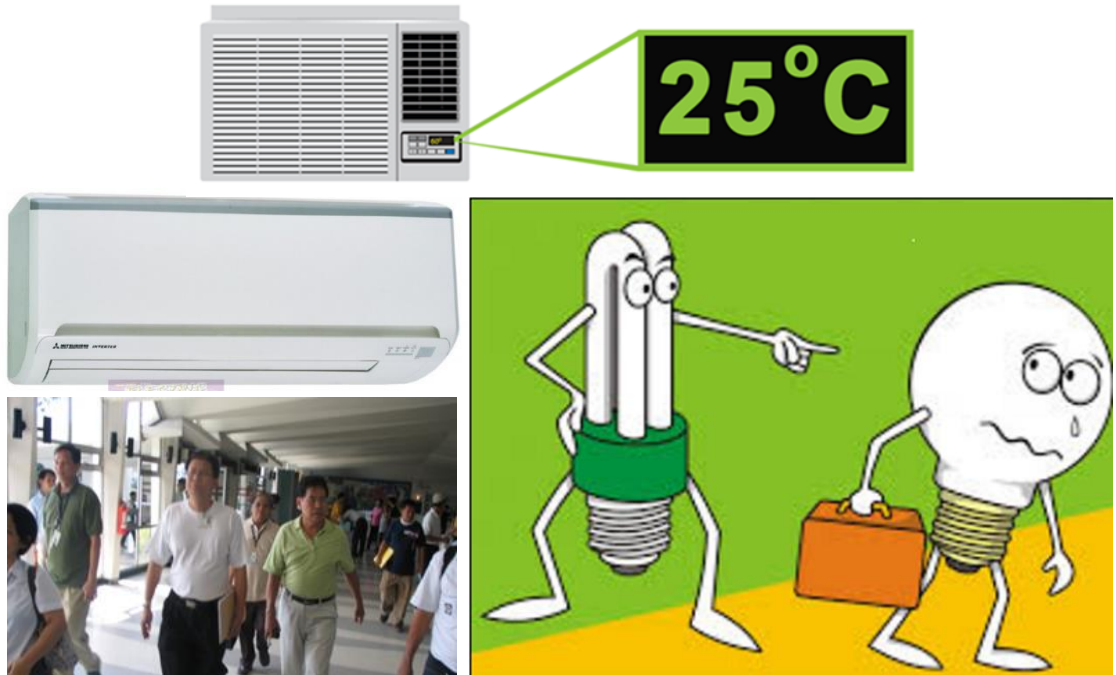
Implementation Schemes of GEMP

- Information, Education and Communication Campaign
- Energy Audit/Survey
- Spot Checks



Common EE&C Measures Implemented

- Set aircon at 25C
- Shift to more efficient aircon technologies & inverter type
- Turn off office equipment when not in use
- Shift to CFL/LED
- Switch to fan mode during lunch break
- Maximize natural lighting



Recognized GEMP Performers

No.	NGAs in 2015
1.	National Electrification Administration
2.	National Power Corporation-Head Office
3.	Office of the President
4.	National Transmission Corporation
5.	Bangko Sentral ng Pilipinas
6.	National Irrigation Administration
7.	Metropolitan Manila Development Authority
8.	Presidential Management Staff
9.	National Economic Development Authority
10.	Bureau of Internal Revenue

No.	NGAs in 2016
1.	Center for International Trade Expositions and Missions
2.	Bangko Sentral ng Pilipinas
3.	Metropolitan Waterworks and Sewerage System
4.	Department of Agrarian Reform
5.	National Irrigation Administration-UPRIIS-DRD
6.	Forest Management Bureau
7.	Mariano Marcos State University
8.	Philippine National Oil Company
9.	Department of Environment and Natural Resources
10.	National Housing Authority



Monitored Performance on Electricity

Reported Savings

Year	No. of Agency/ Office	GWH Savings	Peso Savings (Million)	CO2 Reduction (Tons)
2005	110	21.55	165.93	11,033.98
2006	101	47.42	362.30	24,279.62
2007	185	48.95	321.60	25,061.09
2008	208	43.82	313.32	22,437.52
2009	142	28.73	213.38	14,708.58
2010	148	31.04	251.54	15,892.84
2011	50	24.03	489.93	12,303.26
2012	39	11.43	116.79	5,854.68
2013	32	6.18	66.84	3,162.88
2014	34	14.01	153.45	7,172.49
2015	43	33.58	217.49	17,194.13
2016	38	21.16	173.40	10,831.78
2017	21	12.42	102.39	6,358.33
Total		344.32	2,948.35	176,291.19

Certified Savings

YEAR	NO. OF AGENCY	GWH Savings	PESO Saving (Million)	CO2 Reduction (Tons)
2010	47	17.59	140.73	9,006.73
2011	49	14.57	116.52	7,457.48
2012	47	12.48	99.86	6,391.12
2013	23	4.02	23.29	2,057.81
2014	18	4.49	31.88	2,298.10
2015	30	3.50	35.27	1,792.50
2016	20	4.77	41.41	2,443.22
2017	22	4.63	36.24	2,371.68
2018 Jan-June	24	4.73	44.22	2,419.55
Total	280	70.78	569.43	36,238.19

344.32 GWH Savings



163 MW Power Plant Avoided



Potential for Energy Savings in Government

"Promotion of LED Lighting and High EER ACU Conversion"



CONVERSION
IB/CFL → LED Lamps/Bulbs



CONVERSION
Non-Inverter ACU → High EER ACU

CLASSIFICATION	NO. OF ENTITIES	% SHARE
National Government Agencies	31	12%
Government Owned and Controlled Corporations	58	64%
Academe	29	11%
Hospital	23	13%

No. NGAs Surveyed	141
Potential Savings	
Lighting, Kwh	35,706,396
Airconditioning, Kwh	38,956,012
Total, Kwh	74,662,408
Peso Equivalent, Million	821.28
Investment Required, Million	2,750.00
Payback Period, Years	3.3



35 MW Power Plant to be avoided



Looking Ahead

- Enhanced GEMP
- Minimum Energy Performance Standards in appliances and equipment
- Energy Efficiency in Government Procurement
- Net Zero Energy Building application in SUCs
- Energy Efficiency and Conservation Law
- Building Energy Code








**POLICY INITIATIVES ON
MAINSTREAMING ALTERNATIVE
FUELS AND ENERGY
TECHNOLOGIES**

**DOE
Initiatives**

Promotion of Alternative Fuels, Vehicles and Technologies



Performance of Electric Vehicles

	Type	Description	Efficiency	CO ₂ Emission
	Hybrid Vehicles	Combination of two (2) or more distinct power sources i.e., gasoline engine and electric motor	Hybrid: 31 km/L 11.16 km/kWhe Gasoline: 19.58 km/L 7.05 km/kWhe	Hybrid: 86 g CO ₂ /km Gasoline: 152 g CO ₂ /km
	Plug-in Hybrid	Power input can either be gasoline or electric Intelligent system; maximize efficiency of gasoline and electric power drive	PHEV: 45 km/L 16.2 km/kWhe Gasoline: 17.58 km/L 6.33 km/kWhe	PHEV: 41 g CO ₂ /km Gasoline: 120 g CO ₂ /km
	Electric Vehicle	Powered by electricity through battery packs	EV: 51 km/Lequiv 18.36 km/kWhe Gasoline: 29.23 km/L 10.52 km/kWhe	EV: No tailpipe emission Gasoline: 101 g CO ₂ /km

Continuing Advocacy of DOE

“Make energy efficiency and conservation a way of life for the Filipinos”

Sec. Alfonso G. Cusi
Department of Energy

