



PHILIPPINE ALTERNATIVE FUELS AND EMERGING TECHNOLOGIES PROGRAM FOR TRANSPORT

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ENERGY UTILIZATION MANAGEMENT BUREAU

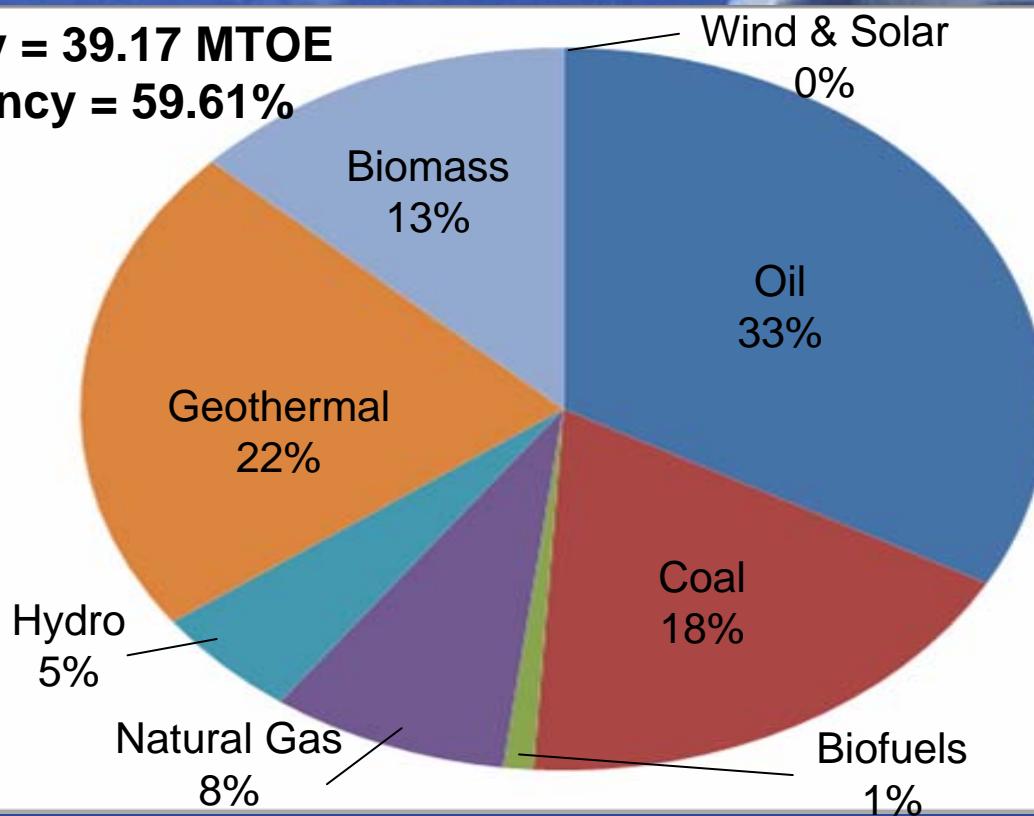
DEPARTMENT OF ENERGY





2010 Primary Energy Mix

Total Energy = 39.17 MTOE
Self-Sufficiency = 59.61%

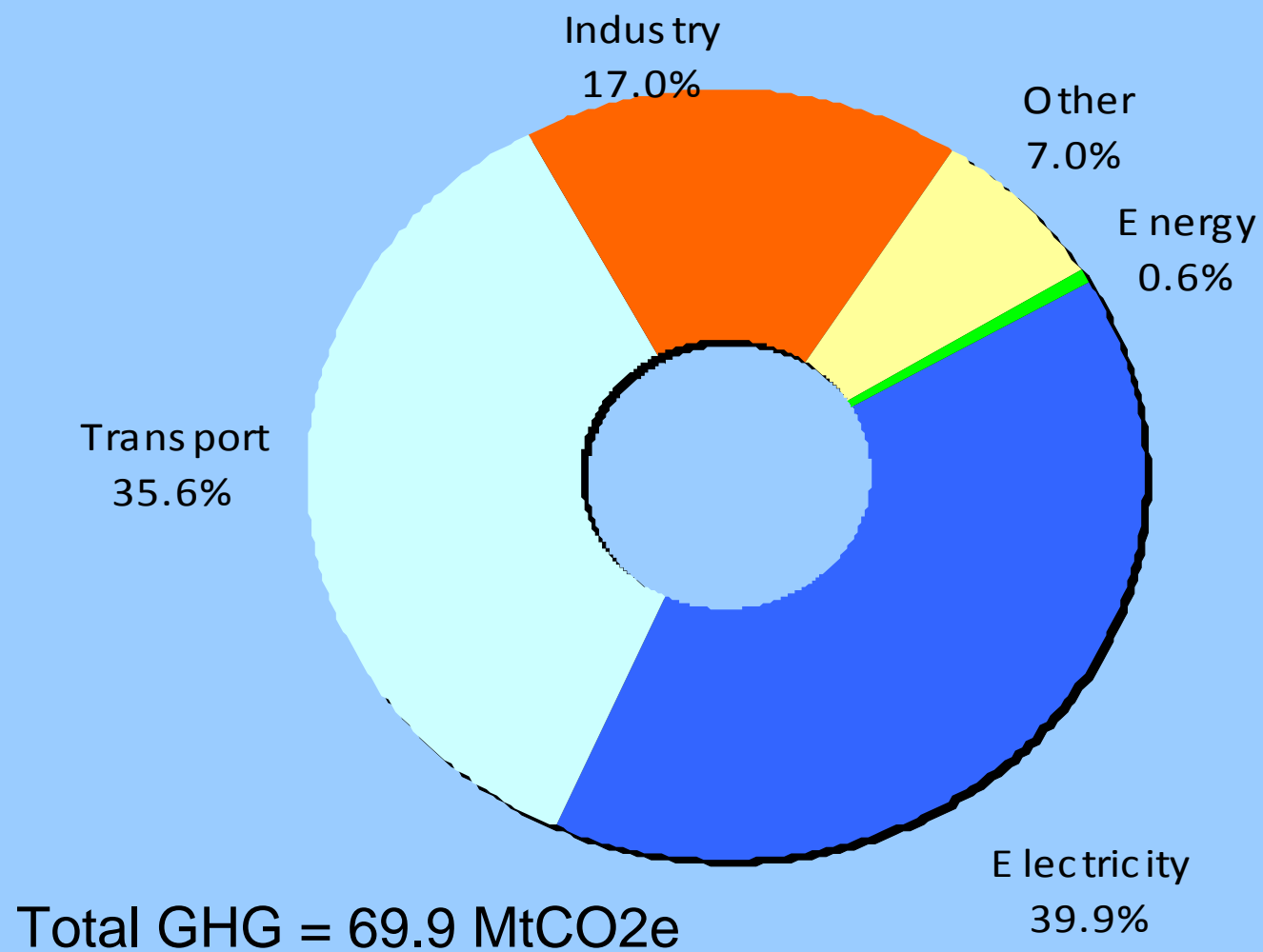


INDICATORS	2010
TPES Intensity (TOE / Php 1 M)	25.45
Oil Intensity (BBL / Php 100K)	7.04
Electricity Intensity (Wh / Php)	42.76
Electricity Consumption per Capita (Mwh / person)	0.7 (estimate)
Energy per Capita (TOE / person)	0,42



2010 ENERGY SITUATIONER

- ✓ **Self-sufficiency at 60%**
 - **RE accounts for 43%**
- ✓ **Transport sector remains the major user of oil accounting for 72%**
- ✓ **Self-sufficiency in the power generation mix at 68%**
 - **Natural gas accounts for 32%**
 - **RE accounts for 33%**
 - **Total installed capacity at 15,610 MW with dependable capacity of about 13,319 MW**
- ✓ **Electrification level at 99.89% (Dec 2010)**
- ✓ **Genco asset privatization level at 85% (Dec 2010)**



GHG Emission, by Sector and Activity (2009)



Consequences are immense...





Deteriorating Air Quality





DOE MISSION

The Department of Energy, in partnership with its stakeholders, shall improve the quality of life of the Filipino, by formulating and implementing policies and programs to ensure sustainable, stable, secure, sufficient, accessible and reasonably-priced energy.





ENERGY SECTOR AGENDA

Energy Self-sufficiency & Sustainability

- Increase resources of indigenous fossil fuels
- Aggressively develop renewable energy potential such as biomass, solar, wind and solar resources
- **Increase use of alternative fuels and emerging technologies for transport**
- Strengthen and enhance energy efficiency and conservation program

Globally Competitive Energy Sector

- Establish a transparent privatization process
- Create an investment climate attractive to investors



Sustainable Energy Consumption in the Transport Sector

- ❑ Diversification of energy sources
 - Use of alternative fuels such as biofuels, CNG and auto-LPG
- ❑ Promotion of new vehicle technologies
 - Hybrid, electric, solar, fuel cell technologies
- ❑ Promotion of fuel-efficient vehicles & energy efficiency in the transport sector
 - Fuel Economy Runs
 - Labeling / Fuel Consumption Rating
 - IEC



Fuel Diversification

RA 9367: Biofuels Act of 2006

Provides fiscal incentives and mandates the use of biofuel-blended gasoline and diesel



BIODIESEL

- ❑ 2010 consumption of 125 million liters (CME)
- ❑ 2% biodiesel blend by Feb. 6, 2009

BIOETHANOL

- ❑ 2010 Actual production of 10,173,976 liters
- ❑ Start of 10% by total volume mandate on Feb. 6, 2011





BIOFUELS ACT OF 2006

Incentives

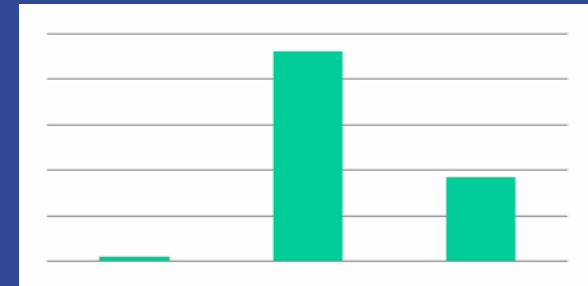
- ❑ Specific Tax per liter of volume capacity on local and imported biofuels, is zero (0);
- ❑ Value Added Tax (VAT) – Exemption of sale of raw materials used in the production of biofuels;
- ❑ Water effluents from biofuels production used as liquid fertilizer and other agricultural purposes which are considered “reuse” are exempted under by RA 9275 or Philippine Clean Water Act;
- ❑ Government Financial Institutions will accord high priority to Filipino entities that shall engage in production, storage, handling and transport of biofuel and biofuel feedstock, including the blending with petroleum, as certified by the DOE.



ACTUAL FUEL DISPLACEMENT

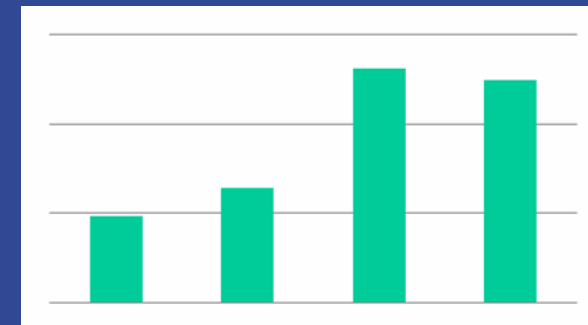
Gasoline Importation Displaced with Ethanol

- 415,067 liters (2008)
- 23,108,252 liters (2009)
- 9,169,832 liters (2010)



Diesel Importation Displaced with Biodiesel

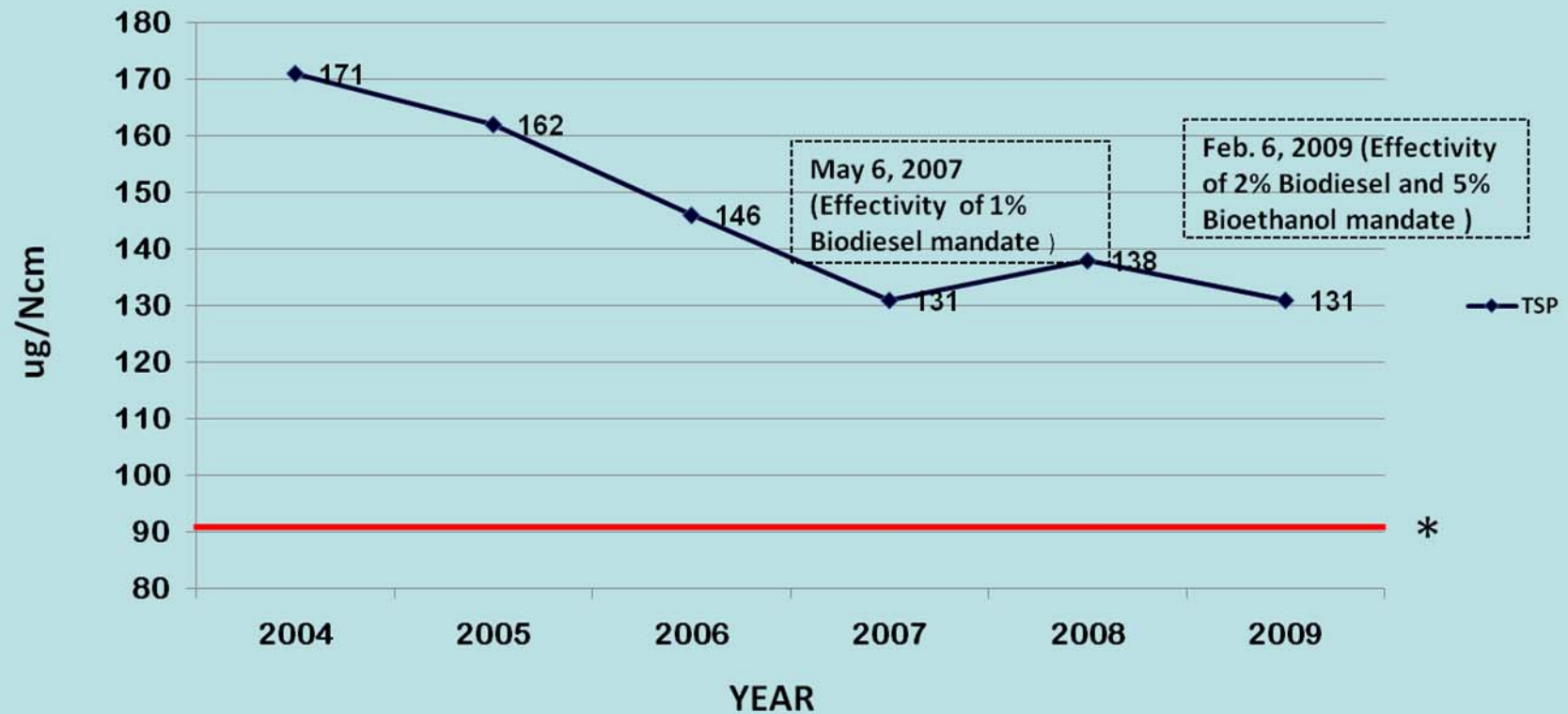
- 48,482,948 liters (2007)
- 64,482,908 liters (2008)
- 130,930,444 liters (2009)
- 124,510,084 liters (2010)





AIR QUALITY IMPROVEMENT

2004-2009 METRO MANILA TSP LEVEL



*GV: Guidelines Value

Source : DENR-EMB



Fuel Diversification

Natural Gas Vehicle Program for Public Transport (NGVPPT)



CNG Daughter Station



EXECUTIVE ORDER 290 (Incentives – NGVPPT Pilot)

- **Income tax holiday**
- **Zero rate of duty on Imported NGVs, engines and other related equipment parts and components.**
- **Issuance by LTO of Certificates of Compliance with Emission Standards to NGVs**
- **Preferential and exclusive franchises from the LTFRB for NGVs to newly opened routes**
- **Accelerated issuance of ECC by DENR for NGV facilities and refueling stations**
- **Affordable and commercially tenable financial packages from GFIs**
- **Manpower development and capability building through training and technology transfer programs**
- **Attractive CNG price of Php14.52 (\$0.33) per Nm³ (DLE-Diesel Liter Equivalent) good for 7 years**



- Current Status:
 - Pilot Phase Operation started on 28 April 2008
 - 1 CNG Mother Station and 1 CNG Daughter Station located in southern Luzon
 - Transport of fuel from Mother to Daughter Station through MATS
 - 40 public CNG buses now in operation
 - 21 more CNG buses completed technical evaluation and testing



MARKET DEVELOPMENT

- **61 CNG buses in the country, 40 units are operational**
- **Seven (7) NGVPPT Accredited bus operators (no. of bus commitment)**
 - **HM Transport, Inc. (80 units)**
 - **RRCG Transport System, Inc. (20 units)**
 - **KL Transport, Inc. (40 units)**
 - **Pascual Liner, Inc. (20 units)**
 - **Greenstar Express (10 units)**
 - **Biñan Bus Line (5 units)**
 - **N. Dela Rosa Liner (10 units)**
- **CNG buses (actual CNG buses)**
 - **HM Transport, Inc. (18 units)**
 - **RRCG Transport System, Inc. (10 units)**
 - **KL Transport, Inc. (26 units)**
 - **Biñan Bus Line (5 units)**
 - **Greenstar Express (1 unit)**
 - **N. Dela Rosa Liner (1 unit)**



Fuel Diversification

Auto-LPG for Taxi Operation





AUTO - LPG PROGRAM

Philippine National Standards (PNS)

The DOE, in coordination with DTI-BPS, facilitated the formulation of auto-LPG standards:

1. PNS/UN ECE 67:2006 -
 - ✓ Approval of specific equipment of motor vehicles using liquefied petroleum gases in their propulsion system
 - ✓ Approval of a vehicle fitted with specific equipment for the use of liquefied petroleum gases in their propulsion system with regard to the installation of equipment.
2. PNS/UN ECE 115:2006
 - ✓ Specific LPG retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion system
3. PNS 04:2006 - Road Vehicles - Automotive LPG components - CONTAINERS
4. PNS 05:1983 (existing standard) - Code of Practice
5. PNS/DOE FS 03:2006 Auto-LPG Dispensing Station



Auto - LPG

- 18,731 Auto-LPG vehicles / taxis registered
- 217 retail dispensing stations nationwide
 - 72 private garage-based dispensing stations
- 31 accredited with PS License auto-LPG conversion shops



Promotion of New Vehicle Technologies

(Hybrid Engine Technology)



- ✓ Feb 22, 2006 – Feb 22, 2008 MOA between DOE and Honda Cars Phils, Inc. for the Demonstration & Promotion of Motor Vehicle with Hybrid Engine Technology
- ✓ Conducted demonstration of Honda Civic Hybrid Technology in school /university and exhibits
- ✓ Conducted city and provincial test runs



Promotion of New Vehicle Technologies (*Electric Vehicles*)



Electric Vehicle - consists of a battery as source of power and a controller to regulate energy flow to an electric motor that drives the wheels

Benefits:

- Zero tailpipe emission, less maintenance and noiseless operation

Status:

- Promulgated 11 sets of Philippine National Standards (2008) on electric vehicles
- Estimated 560 electric vehicles operating in major cities





ELECTRIC VEHICLES

E - Trikes in Taguig City:



- **No. of units** : 130 vehicles
- **Capacity** : 9 persons
- **Charging time** : 8 hours
- **No. of batteries** : 5
- **Top speed** : 80 - 100 km/hr
- **Maximum run** : 30 – 35 km
- **Cost per Unit** : Php150,000 – 160,000
- **Fabrication** : locally made in Taguig



ELECTRIC VEHICLES

Electric Jeepneys in Makati City:



- **No. of units** : 10 vehicles
- **Capacity** : 14 persons
- **Charging time** : 8 hours
- **No. of batteries** : 12
- **Type of battery** : Lead-acid deep cycle
- **Top speed** : 35 km/hr
- **Load Capacity** : 2000 kg
- **Maximum run** : 55 – 60 km
- **Cost per Unit** : Php 625,000 / 5kw
: Php 675,000 / 7kw
- **Funded by** : Green Renewable Independent Power Producer (GRIPP)
- **Tech. provider** : Philippine Utility Vehicle (PhUV)



ELECTRIC VEHICLES

Electric Shuttles in Araneta Center, Quezon City:



- **No. of units** : 8 vehicles
- **Capacity** : 14 persons
- **Charging time** : 8 hours
- **No. of batteries** : 12
- **Top speed** : 30-35 km/hr
- **Load Capacity** : 1400 kg
- **Maximum run** : 80-100 km (loaded)
- **Cost per Unit** : Php 750,000 / 5kw
- **Body** : Steel frame & fiber glass



ELECTRIC VEHICLES

Provincial Fleets

Puerto
Princesa



Davao
City
300 scooters
80 trikes



Cavite



Dumaguete



ELECTRIC VEHICLES

Technology Providers :

- **Jiangsu Jewel Electrodynamic Technology Co. Ltd.**
- **Eagle Motorcycles**
- **Philippine Utility Vehicle (PhUV)**
- **Insular Technologies**



SOLAR POWERED CAR



Project SINAG

- **Philippines 1st entry to the World Solar Challenge 2007 last October 21-28 in Australia**
- **Design and construction facilitated by the Mech Eng'g and ECE faculty and students of De La Salle University – Manila**
- **Body is made of carbon fiber and Nomex (aramid fiber)**
- **Weight : 150 kg**





Promotion of Fuel-Efficient Vehicles & Energy Efficiency in the Transport Sector

Fuel
Economy
Run

OBJECTIVES :

- To establish Fuel Mileage Rating
- To label all brand new models of passenger cars and light duty vehicles
- To empower consumers in choosing fuel efficient vehicles sold in the market





SHORT- TO MEDIUM-TERM TARGETS

- Fully implement E10 by August 2011
- NGVPPT commercial implementation - 600 CNG buses and 3 daughter stations (DS) by 2015; 2,000 CNG buses and 12 DS by 2020
- Retrofit public jeepneys to use auto-LPG (and subsequently to convert to CNG) - 300 jeepneys retrofitted by 2015; 800 by 2020
- 20,000 electric tricycles by 2015; 24,000 by 2020
- 19,500 auto-LPG taxis by 2015; 20,500 by 2020
- Demo e-cars in government



ALTERNATIVE FUELS & EMERGING TRANSPORT TECHNOLOGIES

Achieving energy security while meeting environmental challenges through the utilization of alternative fuels & emerging technologies



Bio-Ethanol



Coco-methyl Ester (CME) or Coco-Biodiesel

New Vehicle Technology - Hybrid Systems, Flexi-Fuel Vehicles



Compressed Natural Gas (CNG)



Auto-LPG, Electric Vehicles, Fuel Cells/Hydrogen





Thank you !

www.doe.gov.ph



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