

Consultation on MRC's Hydropower Programme
Vientiane, Lao PDR, 25-26 September 2008

**Meeting rapid electricity demand
growth**

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Viet Nam

V I E T N A M



Official country name: The Socialist Republic of Vietnam

National Day: 2 September

Capital: Hanoi

Area: 331,689 square km

General Information

- Viet Nam has an area of 331,689 km² and 3,260 km coastline. It has territorial waters with an area approximately three times larger than its mainland territory
- In 2005, Viet Nam had a population of 84.4 million.
- Market-oriented reforms since 1986; GDP grew at an average annual rate of 7.9 % over period of 1991-2005.
- Viet Nam is endowed with diverse primary energy resources: Proven reserves of Coal are 3.88 bil.tons (potential 37 bil.tons), Oil - 615-957 mil.tons (potential 2.3 bil.tons), Gas - 600 bil.m³ (potential 1,300 bil.m³). Hydropower potential: 60-80 bil.kWh. Renewable energy and Uranium.

National Economy in 2007

- In 2007 the national economy has continued to develop steadily, reaching a 10-year record high of 8.5 %. The agro-forestry and fishery sector has achieved an increase of 3.5 %, the construction and industrial sector (10.6 %), and the services sector (8.7 %).
- Total social investment capital was estimated at VND464.5 trillion, representing an increase of 16.4 % from last year and making up 40.6 % of total GDP. Of the total amount, the population and private sector has made up 34.4 % (up 19.5 %) and the foreign direct investment sector 16.5 % (up 17.1 %).
- Progress has also been made in social affairs, especially in poverty reduction to catch up with the implementation of other millennium development goals. The rate of poor households has dropped to 14.7 %, lower than the set target of 16 %.
- The high consumer price index has affected business production and people's daily lives

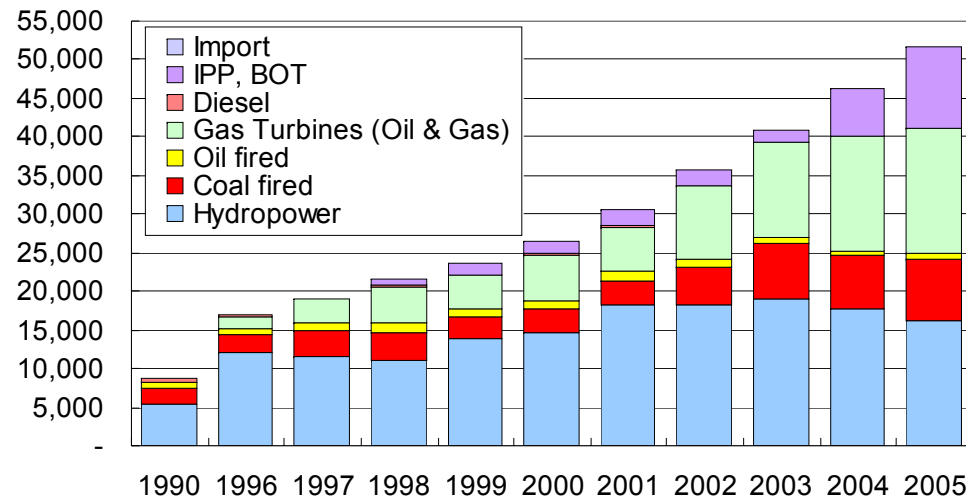
The Socio-Economic Development Plan 2006-2010

Assembly of SR of Viet Nam Resolution No. 56/2006/QH11 dated June 29, 2006:

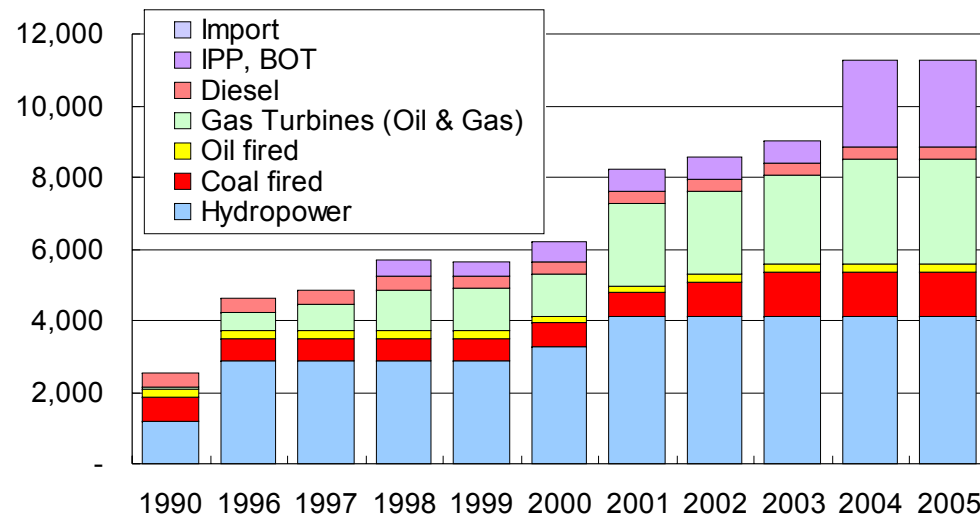
- The economic development: The economic size in 2010 shall expand up to 2.1 times or more of 2000 and the per capita GDP shall increase to 1,050-1,100 dollars.
- Economic growth rate (2006-2010 years) : 7.5-8.0% (Agriculture 3.0-3.2%, Industry 9.5-10.2% and Service 7.7-8.2%)
- Share of GDP: Agriculture about 15-16%, Industry 43-44%, and Service 40-41%
- Foreign Direct Investment (FDI): 24 billion dollars

Power Generation and Installed Capacity Mix by Source in 2005

**Power Generation
Mix by Source
(bil.kWh)**



**Installed Capacity
(MW)**



Power Sector in 2006-2007

- **In 2006**, the total installed capacity operated by EVN and IPPs were 9,544 MW and 2,726 MW respectively, making a total of 12,270 MW, from which 37.5 % hydropower, 11.8 % thermal power (coal and oil-fired), 26.6 % gas turbine and 22.2 % non-EVN.
- The generation output was **58,914 bil. kWh**, of which hydropower generation 32.4 %, coal-fired & oil-fired 16.0 %, gas turbine 30.4 % and non-EVN 21.1 %.
- The National Power Grid has reached all of cities and provinces. The total length and capacity of 500 kV network was 3,286 km and 6,600 MVA, respectively. The figures for 220 kV network was 5,650 km and 15,923 MVA. The 110 kV network has covered with the length of 11,053 km and the capacity of 20,656 MVA.
- **In 2007** estimated total electricity production of EVN was **67,121 bil. kWh**, 13,7% higher that was in 2006 of which electricity bought from BOT and IPP was 19,338 bil. kWh, increased by 54,1%. EVN sold 58 billion kWh of electricity , an increase of 1.2 % over the yearly target and 13.4 per cent over 2006. The electricity sales helped bring in total revenue of US\$3.5 billion, up 22 %. Electricity consumed by production and household sectors was about 58,19 bil. kWh, of which consumption by industry sector increased by 17,5%.

Orientation for Energy Sector Development

- To enhance the exploratory and exploration activities to raise the recoverable reserves of primary resources
- To sufficiently supply primary energy to meet the rapidly growing demand in the future. It is estimated that the national energy demand over the next periods is 47.5-49.5 millions TOE by 2010, 110-120 million TOE by 2025 and 310-320 million TOE by 2050.
- To give high priority to new and renewable development. The target is that new and renewable energy in total primary commercial energy is projected to make up 3% (equates to 1.4 million TOE) by 2010, 8% (i.e. 9.02 million TOE) by 2025 and 11% (i.e. 35 million TOE) by 2050.
- To use energy efficiently, reduce elasticity (energy demand/GDP) from averagely 1.46 at present to 1.0 and 0.8 by 2015, 2025 respectively.
- To ensure financial balance and viability and diversify forms of investment in developing the energy sector. Continues to issue policy that uphold justice and fairness for doing business and investing, to encouraging every economic sector and stakeholder to participate in the sector development and prosperity.

Domestic Primary Energy Supply

Primary Energy Supply: By 2010, about 47.5-49.5 million TOE and by 2020, about 91-100 million TOE, of which

Hydropower:

- About 35 billion kWh of hydropower in 2010, 60-65 billion kWh in 2020, and 70-80 billion kWh after 2020.

Coal production:

- Coal production will reach 35-40 million tons in 2010, 50-60 million tons in 2010, in which a portion is exploited in Khoai Chau (Hung Yen province), and coal production will be increased to 200 million tons in 2050.

Oil and Gas:

- The oil and gas production in the period 2006-2010 is about 25-30 million tons/year; 31-34 million tons/year in 2011-2015 and about 34-35 million tons/year in 2016-2015.

Nuclear energy:

The Government of Viet Nam has issued “Long term strategy on peaceful utilization of nuclear energy until 2020” as a Prime Minister Decision in January

2006, No.01/2006/QĐ-TTg, to start operation of the 1st plant by 2020

- **Renewable electricity:** the share of renewable electricity in power generation companies: 3 % in 2010, 5 % in 2020 and 10 % in 2040.

Master Plan for Power Development

The Master Plan for Nation Power Development during 2006-2015 with prospect to 2025 (MP No. VI), Decision No. 110/2007/QD-TTg dated 18-7-2007.

- Meet the demand by socio-economic development of the country with annual GPD of approximately 8.5%-9% and higher during 2006-2010, the forecast of annual load demand growth rate at 17% (base scenario), 20% (high scenario) during 2006-2015, in which high scenario is defined to be scenario for management, the scenario of 22% annual growth rate is for unexpected growth.
- **Tariff to toward the market direction and to encourage the local and foreign investors to invest on power generation projects.**
- Implement rural electrification, try to achieve 95% communes electrified by 2010 and 100% by 2015.
- *National Steering Committee for MP VI was established in 2007: with a Deputy Prime Minister as Chairman and Minister of Industry and Trade as Vice Chairman.*
- ***Viet Nam will become a Net Energy Importing Country around 2015***

Power Generation in MP No.VI

- Construct hydro power plants of integrated benefits such as: flood prevention, water supply, power production; the gas power shall be reasonably developed to ensure the efficiency; coal fired power plant development shall be intensified; small hydro power plants and new and renewable energy shall be developed for remote, mountainous, bordering and island areas;
- Ensure national energy security and sustainable development, effective exchange of power with countries in the region;
- Complete preparation for investment of nuclear power plant and submit to the PM for approval.
- Properly develop Power centers in various region of the country to ensure the reliable supply of power locally and reduce the technical power loss in the national Grid as well as to ensure the economic efficiency of the projects, as contribution to the socio-economic development for each region in particular and for the whole country in general.
- Develop new power sources taking in to account those options of in-depth investment and renovation of technology in existing power plants; environment requirements; apply modern technology for new power plants.

BOO, IPP Projects in 2006-2015

- Follow types of investments specified by the government; MOIT defines the reasonable ratio of projects under BOT, BOO scheme (about 50% of the total new generation capacity)

Some notable projects to be developed and called for investment under BOO or BOT planned for 2006-2015

- Son My thermal power plant (TPP) in Binh Thuan province. Total installed capacity: 2400MW. Son My 1-4 with commercial operation date (COD) from 2012 to 2015 respectively.
- Nghi Son II TPP in Thanh Hoa province. Capacity: 1200MW. To be COD from 2012 to 2013. Calling for bid.
- O Mon II combined cycle power plant (CCPP). Capacity: 750MW. To be COD by 2013.
- Kien Luong TPP. Units to be COD from 2013 (1200MW) to 2016 (1200MW-2000MW).
- Mong Duong 1000MW.

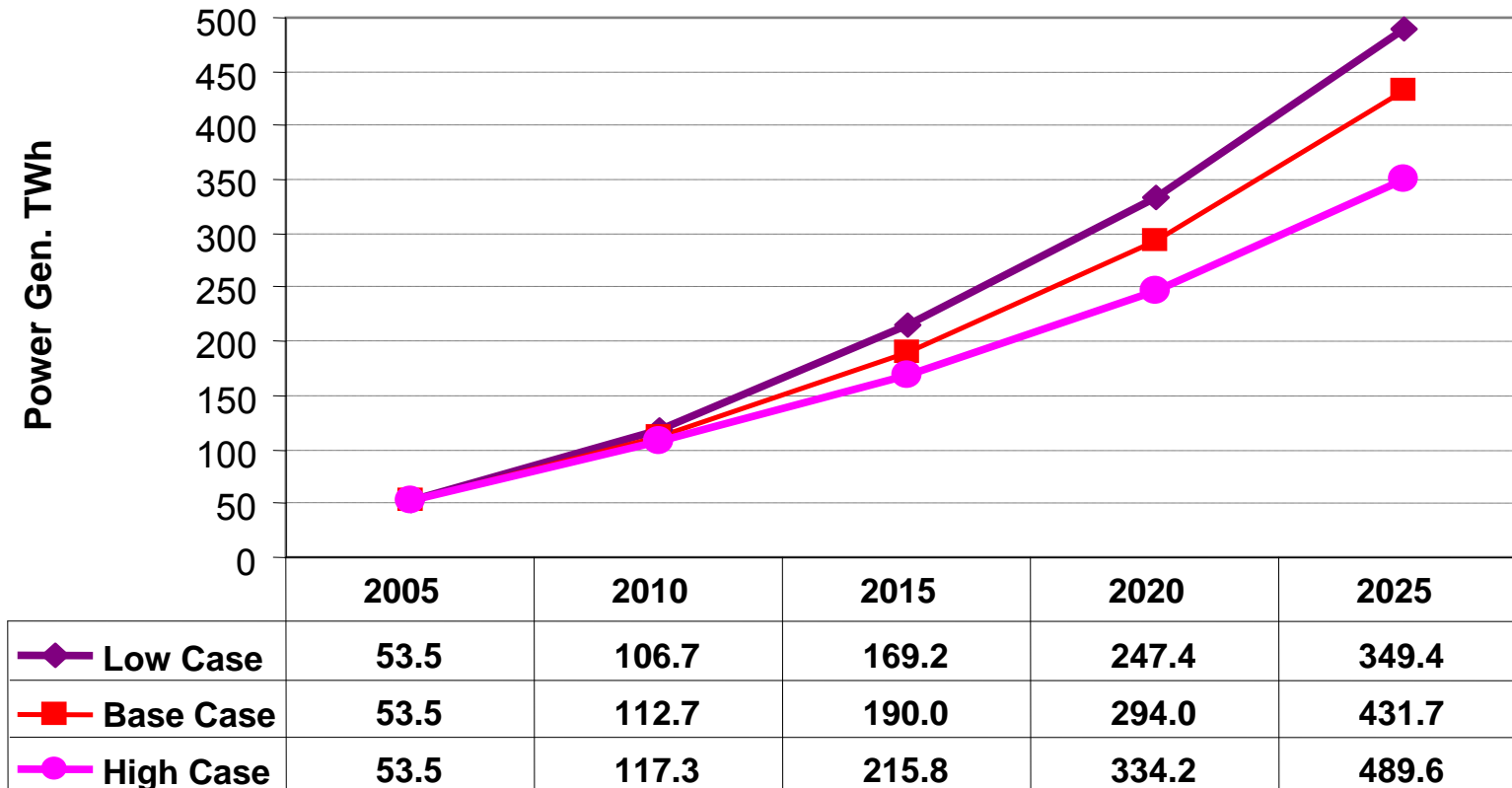
Southern CCPP. Installed capacity: 750MW. To be COD by 2014.

Over the 2006 to 2010 period, an investment of over 16 billion USD is needed for the development of new projects in EVN and BOO,IPP projects of which around 44 new power generation projects.

Mater Plan for Viet Nam Power Sector Development (MP VI)

Category	Unit	2005	2010	2020
Electricity				
Generation	TWh	53.4	113.0	294.0
Peak Load	MW	9,255	20,000	50,000
Installed Capacity	MW	11,577	27,000	62,000
500kV	km	3,179	5,000	9,000
	MVA	7,300	11,500	37,500
220kV	km	5,025	11,000	17,000
	MVA	14,765	32,000	86,000
110kV	km	10,290	20,000	-
	MVA	21,100	40,000	-

ELECTRICITY DEMAND FORECAST



Power Grid Development

Items	Unit	By the year				
		2005	2010	2015	2020	2025
500kV Substations	Sub./MVA	10/6150	20/11850	25/21900	41/39150	49/54900
500kV lines	km	3249	4823	6661	9210	12170
220kV Substations	Sub./MVA	60/15068	120/32318	165/57191	233/90066	271/126127
220kV lines	km	5272	11484	15138	17442	19033
110kV Substations	Sub./MVA	530/21097	854/41270	1076/65700		
110kV lines	km	10290	19188	22949		

- Develop power transmission and distribution network in consistent with power plants development.

- Modernize and the gradual develop underground network in cities, towns in mitigating the adverse impacts to the landscape and environment.

- Mitigate power loss: target of transmission and distribution losses is set at 8-9% in 2010.

Potential Interconnection with Neighbour Countries

- With China
- Honghe–Lao Cai, Van Son-Ha Giang and Dong Hung-Mong Cai: 110kV (existing)
- Yunnan-Lao Cai: 220kV (2007) Yunan—Soc Son: 500kV (~ 2010 - 2015)
Total ~ 2,000 – 2500MW up to 2020
- With Cambodia
- Chau Doc–Phnom Penh: 230kV, 2000
- Tay Ninh-Cong Pong Cham 110kV, 2008 - 2010.
Lower Srepok: 230kV, 2016
Total ~800MW - 1500MW up to 2020
- With Laos
- Sekaman 3 (250MW): 220kV; 2010
- Pleiku – Ban Sok: 500kV; 180km; after 2011
- And others
Total ~ 5000MW up to 2020

Viet Nam has signed and ratified, in Dec.2007, MOU on the ASEAN Power Grid and Power Interconnection.

National Strategic Program on energy saving & effective use

Decision No.79/2006/QD-TTg on 14-4-2006 for 2006 – 2015

Targets:

- Saving 3 - 5% for the period of 2006-2010 and 5 - 8% for the period of 2011-2015
- Establishing models for energy management
- Populating high-efficiency equipment
- Implementation Building code (MOC)
- Energy Efficiency use in Transport Sector
- Complete national regulatory frameworks to EE&C (Energy Conservation Law, Financial Incentives, reasonable energy prices...) and details implementation plan.
- Awareness rising and capacity building at government, public, and private sector levels is very important in order to “create a demand” for energy efficiency and to the fast development of EE&C.
- Experience sharing is a key issue in energy efficiency and conservation implementation, receiving key information and technical assistant such as “the best practices in energy efficiency and conservation” from more advanced countries like Japan, EU, ASEAN.
- **Drafting Law on Energy Saving & Effective Use**

Electricity Saving Program

Decision No.80/2006/QD-TTg for 2006-2010

Target:

- Raise the community's awareness of electricity saving and effective use.
- Ensure the electricity saving and effective use, security and stability electricity supply.

General activities:

- Increasing public awareness
- Encouraging electricity efficiency in generation, transmission, distribution and end-user (government offices: saving at least 10% of yearly electrical consumption).
- Energy controlling model for energy saving for at least 40% key enterprises who consume much energy
- The consecutive 3-shift working plan among industrial enterprises which have P_{max}/P_{min} greater than 2.5 times,
 - *DSM: encourage using of electricity in off-peak hours (22-4). In the case of power tariff for industrial use (more than 110 kV), tariff of peak hours is three times larger than off peak hours (excluding VAT).*
 - *Instruction No.19/2005/CT-TTg dated 2/6/2005 by the PM on Power Saving.*

Power Sector Reform

Electricity Law effected on 01 July 2005

- To develop a models power market suitable to the socio-economic conditions of Viet Nam on the principles of transparency and competition to achieve economic efficiency, to encourage competition between units operating in energy field, facilitating favourable conditions for energy enterprises to attract local and foreign financial resources, fast and sustainable development of energy sector.
- MOIT is entrusted with the responsibility of establishing a competitive power market for Viet Nam.
- In October 2005 Electricity Regulatory Authority of Viet Nam (ERAV) was established. ERAV's main function is to assist the Minister of Industry in implementing regulatory activities in the electricity sector and contribute to a market that is safe, stable, and provides a high-quality supply of electricity; the economical and efficient consumption of electricity; and upholding of equity, and transparency of the sector in compliance with the law.

EVN established as a Group with operation mechanism of mother-daughter Companies by Decision No.148/2006/QĐ-TTg dated 22-6-2006 and its Charter was approved by Prime Minister by Decision 163/2007/QĐ-TTg on 22/10/2007.

Viet Nam Power Market

Main Power Producers/Players in Viet Nam Power Market

- 1- Viet Nam Electricity (EVN),
- 2- Petrovietnam Power Company (PVN Power),
- 3- Viet Nam National Coal and Mineral Industries Group (Vinacomin),
- 3- Song Da Company,
- 4- Foreign and Domestic IPP/BOT companies

EVN: the largest, state owned, power group assigned by Viet Nam Government to

Take major role in ensuring the stable, safe power supply for the socio-economic development. Implement the investments in developing consistent power network projects in order to improve the investment efficiency; investments in power generation projects within its mandate.

- Focus on studies and calculations for site master plans, detailed master plans for coal fired thermal power centers to submit to MOI for approval.
- Take lead in constructing infrastructure projects of coal fired thermal power centers which EVN has partial or entire investment for the power generation projects.

Establishing full competitive power market in Viet Nam could be completed by the year of 2020

Power Sector Reform

Renovation of management and improvement of efficiency in power operations:

- Promotion of administration reform; separating state management functions from the production - business management functions
- The exclusion of State monopoly through implementing pilot equitization and expansion of equitization of energy enterprises. There will be suitable mechanisms for attracting the investors, especially foreigners to buy the equities of energy projects.
- The government shall hold 100% legal capital in those enterprises doing business in transmission of national grid and in large scale power production which have essential significance in socio-economics, national defense and security.
- The government shall hold over 50% equity in those enterprises who play the role in ensuring the significant balancing of the economy, regulating the market in power production operations.

The equalization of EVN's subsidiaries shall be implemented strictly and with proper steps

Speed up Power Market Formulation

- Establishment of the National Electricity Transmission Corporation, a holding company formed by the re-arrangement of the electricity transmission companies 1, 2, 3, 4, is a one-member limited company with 100 percent of the legal capital owned by EVN, on 1 July 2008. Under considering to be separated it from EVN.
- Strengthen co-ordination between project investors and EVN in negotiating and signing power purchase agreements and finalising system regulations.
- Power tariff reform.
- Adding to the revised the Master Plan No.VI new Power Centres : Vinh Tan, Tra Vinh, Soc Trang, Thai Binh, Hai Duong, Nghe An, Phu Tho, Lang Son, Quang Ninh, Thanh Hoa, Thai Nguyen with more IPP/BOT components

Electric Power Price

The electricity prices shall be so determined that

- Investors will get reasonable profits, saving energy resources, using renewable energies which don't make environmental pollution, contributing in socio-economic development, especially in rural, mountainous and island areas;
- Encouraging saving electricity and electricity efficiency;
- Implementing reasonable cross price subsidy between customer classes.
Reducing and towards eliminating the cross price subsidy between production costs and electricity prices in residential sector, contributing in promotion of production and increasing competition of the enterprises
- Ensuring self determination rights on electricity buying and selling prices within the tariff schedules specified by the State for sellers and buyers in the electricity market.
- Ensuring legal rights and benefits of electricity units and electricity users.

Decision 276/2006/QĐ-TTg dated 4/12/2006 by the PM on tariff shall be continued. Electricity tariff reform, in 2007-2010, is considered as the main method of the funding now. Step by step adjust electricity tariff in order to obtain long-run marginal costs to ensure sustainable development of the sector :

- *1-7-2008, average retail tariff shall be 890 đ/kWh (postponed to approve due to high inflation in 2008)*
- *From 2010, retail tariff shall be based on market price.*

Prices of IPPs shall be based on negotiation/agreement but shall not be 25% higher/lower than the approved tariff frame.