



Vietnam Energy Situation

Cogen 3: A Business Facilitator

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Cogen situation in Viet nam

A- General energy situation

1- Primary energy consumption

Table 1- Primary energy consumption by sources (1996-2000)

Unit: MTOE

Fuel\Year	1996	1997	1998	1999	2000
Coal	3.47	4.15	4.50	3.86	4.10
Oil	5.59	5.95	6.56	7.11	8.19
Gas	0.255	0.49	0.77	0.84	1.0
Hydro	4.12	3.64	3.23	4.03	4.35
Biomass	13.03	13.0	12.80	12.90	12.80
Total	26.46	27.23	27.86	28.74	30.44



1- Electricity production by fuels.

Table 2: Total electricity production of Vietnam
(1996-2000)

Year	1996	1997	1998	1999	2000
Fuel					
Total (TWh)	16.93	19.25	21.69	23.56	26.60
in which (%)					
- Coal	13.9	17.4	16.0	13.1	13.7
- Hydro	70.9	61.1	54.3	61.8	58.2
- Oil	8.7	11.3	13.1	8.2	9.1
- Gas	6.5	10.2	16.1	16.2	17.8
- Others			0.5	0.7	0.8



Existing Power Plants

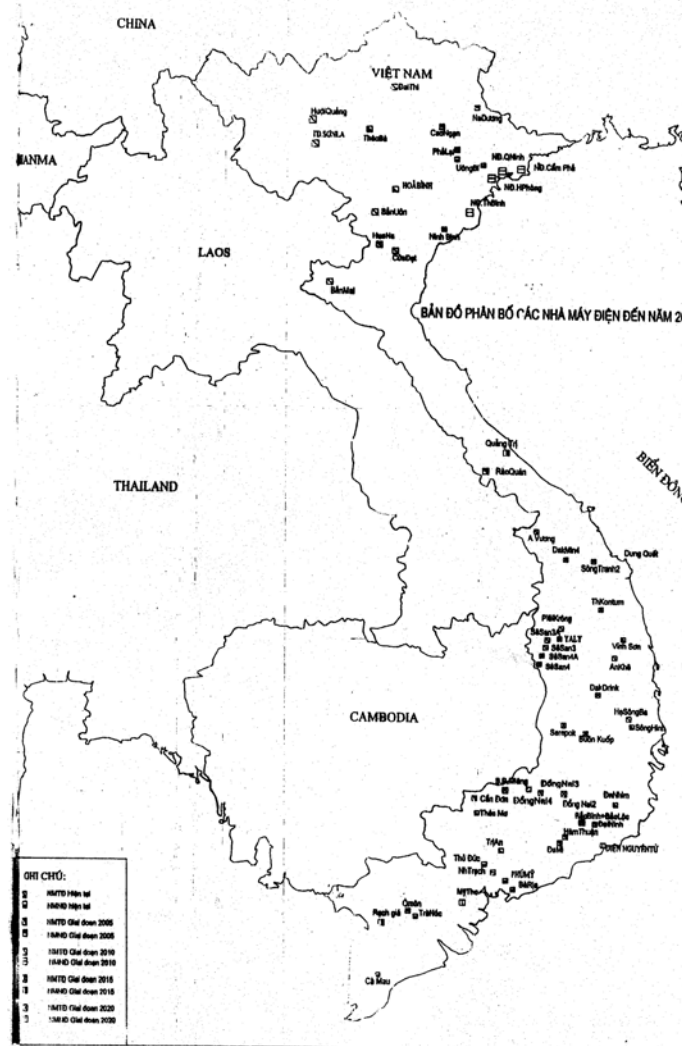




Table 3. Major power plants

Name	Zone	Capacity MW	Generation GWh
Hydro			
1-HoaBinh	North	1920	8000
2-ThacBa	North	108	450
3-SongHinh	Center	70	350
4-VinhSon	Center	66	250
5-Yali	Center	720	3500
6-TriAn	South	400	1700
7-DaNhim	South	160	1000
8-ThacMo	South	120	500
9-HamThuan	South	300	800
10-Dami	South	172	500

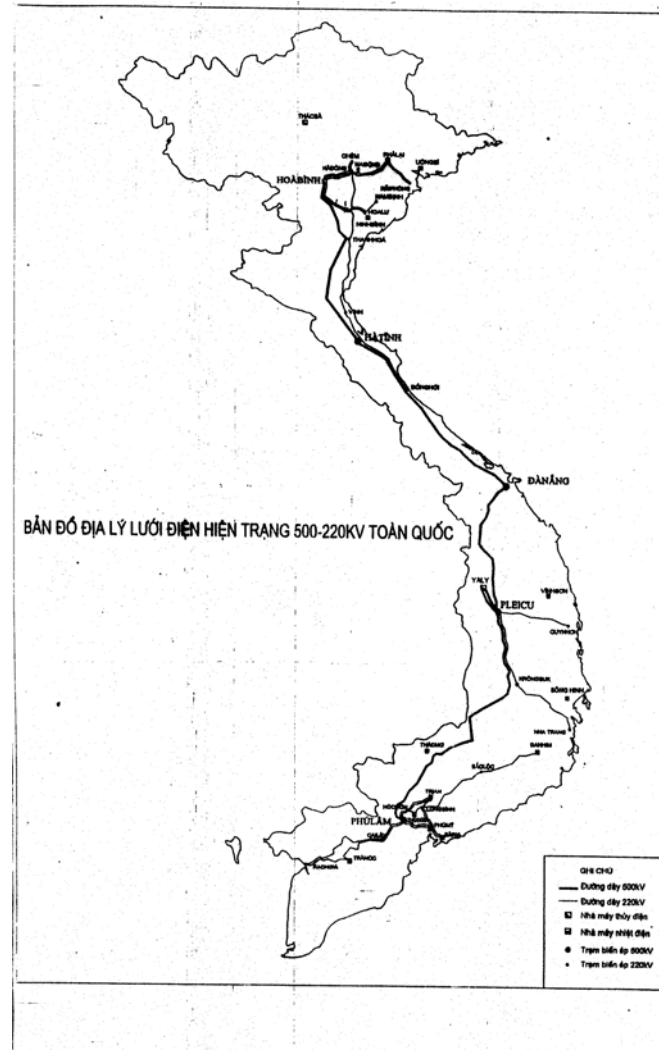


Table 3(cont.) Major Power Plants

Coal Fired			
1-UongBi	North	110	600
2-PhaLai I	North	440	2500
3-PhaLai II	North	600	3500
4-NinhBinh	North	100	500
Oil Fired			
5-ThuDuc	South	157	800
6-CanTho	South	33	200
Combine Cycle gas fired			
7-PhuMy I	South	1090	4500
8-PhuMy II-1	South	710	3500
9-BaRia	South	300	800



Existing Network 220-500kV





B-Cogeneration situation in Vietnam

1- Introduction

The cogeneration is one of the most preferable energy systems in order to utilize the limited resources of valuable fossil fuels in the most efficient manner.

The cogeneration systems, therefore, have been utilized for a long time, especially in EU. However in the past, the cogeneration systems were used mainly in power plants with extraction steam turbines or backpressure steam turbines. Last decades due to technology progresses, energy technology with high quality and low price, especially to gas turbine is available. The combination of gas turbine and extraction condensing steam turbine is the most promising cogeneration system.

Cogeneration systems have been used since sixties of last century in Vietnam.

- The Viettri power plant was built since 1960.
- The Vandien sugar factory was equipped in 1960.
- BaiBang paper factory has built since 1980
- The Cogido paper factory was built since 1959.



Classification of industrial cogeneration

Type 1- Cogen with Backpressure steam turbine

Type 2- Cogen with extraction condensing steam turbine

Type 3- Cogen with using discharged heat from gas turbine, diesel

Type 4- Cogen with combinecycles (GT/ST)

Type 5- Cogen with using discharged heat from cement metallurgy industries.



1-Cogeneration potential.

- Number of energy consumers with average daily electricity demand more than 500KW and average annual thermal demand more than 500 TOE is presented in the table 4.
- Sugar sector: There are about 40 big factories in Vietnam by estimated data of EC/ASEAN cogen programs- 1997, power potential of sugar factories is about 250MW, in near future it is expected to be bigger if the government plan of 2 millions sugar tons by 2005 is successful.
- Paper factories are big consumers of power and heat, but up to now there is no cogeneration system installed, except the Cogido paper mill, but it was damaged.
- The textile sector uses also a lot of energy in the kinds of electricity, heat, cooling. Many factories have installed diesels. This situation can create an adequate condition to use cogeneration system, but up to now there is no installed cogeneration system in these factories.



- Chemical factories, especially rubber factories are big electricity and thermal consumers with outdated technologies. There is still no factory practicing cogeneration.
- The food sector, especially due to tropical climate condition, consumes much power, thermal, cool. Technology renovations including the cogeneration are strongly recommended.
- In service sector, there are big power, thermal, cool consumers such as hotels, supermarkets, etc. They may be a cogeneration potential customers.
- Presently, a number of industrial zones are under planning stages (Haiphong, Quangninh, Dungquat, Camau etc.). The new thermal power plants are planned to be built to supply electricity and heat for these zones. Therefore, there is a good opportunity for cogeneration technology.

From the above analysis, we can expect a lot of key players in the cogeneration market.





Table 4- Intensive energy consumers in industrial sector by subsectors.

No	Subsector	Number of consumers with average daily power demand more than 500KW	Number of consumers with average annual thermal demand more than 500TOE
	All consumers	338	141
1	Electricity	-	-
2	Fuel production	6	-
3	Ferrous metallurgy	10	4
4	Non-ferrous metallurgy	4	4
5	Manufacture of machinery and equipment	24	8
6	Electric or electronic products	9	3
7	Other metal products	-	-



Table 4.Intensive Energy Consumers(Cont.)

8	Chemical products, fertilizers and rubber	24	18
9	Construction materials	38	48
10	Wood and wood products	8	-
11	Paper and paper products	6	15
12	Glass, earth ware and porcelain	1	8
13	Food processing	9	-
14	Food stuff	34	17
15	Textile products	21	16
16	Serving products	1	-
17	Leather and leather products	4	-
18	Printing	1	-
19	Other industries	38	-





3-Existing cogen systems in Vietnam

Table 5. Existing cogen systems

Name\Status	Year in operation and zone	Total capacity (kW)	Technology	Status Operating
1- Viettri power plant	1958 North	10.000	Coal fired boilers Backpressure and extraction condensing	No
2- Vandien sugar	1960 HaTay Pro.	2.000	boiler using bagass & backpressure steam turbine	No
3- BaiBang paper	1980 PhuTho Pro.	130.000	Wastes and coal fired boilers & extraction steam turbines	Yes
4- HaBac Fertilize	1966 Bacgiang Pro.	12.000	Coal fired boilers and extraction steam turbine	Yes
5- Cogido paper	1959 Dong Nai Pro.	9.100	Wastes and oil fired Back pressure	No
6- Lamson sugar	1995 ThanhHoa Pro.	9.750	Boiler using bagass 4 backpressure turbine	Yes
7- DaiLoan-ThanhHoa sugar	ThanhHoa Pro.	9.000	Backpressure turbine	Yes





Table 5(cont.)

8-Nong cong sugar	2000 ThanhHoa Pro	3.000	Boilers using bagass and backpressure	Yes
9- An-Anh Sugar	1999 QuyHop-NgheAn Pro	9.000	Boilers using bagass and turbines	Yes
10- QuangBinh sugar	QuangBinh Pro.	3.000	backpressure turbine	Yes
11- Bourbon sugar	1998 TayNinh Pro.	10.000	Boilers using bagass and turbines	Yes
12- CamRanh sugar	KhanhHoa Pro.	10.000	backpressure	Yes
13- BinhDuong sugar	BinhDuong Pro.	3.000	backpressure	Yes
14- HiepHoa sugar	BinhDuong Pro.	3.000	backpressure	Yes
15- Nagajuna LongAn sugar	LongAn Pro.	3.000	using bagass and backpressure	Yes
16- PhungHiep sugar	CanTho Pro.	3.000	backpressure	Yes
17- HaTien II Cement	2000 HaTien Pro.	3.000	HRSG and steam turbine	Yes
18- CORA supermarket	1998 DongNai Pro.	1.500		Yes



Remark on cogen situation

- Cogeneration technology was introduced into Vietnam early, but has been developed very slowly, due to the out of dated technology, lack of manpower and finance.
- Due to the technology progress, cogeneration technology attracts the business circle and the interest in cogeneration investment is increasing. But there are still only few projects realized. There is a need to improve the awareness and to develop manpower.
- Cogen potential in Vietnam industries is relatively large. There a need of adequate strategy and roadmap for the realization of that potential.



4- Energy pricing.

- **Electricity price**

- + Will step by step be determined by long term marginal cost.

- + Improving the existing electricity tariff structure.

- **Coal price**

- + Coal price is relatively corrected by other fuels in country.

- + Coal price will be step by step corrected by market mechanics.

- **Oil and oil products** prices are determined by international oil prices.

- **Gas price** is mainly determined by negotiation



5- Legistration in Energy sector.

a) *Legislation in Power Sector*

Currently activities in the Vietnam power sector are regulated by Government Decree No 80-HDBT **Regulations on Electricity Supply and Utilization** issued in 1983. Electricity of Vietnam (a state corporation) is only electricity service provider

The restructre last time made state management and business operation roles separated. The Ministry of Industry (MOI) is currently in charge of management. Electricity of Vietnam is in charge of production. Independent power producers (IPP) and BOT projects are now allowed.

The 1983 Decree is needed to e updated now, From 1996 the MOI began to prepare an Electricity Law for Vietnam. This new law is at present in its 14th draft. The National Assemble is going to approve it by 2003.

b) *Legislation in Coal Sector*

Coal sector is regulated the Mineral Law, issued on 20-3-1996.

The Mineral Law has institutionalized economical development and in line with market mechanism, with the prime objective to strengthen management role and efficient use of mineral resources.





c) Legislation in Oil and Gas Sector

Activities of oil and gas industry are based on Petroleum Law, issued by 1993 and Guideline Decree issued in 1996. However, some issues are still not well defined such as resources tax, export-import tax, income tax, bidding process. To tackle these issues, Petroleum Law was amended and approved by Government in September 2000.

d) The Environment Protection Law.

The Law of Environment Protection issued by National Assembly on 27th December 1993. The main features are:

- Definition of the responsibility of organizations and personals for the environmental protection.
- Issuance of the system of norms and standarts.

e) National Energy Policy

In 1996-2000, Vietnam carried out the National Science Technology Program-Building strategy and policy of sustainable energy development for period of 2001-2020 . Main target of program is to create scientific bases for National Energy Policy. The Steering Committee was designed by the government and headed by Ministry of Planning and Investment