

# THE ENERGY SCENARIO (1978-1987)

By the Ministry of Energy

- The Magnitude of the Challenge
- The Policy Imperatives
- The Cost of Energy Independence

## ENERGY POLICY OBJECTIVES

TO SUPPORT NATIONAL ECONOMIC AND SOCIAL  
DEVELOPMENT GOALS THROUGH:

- Adequate and Secure Energy Supplies in the Forms the Markets Require
- Judicious and Efficient Energy Consumption

## SUMMARY OF FUNDAMENTAL ENERGY PROBLEMS

- A. Overdependence on Petroleum.
- B. High Proportion of Imported Energy Supplies.
- C. Increasing Import Cost and Pressure on Balance of Payments.
- D. Depletion of World Oil Reserves.
- E. Relatively High Energy Demand Growth Rate Projected for the Country.
- F. Increasing Demand for Non-Energy Uses of Traditional Fossil-Fuels.

## OIL IMPORTS AND THE NATIONAL BALANCE OF TRADE (C.I.F. IN MILLION U.S. DOLLARS)

	1973	1974	1975	1976
Oil imports	231	681	833	887
Total imports	1,790	3,468	3,776	3,953
Oil imports as % of total imports	12.9	19.6	22.1	23.2
Total exports	2,099	2,974	2,610	2,964
Oil imports as % of total exports	11.0	22.9	31.9	30.9
Balance of trade	309	(494)	(1,166)	(989)
Oil imports as % of negative balance of trade	—	138	71	93

*Source:* Central Bank

## ENERGY POLICY STRATEGIES

1. Acceleration of Indigenous Energy Development.
2. Diversification of Primary, Commercial and Geographic Sources of Energy.
3. Establishment of Adequate Stockpile Especially Crude Oil and Oil Products.
4. Institutionalization of Energy Conservation Through Expanded Use of Fiscal Measures in Energy Production and Consumption.
5. Conversion and/or Development of Market To Use Non-Oil Energy Sources.
6. Encouragement of Technical and Economic Cooperation with Other Countries in Energy Related Matters.
7. Promotion of Adaptive Energy Research and Development.

### TENTATIVE ASSESSMENT OF INDIGENOUS ENERGY RESOURCES

(in million barrels of oil/oil equivalent, mmmboe)

	<i>Developed</i>	<i>Probable</i>	<i>Potential<sup>a</sup></i>
Hydro	4.4/yr.	36/yr.	50/yr.
Geothermal	3.3/yr.	26/yr. <sup>b</sup>	2.50 x 10 <sup>6</sup>
Nuclear	_____	10	Under evaluation
Coal	_____	300	6 x 10 <sup>3</sup>
Petroleum	_____	Under evaluation	Under evaluation
Non-Conventional (solar, biomass, etc.)	0.45/yr. <sup>c</sup>	16 <sup>d</sup>	Theoretically unlimited

<sup>a/</sup> Including developed and probable.

<sup>b/</sup> In the fields currently under development.

<sup>c/</sup> Usage directly resulting from government program only.

<sup>d/</sup> Estimated maximum usable for 1978.

### EXPLORATION, DEVELOPMENT AND PRODUCTION EXPENDITURES

(In Million Pesos)

	<i>Oil and Gas<sup>1</sup></i>	<i>Coal<sup>2</sup></i>	<i>Geothermal<sup>3</sup></i>	<i>Uranium<sup>1</sup></i>	<i>Total</i>
1973	26.25	5.07	14.48	0.01	45.81
1974	122.70	6.62	16.43	0.15	145.90
1975	252.00	15.49	36.07	0.30	303.86
1976	459.45	24.15	62.35	0.35	546.00
1977	420.00	47.81	93.75	6.60 <sup>4</sup>	568.16
T o t a l	1,280.10	99.14	223.08	7.41	1,609.16

<sup>1</sup> Includes exploration expenditures only

<sup>2</sup> Includes exploration, development and production costs

<sup>3</sup> Includes exploration and development costs

<sup>4</sup> Estimates

PHYSICAL ACCOMPLISHMENTS OF FIELD DEVELOPMENT PROGRAMS

	OIL & GAS		COAL		GEOTHERMAL			URANIUM		HYDRO
	Service Contract No. of Wells	Seismic Lines (000 kms.)	Production (000 mt.)	No. of Wells	Footage (000 ft.)	Steam Capacity	Holes Drilled	Footage (000 ft.)	Mega-watts	
1973	1	4	39	4*	23	19.5	—	—	595 (existing)	
1974	4	15	51	4	22	14.5	5	2	—	
1975	9	7	105	8	47	28.8	9	4	—	
1976	10[2]	5	122	15	82	96.8	10	5	—	
1977	15[3]	9	285	21	129	88.8	32**	18**	150	
1973-1977	42	40	601	52	303	248.4	56	29		

[ ] — Discovery Wells

\* — Includes 2 wells drilled prior to 1973

\*\* — Estimates

TARGET GENERATION CAPACITIES BY FUEL SOURCE

	EXISTING *						1982		1987			
	MW	%	MMBOE	MW	%	MMBOE	MW	%	MMBOE	MW	%	MMBOE
Hydro	739	24.0	3.60	1288	28.1	6.60	4406	45.9	23.24			
Geothermal	3	0.1	0.00	548	12.0	5.61	768	8.0	8.38			
Oil-Thermal	1860	61.0	16.53	2190	47.8	20.09	2065	21.5	18.00			
Diesel	462**	14.9	2.49	498	10.9	4.29	498	5.2	3.46			
Coal-Oil Thermal				55	1.2	0.51	1245	13.0	11.32			
Nuclear							620	6.5	6.42			
T O T A L	3084	100.0	22.62	4579	100.0	37.10	9602	100.0	70.82			

\* Includes capacities of plants scheduled for operation in 1977

\*\* Includes capacities of plants owned by municipalities, cooperatives, and private utilities, as well as capacities of non-operational plants totalling 362 MW.

PROJECTS	78	79	80	81	82	83	84	85	86	87
REFINERY FACILITIES										
DEBOTTLENECKING		25 MUSD								
GRASSROOTS EXPANSION			110 MUSD							
TANKAGES										
CRUDE		2230 MB								
PRODUCT		(ANNUALLY OR AS REQUIRED)								
STRATEGIC STORAGE		12000 MB								
MARKETING FACILITIES										
SERVICE STATIONS		(ANNUALLY OR AS REQUIRED)								
PROD. TERM RELOCATION					769 MB					
CRUDE TRANSPORT										
VLCC ACQUISITION		250 MDWT			250 MDWT					
RECEIVING FACILITIES										
PRODUCT TRANSPORT										
TANKERS / BARGES / TUGS		(ANNUALLY OR AS REQUIRED)								
PIPELINE			104.9 MBOE							
ROLLING EQUIPMENT		(ANNUALLY OR AS REQUIRED)								
SHIPYARD										
ENERGY SUPPLY BASE										
COAL DISTRIBUTION										
TERMINALS										
COAL TRANSPORT										
PETROCHEMICAL		UPSTREAM - 175000 MT/y; 25000 MT/y								

## OIL EXPLORATION LEGISLATIONS

I. R.A. 387 (Petroleum Act No. 1949)—July 18, 1949.

### AMENDMENTS:

A) P.D. 529 (Tax Provisions)—August 6, 1974.

B) P.D. 782 (Integration of Authority and System)—August 25, 1975.

C) P.D. 987 (Extension)—August 25, 1976.

II. P.D. 8 (Senate Bill No. 531)—October 9, 1972.

III. P.D. 87 (Oil Exploration and Development Act of 1972)—  
December 21, 1972

*AMENDMENTS:*

- A) P.D. 469 (Petroleum Board Reconstituted)—May 23, 1974.
- B) P.D. 575 (PNPC) —
  - Technical Personnel
  - Data Centralization
  - Supportive Services
- C) P.D. 910 (EDB)—March 12, 1976 —
  - Self reliance on energy requirements.
  - Policy formulation, implementation and coordination.
  - Regulatory authority.

PETROLEUM SUMMARY  
Since P.D. No. 87

I. SERVICE CONTRACTS

1. No. of service contract awarded	26
2. Total hectarage	11.257 million
3. Total financial	\$278.64 million
4. No. of service contracts relinquished	5
5. Total hectarage after relinquishments	7.36 million
6. No. of service contracts operated by multinationals	9
7. No. of service contracts operated by Philippine Corporations	12

PRESIDENTIAL DEGREE NO. 87

- 1. Manner of acquiring rights Service contract
- 2. Citizenships ..... No Filipino nationality require-  
ment
- 3. Participants ..... Government/service contractor
- 4. Area ..... Maximum allowed is 1.5 million  
hectares

- 5. Duration ..... Exploration period-7 years extend-  
ible to 10 years.  
Exploitation period-25 years re-  
newable for another 25 years
- 6. Relinquishment ..... 25% after 5 years; another 25%,  
after 7 years excluding produc-  
tion area.
- 7. Annual work obligation ..... Drilling and financial commit-  
ments.
- 8. Cost recovery ..... Maximum of 70% of gross pro-  
ceeds.
- 9. Contractor's share ..... Maximum of 40% of net proceeds
- 10. Government's share ..... At least 60% of net proceeds.

## II. SPECIAL INCENTIVES

- A) Tax exemption
- B) Special income tax provisions
  - 1) Gross income-proceeds from sale/consumption of oil  
and gas and incidental income.
  - 2) Deductions—FPA and operating expenses.
- C) Free entry of alien technical personnel.
- D) Repatriation of capital and retention of profits.
- E) Filipino participation incentive allowance.
- F) Deep water contract (200 meters).

### PRESIDENTIAL DECREE NO. 972

Promulgating an Act to promote an accelerated exploration, development, exploitation, production and utilization of coal.

- Introduced the service contract system for coal exploration and development activities.
- Provided incentives to coal producers, as well as to industrial firms that would convert or re-convert to coal use.

### INCENTIVES UNDER P.D. 972 (Coal Development Act of 1976)

Provides incentives to enterprises/industries which will convert their existing oil-fired plants and facilities to coal burning. Such incen-

tives which may be availed of through the Board of Investment are summarized as follows:

- \* Tax exemption on imported capital equipment
- \* Tax credit on domestic capital equipment
- \* Net operating loss carryover for deduction of taxable income
- \* Capital gains tax exemption
- \* Accelerated depreciation
- \* Preference in grant of government loans.

#### SUMMARY OF COAL ACTIVITIES

Since P.D. No. 972

##### I. COAL EXPLORATION CONTRACTS:

1. No. of Coal Contracts Awarded	12
2. No. of Exploration Contracts	4
3. No. of Development and Production Contracts	7
4. Total Hectarage	40,292
5. Areas Covered by the Contract	Cebu, Surigao, Cagayan, Semirara Batan
6. No. of Contracts Currently Negotiated	6

##### II. COAL PERMITS:

1. No. of Coal Permit Granted (Utah Exploration Co.)	1
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#### PRESIDENTIAL DECREE NO. 1174

- Granted additional incentives to coal operators participating in the coal development program.
- Introduced clause on entry and use of private lands.

#### PRESIDENTIAL DECREE NO. 1068

12 January 1977

Directing the Acceleration of Research, Development and Utilization of Non-Conventional Energy Resources in the Country.

##### *Bed Tasks:*

- Monitor, Integrate, Coordinate all Government RD & D Projects.
- Formulate A *National Program* and Directing its Implementation.
- Grant and Recommend Financial Assistance and Incentives to Deserving Participants, Public and Private.



## PRIORITY PROJECT AREAS

1. *Evaluation of Potentials*
  - Noncon Resources Survey
  - Solar/Wind Monitoring Network
2. *Available Technologies: Large-Scale Output*
  - Power & Fuels from Agro Wastes
  - "Alcogas" for Motor Fuel
  - Energy Plantations
  - Industrial Solar Water Heating
4. *Others: ore R & D Required*
  - Solar Refrigeration
  - Solar Pumps
  - Solar Powers, etc.

## ENERGY CONSERVATION THROUGH TAXATION

1. P.D. No. 843 — Increase the annual registration fee on private automobiles and imposing an energy tax to discourage uneconomic consumption of fuel.

<i>Schedule of Energy Tax Payment Vehicle Type</i>	<i>of Market Price</i>
Sports Car	1 1/2
Extra Heavy Automobile (2001 kg+)	1 1/2
Heavy Automobile (1,501-2,000 kg)	1
Light Automobile (1,001-1,500 kg)	3/4
Bantam Automobile (1,000 kg or less)	1/2
Private jeeps and jeepneys	1/2

2. P.D. No. 844 — Imposing an energy tax on aircraft not operated for hire and increasing the registration fees of aircrafts.
3. P.D. No. 845 — Imposing an energy tax in motorized watercraft used for pleasure and recreation.
4. Socialized pricing and taxation of different petroleum products.

TABLE 19

## ENERGY CONSERVATION THROUGH GOVERNMENT AND PRIVATE SECTOR PARTICIPATION

1. P.D. No. 846 — Require all sectors of mass media including billboard operators to allocate spot time and/or space for informational and education campaigns and programs on energy conservation of the Government and of the energy conservation movement.

2. LOI No. 328 — Directs the machinery of the government on a total conservation and promotion of efficient utilization of fuels and electricity in all sectors of the economy.
3. LOI No. 329 — Directs DPI, DEC, and DLGCD to mount a sustained and intensified program of information and education campaign on energy conservation measures including the implementation of these measures through the Barangay.
4. Memorandum Circular No. 1000 — Requires all heads of Departments, Bureaus including government-owned or controlled corporations to abide by an Energy Conservation Code in their respective jurisdictions.
5. Metropolitan Manila Commission Energy Conservation Program.
  - \* Require all establishment to maintain air conditioning setting not lower than 76°F
  - \* All neon signs to be turned on not earlier than 7:00 PM and to be turned off not later than 10:00 PM
  - \* All streetlights should be turned on not earlier than 7:30 PM and turned off at such time when public safety or security is assured
  - \* Lights, air-conditioning units and other electric power consuming facilities in all government offices shall be turned off from 12:00 noon to 1:00 PM
6. Presidential Proclamation Nos. 1629 and 1629 — Adoption of the Daylight Savings Time which was effected last March 28, 1977 up to midnight of September 21, 1977.
7. Energy Conservation Movement (ENERCON Movement) — a voluntary act on the part of the private sector with an objective to reduce fuel and power consumption by at least 5% for industrial establishments and at least 10% for commercial establishments without affecting production goals and normal operation.
8. P.D. No. 1206 Creating the Department of Energy and its Bureaus— of Energy Utilization, tasked with this important function with its conservation goals consistent with the country's economic development objectives.

#### ENERGY CONSERVATION MEASURES UNDER P.D. 1575

##### Powers and Functions of the Bureau of Energy Utilization

1. Formulate, develop, and periodically review and revise as necessary a comprehensive national energy conservation program.
2. Conduct energy audit of energy-consuming establishments to evaluate and help improve energy utilization efficiency.

3. Develop and adopt energy utilization standards.
4. Require energy-intensive projects and establishments to submit an Energy Impact Assessment to cover:
  - \* Energy Utilization Efficiency of proposed project
  - \* Project Operation Timetable
  - \* Projected Production and Energy Consumption
  - \* Effect of project on the energy network system of affected area
  - \* Comparison of different fuel and site alternatives to assure most economical energy cost with due consideration to overall project economics.

#### PRESIDENTIAL DECREE No. 1442

#### AN ACT TO PROMOTE THE EXPLORATION AND DEVELOPMENT OF GEOTHERMAL RESOURCES

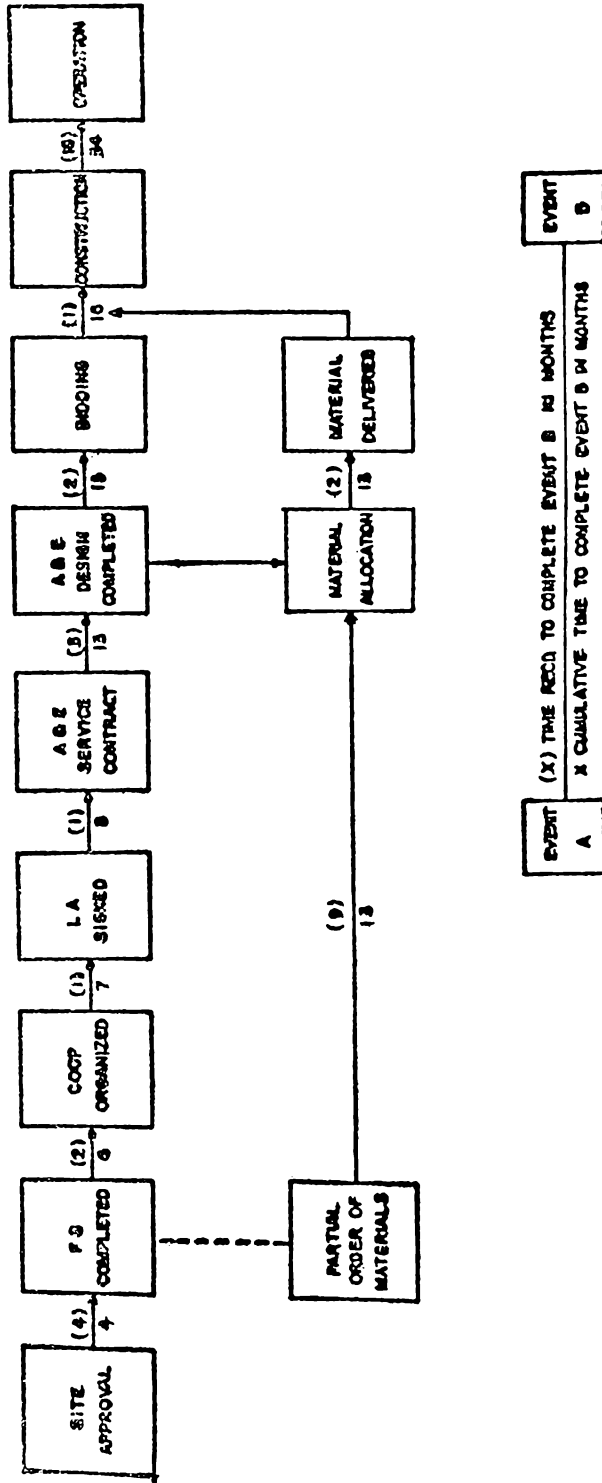
- Allows government to directly explore FOF exploit and develop geothermal resources; or undertake same under *service contracts* with a domestic or foreign contractor.
- Provides for the conversion of geothermal exploration permits and leases to service contracts.
- Provides institution alincentives, such as tax exemption.

#### RADIOACTIVE MINERALS LEGISLATION

- I. *P.D. No. 647* —January 30, 1975  
 Declared uranium, thorium, and other radioactive minerals as property of the state all radioactive minerals found shall not be subject to mining location, base or disposition and shall not be processed, manufactured, refined or used except by government and its agencies.
- II. *P.D. No. 1101* —January 20, 1977
  1. Opened radioactive minerals to mining location and disposition.
  2. Included the right to discover, locate, register, explore and exploit radioactive minerals in existing mining laws and decrees.
- III. *P.D. No. 1206* —October 6, 1977
  1. Created the department of energy to among others formulate and implement government policies and programs on energy resources development including nuclear fuel resources.

FLOW CHART

ELECTRIC COOPERATIVE PROJECT



## NONCONVENTIONAL ENERGY

### *Policy Considerations*

- Island nature of country and highly dispersed rural population create need for localized energy.
- Philippines lies in sunbelt of planet: has significant biomass, wind and direct solar energy resources.

### *Strategies/Priorities*

- Program of R & D, demonstration and utilization with small-scale rural applications as immediate target and large-scale power as longer range goal.
- Emphasis on simple/adaptable technologies.
- Leave sophisticated capital-intensive R & D to advanced countries.

## NATIONAL ELECTRIFICATION PROGRAM CONCEPTS

- Size* : 10 municipalities (average)  
*Coverage*: 100,000 - 500,000 people  
*Quality* : Adequate, reliable  
Round-the-clock and  
Low cost electricity

## NATIONAL ELECTRIFICATION PROGRAM OBJECTIVES

- Long Range*: To attain total electrification of the country by 1980  
(To provide electricity to all barrios by 1984)
- Mid Range* : To complete the country's "backbone" power system by 1980
- Short Range*: To establish electric cooperatives system in each province of the country by 1977.

## STATUS OF ELECTRIFICATION

1. Out of a total population of some 42 million, only 13 million directly enjoy the benefits of electrification.
2. Of the 13 million mentioned 5 million live in the Greater Manila Area. Another 3 million live in the other cities.
3. In the rural areas where 2/3 of our population resides, only 5 million have electric service.

## PHASES OF COOP DEVELOPMENT

1. Selection of cooperative area
2. Preparation of feasibility study
3. Organization, incorporation, registration of coop
4. Pre-construction engineering
5. Construction of physical facilities
6. System operation

Estimated project gestation period—30 months

## PER CAPITA ELECTRIC ENERGY CONSUMPTION (in kWhrs/year in 1970)

Norway	14,847
USA	8,285
Japan	3,390
Singapore	1,040
Taiwan	930
<i>ECAFE Region</i>	470
Malaysia	330
Philippines	220
Thailand	128
Papua, New Guinea	68
Pakistan	57
Indonesia	19

## RURAL ELECTRIFICATION TARGET

	<i>Actual</i> As of '77	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	<i>Total</i>
Poles	226,644	120,571	121,594	103,928	45,617	44,264	44,946	44,946	44,946	44,946	44,946	887,348
Lines (km.)	16,483	10,961	11,054	9,448	4,147	4,024	4,086	4,086	4,086	4,086	4,086	76,547
Number of cooperatives organized	100	25										125
Number of barrios energized	5,736	3,500	4,000	4,500	4,600	4,400	4,400	2,100				33,236
Number of towns and cities energized	541	280	274	250								1,345
Number of households connected	652	440	358	493	567	570	183	183	183	183	183	3,995

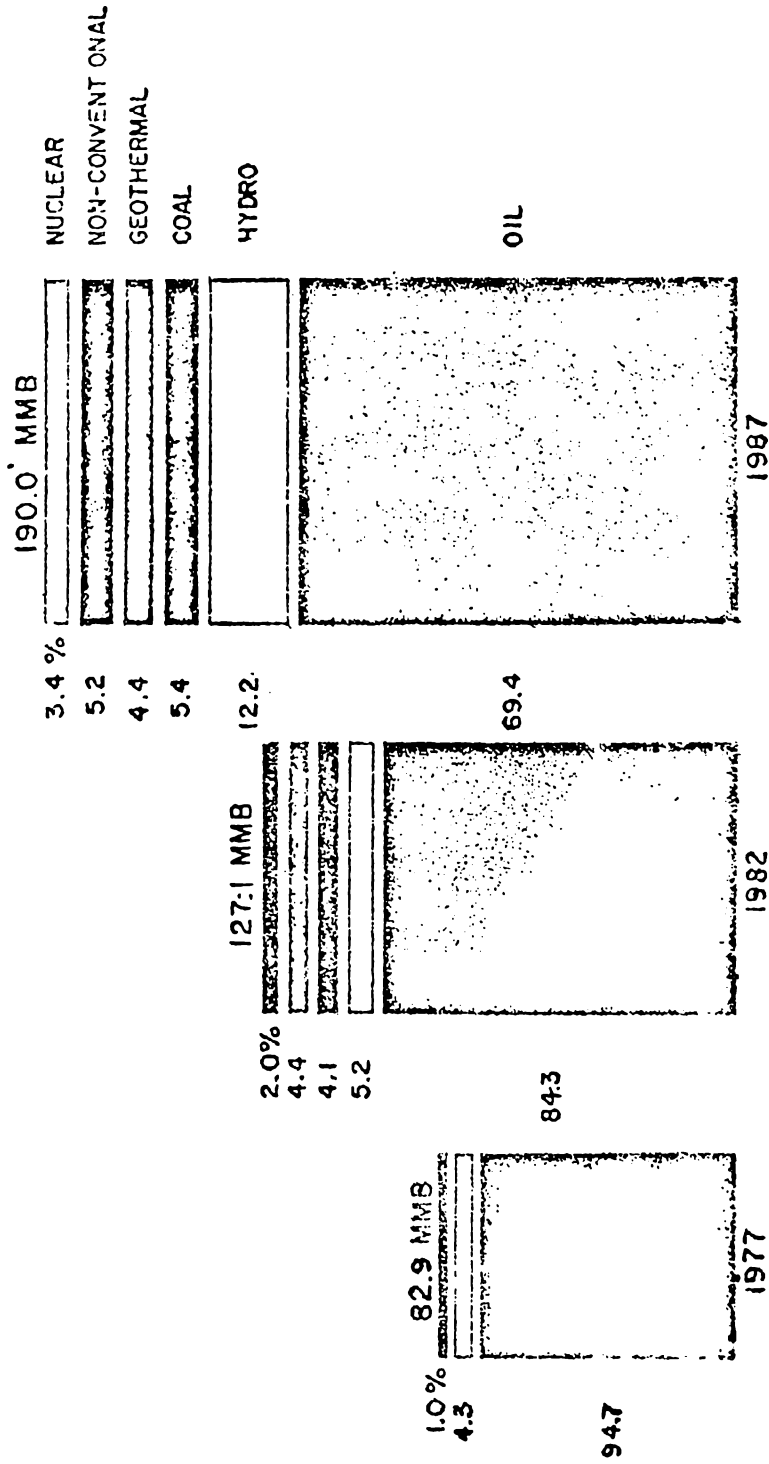
**RURAL ELECTRIFICATION FINANCIAL REQUIREMENTS\***  
(in million U.S. dollars; peso component expressed in dollars)  
1978 price level

Year	Poles		Lines		Plants		Totals		
	\$	P	\$	P	\$	P	\$	P	
1978	10.63	9.05	32.70	16.85	1.83	1.81	45.16	27.71	72.87
1979	12.15	10.35	33.07	16.29	0.04	0.68	45.26	27.32	72.58
1980	10.85	10.01	29.75	18.24	0.06	0.63	40.66	28.88	69.54
1981	12.03	10.67	39.14	18.42	0.15	0.66	51.32	29.75	81.07
1982	11.05	9.04	40.44	19.03	0.14	0.66	51.63	28.73	80.36
1983	11.05	9.04	40.44	19.03	0.14	0.66	51.63	28.73	80.36
1984	11.05	9.04	40.44	19.03	0.14	0.66	51.63	28.73	80.36
1985	11.05	9.04	40.44	19.03	0.14	0.66	51.63	28.73	80.36
1986	17.24	14.11	38.09	10.12	0.14	0.66	55.47	24.89	80.36
1987	26.51	21.70	26.96	4.39	0.14	0.66	53.61	26.75	80.36
<b>T o t a l</b>	<b>133.61</b>	<b>112.05</b>	<b>361.47</b>	<b>160.43</b>	<b>2.92</b>	<b>7.74</b>	<b>498.00</b>	<b>280.22</b>	<b>778.22</b>

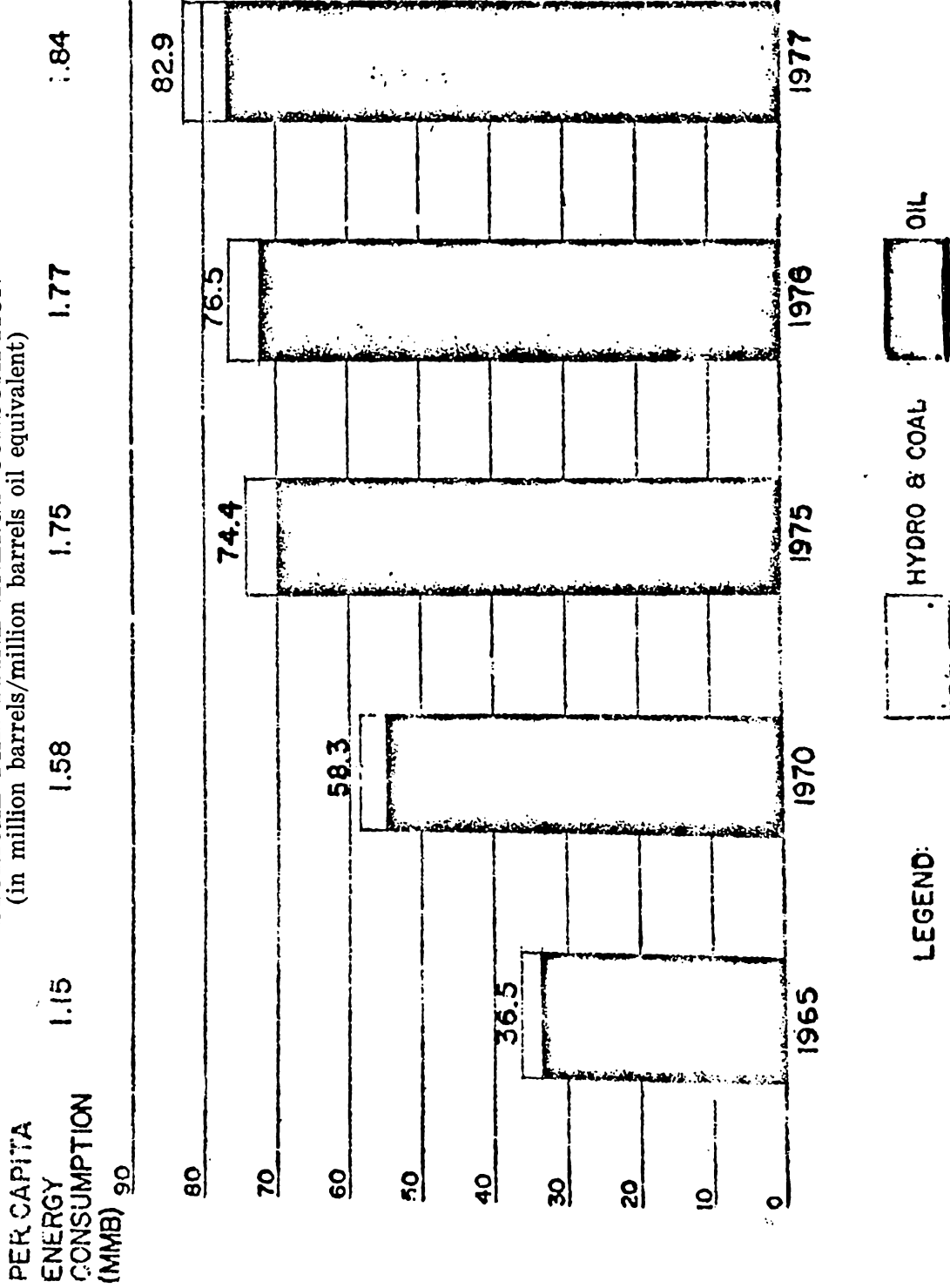
\* Does not include urban-electrification investments from 1978-1987 amounting to \$688.33 million.



PROJECTED NATURAL ENERGY SOURCES  
(In Million Barrels/Million Barrels Oil Equivalent)



HISTORICAL PHILIPPINE ENERGY CONSUMPTION  
(in million barrels/million barrels oil equivalent)

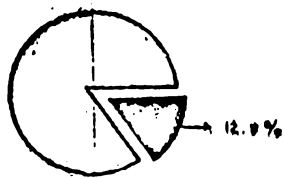


LEGEND:

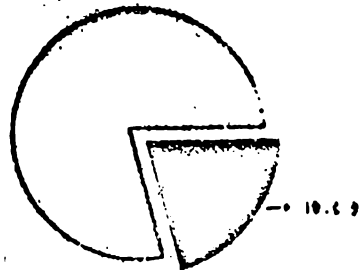
- OIL
- HYDRO & COAL
- (Unlabeled)

OIL IMPORTS AS A PERCENTAGE

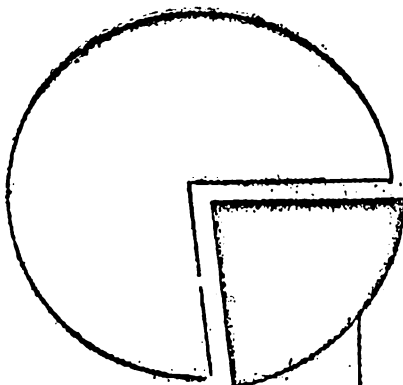
OF TOTAL IMPORTS



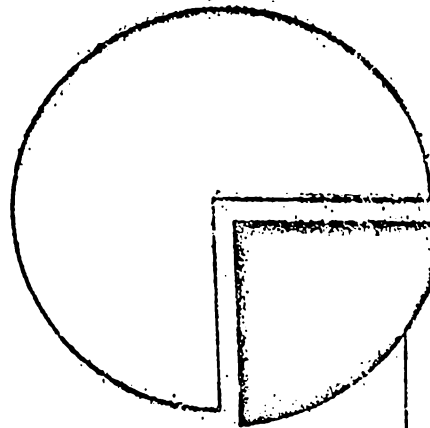
TOTAL IMPORTS \$1.8 B  
1973



TOTAL IMPORTS 3.5 B  
1974

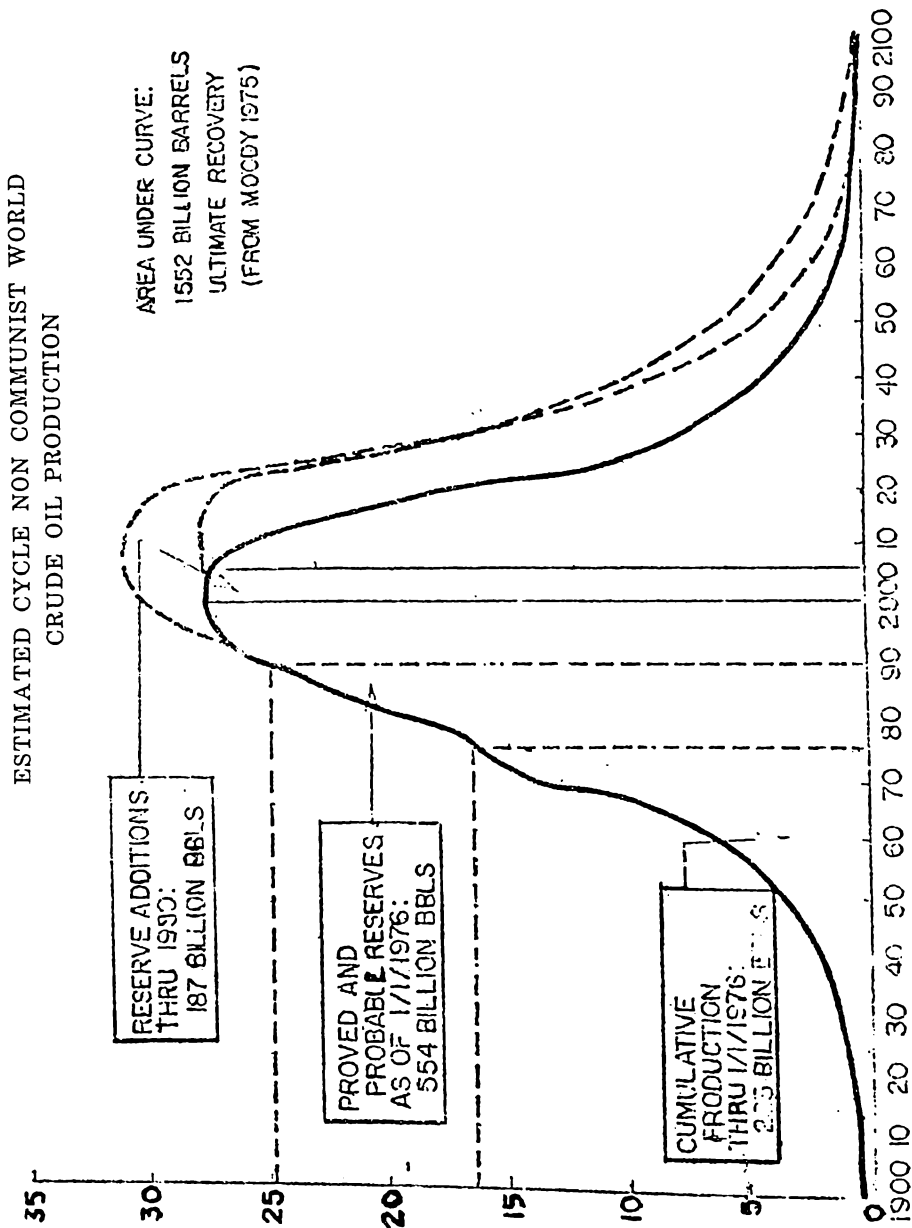


TOTAL IMPORTS \$3.8 B  
1975



TOTAL IMPORTS \$4.0 B  
1976

ANNUAL PRODUCTION RATE (BILLION BARRELS)



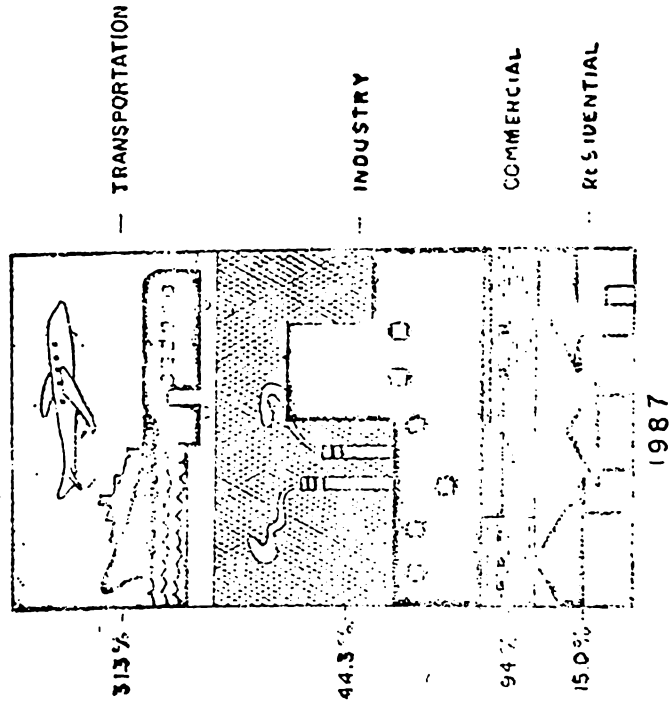
# SECTORAL MIX

1.84  
PER CAPITA  
ENERGY  
CONSUMPTION  
(MMB)

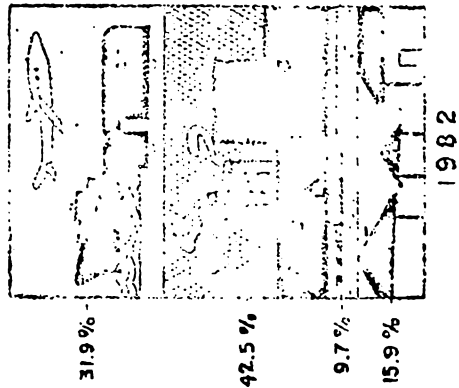
2.53

3.39

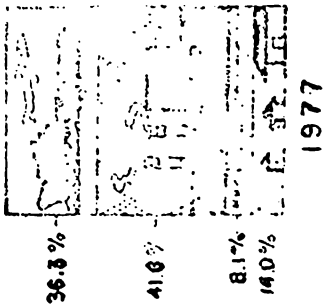
190 MMB



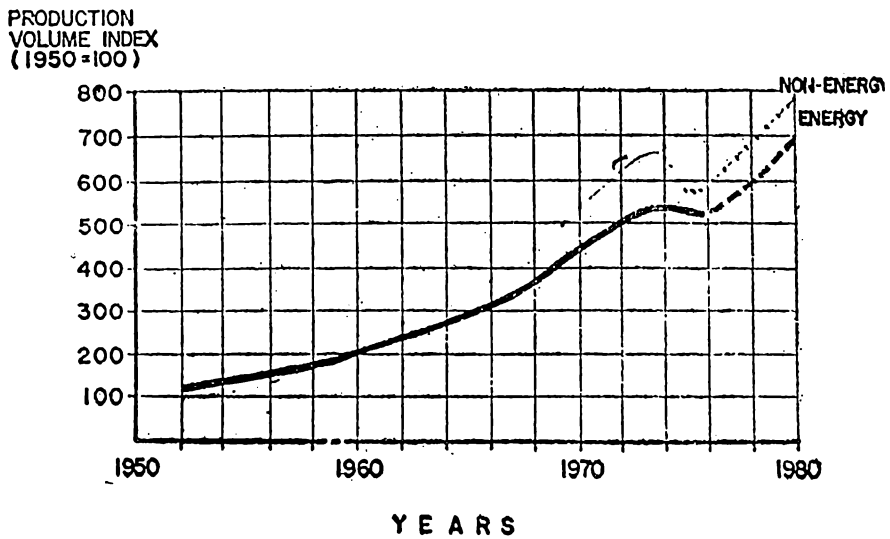
127.1 MMB



82.9 MMB



## HISTORICAL GROWTH OF PETROLEUM PRODUCTION



### NON-ENERGY USES OF HYDRO POWER

1. Irrigation
2. Domestic/Industrial Water Supply
3. Fish Conservation
4. Flood Control
5. Recreation

### NON-ENERGY USES OF COAL

1. Metallurgical Purposes
2. Soil Conditioner
3. Petrochemical

ENERGY CONSUMPTION Barrels Per Capita

