TABLE 11.2.8 POWER BALANCE CONSIDERED WITH INTERCONNECTION IN VISAYAS

Year	Reserve (MW)				Interconnection (MW)			Power Shortage (MW)			
	Cebu	Negros-Panay	Bohol	Leyte	Cebu Negros	Cebu Leyte	Cebu Bohol	Cebu	Negros * Panay	Bohol	Leyte
1990	190.5	59.8	6.6	24.5	-	-	-	0	0	0	
1991	173.5	43.8	5.1	13.5	-	-	-	0	0	0	0
1992	155.5	26.8	3.1	2.5	-	-	-	0	0	0	0
1993	141.5	53.8	1.7	-6.5	Ceb-Neg (100)	-	-	0	0	0	6.5
1994	108.5	61.6	-1.9	-26.5	0	-	-	0	0	1.9	26.5
1995	84.5	39.8	-3.9	-41.5	0	-	-	0	0	3.9	41.5
1996	7.5	16.8	-16.9	61.5	0	Ceb-Ley (300)	-	0	0	16.9	0
1997	32.5	24.8	-14.9	518.5	0	32.5	-	0	0	14.9	0
1998	-77.5	-33.2	-7.9	765.5	33.2	110.7	-	0	0	7.9	0
1999	-132.5	-57.2	-7.9	731.5	57.2	189.7	-	0	0	7.9	0
2000	-233.5	-117.2	-7.9	692.5	100	300	-	33.5	17.2	7.9	0
2001	-329.5	-189.2	-15.9	645.5	100	300	Ceb-Bhol (21.0)	129.5	89.2	15.9	0
2002	-356.5	-253.2	-22.9	603.5	100	300	21	156.5	153.2	22.9	0
2003	-496.5	-318.2	-29.9	561.5	100	300	21	296.5	218.2	29.9	0
2004	-550.5	-369.2	-34.9	528.5	100	300	21	250.5	269.2	34.9	0
2005	-604.5	-394.2	-39.9	495.5	100	300	21	404.5	294.2	39.9	0

Note: * Power transfer by interconnection is not applied.

11.3 DEVELOPMENT OF NON-CONVENTIONAL ENERGY SYSTEMS TO SUPPLY POWER TO THE RURAL AREA

The study area has very limited energy resources. There is no hydro and geothermal potential. Oil and gas are only in small quantity. However, large amount of agriwaste, wastewood, animal waste and solar energy can be tapped to augment power generated from conventional sources. Solar energy which is abundant year round due to the strategic location of the study area, is expected to generate an average of 1,700 kWh/ sq.m. per year. On the other hand, agriwaste materials such as rice husk, baggasse, coconut husk and wastewood are estimated to have a heat value of 3,600 Kcal/kg, 1,800 Kcal/Kg, 3,655 Kcal/kg and 2,600 Kcal/Kg respectively. However, the above agriwaste and wastewood are not utilized effectively except in small scale cooking and steam making.

Local coal has an estimated heat value of about 3,000 Kcal/Kg and is also expected to be utilized as fuel for small scale power generation. Solar energy utilization deserves the most priority in the study area not only for local energy development but for the electrification of the rural and isolated areas as well.

11.3.1 OBJECTIVES, CONSTRAINTS AND STRATEGY FOR ENERGY DEVELOPMENT

(1) Objectives

The objectives of the rural energy development are as follows:

1. To improve the quality of life of the people in the rural areas.
2. To improve the environmental conditions of the study area.
3. To replace imported fuel to local indigenous energy thus reducing government financial burden.

(2) Constraints

The constraints for rural energy development are as follows:

1. Lack of know-how in the operation and maintenance of the systems.
2. The necessity to form an organization for the collection of energy utilization charges.
3. To organize a body responsible for the operation and maintenance of the systems.

(3) Strategy

The strategies to the constraints are as follows:

1. Installation of the systems through grant or offer low interest rates.
2. Government assisted training of personnel for the operation and maintenance.
3. Organize a cooperative for energy utilization and for collection of energy utilization charges.
4. Operation and maintenance staff should also be involved in the cooperative.

The utilization of solar energy at present is already in the commercial stage, solar water heater is currently being used in hotels, hospitals, restaurants, in the houses of the affluence, offices and resorts for their hot water needs.

11.3.2 DEVELOPMENT PROJECTS

(1) Solar Energy

The present condition of the utilization of solar energy, the solar water heater was already commercial stage and was used for hot water supply to hotels, hospitals, restaurants, high-society houses, offices and resorts. The solar absorption liquid chiller for air cooler by solar water system is now trial stage. The photo-voltaic system for battery charging station, solar home system, solar pumping system, power supply system communication repeater station and street lighting are trial or commercial stage.

Our recommendation for utilization system of the solar energy are as follows:

1) Solar Water Heater

- solar hot water supply system
- solar absorption liquid chiller for air conditioner

2) Solar Voltaic System

- photo voltaic electricity supply system for rural electrification system
- photo voltaic electric supply system for water supply system
- solar battery charging station
- solar street lighting and traffic signal system
- solar desalting system

(a) Solar Water Heater

1) Solar hot water supply system

Solar water heater supply system is comprised with the sunshine (or solar) collectors, heat storage tank, booster tank, collector pump and auxiliary boiler. The system is divided into two systems by heat collecting method. One is direct system and the other is indirect system. Auxiliary boiler is equipped for additional heat supply to hot water when the heat value became insufficient due to increase heat demand.

The system configuration is shown in Figure 11.3.1. Solar hot water supply system involves only very simple construction work and very low operation and maintenance cost. With this system, the users can obtain 60 degree Celsius hot water for several uses. Combination on sunshine collector unit is selected by hot water demand, for example, the application to several sectors such as hospital, hotel and restaurant etc. area shown on Table 11.3.1. On this Table, served energy estimated with Kcal/year and Peso/year can be obtained, and also roughly estimated equipment cost can be seen.

TABLE 11.3.1 OUTLINE OF SOLAR WATER SUPPLY SYSTEM

	Configuration						
Hot Water Supply per Day (ton)(60 degree C)	2	4	6	8	10	15	20
Nos. of Unit	17	34	51	68	85	127	169
Objectives							
Hotel (person)	14	29	43	57	71	107	143
Public Bath (person)	11	21	32	43	53	80	107
Hospital (bed)	8	17	25	33	42	53	83
Sports Center (shower use, person)	87	174	261	348	435	652	870
Restaurant (Nos. of dishes)	250	500	750	1,000	1,250	1,875	2,500
Apartment (Household)	9	17	26	34	43	64	85
Served Energy							
10^6 Kcal/year	25	50	80	100	130	190	260
Thousand Pesos/year *	28.8	57.6	92.0	115.2	150.0	220.0	300.0
Installed Space (sq.m.)	79.0	137.0	185.0	236.0	285.0	423.0	548.0
System Cost (1,000 Yen)**	7,000	11,000	15,500	19,000	23,000	32,000	42,000

Notes: * Heat value and price (in 1991 Nov.) for Kerosene is assumed as 8,250 Kcal/liter & 9.5 Pesos/liter

** Equipment cost including transportation cost, but excluded installation cost.

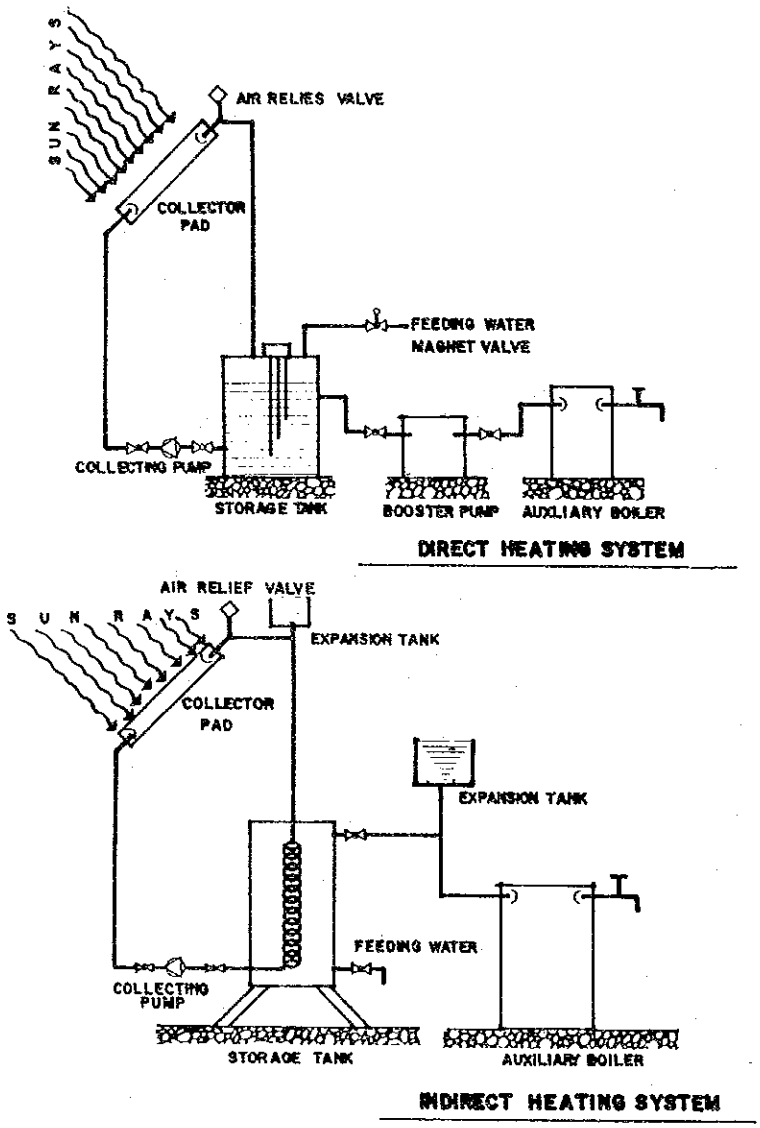

FIGURE 11.3.1 SYSTEM CONFIGURATION FOR SOLAR WATER SYSTEM

2) Solar heat absorption liquid chiller

The solar heat absorption liquid chiller is also a modern technique used to produce chilled water that can be used for room cooler passing through cooling fan units. This system contributes to energy saving and bringing about many benefits to the users. This system consists of solar heat collectors, hot water tank, auxiliary boiler and heat exchanger, absorption liquid chiller, chilled water tank, cooling tower and cooling fan units.

The absorption liquid chiller consists of evaporator, absorber, condenser, regenerator, heat exchanger and cooling medium pump etc. The principle of the absorption liquid chiller can be explained as follows.

- Cooling medium vapor generated in evaporator is absorbed and diluted by Biomic-Lithium liquid in absorber.
- Temperature of the diluted liquid rise passing through heat exchanger by liquid pump and the liquid become heavy by heating in regenerator.
- This heavy liquid return to absorber transferring heat to heat exchanger.
- Then, the cooling medium vapor generated from the diluted liquid in regenerator return to evaporator.

An example of the specification and performance of the typical types are shown in Table 11.3.2. As shown in this table, energy annually saved and benefit cost converted to electricity, for example for cases of 50 VSRT are 150,000 kWh and 390,000 Pesos assumed as electricity tariff assumed by ₱ 2.60/kWh.

(c) Solar Voltaic System

1) Photo-voltaic electricity supply system for rural electrification system

The system consists of solar array, battery charger, storage battery, DC/AC inverter, transformer and control panels. Study for the system was carried out for three cases, assuming demand of 100 W per household and demand hour of nine hours per day (six hours at night and three hours at morning)

-	Case 1	output	3KW	30 households
-	Case 2	output	5KW	50 households
-	Case 3	output	10KW	100 households

2) Photo-voltaic electricity supply system for water supply pump

Photo-voltaic electricity supply system can be very useful and beneficial to villagers in the rural areas where power supply from the cooperatives can not be expected. This can be used either to pump drinking water from deep wells or used to pump irrigation water or as a drainage water pumping system.

TABLE 11.3.2 SPECIFICATION AND PERFORMANCE OF SOLAR ABSORPTION LIQUID CHILLER

Item		Case Unit	1	2	3
Refrerating Capacity		USRT	30	50	100
		MW	106	175	350
Chilled water	- Temperature	°C		14/9	
	- Flow rate	m^3/min.	0.30	0.55	0.96
Cooling water	- Temperature	°C		31/36	
	- Flow rate	m^3/min.	3.5	11.0	2.4
Hot water	- Temperature	°C		85/80	
	- Flow rate	m^3/min.	0.44	0.8	1.4
Electricity		KW	4.0	4.0	4.0
Solar collector - Unit size		m x m	1 x 2	1 x 2	1 x 2
	- Nos. of Unit	-	490	820	1,640
	- Total area	m^2	980	1,640	3,200
Applied room area		m^2	990	1,650	3,300
Annual served energy - Energy		KWh	90,000	150,000	300,000
	- Benefit cost	Pesos	234,000	390,000	780,000
Equipment cost		¥ 10^3	82,000	125,000	240,000

Note: Excluded installation cost

TABLE 11.3.3 SPECIFICTION OF THE SOLAR VOLTAIC SYSTEM

ITEM			CASE	1	2	3
System Output	- Voltage		(V)	230	230	230
Output			(KW)	3	5	10
	- Frequency		(HZ)	60	60	60
Demand Hour			(hr)	9	9	9
Solar Array	- Output		(WP)	18,126	30,528	61,056
	- Arrangement	Serial		18	18	18
		Parallel		19	32	64
	- NOS		(PCS)	342	576	1,152
	- Total area		(m^2)	136	227	455
Inverter			(KW)	3	5	10
Battery	- Voltage		(V)	310	310	310
	- Arrangement	Serial		124	124	124
		Parallel		2	2	3
	- Capacity		(AH)	2,200	3,700	7,300
Total Installation Area			(m^2)	800	1,100	2,300
Equipment Cost			(¥ x 10^6)	110	170	300

In the Study Area, shortage of drinking water for domestic consumption and shortage of irrigation water for agricultural production is becoming a serious problem. The photo-voltaic electricity system for water supply pump, consists of solar array, DC/AC inverter, deep well pump, piping and a storage tank. Pump capacity can be selected depending on the demand for water drinking purposes including that of the household consumption. Irrigation and drainage water systems has the same items as that of the water system except for the storage tank.

3) Battery charging system

This system is the best option to supply electricity to isolated areas not served by the distribution facilities of the cooperatives, more especially so to the island barangays.

This system had been designed and developed under a joint program of AFA Electro Industrial System, Inc. and the Philippine-German Solar Energy Project (PGSEP) July 18, 1988.

This system is so designed two charge the battery, DC12V, 100 AH, used for diesel car, which can be use to light two pieces of 20 W fluorescent lamp, one piece of 15 W incandescent lamp, a TV and a radio in one household.

The components of the system except the solar panels are available in the local markets.

The specification and design of the system are so that with maximum of 15A output current from a 200 Wp P.V.

Solar panel, and the battery charging station allows the easc and assurance of charging batteries in remote area where is solar energy available.

It minimizes the available charging time by an automatic change-over of charging operation to the next battery is stand-by, after the first battery has been fully charged, and vice-versa.

The battery charging stations are fully automatic and can accommodates a maximum of two batteries at individual charging where one battery is always on stand-by. When requirement of numbers of batteries are over two units, it is available to charge the batteries, to integrate the changing unit for adequate supply capacity.

The villagers or consumers can be chargeable their battery everyday or every two days, and they can use the lighting, TV and radio etc., in every night.

To supply the electricity in rural and isolated area, especially in isolated islands, this system is the most excellent and effective to meet the requirement for local electrification.

4) Street lighting and traffic signal

The application of solar energy to the street lighting in rural and remote area and for the traffic signal system is so useful and effective.

The present traffic signal system can not be made operational during power outage. The design of the solar traffic signal system will include a solar panel, a 12 V 100 AH battery and a charging unit, a DC/AC inverter and control facilities.

The capacity of solar panel will be 40Wp and 400Wp for street lighting and the traffic signal system, respectively.

5) Solar desalting system

In solar desalting system, the newest technology applied is the reverse osmosis method. The process involves the penetration of sea water in a sealed box utilizing high pressure of about 56 kg/cm^2 to 68 Kg/cm^2 through an osmosis filter. As high as 95% of the salt contents can be eliminated by the osmosis filter. The system has the capability of converting 3,000 ppm sea water to 200-300 ppm drinkable fresh water.

The plant can be used to produce drinkable fresh water not only from sea water but also from salt contaminated water produced from shallow and deep wall.

For example, one practical type of the plant shown here.

Production of fresh water	:	10 m^3/day	
Intake of sea water	:	49 m^3/day	
Motor capacity	:	5.5 Kw	
Energy (kWh)/m^3	:	10.2 kWh/m^3	
Productivity	:	21.0%	
System cost	:	Desalting system	¥ 8,000,000
		Solar system (6.0 Kwp)	¥12,000,000
		Total	¥20,000,000

Note: System cost is FOB price at Japan and does not include CIF and construction cost.

The outline of the reverse osmosis desalting system is shown on Fig.11.3.2.

(2) Universal Type Boiler Power Generation System

The universal type boiler power generation system is mainly composed of a boiler system, power generation system and steam utilization process system.

The universal boiler system is very efficient and convenient because it utilizes many kinds of solid fuel such as low quality coal, agriwaste and wood waste.

For the useful utilization of local energy for local power supply, it is highly recommended that the universal type boiler power generation system be utilized to generate power especially in the remote barangays of the province.

The power generation system is being driven by a steam turbine coupled to a turbine generator.

The wasted heat from the turbine outlet can still be recycled for other uses such as evaporation process in the sugar industry, in drying process in saw mills and architectural wood industry in various food processing and others. The site for the installation of the recommended plant should be just adjacent to fuel production sites or on sites where there is demand for energy.

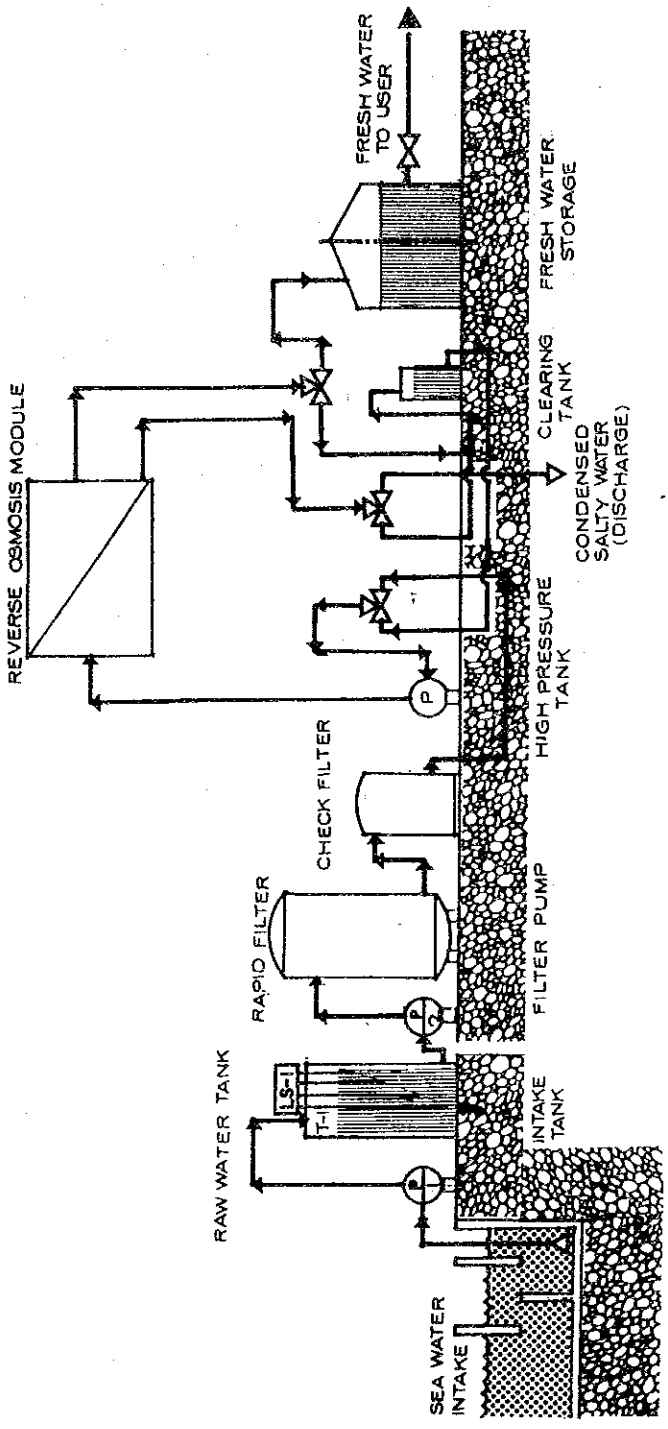

FIGURE 11.3.2 OSMOSIS TYPE DESALTING SYSTEM

(a) Typical type of the system of fuel application

The study on a typical type of the system utilizing four kinds of fuel such as lignite, baggasse, rice-husk, cocoshell and waste wood yielded an output of 1,320 kw, 1,800 kw, 2,700 kw, 3,650 kw and 4,600 kw, respectively.

The utilization of mixed fuel application can be made available depending on the milling seasons of different crops. For example, its about 6 months for sugar millers and 4 months for rice millers.

For effective and efficient operation of the plant during the remaining 6 or 8 months, other fuel such as coal and waste wood can be utilized.

(b) The investment cost for the typical boiler and generation system

Table 11.3.4 shows Application of Boiler Generating System.

TABLE 11.3.4 SPECIFICATION OF THE BOILER GENERATING SYSTEM

type	Pumped Volume	Total Head	Solar output	Array Area	Served		Pump		Cost (million yen)	
	(cu.m/day)	(m)	(Kwp)	(m^2)	Popu-lation	House-holds	H (m)	Q (c.m/m)	Solar	Pump
1/8	10	80	1.5	17.5	200	40	88	0.02	10.5	1.4
1/10	10	100	1.9	22.2	200	40	100	0.02	13.3	1.4
20/1	200	10	3.8	44.3	n.a.	n.a.	10	0.42	26.6	0.6
5/8	50	80	7.5	87.5	1,000	200	80	0.1	52.5	1.8
5/10	50	100	9.4	109.7	1,000	200	100	0.1	65.8	1.8
20/8	200	80	30.0	350.0	4,000	800	80	0.42	210	3.8
20/10	200	100	37.5	437.5	4,000	800	100	0.42	262.5	3.0
200/3	2000	30	112.5	1,312.6	n.a.	n.a.	30	4.2	787.5	5.2

(c) The benefit of application of the system

We estimate the benefit to apply the 20 T/H type boiler for power generation.

Boiler steam production	20,000 Kg/hr
Max steam pressure	66 Kg/cm^2
Normal steam pressure	61 Kg/cm^2
Turbine inlet pressure	9 Kg/cm^2
Turbine outlet pressure	6 Kg/cm^2
Superheated steam temp.	425°C
Generating output	1,800 Kw
Electricity tariff	¥18.0/kWh (assumed as a average price in Japan)
Boiler feeding water temp.	140 °C (ejector outlet)
Boiler efficiency	92%
Fuel cost	¥ 25,000/ton (assumed utilization of heavy fuel oil)
Yearly operation hour	7,200 hr
Entropy difference (A Steam) - (B + C steam)	1,540,000 Kcal/Hr

This difference of Entropy is equivalent to 2.22 tons/hr, 2.20 tons/hr of steam consumption (1,540,000 / 695)
Furthermore, this 2.20 tons/hr of steam consumption is equivalent to 0.156 ton/hr (2.22/14.2) of heavy fuel consumption.

Generating energy (kWh)	1,800
Incremental fuel cost	¥3,900 (0.156 ton/hr x ¥25,000/ton)
Generating energy cost	¥2.2/kWh (Incremental fuel cost/generating energy
	¥3,900/1,800 kWh)

The difference between buying and generating energy cost (¥18 - ¥2.2 = ¥15.8)
Yearly saving energy cost 204,768,000/year (1800 x 15.8 x 7,200)

(3) The Methane Gas Generator Plant

In the Study Area, the methane gas generating plant is recommended to replace fuel wood for the protection of national forests. The methane gas generating plant using animal residue from 500 head of swine by digested fermentation effect is expected to generate 30 m^3/day of methane gas which can be used for cooking at households. This 30 m^3/day gas can be supplied to 30 households assuming 1.0 m^3/day per household. The plant consists of feces press, pressed waste storage, gas generator, water separator, sulfur separator, gas holder, booster pump and accumulator and pressure reducer. Feces and urine derived from cattle house are separated from separated waste and pressed waste by the feces press, and pressed waste is fed to gas generator. In the gas generator, the methane gas is generated derived pressed waste by digested ferment effect, and the effect, and the methane gas is sent into gas holder passing through water and sulfur separator. The piping systems made by vinyl chloride are necessary to dispatch the gas to each households.

(4) Windmill Generation

In the study Area, relatively high mountain ranges is lined on the center axis of the island from North to South.

In this highland area, installation of windmill powered generating units is considered viable, however, no wind duration data is available at present, so the Study Team recommends to install a pilot scale plant of about 10 ~ 20 kw base and collect the data on wind duration and the data on turbine operating performance. After the completion of the plant test, a proto-type wind power generating plant of 50 ~ 250 kw class shall be installed at suitable sites expected from the pilot plant data.

CHAPTER 12

TELECOMMUNICATIONS DEVELOPMENT

CHAPTER 12

TELECOMMUNICATIONS DEVELOPMENT

12.1 INTRODUCTION

Telecommunications has been recognized as an important factor contributing to the economic development and integration of nations. Without an adequate telecommunications infrastructure, producers are uninformed of the market conditions and cannot bring their goods to the market in a timely fashion; nationwide enterprises cannot efficiently coordinate their operations; supply and distribution systems cannot be effectively operated; families cannot maintain close contact in times of crisis; and the Government cannot effectively carry out its programs for development or protect national security and sovereignty.

In recognition of the importance of telecommunications in the economic development of the country, the Government formulated the Medium-Term Philippine Development Plan (MTPDP) 1993-1998 which spells out the vision and goal of development of the telecommunications sector.

The vision of the Government is to make the Philippines a new industrialized country by the year 2000. To attain this vision, the telecommunications sector shall pursue more vigorous development through intensified private sector participation. The high level of attention given to the telecommunications sector reflects the Government's recognition that an inadequate telecommunications infrastructure impedes economic growth, and that the Philippines has fallen behind nearly all other Southeast Asian countries in terms of telecommunications development.

In support of the Government's MTPDP, the Department of Transportation and Communications (DOTC) prepared the National Telecommunications Development Plan (NTDP), which covers the period 1991 to 2010. The NTDP intends to guide the development of the country's telecommunications sector. Also, the NTDP seeks to focus on on-going and future efforts of the telecommunications sector to support both sector goals and national development objectives.

12.2 STRUCTURE OF THE TELECOMMUNICATIONS INDUSTRY

The entities involved in the Philippine telecommunications sector include government agencies, private and public telecommunications network operators, equipment manufacturers and suppliers, users of telecommunications services, and local industry associations.

12.2.1 GOVERNMENT

The government agencies involved in the telecommunications sector are as follows:

1. The Department of Transportation and Communications (DOTC) as the policy making body for telecommunications;

2. The National Telecommunications Commission (NTC) as the regulatory arm, with quasi-judicial powers;

3. The Telecommunications Office (TELOF) as the operating arm, providing limited telephone and telegraph services in the rural areas; and

4. The Municipal Telephone Project Office (MTPO) as the implementing arm of the Government's municipal telephone program.

12.2.2 PRIVATE SECTOR

The Private sector plays a major role in the industry as it accounts for the bulk of investments to date and handles most of the country's telecommunications traffic.

The Philippine Long Distance Telephone Company (PLDT) is the largest among 45 entities providing telephone services in the Philippines. It has a network of 127 central office exchanges serving Metro Manila and 133 other cities and municipalities throughout the country. As of the end of 1992, there were 1,175,332 telephones in service, representing approximately 94% of all telephones in operation throughout the country.

PLDT is the largest supplier of both domestic and international long distance telephone service in the Philippines. Domestic toll service is carried on the company's microwave radio carrier system as well as on the Domestic Satellite Communications System (DOMSAT).

12.3 PRESENT STAGE OF TELECOMMUNICATIONS SERVICES IN CEBU

12.3.1 LOCAL EXCHANGE SERVICE

The local exchange service in the Province of Cebu covers the areas of Argao, Cebu City, Lapu-lapu City (Mactan), Mandaue City, Talisay, Danao City and Toledo City.

There are three companies which are operating a local exchange service in the said province, namely, Philippine Long Distance Telephone Company (PLDT), Danao Telephone Company, and Telephone Management and Services. Among the 3 operators, PLDT dominates the market except for Danao City and Toledo City which are served by Danao Telephone Company and Telephone Management and Services, respectively.

As of August 1993, data indicate that the existing switching capacity installed in the above-mentioned areas has a total of 56,480 telephone lines. Of the said total, there are only 49,889 telephone subscribers/connections (Residential and Business). Refer to Table 12.3.1 for the details.

TABLE 12.3.1 LIST OF OPERATORS AND EXISTING FACILITIES IN CEBU

Area	Operator	Type of Exchange	Total Number of Lines			
			Switching	Equipped Connec-tions	Excess	Sub-scribers
1.Argao	PLDT	Analog	192	200	182	18
2.Cebu	PLDT	Analog	23,366	23,400	17,844	5,556
		Digital	19,502	21,500	18,692	2,208
3. Lapulapu (Mactan)	PLDT	Analog	483	600	592	8
		Digital	612	764	748	16
4.Mandaue	PLDT	Analog	5,800	5,800	5,566	234
		Digital	2,091	2,400	2,341	59
5.Talisay	PLDT	Digital	3,334	3,500	3,415	85
Sub-total, PLDT			55,380	58,164	49,380	8,784
6.Danao	DANAO	Analog TEL.CO.	300	300	300	0
7.Toledo	TELECOM MGMT. & SERVICES	Digital	400	800	209	591
		Analog	400			
Sub-total			1,100	1,100	509	591
Grand Total			56,480	59,264	49,889	9,375

Source: August 1993 Philippine Association of Private Telephone Companies, PAPTELCO Report

PLDT accounts for more than 98% of the total capacity and 99% of the total telephone subscribers in Cebu.

PLDT has also installed Public Calling Offices (PCOs) in the Province of Cebu. The Municipal Telephone Act (RA 6849) which was enacted by Congress, aims to install a telephone in every unserved municipality nationwide. RA 6849 gave qualified private telecommunication operators the first option to provide, install, and operate a Public Calling Office (PCO) in all unserved municipalities. By this virtue, PLDT was able to establish PCOs in the Province of Cebu.

As of August 1993, data indicate that PLDT has already installed Public Calling Offices (PCOs) in 44 municipalities in the entire province. Table 12.3.2 shows the list of municipalities with PCOs installed by PLDT.

PLDT's expansion program in the Province of Cebu is covered under the X-T Program. The project is set to be launched soon by PLDT. Code-named X-6, the PLDT project will run from 1994-1997, and is set to provide 586,600 new digital lines in 124 exchanges nationwide.

TABLE 12.3.2 LIST OF MUNICIPALITIES IN CEBU WITH PLDT INSTALLED PCO

1.	Alcantara	12.	Compostela	23.	Malabuyoc	34.	San Fernando
2.	Alcoy	13.	Carcar	24	Medellin	35.	San Francisco
3.	Alegria	14.	Carment	25.	Minglanilla	36.	San Remegio
4.	Aloguinsan	15.	Catmon	26.	Moalboal	37	Santa Fe
5.	Asturias	16.	Cordova	27.	Naga	38	Santander
6.	Badian	17.	Daanbantayan	28.	Oslob	39.	Sibonga
7.	Balamban	18.	Dalaguete	29.	Pilar	40.	Sogod
8.	Bantayan	19.	Dumanjug	30.	Pinamungahan	41.	Tabogon
9.	Borbon	20	Ginatilan	31.	Poro	42.	Tabuelan
10.	Barili	21.	Liloan	32.	Ronda	43.	Tuburan
11.	Boljoon	22.	Madridejos	33.	Samboan	44.	Tudela

Source: Municipal Telephone Projects Office (MTPO)

TABLE 12.3.3 PROPOSED PLDT EXPANSION IN CEBU

Proposed Service Area	Time Frame	Type of Exchange	Total No. of Lines	Status of CPCN/PA Franchise (with CPCN/PA, For Application or pending w/ NTC)
1. Argao	1996	Digital	200	Existing Service
2. Bantayan	1996	Digital	1100	For Application of CPCN
3. Madridejos	1996			For Application of CPCN
4. Sta. Fe	1996			For Application of CPCN
5. Carcar	1996	Digital	950	CPCN Approved
6. San Fernando	1996			CPCN Approved
7. Sibonga	1996			For Application of CPCN
8. Cebu-Jones	1996	Digital	13000	Existing Service
9. Cebu-North	1996	Digital	20000	Existing Service
10. Cebu-South	1996	Digital	20500	For Application of CPCN
11. Mandaue City	1996	Digital	9,600	Existing Service
12. Liloan	1996			For Application of CPCN
13. Agus	1996	Digital	1700	For Application of CPCN
14. Cordova	1996			For Application of CPCN
15. Consolacion	1996	Digital	4000	CPCN Approved
16. Mactan	1996	Digital	3086	Existing Service
17. Talisay	1996	Digital	4700	Existing Service
18. Minglanilla	1994	Digital	1800	Existing Service
19. Naga	1996	Digital	500	For Application of CPCN

Source: August 1993 PAPTELCO Report, National TelecommunicationsCommission (NTC)

The plan will expand international and domestic switching/toll facilities to include backbone systems and expand transmissions system and network management.

The areas that will be covered by PLDT's X-6 program in Cebu are listed in Table 12.3.3.

12.3.2 LONG DISTANCE SERVICES

(1) Domestic Service

National long distance service is primarily operated by PLDT, which owns and operates provincial and nationwide backbone transmission network.

(a) Operator-assisted call

Based on the PLDT 1992 Domestic Toll Traffic Operations Report, Cebu toll center handled a total of 2,147,536 domestic calls. Of the total calls handled, 873,434 calls were completed.[1]

(b) National direct dialing call

Based on the 1992 Volume Report of National Direct Dialing (NDD), NDD originating from Cebu reflected a total of 1,136,290 calls.

Currently, the Government is developing an alternative backbone transmission network in the Visayas through the National Telephone Program (NTP) Tranche I-2.

NTP Tranche I-2 will provide telephone lines in Region 6 (Western Visayas), and 8 (Eastern Visayas). It will provide a backbone network in these regions. In 1989, the DOTC and a French consortium signed a contract for the implementation of a pilot project in Region 8 and the complete detailed French Protocol. The pilot project in Region 8 will provide digital exchanges in the cities of Catarman, Catbalogan, Ormoc and Borongan and the related transmission facilities to interconnect these exchanges, later to be integrated in the overall Visayas network.

Due to limited funds, the pilot project was split into two parts: Catarman-Catbalogan-Ormoc section and Spur Borongan.

The rest of the Tranche I-2 project covers 20 cities/municipalities with a total capacity of about 20,000 lines with individual exchange capacities ranging from 300 to 4,500 lines.

For the Province of Cebu, NTP Tranche I-2 Project will cover the following areas: Cebu City with 30 lines; D.S. Soriano with 900 lines; Danao City with 400 lines; and Toledo City with 500 lines. A total of 1,830 lines will be installed in Cebu.

Implementation of this project will be undertaken by the Government through the DOTC/CPMO.

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1 Completed and Handled calls volume refer to Operator-Assisted calls only. Completed calls consist of Paid, Collect, and Report Charge. Handled calls consist of completed Messages, Canceled No Charge, and Assistance Calls

(2) International Service

International carriers are PLDT, ETPI, and PHILCOM. They have their own gateways. International service can be classified into an operator-assisted call and a direct dialing call.

(a) Operator-assisted call

Based on the PLDT International Toll Traffic Operations Report of 1992, Cebu Toll Center handled a total of 173,668 international calls. Of the total international calls handled, 139,817 calls were completed.

(b) Direct distance dialing call[2]

Based on the 1992 Volume Report of Direct Distance Dialing Calls which originated in Cebu, the following were reflected: a total of 190,315 calls with 138,637 International Direct Dialing Call and 51,678 Autodialler calls.

12.3.3 OTHER PUBLIC SWITCH TELEPHONE NETWORK (PSTN) BASE SERVICES

(1) VAN/VAS

The new technological innovations in telecommunications have produced new services called Value Added Network Services and Value Added Services. A VAN can be interpreted as one that provides facilities and/or features to a user above and beyond that of pure information transportation, while a VAS is one that can be provided on top of, or via the basic telecommunications network, or a Value Added Network. These services, in most developed countries, have been deregulated through the introduction of competition. In the Philippine context, VAN & VAS are limited to enfranchised telecommunications providers.

Domestic VAS is being offered by PT & T and Francisco M. Cervantes. International VAS providers are Capwire, PHILCOM, Eastern Telecommunications Philippines, Inc. (ETPI) and Globe Telecom.

There are no available data on the status of VAN/VAS in Cebu.

(2) Integrated Services Digital Network (ISDN) Service

An ISDN trial exchange is to be deployed in Metro Manila in 1994 and another in Cebu by 1995. Depending on the result of the trials, a schedule for commercial offerings and or wider scale deployment can be drafted.

(3) Intelligent Network

Intelligent Network services are offered by controlling network from a central database and a network system instead of settlement of additional function to each switching

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2 Direct Distance Dialing Calls refer to subscriber-initiated calls wherein subscribers are given the capability to make domestic/overseas calls to some provincial exchanges/countries without having to pass through a PLDT operator.

system. There are advantages of quick and cheap service and more sophisticated services like toll free dial. In the Philippines, there is no service of this kind is available.

(4) Cellular Mobile Telephone System (CMTS) Service

CMTS service is available from two operators, namely, Pilipino Telephone Corporation (PILTEL) and Express Telecommunications Company, Inc. (EXTELCOM).

In Cebu, PILTEL is the provider of CMTS. There are three cell sites in the said area: Talisay, Mactan, and North Cebu. (Refer to the attached map of PILTEL's CMTS Network Plan for the illustration).

(5) Domestic Satellite Service

(a) DOMSAT system

DOMSAT was established in 1975 and it offers only domestic satellite service. It has a control station in Antipolo and 11 fixed earth stations nationwide. DOMSAT leases transponder capacity from the Indonesian Satellite, PALAPA. DOMSAT has 1 earth station in Cebu. Refer to the attached DOMSAT network for the illustration.

(b) Very Small Aperture Terminal (VSAT)

VSAT technology was introduced in the rural areas. In October 1989, the NTC has taken the policy initiative with regard to satellite communications, since no specific guidelines have been given by DOTC. NTC has granted provisional authorities to five carriers to provide telecommunications services through the VSAT. The VSAT carriers in the country are the following: PLDT, Globe Mackay Cable and Radio (GMRC), International Communications Corporation (ICC), Liberty Broadcasting Network, Inc. (LBNI) and Capitol Wireless (CAPWIRE)

On February 24, 1992, PLDT obtained a provisional authority from NTC to establish two hub stations in Sampaloc, Manila and Cebu and install 620 VSAT terminals nationwide.

PLDT was authorized to install, operate and maintain VSAT earth station to upgrade its transmission capabilities.

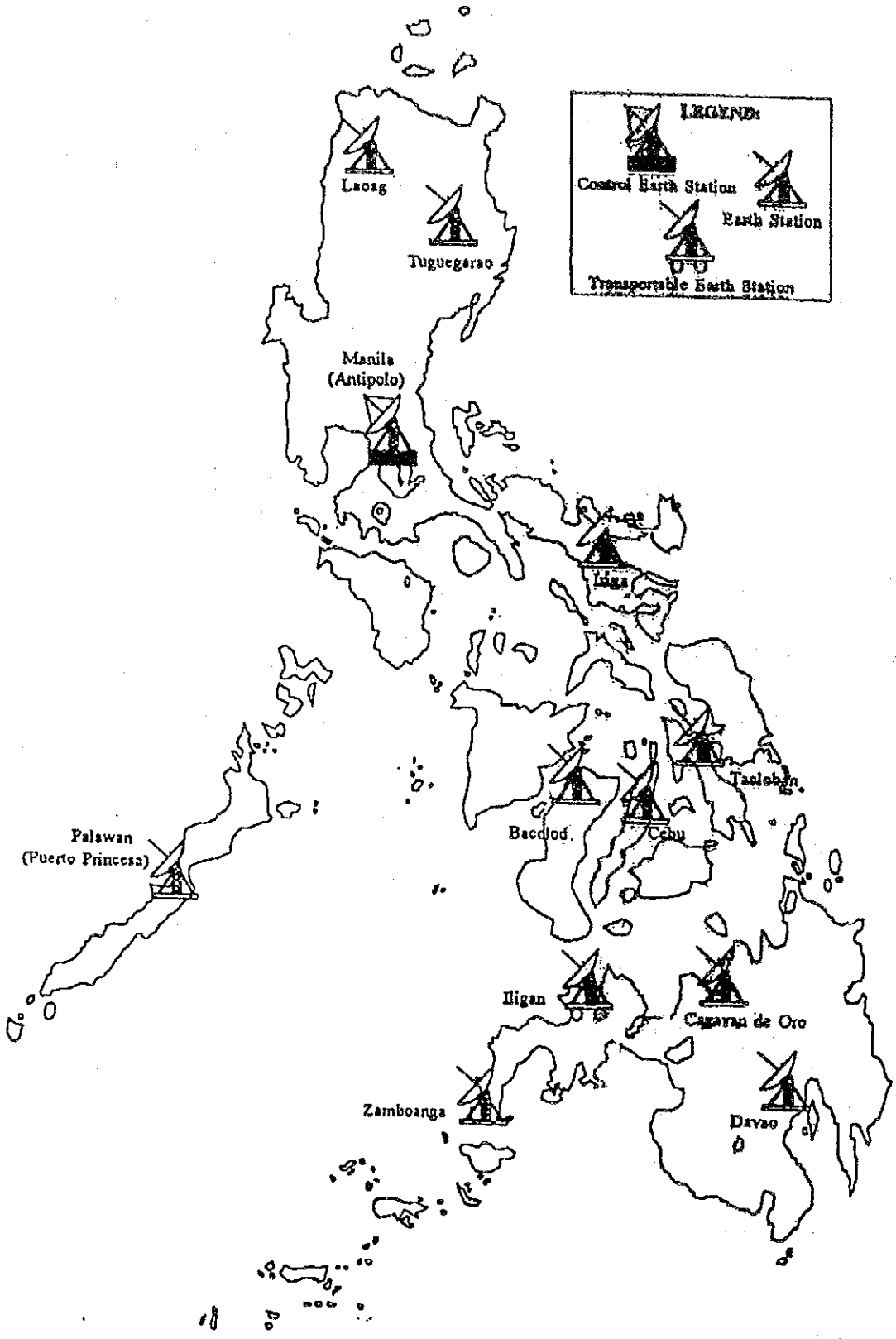

FIGURE 12.3.1 PILTEL'S CMTS NETWORK PLAN (AS OF MAY 31,1992)

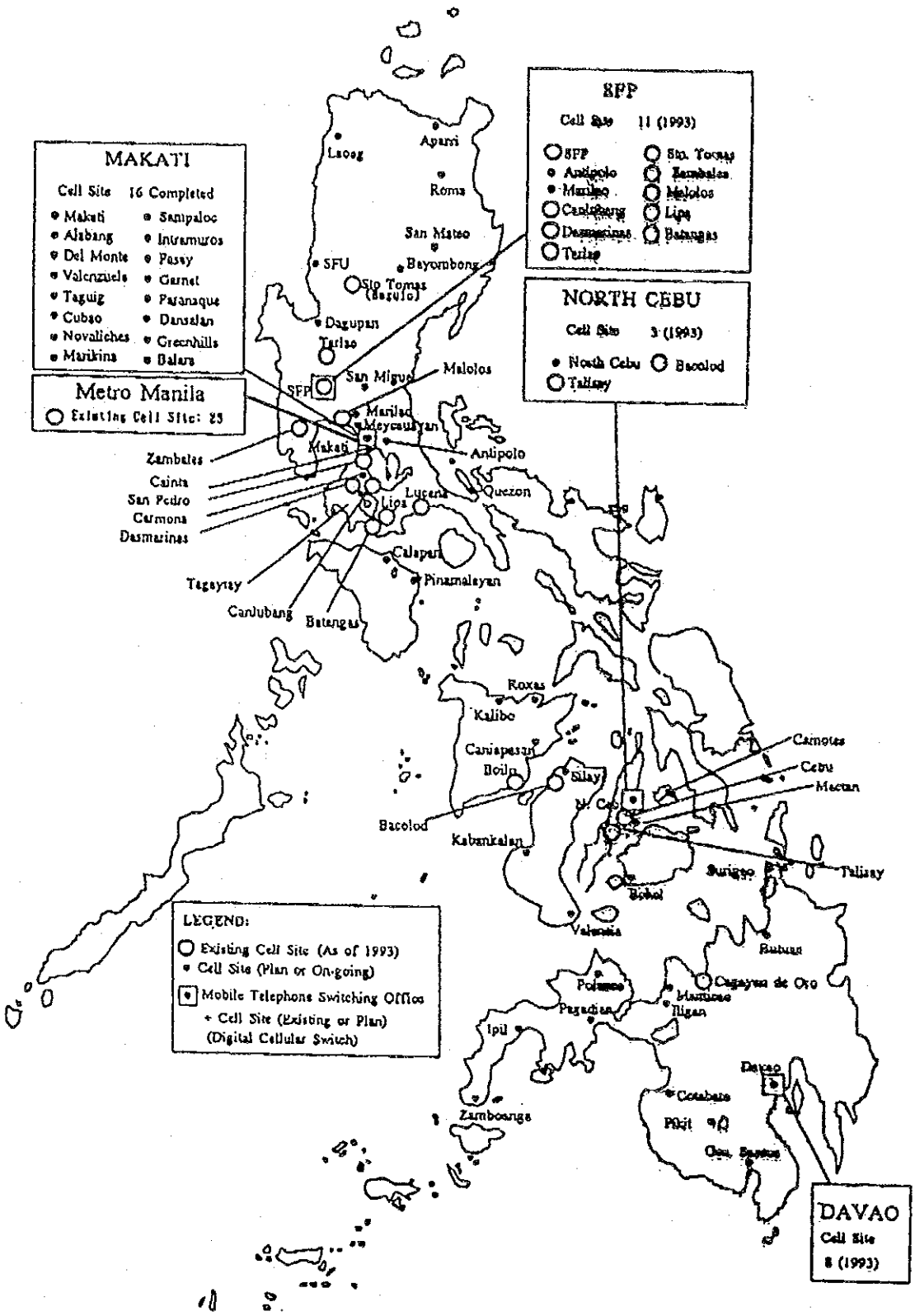

FIGURE 12.3.2 DOMSAT NETWORK (AS OF 1992)

12.4 NECESSARY CONSIDERATIONS FOR POLICY MAKING

12.4.1 POLICY PROGRESS

Telecommunications policies in the Philippines are being progressively refined and improved through policy statements, DOTC Memorandum Circulars, Executive Orders and legislative initiatives.

In 1987, the Department of Transportation and Communications (DOTC) issued Circular No. 87-188 which contained policy statements intended to rationalize and guide the development of Philippine telecommunications through the 1990s. These policy statements were then taken up by the Government Industry Relations Committee (GIRC), which developed a series of implementation guidelines intended to translate the policies into action by the government and the private sector. Subsequently, presidential Memorandum Order No. 163, issued in 1988, created the National Telecommunications Development Committee (NTDC). The NTDC composed of high level decision makers from the Government and the private sector, was established for the purpose of facilitating the resolution of immediate developmental, regulatory, and other issues for telecommunications.

In late 1989, the DOTC started work on the National Telecommunications Development Plan (NTDP) covering the period 1991 to 2010. The NTDP was issued in October 1990.

In 1993, the NTDP was updated to take into account the foregoing developments. The NTDP seeks to focus ongoing and future efforts in the sector to support both sector development goals and national development objectives. The purpose of the NTDP, therefore, is to provide a framework of government policies, objectives and strategies to guide the telecommunications sector development into the next century.

12.4.2 GOAL OF THE TELECOMMUNICATIONS SECTOR

As drafted and approved by the Government and the telecommunications industry representatives, the following are the mission and visions of the telecommunications sector:

(1) Vision

1. More vigorous development through intensified private sector participation, aided by government
2. A more proactive industry that anticipates the users' needs;
3. An environment with healthier competition;
4. More widespread access to basic telecommunications services; and
5. An integrated and fully interconnected public telecommunications network with facilities satisfying prescribed national standards.

(2) Mission

The Government and the private sector, as partners with shared mission, shall provide adequate telecommunications services.

Thus, the Government's goal for the telecommunications sector is growth and development, in support of the vision and mission for the sector.

12.4.3 TELECOMMUNICATIONS SECTOR POLICIES

(1) Role of the Private Sector

The efficient development of the telecommunications sector requires the maximum participation of the private sector. The private sector shall, therefore, be responsible for serving the telecommunications needs of the public throughout the country, and for achieving and maintaining quality-of-service standards by the National Telecommunications Commission (NTC).

(2) Role of the Government

The Government's role in the telecommunications sector consist of policy formulation, regulation, and facilitation in support of the declared primary goal.

(a) Policymaker

The Government shall provide policies and general guidelines to promote the orderly development of the nation's telecommunications sector, consistent with national goals and objectives.

(b) Regulator

To help accelerate the telecommunications sector's growth and development, the Government shall continue to seek improvements in the regulatory system to make it simpler yet more effective. The National Telecommunications Commission (NTC) shall continue to improve its monitoring and enforcement capability for all telecommunications services. It shall ensure that companies providing telecommunications services meet performance, technical, and efficiency standards. The NTC shall impose sanctions on operators that fail to comply with such standards. Sanctions shall be designed so that they affect the non performing companies and not the subscribers served by those companies. The NTC shall also institute more efficient regulatory practices and procedures to ensure that proceedings are fair and expeditious.

(c) Facilitator

The Government shall actively promote an environment conducive to growth and development of the telecommunications sector. Accordingly, the Government shall, in consultation with the private sector, initiate further improvements in policies and regulations and shall vigorously continue to privatize government telecommunications assets and/or operations. The Government may initiate or facilitate official development assistance (ODA)-funded telecommunications projects in underdeveloped or unserved areas. It shall assist in the development of such areas after having selected, through a public process, a suitable private-sector operator.

In cases where public telecommunications facilities are government-owned, the Government shall enter into appropriate arrangements for a private-sector group or groups to operate the facilities.

(3) Universal Access and Network Interconnection

The Government shall continue to work toward the evolution of a rational, integrated and interconnected telecommunications system which meets both national and international standards, to achieve universal access. Technically sound interconnection of public networks is imperative for maximum efficiency and effectiveness of installed telecommunications facilities. Interconnection agreements should ensure that the costs associated with local access will be adequately covered. Moreover, there should be coordination and mutual agreement among the parties to ensure timely implementation of the interconnection required. In cases of disagreement among parties, the NTC shall prescribe a formula for fair and equitable compensation.

(4) Intra-Sectoral Cross Subsidy

Until universal access to basic service is achieved, and such service is priced to reflect actual costs, local exchange service should continue to be cross-subsidized by other more profitable services that use the local distribution system. Local exchange service shall be protected from uncompensated bypass.

Services arising out of the interconnection of facilities i.e., inter-exchange services as well as cellular mobile telephone service, value-added network services, and similar emerging technologies should compensate the local exchange carrier for providing the network, possibly in the form of an access charge based primarily on usage.

(5) Investment Efficiency

Telecommunications development demands maximum efficiency in the use of invested capital. This can be achieved by the prevention of unnecessary duplication of facilities and equipment in the provision of essential services. In areas where demand is relatively low and inadequate to support the profitable operation of more than one firm, and there are several small carriers, mergers shall be encouraged in the interest of achieving economies of scale.

(6) Promotion of Emerging Technologies

Where appropriate, the Government shall promote the use of emerging technologies as a means of improving and broadening the availability of telecommunications facilities for broadcast and other media, education, public information and other services essential to economic, social and cultural development.

(7) Liberalization of Services

The Government shall liberalize telecommunications services when this is considered to be in the public interest. It is noted that cellular mobile communications, record carrier, radio paging, and other radio-based services are already competitive, although the rates charged are still subject to NTC approval. These services should be liberalized further, and supervised by the NTC only to ensure that market forces determine prices, and that no unfair practices are involved.

The provision of customer service equipment is now subject only to type approval. Services such as data and computer-based communications services and value-added network services should also be liberalized.

(8) Local Manufacturing

The Government shall continue to encourage the local manufacture of telecommunications equipment, cables and other support materials and equipment. This can result in foreign exchange savings, employment opportunities, technology transfer, and growth of support industries.