ARMM:
Autonomous Region in Muslim Mindanao

At a Glance…

SOCIO-ECONOMIC PROFILE

Provinces	Maguindanao, Lanao del Sur, Sulu, Tawi-Tawi, Basilan
Land Area	25,276 sq.kms.
Population	2,412,159
Density	95 person / sq.km.
GRDP	PhP 10.4 billion
Top Three Sectors	▪ Agriculture Fishery and Forestry Sector ▪ Service Sector ▪ Industry Sector
Major Products	
Agricultural (Raw and Manufactured)	▪ Rice ▪ Corn ▪ Coconut ▪ Cassava ▪ Banana
Non-Agricultural	▪ Gold ▪ Copper ▪ Silver

Source: National Statistical Coordination Board (NSCB)

A. ENERGY SITUATIONER

A.1 ENERGY RESOURCES

a. Hydropower

The region is noted for its vast water resources and is a possible source of 84 megawatts (MW) of hydropower. Table 1 shows the number of hydropower sites found in the region.

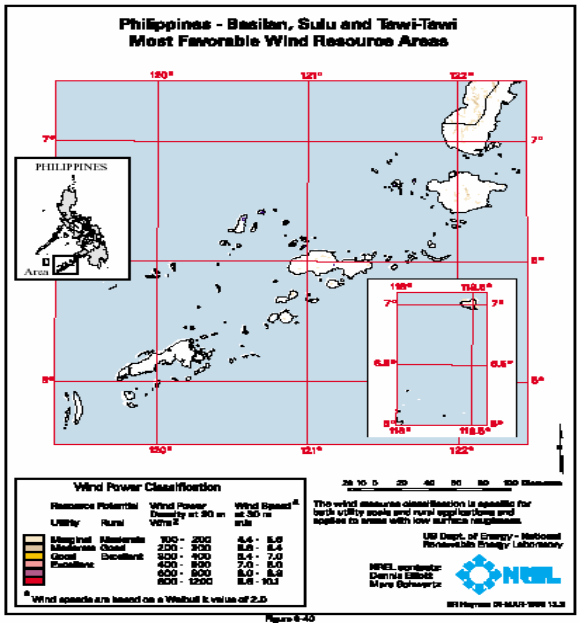
Table 1. LOCATIONS OF HYDROPOWER POTENTIAL RESOURCES

Province	Number of Sites	Estimated Capacity (MW)
Lanao del Sur	4	26
Maguindanao	6	58
Total	**10**	**84**

b. Wind

The estimated potential of this resource is presented in Figure 1.

Figure 1. POTENTIAL WIND ENERGY SITES



c. Other Resources

Initial findings show that the region has a coal resource potential of 21 million metric tons (MMMT) located in Maguindanao, while the oil resource potential in the Sulu Basin is currently being offered under the Philippine Energy Contracting Round (PECR) 2005.

A.2 DOWNSTREAM FACILITIES

The region currently hosts one depot and 30 gasoline stations, majority of which are located in Lanao del Sur (Table 2).

Table 2. DISTRIBUTION OF DOWNSTREAM OIL FACILITIES

Province	Depots		LPG Refilling Plants	Gasoline Stations
	Number of Units	Storage Capacity (MB)		
Maguindanao	-	-	-	7
Lanao del Sur	-	-	-	14
Sulu	-	-	-	1
Tawi-Tawi	1	2,000	-	3
Basilan	-	-	-	5
Total	**1**	**2,000**	**-**	**30**

A.3 POWER AND ELECTRIFICATION

The region hosts several power plants: (i) 260-MW Agus 1 and 2 hydropower plant; (ii) 950-kilowatt (kW) mini-hydropower projects in Basilan; and (iii) 12 diesel-fired generator sets with a total installed capacity of 27 MW (Table 3).

Table 3. EXISTING SPUG POWER PLANTS

Plant	Capacity (MW)		Location
	Installed	Dependable	
Hydropower			
Kumalarang MHP	0.68	0.50	Basilan
Balagtasan MHP	0.27	0.10	Basilan
Diesel			
Basilan DPP	1.67	0.30	Isabela, Basilan
Power Barge 119	7.20	6.00	Basilan
Jolo DPP	5.96	5.00	Jolo, Sulu
Siasi DPP	1.64	0.90	Jolo, Sulu
Bongao DPP	2.12		Bongao, Tawi-Tawi
Power Barge 108	7.20	4.50	Tawi-Tawi
Balimbing DPP	0.32	0.30	Balimbing, Tawi-Tawi
Cagayan de Tawi-Tawi	0.53	0.50	Cagayan de Tawi-Tawi, Tawi-Tawi
Manuk-Mangkaw DPP	0.16	0.15	Simunul, Tawi-Tawi
Sibuto DPP	0.33	0.30	Sitangkay, Tawi-Tawi
Sitangkay DPP	0.05	0.05	Sitangkay, Tawi-Tawi
Tandubas	0.11	0.10	Tandubas, Tawi-Tawi
Total	**28.239**	**18.70**	

The mainland provinces of Maguindanao and Lanao del Sur are served by Maguindanao Electric Corporation (MAGELCO) and the Lanao del Sur Electric Cooperative (LASURECO). The energy requirements in the island grids are provided by the National Power Corporation (NPC) through the Small Power Utilities Group (SPUG).

The region's electricity distribution is maintained and administered by seven electric cooperatives (ECs) and one private investor-owned utility (PIOU): Basilan Electric Cooperative (BASELCO), Cagayan de Sulu Electric Cooperative (CASELCO), Lanao del Sur Electric Cooperative (LASURECO), Maguindanao Electric Cooperative (MAGELCO), Siasi Electric Cooperative (SIASELCO), Sulu Electric Cooperative (SULECO) and Tawi-Tawi Electric Cooperative (TAWELCO), while the PIOU is the Bumbarn Electic Light System (Table 4).

Table 4. REGIONAL ELECTRICITY PROFILE BY DISTRIBUTION UTILITY, 2005

Name of Distribution Facility	Electricity Purchased/ Generated (GWh)	Electricity Sales (GWh)	System Loss (%)	Classification
MAGELCO	76	58	22.9	EL
BASELCO	23	19	16.9	-
LASURECO	No data			
CASELCO	No data			
SIASELCO	No data			
TAWELCO	No data			
SULECO	No data			
Bumbaran Electric Light System	No data			

EL-Extra Large
Note: Classification is based on the following criteria: (i) volume of average MWh Sales; (ii) number of service customers (iii) average kilometers of lines

As of end-2005, ARMM's barangay energization level was pegged at 69.3 percent (Table 5), which is the lowest rate among the 17 administrative regions. This represents a total of 751 barangays still to be energized out of the 2,445 barangays in the region.

Table 5. STATUS OF BARANGAY ENERGIZATION BY PROVINCE, as of 2005

Province	Coverage	Energized Barangays	Energization Level (%)
Basilan	210	203	96.67
Lanao del Sur	1,155	796	68.92
Maguindanao	467	306	65.52
Sulu	410	242	59.02
Tawi-Tawi	203	147	72.41
Total	**2,445**	**1,694**	**69.28**

For the households, 128,110 have been energized, representing an energization level of 35.9 percent. This leaves 35.7 million potential households yet to be energized.

A.4 BENEFITS TO HOST COMMUNITIES

As of 2005, the region has received an accumulated financial benefit amounting to PhP 58.6 million. These funds, which are sourced from one percent of one centavo for every kilowatt-hour sold, are used to fund the electrification (EF), development and livelihood (DLF) and reforestation, watershed management, health and/or environmental enhancement (RWMHEEF) projects of the host barangay, town or province (Table 6).

Table 6. SUMMARY OF APPROVED PROJECTS, as of 2005

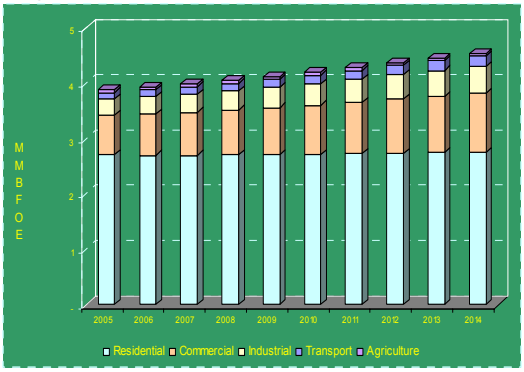
Type of Fund	Number of Projects	Total Amount (PhP million)
EF	52	27.36
DLF	19	7.20
RWMHEEF	21	24.01
Total	**92**	**58.57**

B. ENERGY DEMAND FORECAST

The average regional energy consumption is expected to register around 4.2 MMBFOE (0.6 MTOE) for the planning period, with a 1.7 percent average growth rate. The region's share of the country's total energy requirement will comprise only about 2.1 percent.

The residential sector will register the highest share in the region's total energy demand, while the industrial sector will grow fastest during the planning period (Figure 1).

Figure 1. FINAL ENERGY DEMAND, BY SECTOR (MMBFOE)



Biomass, mainly fuelwood, will figure dominantly in the region's fuel requirement followed by petroleum products (Table 7).

Table 7. SECTORAL ENERGY DEMAND (MMBFOE)

	2005	2006	2010	2014
Grand Total	**3.85**	**3.89**	**4.14**	**4.46**
Oil and Oil Products	0.40	0.40	0.46	0.53
Biomass	3.35	3.37	3.48	3.63
Other Renewables	nil	nil	nil	Nil
Electricity	0.10	0.11	0.19	0.31
Industry	**0.29**	**0.31**	**0.39**	**0.49**
Oil and Oil Products	0.05	0.04	0.05	0.05
Biomass	0.22	0.23	0.29	0.37
Electricity	0.03	0.03	0.05	0.08
Other Renewables	0.00	0.00	0.00	0.00
Commercial	**0.72**	**0.75**	**0.89**	**1.07**
Oil and Oil Products	0.05	0.05	0.07	0.09
Biomass	0.63	0.66	0.76	0.88
Other Renewables	nil	nil	nil	nil
Electricity	0.03	0.03	0.06	0.10
Residential	**2.67**	**2.66**	**2.66**	**2.67**
Oil and Oil Products	0.13	0.13	0.15	0.16
Biomass	2.50	2.48	2.43	2.38
Electricity	0.04	0.05	0.08	0.13
Transport	**0.12**	**0.13**	**0.15**	**0.18**
Oil and Oil Products	0.12	0.13	0.15	0.18
Agriculture	**0.05**	**0.05**	**0.05**	**0.05**
Oil and Oil Products	0.05	0.05	0.05	0.04
Solar	nil	nil	nil	nil
Electricity	0.00	0.00	0.00	0.00

Total may not tally due to rounding off

Residential

Energy demand in the residential sector is estimated to constitute an average share of 64.1 percent of the region's total energy demand. It is projected to reach an average volume of 2.7 MMBFOE (0.4 MTOE). Major fuels in the sector will be biomass, particularly fuelwood (59.3 percent), coconut residues (26.3 percent), and charcoal (5.5 percent).

Transport

With an estimated average share of 3.7 percent of the region's total energy demand, the sector is projected to consume an average volume of 0.2 MMBFOE (22.4 KTOE) during the planning period. The transport sector is solely fueled by petroleum products, comprised mainly of diesel and gasoline.

Industrial

Energy consumption in the industrial sector will reach an average share of 9.4 percent of the region's total energy requirement. Energy demand in this sector will reach an average volume of 0.4 MMBFOE (57.0 KTOE). The major fuels in the sector will be coconut residues (41.9 percent), industrial waste (19.5 percent), and electricity (13.3 percent).

Commercial

The commercial sector will constitute about 21.5 percent of the region's total demand. It is estimated to post an average volume of 0.9 MMBFOE (0.1 MTOE) for the planning period. Biomass, specifically fuelwood, will be the dominant fuel in the sector, with an average share of 85.3 percent, followed by electricity (7.0 percent) and fuel oil (3.2 percent).

Agricultural

The average annual volume of consumption in the sector is estimated at 0.05 MMBFOE (7.0 KTOE). Energy consumption of this sector will register the lowest level, which will account for only 1.2 percent of the total regional demand. Petroleum products will dominate the sector's fuel mix with an average share of 96.1 percent during the planning period. Among the petroleum products, diesel will contribute the highest share at about 82.7 percent, followed by fuel oil at 11 percent. On the other hand, solar energy will account for an average share of 3.8 percent.

C. SECTORAL PLANS AND TARGETS

❖ *POWER DEVELOPMENT PLAN*

MINDANAO GRID

In order to meet the expected increase in electricity demand, continuous reliability and maintenance activities shall be done in the Agus 1 & 2 complex in addition to the 800 MW of new capacity addition which will be put up in Mindanao during the planning period.

SMALL ISLAND GRIDS

Electricity demand in region's small island grids will grow at an average annual rate of 10.7 percent over the planning period. Likewise, peak demand is estimated to grow at an average annual rate of 11.0 percent (Table 8).

Table 8. SMALL ISLAND GRIDS DEMAND AND SUPPLY OUTLOOK

	2005	2006	2010	2014
Capacity Addition, (MW)	10.50	3.45	1.15	-
Cumulative Installed Capacity, (MW)	40.78	42.98	57.73	72.18
Peak Demand, (MW)	16.83	18.82	28.25	42.02
Electricity Sales, (GWh)	60.39	66.04	98.99	149.05
Gross Generation, (GWh)	68.52	75.04	112.75	170.37
Dependable Capacity, (MW)	31.17	33.28	46.55	59.56

❖ TRANSMISSION DEVELOPMENT PLAN

The required transmission infrastructure projects needed to meet customer demand and ensure reliability, adequacy and stability of the nationwide transmission system during the planning period are listed in Table 9.

Table 9. TRANSMISSION LINE PROJECTS

Project Name	Description	Target Date of Completion
Projects that will relieve constraints in the Luzon Grid		
Gen. Santos-Tacurong-Nuling 138 KV T/L	To relieve the Gen. Santos-Tacurong 138 KV SC-WP T/L	2007
Indicative Project – Sub-Transmission		
ARMM Subtransmission Project Note: Projects are subject for further study and for clarification on ERC's Connection Charging Policy.	To serve additional power to customers and minimize distribution loss.	2013
Mindanao Capacitor Project III part only of 26-7.5 Mvar (sites for further study)	To maintain the voltages limit prescribed by the Grid Code	2012

❖ DISTRIBUTION DEVELOPMENT PLAN

To ensure reliability of supply at the distribution level, the distribution development plan of cooperatives in ARMM is shown in Table 10.

Table 10. DISTRIBUTION DEVELOPMENT PLAN

Name of Cooperative	2005	2006	2010	2014
Number of Customers				
Residential	47,686	50,951	69,821	94,814
Commercial	5,327	5,664	7,297	9,436
Industrial	356	377	482	622
Others	2,010	2,042	2,201	2,381
MAGELCO				
System Loss (%)	23.8	20.3	9.3	7.9
Electricity Purchase/Generated (Gwh)	77	79	94	125
Electricity Sales (Gwh)	58	62	85	116
BASELCO				
System Loss (%)	16.9	15.2	11.4	9.3
Electricity Purchase/Generated (Gwh)	23	25	43	80
Electricity Sales (Gwh)	17	15	38	72
CASELCO	*No Data*			
TAWELCO	*No Data*			
SIASELCO	*No Data*			
SULECO	*No Data*			
LASURECO	*No Data*			
BUMBARAN ELECTRIC LIGHT SYSTEM	*No Data*			

❖ EXPANDED RURAL ELECTRIFICATION

Consistent with the objective of attaining 100 percent barangay electrification nationwide by 2008, a timetable covering the period 2006-2008 will be adopted for implementation in the region. The corresponding line extension and rehabilitation targets are shown in Table 11.

Table 11. EXPANDED RURAL ELECTRIFICATION PROGRAM

Year	Barangays	Expansion		Line Rehabilitation (ckt.-kms.)
		Distribution Lines (ckt.-kms.)	Substations (MVA)	
2006	210	208.60	-	23.27
2007	278	220.75	-	17.16
2008	263	288.60	10	23.92
2009	-	-	-	9.76
2010	-	-	-	4.46
2011	-	-	-	4.37
2012	-	-	10	4.58
2013	-	-	-	3.94
2014	-	-	-	3.84
Total	**751***	**717.95****	**20****	**95.3****

*Source: DOE
**Source: NEA

❖ ENERGY RESOURCE DEVELOPMENT

Hydropower

The 10-MW Kanapnapan Falls in Malabang, Lanao del Sur is a possible power source to fill-up the capacity requirement of the Mindanao grid during the planning period. The plant is envisioned to be commissioned in 2008.