The Philippines' Current Financial Mechanisms that Support the Implementation of Utility Based Renewable Energy and Efficiency***

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Presentation outline

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3. Overall policy for renewable energy development
4. Long-term objectives for RE of the policy framework
5. Renewable energy development status
6. Electricity grid system
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9. Role of DOE, ERC and WESM
10. NRET projects connected to the grid
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13. Montalban Methane Power
14. NRET Power sales
15. Financing/ Incentive schemes

Philippine renewable energy resources

A US-NREL study shows the following:

- **Wind resources – over 10,000 km^2 with 76,000 MW of potential installed capacity.**
- **Micro-hydro applications – potential capacity of at least 500 KW in Luzon and Mindanao islands**
- **Solar radiation nationwide – an annual potential average of 5.0 – 5.1 KWh/m^2/day**
- **Mini-hydro potential capacity of 1,784 MW capacity for 888 sites**
- **Ocean energy resources – potential CAPACITY OF ABOUT 170,000 MW**
- **Biomass (Bagasse) total potential of 235 MMBFOE**

Source: New and Renewable Energy Laboratory (USA) – E. Karunungan (Department of Energy, Philippines

Legal mandates, motivating laws and policies

1. Presidential Decree 910 (Energy Development Board) – 1976
2. Presidential Decree 1206 (DOE Charter) – 1976
3. Presidential Decree 1068 (NERDP Program) - 1977
4. Foreign Investment Act (RA 7042/RA 8719) - 1991
5. Executive Order 215 (BOT projects) – 1995
6. Executive Order 462/AEO 232 - 1997
7. DOE New Charter (RA 7638) – 1992
8. BOT Law (RA 6967/RA 7718) – 1994
9. Clean Air Act (RA 1234) – 1999
10. Ecological Solid Waste Management Act (RA 9003) - 2000
11. EPIRA Law (RA 9136) - 2001
12. Biofuels Law (RA 9367) - 2006
13. Renewable Energy Law (RA 9513) - 2008

EPIRA Law vis-à-vis NRET generation ventures

1. EPIRA LAW Categorized the major electric power sector into 4 sectors namely: generation, transmission, distribution and supply;
2. EPIRA Law demonopolized/privatized power generation secto;.
3. EPIRA Law established wholesale electricity spot market (WESM), Power Sector Assets and Liabilities Management I PSALM), and National Transmission Company (TRANSCO);
4. EPIRA Law made it a state policy to develop indigenous and renewable energy sources of energy;
5. Prices charged by power generation companies is not regulated and the law itself appeared investor-friendly;
6. EPIRA requires/encourages open access and market competition in power generation;
7. EPIRA allows distribution companies to have bilateral agreements as to sourcing of electricity allowing opportunities for NRET power generation projects.

Relevant provisions under the RE Law

1. Legal and policy commitment to develop and support NRET programs/projects;
2. Transformation of DOE Alternative Energy Division into fully-staffed bureau;
3. Establishment of a National Renewable Energy Board;
4. Encouragement of private sector investments/participation in NRET projects;
5. Variety of incentives to private investors in NRET projects;
6. Financial support from local, foreign and other sources
7. Mandatory and priority connection of RE to the electricity grid;
8. Having a Renewable Energy Portfolio Standards;
9. Putting in place the net metering mechanism;
10. Mandatory feed-in tariff scheme (Price premium for RE power)
11. Establishment of Renewable Energy Market (REM/WESM)
12. Entitlement to Renewable Energy Certificates
13. Concern for Kyoto Protocol and UN Clean Development Mechanism
14. Broad powers of DOE to allow more private investments in grid-connected NRETs (e. g., Wind power contracting, etc.)

Overall policy for RE development

1. Renewable energy policy framework launched in 2003.
2. Policy bias towards the development and utilization of renewable energy:
   a) Promote more private sector participation in RE development
   b) Encourage the use of renewable energy in rural and off-off grid electrification
   c) RE projects given " priority " for special incentives
3. A renewable energy law to promote development and utilization of clean energy. Renewable Energy Law already in place (RA 9513) and Implementing Rules and Regulation (IRR) now under national consultation process with final version due on or before mid 2009.

Long-term objectives of RE policy framework

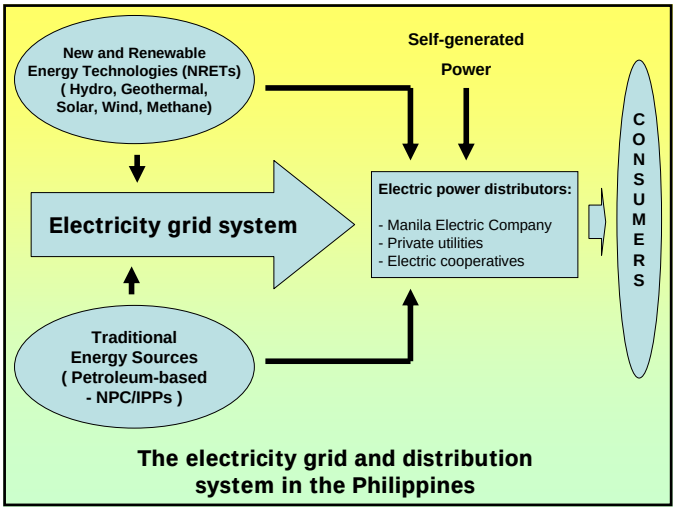
1. Increase RE-based capacity by 100 % - " 100 – 10 "
2. Be the number 1 geothermal energy producer in the world.
3. Be the number 1 wind energy producer in Southeast Asia
4. Double hydro electric capacity.
5. Be the solar cell manufacturing hub in ASEAN.
6. New contribution of biomass, solar and ocean energy by more than 100 MW
7. Increase non-power contribution of RE to energy mix by 10 MMBFOE with the next 10 years.

Source: E. Karunungan (Department of Energy), Philippines

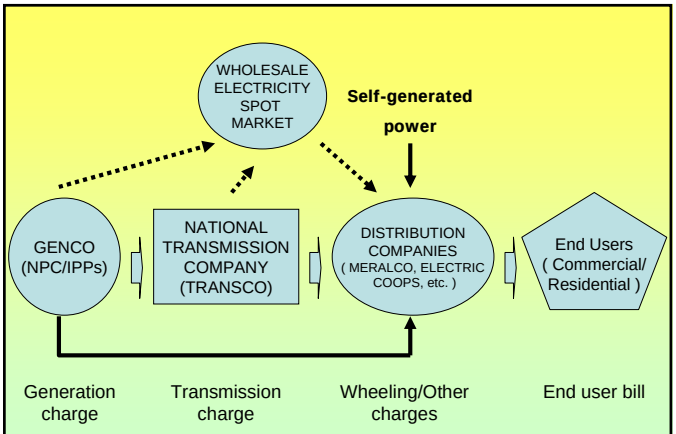
Renewable energy development projects status

Resource	Existing capacity (MW)	Number of plants in operation	On-going projects
Geothermal	2,027.07	14 geothermal plants	10 projects offered to private investor (300 – 500 MW)thru Contracting Round
Hydro	3,367.07	21 large hydro, 52 mini-hydro, 61 micro hydro	4 mini-hydros, 14 large hydro under evaluation
Wind	33.2	33 MW In Ilocos Norte, 5 KW Camarines in 180 KW in Batanes, 6 KW in Boracay	NPDC wind farm, 7 sites on resource assessment
Solar	5.161	960 KW – CEPALCO, Cagayan e Oro 729 KW Camarines Sur	Sunpower Phil Solar Plant/rural electrification projects
Biomass	20.93		1 MW Isabela
Ocean			R & D activities – Demo projects in Leyte/Mindanao

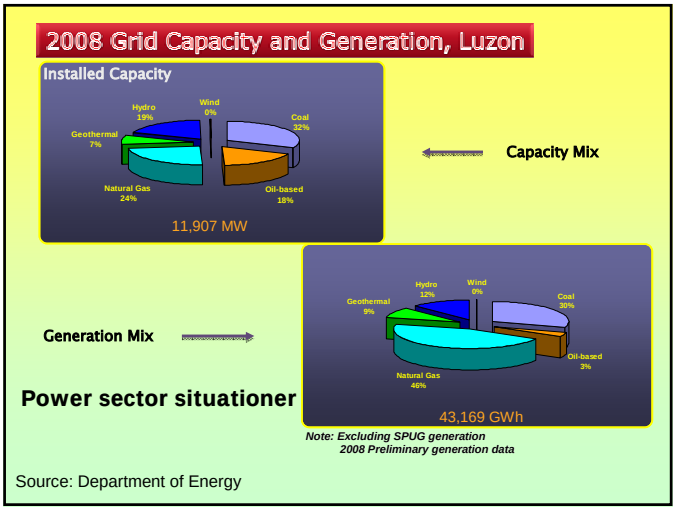
Source: E. Karunungan (Department of Energy)/Philippine Daily Inquirer



The electricity grid and distribution system in the Philippines

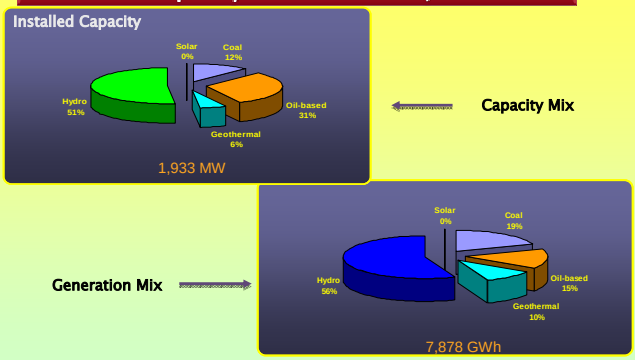


The power distribution system and WESM



Source: Department of Energy

2008 Grid Capacity and Generation, MINDANAO

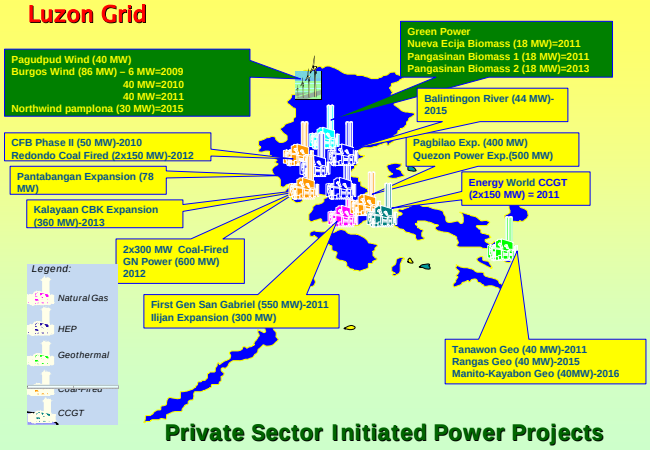


Power sector situationer

Note: Excluding SPUG generation
2008 Preliminary generation data

Source: Department of Energy

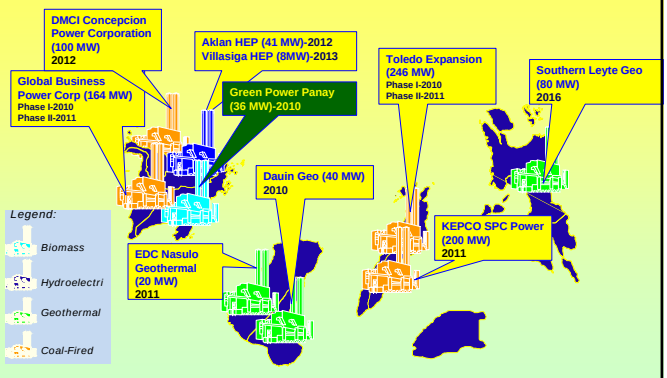
Luzon Grid



Private Sector Initiated Power Projects

Source: Department of Energy

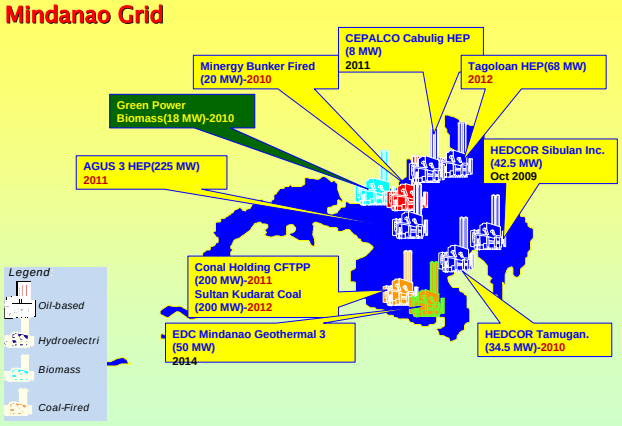
Visayas Grid



Private Sector Initiated Power Projects

Source: Department of Energy

Mindanao Grid



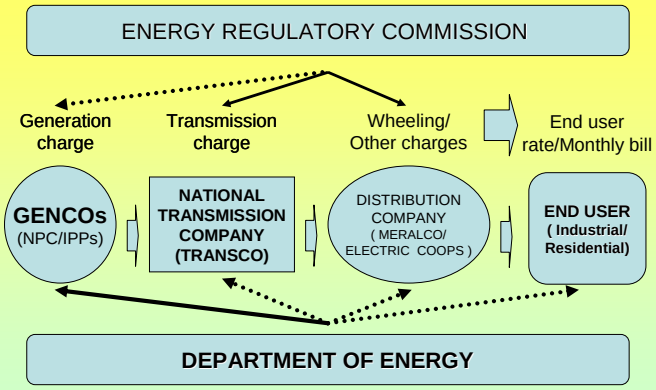
Private sector initiated power projects

Source: Department of Energy

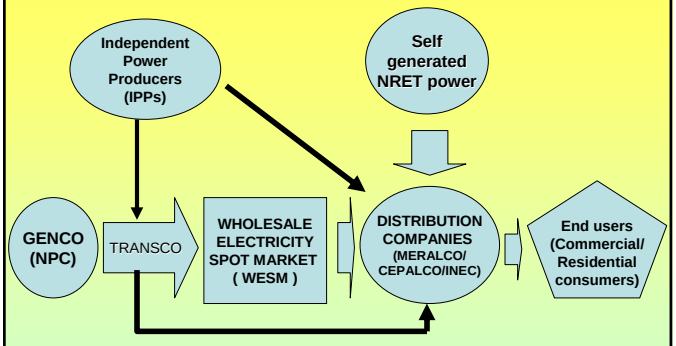
Energy supply mix of the Philippines, MTOE

	1993	% Share	1995	% Share	2000	% Share	2005	% Share	2007	% Share
INDIGENOUS ENERGY	**15.49**	**53.07**	**15.43**	**46.51**	**19.48**	**49.07**	**21.20**	**54.57**	**21.97**	**55.69**
OIL	0.45	1.53	0.13	0.39	0.06	0.14	0.61	1.57	0.63	1.59
NATURAL GAS	-	0.00	0.00	0.01	0.01	0.02	2.70	6.95	3.03	7.69
COAL	0.80	2.73	0.68	2.05	0.71	1.80	1.52	3.91	1.80	4.55
Subtotal	**16.73**	**57.33**	**16.24**	**48.96**	**20.26**	**51.03**	**26.03**	**67.01**	**27.42**	**69.52**
HYDRO	1.25	4.29	1.55	4.68	1.94	4.89	2.09	5.37	2.13	5.41
GEOTHERMAL	4.87	16.70	5.28	15.90	10.00	25.19	8.52	21.92	8.78	22.27
BIOMASS (Bagasse and Other RE)	8.12	27.82	7.79	23.48	6.76	17.02	5.77	14.84	5.56	14.10
SOLAR AND WIND				0.00			0.00	0.00	0.01	0.01
CME				0.00			0.00	0.00	0.03	0.08
Subtotal	14.25	48.81	14.62	44.06	18.70	47.10	16.37	42.14	16.51	41.87
NET IMPORTED ENERGY	**13.70**	**46.93**	**17.75**	**53.49**	**20.22**	**50.93**	**17.65**	**45.43**	**17.48**	**44.31**
OIL	13.02	44.62	16.84	50.77	16.39	41.30	13.94	35.87	13.40	33.96
COAL	0.67	2.30	0.90	2.72	3.82	9.63	3.71	9.55	4.08	10.34
ETHANOL				0.00	-	-	0.00	0.00	0.00	0.01
				0.00						
TOTAL ENERGY	**29.19**	**100.00**	**33.18**	**100.00**	**39.69**	**100.00**	**38.85**	**100.00**	**39.44**	**100.00**
GROWTH RATE (Total Energy), %			**5.49**		**2.93**		**0.10**		**1.81**	
Self Sufficiency %	**53.07**		**46.51**		**49.07**		**54.57**		**55.69**	

Source: Department of Energy



The electric power industry of the Philippines



Power sourcing options for electric power distributors

Existing grid-connected NRET projects

1. **NorthWind Power Development Corporation (NPDC) / Ilocos Norte Electric Cooperative (INEC) – A 33 MW facility from 20 wind turbine unit and soon another 40 MW wind farm in another area**
2. **Cagayan Electric Power and Light Company (CEPALCO – A 1MWp Photovoltaic power plant**
3. **Montalban Methane Power Corporation (MMPC) – A 15 MW Biogas / Methane Power Plant over 10 years period**

Plus – Expansion projects underway in wind, solar, hydro, and biomass-based power generation projects

From unproductive agricultural farm to a wind farm

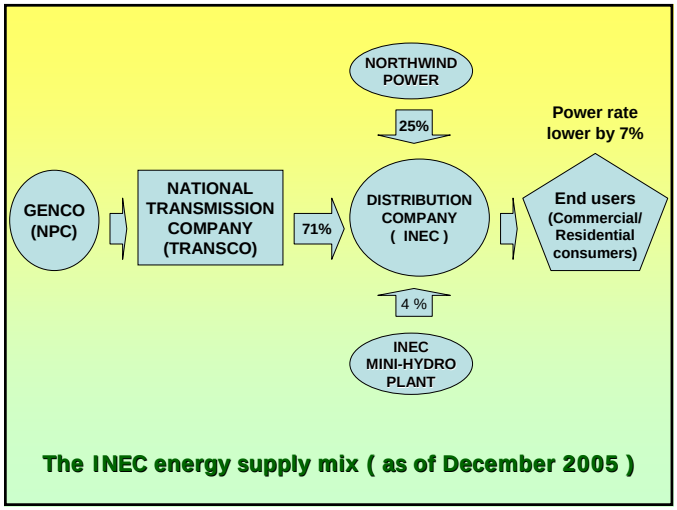
Specifications of NorthWind Power System

Turbine's hub height	- 70 meters
Blade length	- 41 meters
Rotor diameter	- 82 meters
Windswept area	- 5,281 sq. m.

*** Ground level to center of nacelle

The turbine are oriented facing the sea, effectively eliminating windbreaks and achieving terrain roughness of class 0.

Annual generation capacity	- 74,482 MWh
Wind turbine arrangement	- Single row
Spacing	- 326 meters
Orientation	- North
Prevailing wind direction	- Northeast



The INEC energy supply mix (as of December 2005)

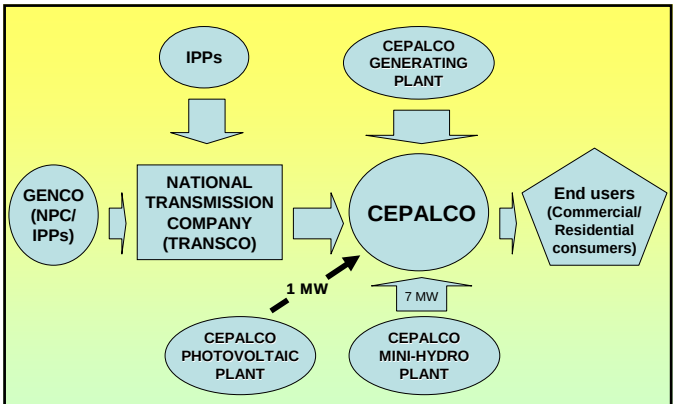
Energy supply mix of INEC (2005)

Months	Mini Hydro	% share	NPC	% share	NorthWind	% share	Total	DEMAND
	(KWh)		(KWh)		(KWh)		(KWh)	(KWh)
January	906,220	7%	11,961,974	93%	0	0.00%	12,868,194	33,465
February	587,200	4%	12,743,614	96%	0	0.00%	13,330,814	33,608
March	657,670	5%	11,943,508	95%	0	0.00%	12,601,178	33,544
April	450,060	3%	15,762,013	97%	20,789	0.13%	16,232,862	34,306
May	249,180	1%	15,660,217	93%	849,165	5.07%	16,758,562	35,486
June	201,600	1%	14,500,913	91%	1,268,114	7.94%	15,970,627	34,958
July	138,600	1%	13,738,983	87%	1,850,940	11.77%	15,728,562	33,182
August	195,300	1%	13,487,345	87%	1,769,442	11.45%	15,452,087	28,689
September	174,300	1%	12,795,817	86%	1,826,552	12.34%	14,796,669	33,542
October	137,600	1%	11,176,063	78%	3,037,368	21.16%	14,351,031	32,319
November	319,200	2%	11,497,740	76%	3,404,884	22.37%	15,221,824	32,862
December	621,600	4%	9,930,433	71%	3,442,196	24.60%	13,994,229	32,374
Total	4,638,530		155,198,620		17,469,450		177,306,600	
Average		2.75%		87.51%		9.74%		

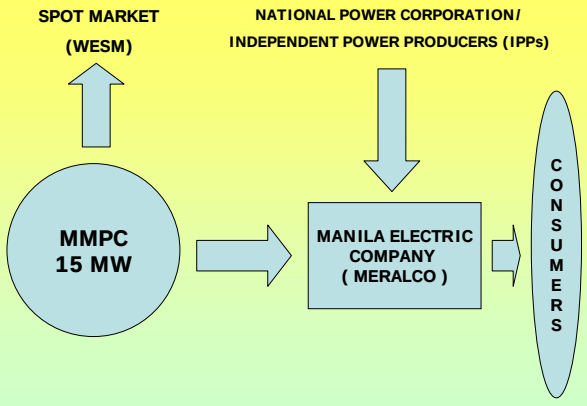
Source: www.erc.gov.ph

CEPALCO renewable energy initiatives

1. Cabulig river hydro project
2. Culaman River Hydro Project
3. Lower Bubunawan Hydro Project
4. Biomass-fired energy facilities
5. Cagayan de Oro Landfill Gas-to-Energy (LFGE) Conversion Project
6. Cogeneration (Combined Heat and Power) projects
7. The solar photovoltaic (PV) plant - Operational
8. The planned 10MWp Solar Park



The CEPALCO energy supply sources



Montalban Methane Power Corporation (MMPC)

Installed cost comparison

1.	NPDC's wind power	- US$50 M / 33 MW	- (US$ 1.5 / MW)
2.	CEPALCO PV power	- US$ 7 M / 1MW	- (US$ 1 / MW)
3.	MMPC Methane power	- US$ 30 M / 15 MW	- (US$ 2 / MW)

Sale of NRET power system outputs

1. Renewable Energy Sales Agreement (RESA) between NorthWind Power Development Corporation (NPDC) and Ilocos Norte Electric Cooperative (INEC) and hopefully via the spot market/WESM.
2. Electricity output of Cagayan Electric Power and Light Company (CEPALCO) is fully consumed internally hence no external sales.
3. Electricity output of Montalban Methane Power Corporation (MMPC) is sold to major utility (Manila Electric Company - a sister company of MMPC) and hopefully via spot market/WESM.

Price of NRET-based electricity

1. NPDC energy sales/cost to INEC is benchmarked against NPC rate (i. e., 7 per cent discount) – and the 7 percent discount is directly passed on to end users bill
2. CEPALCO PV power is used internally and cost is tied in to company's internal power generation costs related to hydro project
3. MMPC electricity output is sold to MERALCO (a sister company) and hopefully to thru the spot market (WESM).

Some concerns and NRET power sales

1. Some conflict and concerns between GENCO-Distributor's sales contract (RESA, Off-take, power purchase agreement, etc.). Legal case now exists between NPDC and INEC and ERC adjudication underway.
2. Income from carbon sales undiscussed in generation cost determination

Carbon Sales Credit

1. NPDC carbon generation of 65 tonnes equivalent per year (Estimated value: US$ 65,000 per year)
2. CEPALCO carbon generation of 10,000 throughout its project life (Estimated value: US$ 10,000)
3. MMPC carbon generation of 500,000 tonnes equivalent (Estimated value: US$ 5 million)

Financial support schemes

1. Available financial support and assistance from Government Financial Institutions (GFIs)
2. Availability of support funds from foreign multilateral sources (e. g., GEF, IFC, DANIDA, etc.)
3. Availability of loan portfolio from commercial banking sources
4. Available funding sources from internal (corporate) sources
5. Existence of investment bankers who arrange/package new and innovative commercial ventures

Success factors for NRETs in the Philippines

1. Available natural resources (e. g., solar/wind/biomass)
2. Government policy pronouncements and incentive support schemes (e. g., privatization of the power sector)
3. Existence of laws that ,motivates and induce investments in NRET-based power generation system
4. Availability of foreign/local financing schemes (e. g., DBP, LBP, WB/IFC, DANIDA, etc.)
5. Existence of guaranteed or captive markets
6. Support of local government units.
7. Advocacy support from private sector groups and NGOs (WWF, Church, etc.)
8. External inducements/incentives to venture into NRETs (e. g., Kyoto Protocol and carbon market)
9. Existence of mature and commercially available NRETs
10. Willing local/foreign investors and concerned entrepreneurs

Thank you very much
and
Good Afternoon!

Full/MS Word version of the presentation is available on request at email address:

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