ALTERNATIVE FUELS

DO RIGHT. BE BRIGHT.

Presentation Outline

1	2011 Major Accomplishments
2	Measurable Targets
3	Plans and Programs

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Promoted Clean Energy

Biofuels

(In Million Liters)

	2011		(1st Semester) 2012	
	Production	**Actual Sales**	**Production**	**Actual Sales**
Biodiesel	**132.99**	**122.97**	65.155	67.018
Bioethanol	**4.14**	**2.87**	15.742	20.664

- Issued 2 Certificates of Accreditation to Manufacture biodiesel with total capacity of 75.6 million liters per year
- Issued policy guidelines on the mandatory use of biofuel-blends and utilization of locally-produced bioethanol in the production of e-gasoline

Promoted Clean Energy

Existing Biofuel Refinery Plants

(Philippines)

BIODIESEL PROPONENT	CAPACITY (In Million Liters/year)	LOCATION
Chemrez Technologies, Inc.	75	Pasig City
Mt. Holly Coco Industrial Co., Ltd.	50	Lucena City, Quezon
Pure Essence International, Inc.	60	Pasig City
Golden Asian Oil International, Inc.	60	Pasig City
Bioenergy 8 Corporation	30	Davao City
Tantuco Enterprises	30	Tayabas, Quezon
Freyvonne Milling Services	15.6	Davao City
Phil. Biochem Products, Inc.	12	Muntinlupa City
JNJ Oleochemicals, Inc.	60	Lucena City, Quezon
Total:	**392.6**	

BIOETHANOL PROPONENT	CAPACITY (In Million Liters/year)	LOCATION
Leyte Agri Corp.	9.0	Ormoc, Leyte
San Carlos Bioenergy Corp.	40.0	Negros Occidental
Roxol Bioenergy Corp.	30.0	Negros Occidental
Green Future Innovations, Inc.	54.0	Isabela Province
Total:	**133.0**	

Promoted Clean Energy

Existing Biofuel Refinery Plants

(Luzon)

BIODIESEL PROPONENT	CAPACITY (In Million Liters/year)	LOCATION
Chemrez Technologies, Inc.	75.0	Pasig City
Mt. Holly Coco Industrial Co., Ltd.	50.0	Lucena City, Quezon
Pure Essence International, Inc.	60.0	Pasig City
Golden Asian Oil International, Inc.	60.0	Pasig City
Tantuco Enterprises	30.0	Tayabas, Quezon
Phil. Biochem Products, Inc.	12.0	Muntinlupa City
JNJ Oleochemicals, Inc.	60.0	Lucena City, Quezon
Total:	**347.0**	

BIOETHANOL PROPONENT	CAPACITY (In Million Liters/year)	LOCATION
Green Future Innovations, Inc.	54.0	Isabela Province
Total:	**54.0**	

Note: Green Future Innovations, Inc. started performance testing and commissioning in July 2012. Accredited as a bioethanol producer under JAO 2008-1 in August 2012.

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Compressed Natural Gas (CNG)

Particulars	Fuel Displacement & CO_2 Avoidance 2011
▪ 41 CNG fed buses commercially operating along Batangas-Laguna-Manila route	▪ 3,259,582 liters of diesel equivalent
▪ 7 Certificates of Accreditation issued (KL CNG, RRCG, BBL, HM Transport, N. dela Rosa Liner and Greenstar Express)	▪ 1,844,787 kg CO_2
▪ 2 Certificates of Authority to Import 10 CNG Buses each issued for RRCG and N. dela Rosa Liner	

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Auto-LPG

Particulars

- 19,052 units of taxis converted to LPG as of end of 2011
- 229 auto-LPG refilling stations available nationwide
- 7,321 auto-LPG taxis as of May 2012

Note: The drop in number of auto-LPG taxis in Luzon area was due to expiration of extended franchises

Fuel Displacement & CO_2 Avoidance

2011

- 136 Million liters of gasoline displacement
- 138,437 metric tons of CO_2

Promoted Clean Energy

E-vehicles

Number of Available Demonstration Units Nationwide

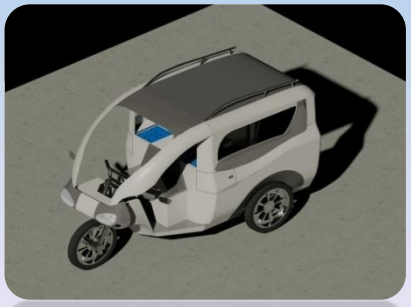
- 630 units of electric vehicles in 2011
- 524 units of electric vehicles in 2012

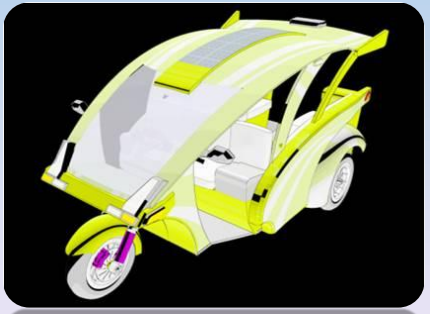
Fuel Displacement & CO_2 Avoidance

2011

- 788,760 liters of gasoline displacement
- 1,833 metric tons CO_2

- Conducted Nationwide E-Trike Design Contest





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ALTERNATIVE FUELS

Plans and Programs

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Measurable Targets

Biofuels

(Biodiesel)

Year	Total Diesel (Target)	Diesel Demand (In Million Liters)	Supply Requirement (In Million Liters)	Biodiesel Blend (Target)
2011	6,423	6,284	139	2%
2015	7,336	6,969	367	5%
2020	7,919	7,127	792	10%
2025	8,692	6,953	1,738	20%
2030	9,031	7,225	1,806	20%

Note: *Total Supply requirement of Biodiesel is equal to the total diesel to be displaced*

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Measurable Targets

Biofuels

(Bioethanol)

Year	Total Gasoline (Target)	Gasoline Demand (In Million Liters)	Supply Requirement (In Million Liters)	Bioethanol Blend (Target)
2011	3,683	3,314	368	10%
2015	3,795	3,415	379	10%
2020	4,302	3,441	860	20%
2025	4,683	3,746	937	20%
2030	5,052	4,042	1,010	20%

Note: *•Total Supply requirement of Bioethanol is equal to the total gasoline to be displaced*

• Availability of 85 % Ethanol Blend (E85) by 2025 on a voluntary basis

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Measurable Targets

Biofuels

BIOETHANOL PLANT CAPACITY ADDITION

Bioethanol Plant	Location	Production Capacity (In Million liters)	Target Year
Cavite Biofuels Producers Inc.	Cavite Province	34.4	2013
Canlaon Alcogreen Agro Industrial Corp.	Negros Occidental	45.0	2013
Total		**79.4**	

Plans and Programs

Biofuels

- Create market awareness for alternative energy projects in collaboration with various industry stakeholders
- Secure funding requirements to undertake tests and studies including procurement of test vehicles
- Undertake manpower capability building to develop relevant knowledge and skills in implementing the Biofuels Program
- Pursue current efforts to forge partnership with the academe and research institutions on the conduct of on-road performance and durability tests for higher biofuels blend for vehicles

Plans and Programs

Biofuels

- Demonstration on the use of up to 100 percent biodiesel for power and marine transport; viability study for other potential feedstock for biofuels; and life cycle analysis and technology road mapping
- Introduce higher biofuels blend – up to 20.0 percent for biodiesel and 20.0 percent to 85.0 percent for bioethanol – would be contingent with the availability of supply
- Broaden the coverage of the Biofuels Program and look for other possible feedstocks such as techno-economic studies on algae as potential biodiesel feedstocks and the use of cellulosic technologies for the production of bioethanol

Compressed Natural Gas (CNG) Buses

Measurable Targets

Compressed Natural Gas (CNG) Buses

Year	Luzon		Visayas		Mindanao		Total		Fuel Displacement DLE (Million Liters)
	CNG Buses	Refilling Stations	CNG Buses	Refilling Stations	CNG Buses	Refilling Stations	CNG Buses	Refilling Stations	
2011	61	1	-	-	-	-	61	1	4.85
2015	1,000	10	-	-	-	-	1,000	10	79.50
2020	6,400	64	100	1	400	4	6,900	69	548.56
2025	7,200	72	1,000	10	1,000	10	9,200	92	731.42
2030	10,500	105	2,400	24	2,100	21	15,000	150	1,192.53

Assumptions:
Bus Consumption = 254 DLE per bus per day
Operating number of days = 313 days per year

Fuel efficiency = CNG @ 2.5 km. per liter
1 station can refill 100 buses a day
Total CNG Consumption of Bus per day = 254 nm^3/200 kg

Measurable Targets

Compressed Natural Gas (CNG) Taxis

Year	Luzon	Visayas	Mindanao	Total	Fuel Displacement DLE (Million Liters)
	CNG Taxis	CNG Taxis	CNG Taxis	CNG Taxis	
2016	100	-	-	100	0.94
2020	800	100	100	1,000	9.39
2025	4,200	1,200	600	6,000	56.34
2030	11,200	3,200	1,600	16,000	150.24

Assumptions:

Gasoline Taxi Fuel Consumption = 30 liter per day per day

CNG Taxi fuel consumption (based on heating value of CNG) = 33.6585 liters per day

Operating number of days = 313 days per year

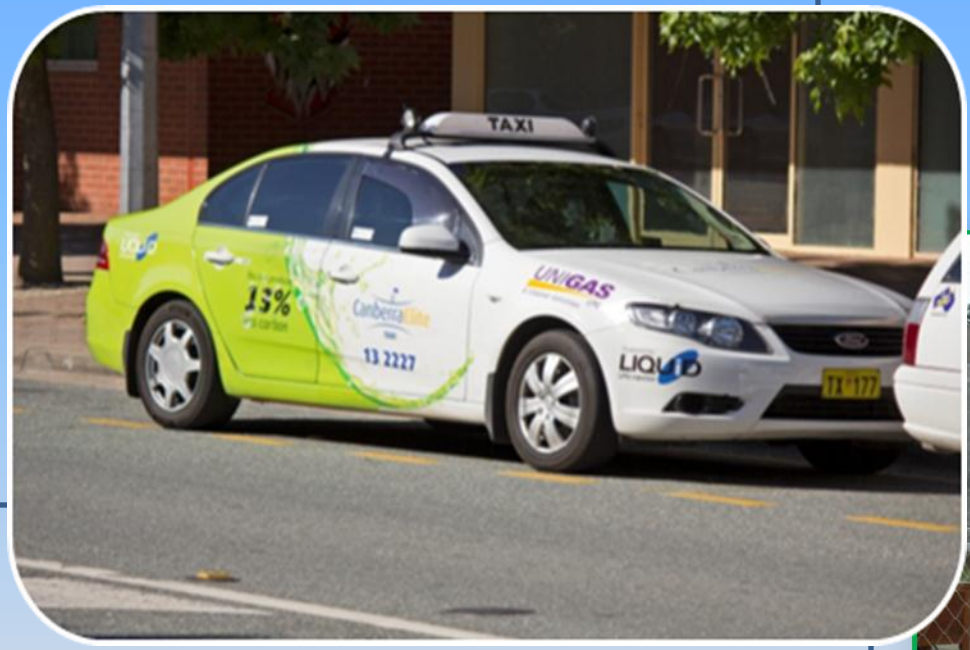
CNG Taxi Refilling Station is anchored on the Target Refilling Station of CNG Buses

Plans and Programs

Compressed Natural Gas (CNG)

- Enhance the policy directives on NGVPPT/supply and price mechanisms, and ensure gas supply for the NGVPPT commercial phase
- Intensify the use of natural gas in the transport sector is to promote the CNG Conversion/Retrofitting Technology and develop manpower expertise/technical capability for regulators/implementers
- Encourage private sector participation, incentives are provided through the policy issuance of Executive Order 396, *"Reducing the Rates of Import Duty on Compressed Natural Gas Motor Vehicles and Natural Gas Vehicle Industry - Related Equipment, Parts and Components Under Section 104 of the Tariff and Customs Code of 1978 (Presidential Decree No. 1464), As Amended"*
- Support and facilitate the passage of the Natural Gas Bill
- Create market awareness for alternative energy projects in collaboration with various industry stakeholders

Auto LPG Taxis



Measurable Targets

Auto LPG

Year	Luzon		Visayas		Mindanao		Total		Fuel Displacement Gasoline (Million Liters)
	Auto LPG Taxis	Refilling Stations	Auto LPG Taxis	Refilling Stations	Auto LPG Taxis	Refilling Stations	Auto LPG Taxis	Refilling Stations	
2011	**12,384**	**150**	3,810	44	2,858	35	19,052	229	178.90
2015	**13,130**	**164**	4,040	51	3,030	38	20,200	253	189.68
2020	**14,105**	**176**	4,340	54	3,255	41	21,700	271	203.76
2025	**15,080**	**189**	4,640	58	3,480	44	23,200	290	217.85
2030	**14,950**	**187**	4,600	58	3,450	43	23,000	288	215.97

Assumptions:
Taxi Consumption = 30 liters per day
Operating number of days = 313 days per year

Total LPG Consumption per day = 23.19 liters
Density of LPG = 0.559 kg/cubic meter
1 station can refill 80 taxis a day

Plans and Programs

Auto LPG

- Push for a wider utilization of LPG from household to the transport sector since LPG has the same positive environmental advantage as the other alternative energy
- Enhance policy direction on LPG utilization and conduct studies on its effect to the transport *vis-à-vis* household, the pricing mechanism and regulation, as well as on importation and taxes
- Formulate policy directions and facilitate development of standards for the two/four stroke motorcycle engine, motorized bancas and other diesel engines
- Conduct technology validation for dual fuel jeepneys and other motorized diesel/gas engines and develop manpower expertise and capability building for regulators and implementers
- Undertake continuous IEC activities to ensure that concerned individuals and stakeholders are informed on the benefits derived from the said Program
- Create market awareness for alternative energy projects in collaboration with various industry stakeholders

Measurable Targets

E-Vehicles

Year	Philippines	Fuel Displacement Gasoline (Million Liters)	Power Requirement (MW)
2011	630	0.789	0.51
2015	50,170	62.827	40.51
2020	106,000	132.743	85.60
2025	150,000	187.845	121.13
2030	230,000	288.029	185.73

Assumptions:
Average distance traveled per day = 80 km.
Tricycle Consumption = 4 liter per day
Operating number of days = 313 days per year

Load Factor = 30%
Total Power Consumption per day = (Lithium-ion Battery) = 6.78 kWh.
Estimated charging time = 1 to 1.5 hrs.

Plans and Programs

E-Vehicles

- Formulate policies that provide incentives to encourage investment on *Alternative Fuel Vehicles* (AFVs)
- Develop safety standards to facilitate the utilization of electric vehicles
- Devise counterpart supportive measures to expand the use of EVs among cities and provinces in the country
- Intensify IEC activities to ensure that the program will be well promoted nationwide
- Create market awareness for alternative energy projects in collaboration with various industry stakeholders

Thank You