

M-POWER



Acknowledgements

The Expert Team expresses its thanks to Dr. Pham Khanh Toan, General Director of the Energy Institute and Mr. Tran Hong Quan, Department of Energy, Ministry of Industry and Trade (MOIT), and Dr. Pham Xuan Su, President of the Vietnam Commission on Irrigation and Drainage (VNCID) for providing the Team with valuable documents, information and advice. The Expert Team also expresses its sincerest thanks to the individuals and experts from departments within MOIT, Ministry of Natural Resources and Environment (MONRE), and Ministry of Agriculture and Rural Development (MARD). Our high appreciation also goes to other key experts from various organizations who have actively participated in the consultation process and provided the Team with valuable contributions and advice.

The Expert Team acknowledges the support of the Challenge Program on Water and Food (CPWF) and the M-POWER governance network for this study. The Team highly appreciated Mr. John Dore, Water Adviser, AusAID, Dr. Tira Foran, and Dr. Helen Locher for providing important guidelines to the development of the report. Especially, the Team would like to express its high appreciation to Ms. Kate Lazarus and Mr. Sokhem Pech, of M-POWER and CPWF for their support to finalize this Report.

Authors

The authors can be reached at the contact addresses below:

Dao Trong Tu

Centre for Sustainable Water Resources Development and
Climate Change Adaptation (CEWAREC), Hanoi, Vietnam
tudaotrong49@yahoo.com.vn

Le Thi Thuy Quynh

Vietnam Electricity (EVN), Hanoi, Vietnam
quynhltn@evn.com.vn

Pham Quang Tu

Consultancy on Development (CODE), Hanoi, Vietnam
pqtu@codeinter.org

Bach Tan Sinh

National Institute for Science and Technology Policy and
Strategic Studies (NISTPASS), Ministry of Science and
Technology, Hanoi, Vietnam
sinhbt@gmail.com

Cover photos

Nga Dao

Disclaimer

This report solely reflects the viewpoints of the independent experts. It in no way reflects the opinions of the organizations where the experts are working or of any other organization.

TABLE OF CONTENTS

APPENDICES	ii
TABLES	iii
FIGURES	iii
ACRONYMS	iv
EXECUTIVE SUMMARY	vi
1.0 INTRODUCTION AND BACKGROUND	1
1.1 ABOUT THE PROJECT AND ASSESSMENT	1
1.1.1 Assessment Participants	2
1.2 OBJECTIVES OF THE ASSESSMENT	3
1.3 METHODOLOGY OF ASSESSMENT	3
1.4 SCOPE AND CONTEXT OF THE ASSESSMENT	3
1.5 COUNTRY WATER RESOURCES, ENERGY AND HYDROPOWER DEVELOPMENT CONTEXT	5
1.5.1 Country water resources	5
1.5.2 Country's Energy and Hydropower Development	6
1.5.3 Legal framework for energy and hydropower development in Vietnam.....	7
2.0 DISCUSSION OF RESULTS: RAPID SUSTAINABILITY ASSESSMENT OF MEKONG ELECTRICITY PLANNING IN VIET NAM	9
2.1 DEMONSTRATED NEED	9
2.1.1 Assessment	10
2.1.2 Management	14
2.1.3 Consultation	15
2.1.4 Stakeholder support	15
2.1.5 Conformance with the Plan	16
2.1.6 Effectiveness.....	16
2.2 OPTIONS ASSESSMENT	16
2.2.1 Assessment	17
2.2.2 Management	19
2.2.3 Consultation	19
2.2.4 Stakeholder support	19
2.2.5 Conformance with plan	19
2.2.6 Compliance	19
2.2.7 Effectiveness.....	19
2.3 REGIONAL AND NATIONAL POLICIES AND PLANS ASPECT	19
2.3.1 Assessment	20
2.3.2 Management	23
2.3.3 Consultation	24
2.3.4 Stakeholder Support.....	24
2.3.5 Conformance with plan	24
2.3.6 Compliance	24
2.3.7 Effectiveness.....	24
2.4 INSTITUTIONAL CAPACITY	24
2.4.1 Assessment	25
2.4.2 Management	26
2.4.3 Consultation	26

2.4.4	Support of Stakeholders.....	26
2.4.5	Compliance.....	26
2.4.6	Conformance with Plan.....	26
2.4.7	Effectiveness.....	26
2.5	POLITICAL ISSUES AND RISK.....	27
2.5.1	Assessment.....	27
2.5.2	Management.....	28
2.5.3	Consultation.....	28
2.5.4	Support of Stakeholders.....	28
2.5.5	Compliance.....	28
2.5.6	Conformance with plans.....	28
2.5.7	Effectiveness.....	28
2.6	TECHNICAL ISSUES AND RISKS.....	29
2.7	ENVIRONMENTAL ISSUE & RISK ASPECT.....	29
2.7.1	Assessment.....	30
2.7.2	Management.....	30
2.7.3	Consultation.....	31
2.7.4	Stakeholders support.....	32
2.7.5	Compliance.....	32
2.7.6	Conformance with plans.....	32
2.7.7	Effectiveness.....	32
2.8	SOCIAL ISSUES AND RISKS.....	33
2.8.1	Assessment.....	33
2.8.2	Management.....	34
2.8.3	Consultation.....	34
2.8.4	Stakeholder support.....	34
2.8.5	Compliance.....	35
2.8.6	Conformance with Plan.....	35
2.8.7	Effectiveness.....	35
2.9	ECONOMIC & FINANCIAL ISSUES & RISKS.....	36
2.9.1	Quality of Assessment.....	36
2.9.2	Management.....	37
2.9.3	Consultation.....	37
2.9.4	Stakeholder Support.....	37
2.9.5	Compliance.....	37
2.9.6	Conformance with Plans.....	37
2.9.7	Effectiveness.....	37
3.0	CONCLUSION OF RAPID ASSESSMENT.....	37
4.0	EXPERIENCE WITH APPLICATION OF 2009 DRAFT HYDROPOWER SUSTAINABILITY ASSESSMENT PROTOCOL.....	38
5.0	REFERENCES.....	39
 APPENDICES		
Appendix A1	Assessment Team.....	41
Appendix A2	Water/Energy in Viet Nam.....	42

TABLES

Table 1.1	Section 1: Strategic Assessment Aspects, Attributes and Sub-Attributes	4
Table 3.1	Summary table of overall outcomes of the assessment	38

FIGURES

Figure 1.1	Power composition and power plants in Vietnam.....	6
Figure 1.2	Legal framework for energy and hydropower development in Vietnam.....	7
Figure 2.1	Demonstrated Need	10
Figure 2.2	Options assessment.....	17
Figure 2.3	Regional and National policies and plan aspect.	20
Figure 2.4	Institutional Capacity Aspect	25
Figure 2.5	Political issues and risks.....	27
Figure 2.6	Environmental issues and risks	30
Figure 2.7.	Social issues and risks	33
Figure 2.8	Economic and Financial Issues and Risk	36

ACRONYMS

ADB	Asian Development Bank
AFD	Agence Francaise de Developpement
ASEAN	The Association of Southeast Asian Nations
AusAID	Australian Agency for International Development
CDM	Clean Development Mechanism
CODE	Consultancy on Development
CPWF	Challenge Program on Water and Food
CRES	Centre for Natural Resources and Environmental Studies
CSOs	Civil Society Organizations (NGOs, Academia, and community based organizations)
DSM	Demand-side management
EIA	Environmental Impact Assessment
EVN	Electricity of Vietnam or Electricite du Vietnam
GDP	Gross Domestic Products
GMS	Greater Mekong Sub-region
GoV	Government of Vietnam
GWh	Giga-watt-hour (= million kilowatt-hour)
HSAF	Hydropower Sustainability Assessment Forum
HSAP	Hydropower Sustainability Assessment Protocol
ICEM	International Centre for Environmental Management
IE	Institute of Energy
IHA	International Hydropower Association
JICA	Japanese International Cooperation Agency
kWh	Kilowatt hour
Lao PDR	Lao People's Democratic Republic
LWR	Law on Water Resources (Vietnam)
MARD	Ministry of Agriculture and Rural Development
MDG	Millennium Development Goals
MOC	Ministry of Construction
M-POWER	Mekong Program on Water, Environment and Resilience
MONRE	Ministry of Natural Resources and Environment
MOIT	Ministry of Industry and Trade
MRC	Mekong River Commission
MSPs	Multi-stakeholder Platforms
MW	Megawatt
NGOs	Non-Governmental Organizations
NHP	National Hydropower Planning
NMP	National Electricity Master Plan

ODA	Overseas Development Assistance
PanNature	People and Nature Reconciliation
PDP V	Master Power Development Plan No. V 2001 (Vietnam)
PDP VI	Master Power Development Plan No. VI -2005 (Vietnam)
PECC	Power Engineering Consulting Joint Stock Company
SEA	Strategic Environmental Assessment
SEI	Stockholm Environment Institute
TNC	The Nature Conservancy
VNWP	Vietnam Water Partnership
VNCID	Vietnam Commission on Irrigation and Drainage
VND	Vietnamese Dong (national currency of Viet Nam)
VUSTA	Vietnam Union of Science and Technology Associations
WB	The World Bank Group
WCD	World Commission on Dams
WWF	World Wildlife Fund

EXECUTIVE SUMMARY

The Draft Hydropower Sustainability Assessment Protocol (HSAP) was first introduced in Vietnam at the National Consultant Workshop organized by Vietnam Water Partnership (VNWP) in November 2009. Although the structure of HSAP is relatively complex and new to Vietnam, the participants (from Government agencies, experts, investors, and Vietnamese and international civil society organizations) had the impression that the HSAP has the potential to be a useful tool for participatory assessment of the sustainability of a hydropower project and broader planning.

With the assistance of the M-POWER (Mekong Program on Water, Environment and Resilience), a national group of experts in multiple disciplines from government agencies, national organisations and NGOs was mobilized to conduct a rapid sustainability assessment of the energy and hydropower development policy and plan in Vietnam. Section I of the draft HSAP 2009 was used as an assessment tool. The assessment focused on the quality of the process of developing and implementing the strategic development of the electricity sector in general and hydropower development of Vietnam in particular.

Even though the rapid assessment framework of HSAP was quite new to the Assessment Team and the assessment subjects are broad, the Team and participants in this trial learned positive and negative lessons that can serve as a basis for future assessment exercises to enable deeper and more comprehensive assessment.

The assessment report includes four major parts: 1) Introduction and background, 2) Water and hydropower development in Vietnam; 3) Rapid assessment - process and discussion of results; and 4) Lessons learned from the assessment and recommendations for draft HSAP 2009.

The situation of power development and hydropower in Vietnam in the last two decades

Over the last two decades, Vietnam has achieved rapid economic development. The average growth rate of GDP has continually risen over the past 10 years from 6% in the 1990s to 7.4% in the 2000s. The population also rapidly increased from 66 million people to 87 million people in 2009 (Office of Statistics, Annual Statistics of Vietnam, 2009). With increased economic development and population growth, the need for power is also rapidly increasing. Annual power demand growth rate is projected to range from 10% to 12%. Hydropower has been identified as an important potential contributor to the national grid and its development has been encouraged by the Government of Vietnam (Law on Water Resources, 1998, Article 29).

The 2004 Electricity Law encourages all economic sectors to invest in power sources while the State monopolizes the transmission and regulation of the national electricity network, construction and operation of large hydropower plants (Law on Electric Power, 2004, Art. 4). The development of power nationally is directed by the National Master Plan for Power Development (PDP), updated every five years.

Water resources, energy and hydropower development in Vietnam

Vietnam's climate ranges from sub-humid in the extreme north to sub-tropical in the remaining areas. The average rainfall is 1,600 mm and changes by region from 700

mm to 4,000 mm. Vietnam has 2,360 river basins having lengths of more than 10km each. Of these, 13 have catchment areas over 10,000 km². All of them are either trans-provincial and/or transnational. Total surface water volume of Vietnam is 830-840 billion m³ per annum, however only 310-315 billion m³ or 37% is formed internally in Vietnam. The balance of 520-525 billion m³ (63% of total water volume) comes into Vietnam from other countries (MONRE, 2006). Water resources in river basins (both surface and groundwater) play an important role in socio-economic development and environment protection (MONRE, 2006)

With the high demand for electricity to enable socio-economic development, the Government of Vietnam launched a Master Power Development Plan No. VI -2005 (PDP VI) to develop energy potential to meet the growing demand. Hydropower is seen as one of the main renewable sources to be exploited to bring high benefits to the country. PDP VI proposes initiating planning for 26 big hydropower plants in the period 2006-2015, with construction to be carried out over a 20 year period (IE, 2007).

Hydropower development faces a lot of challenges including how to redress the domination by the energy sector and monopoly state power producers and distributors to ensure involvement of all stakeholders as early as possible. In many cases, the construction of hydropower facilities has not carefully considered the impacts on the environment, ecosystems and human livelihoods.

Rapid Sustainable Assessment for Hydropower Development strategies and planning in Vietnam, using Section I of HSAP 2009

Sustainable Assessment of Vietnam's Electricity Planning uses Section I of HSAP 2009 to focus on assessing the quality of the process and implementation of PDP VI and other related plans in Vietnam. The key findings from the assessment of all relevant aspects are summarized as follows:

- Vietnam has a quite good legal framework and procedures for electricity and hydropower development. The National Power Development Plan (PDP) is revised every 5 years in order to update and balance energy production and demand. Over the last two decades the country has been focusing on maximizing potential of hydropower development and diversification of other energy sources.
- This study's results show good scores in 4 aspects, namely i) demonstrated need, ii) options assessment, iii) policies and planning; and, iv) institutional capacity. Lower scores were given to environmental issues and risk, social issues and risk, and the economic and financial risk aspects. This reflects the traditional way of making plans that are focused more on technical aspects of "energy" planning rather than other related issues such social, environment and financial and economic risk assessments. This also explains why the scores of the process attributes are slightly higher than the scores of the performance attributes
- In most aspects, the scores for assessment and management attributes are slightly higher than consultation and stakeholder support attributes. Again, this reflects the traditional way of undertaking planning, where tasks are mostly done by some governmental organisations with limited consultation of relevant stakeholders.

1.0 INTRODUCTION AND BACKGROUND

Vietnam is a developing country under transition towards a more developed economy. Vietnam has committed itself to meet the national Millennium Development Goals (MDG) in terms of socio-economic development, poverty reduction and improvement of the environment.

The average GDP growth rate of Vietnam during the 1990s was 6% and 7.4% during 2000s. In order to meet growing demands of socio-economic development, the Government of Vietnam (GoV) decided that the energy sector has to take on a leading role (GoV, 2004). Due to the Government's energy development strategy, policies and incentives, the energy sector has the most impressive growth rate of all sectors. Hydropower is now contributing about 33% of the total national energy production (EVN, 2008). During the last two decades, more than one thousand hydropower plants of different scales have been planned and/or built throughout the river systems of the country (MOIT, 2010). Hydropower is now attracting many public and private investors in Vietnam.

Besides contributions to meet the growing energy demand in the country, the rapid development of hydropower in Vietnam with high dams and large reservoirs, externalize a wide range of impacts at different levels to the environment and ecosystems, which has raised major concerns for society. Potential impacts of hydropower escalate with population growth and economic expansion overtime in both downstream and upstream areas (Vietnam Net and VnExpress, 2010). Sustainable development, ensuring a balance between environmental, economic and social imperatives, mitigating and compensating for losses due to impacts of hydropower are daunting tasks for many nations including Vietnam.

Sustainable development of hydropower was promulgated in the 1998 Law on Water Resources (LWR, 1998) as the only proper approach to ensure the exploitation of natural resources for economic purposes, through properly mitigating negative impacts on environment, society and humans, in the immediate and long term. Vietnam was also one of a number of countries in Asia that welcomed the establishment of the World Commission on Dams (WCD) and actively participated in all activities of the WCD. Vietnam hosted the Asia Regional Consultation of WCD in 2000. However, in practice, the development of hydropower in the country in the last decades and in recent years remains a subject of hot debate. The strategic priorities of the WCD have not been adequately applied to the process of sustainable development of hydropower in the country.

1.1 ABOUT THE PROJECT AND ASSESSMENT

In 2007, the International Hydropower Association (IHA) in collaboration with the World Wildlife Fund (WWF) and The Nature Conservancy (TNC) established a "Hydropower Sustainability Assessment Forum" (HSAF). The primary objective of the Forum was to review and recommend enhancements to the existing IHA Sustainability Assessment Protocol. In August 2009, the Forum released a Draft Hydropower Sustainability Assessment Protocol (Foran, 2010).¹

¹ The members of the International Hydropower Association (IHA) formally adopted the Hydropower Sustainability Assessment Protocol on November 16, 2010. see http://www.hydropowerworld.com/index/display/article-display/2024978352/articles/hrhrw/News-2/2010/11/Hydropower_Sustainability_Assessment_Protocol_officially_adopted_by_IHA.html

This assessment is conducted within the framework of the M-POWER/CPWF ‘Advancing Sustainable Hydropower’ project. Its aims are to explore and improve the governance of decision-making around energy and water resources development in the Mekong Region. This project is managed by M-POWER and the Challenge Program on Water and Food (CPWF) with financial support from the Australian Government via AusAID, and from the Blue Moon Fund. Similar exercises have been conducted in Cambodia and Thailand and are on-going in Lao PDR and China as well to introduce the draft HSAP and discuss sustainable hydropower options in the Mekong region and countries.

The trialing of the Hydropower Sustainable Assessment Protocol (HSAP, 2009) is a new undertaking in Vietnam. In November 2009, for the first time in Vietnam, a National Consultation introducing the HSAP was organized by the Vietnam Water Partnership (VNWP) (VNWP, 2009). The Workshop was attended by more than 50 representatives from government agencies, professional organizations, NGOs, scientific institutions and academia. The participants were directly/indirectly involved in or interested in the hydropower development of the country and Mekong Region.

Following the November 2009 HSAP consultation, a team of Vietnamese experts were mobilized to carry out a trial assessment (from February – June, 2010) by using the draft 2009 HSAP Section I: Strategy Assessment version This trial was considered as a first step towards understanding the practical application of the HSAP in Vietnam.

Figure 1.1 Vietnam within the Mekong Region



1.1.1 Assessment Participants

The assessment was conducted by a group of experts (assessment team) with participation from over 50 officials and specialists from relevant government agencies, Civil Societies Organizations (CSOs), and Private Sectors.

The assessment team comprised of four experts who have experience in the field of water, energy and hydropower development, and in environment, socio-economic

aspects. The assessment team and participants in the assessment are listed in Annex 1.

1.2 OBJECTIVES OF THE ASSESSMENT

The key objectives of this rapid assessment include:

- Using Section I of the draft Protocol, to assess the sustainability of Viet Nam's electricity planning (focus on strategic justification of major hydropower dams in various long-term energy services plans);
- Documenting, reflecting, and reporting on the assessment Team's experiences during various key stages of the trial: e.g. forming a qualified assessment team, obtaining access to data, generating findings, and numerical scoring; and
- Facilitating informed multi-stakeholder discussion around proposed development of multiple large hydropower dams in the Mekong region, which are proposed to produce power for consumption in Vietnam, as well as alternative options to meeting rising electricity demand in Vietnam.

1.3 METHODOLOGY OF ASSESSMENT

The assessment methodology and approach used in this assessment was based on 'Section 1: Strategic Assessment' of the 2009 Draft Hydropower Sustainability Assessment Protocol (HSAP) (HSAF, 2009). The major phases and key tasks are listed below:

Collect and analyze the data / information: Collect, classify and analyze data and information relating to energy and hydropower development. Secondary data included legal documents as Law on Water Resources (2008), Law on Environment Protection (2006), Law on Electricity (2004), Law on Land Resources (1999-2001); the National Master Plan for Power Development of Vietnam (PDP V and VI) and other related documents and information.

In-depth interviews: interviews were made by the Assessment Team with independent experts (including those who participated in the process of developing the above-mentioned official documents) and experts who work in Government agencies in water, energy and environmental sectors.

Stakeholder workshops and consultation: stakeholder consultation meetings and workshops were organized for the introduction of HSAP and for comments of experts on the draft Report prepared by the Team.

1.4 SCOPE AND CONTEXT OF THE ASSESSMENT

The HSAP (2009²) is organized around sections, perspectives or aspects (criteria), attributes (indicators) and sub-attributes. It consists of four sections which reflect different stages of the project life cycle – i) Strategic Assessment; ii) Project

² The draft HSAP (2009) underwent significant trialing and consultations and as a result has been revised. The final draft finalized in November 2010.

Preparation; iii) Project Implementation and, iv) Project Operation.³ Each section has a set of aspects, reflecting the key sustainability considerations at that stage of the project life cycle. Each aspect can be assessed on up to seven attributes, or scoring components.

The Assessment Team assessed each of the 9 identified Aspects and their applicable attributes. Table 1.1 presents key aspects, attributes and sub-attributes used in this assessment.

Each Attribute is assessed based on a score ranging from 1 to 5 corresponding to levels of Excellent (5); Very Good (4); Good (3); Poor (2); and Very Poor (1). The Assessment team also reviewed and collated key and cross-sector issues of each Section in the HSAP, including: High Profile and Cross-Cutting Issues such as Integrated Water Resources Management, Climate Change, Corruption, Communication and Consultation; Transparency, Human Rights, Complaint Mechanism, Livelihoods, Multi-Purpose Hydropower and Heritage.

Table 1.1 Section 1: Strategic Assessment Aspects, Attributes and Sub-Attributes

Perspective and Aspect	Key Attributes	Sub Attributes
I. Development Perspective		
I.1. Demonstrated need	Assessment	4 sub-attributes related to quality of process
	Management	Not relevant to strategic assessment
	Consultation	1 sub-attribute on consultation quality
	Stakeholder support	1 sub-attribute related to stakeholder support
	Conformance with Plans	Not relevant to strategic assessment
	Compliance	Not relevant to strategic assessment
	Effectiveness	1 sub-attribute related to likely contribution to development needs and objectives
I.2. Options Assessment	As above	As above
I.3. Regional and National Policies and Plans	As above	As above
II. Governance Perspective		
II.1. Institutional capacity	As above	As above
II.2. Political risk	As above	As above
III. Social Issues Perspective		
III.1. Social issues and risks	As above	As above

³ In its final version of November 2010, these sections were slightly renamed as follows: i) Early Stage; ii) Preparation; iii) Implementation; and iv) Operation. See: http://www.hydropowerworld.com/index/display/article-display/2024978352/articles/hrhrw/News-2/2010/11/Hydropower_Sustainability_Assessment_Protocol_officially_adapted_by_IHA.html.

IV. Environmental Perspective		
IV.1. Environmental Issues and Risk	As above	As above
V. Financial and Economic Perspective		
V.1. Economic and Financial Issues and Risks	As above	As above

All reference documents used by the team in the assessment are listed and referred to in the report.

1.5 COUNTRY WATER RESOURCES, ENERGY AND HYDROPOWER DEVELOPMENT CONTEXT

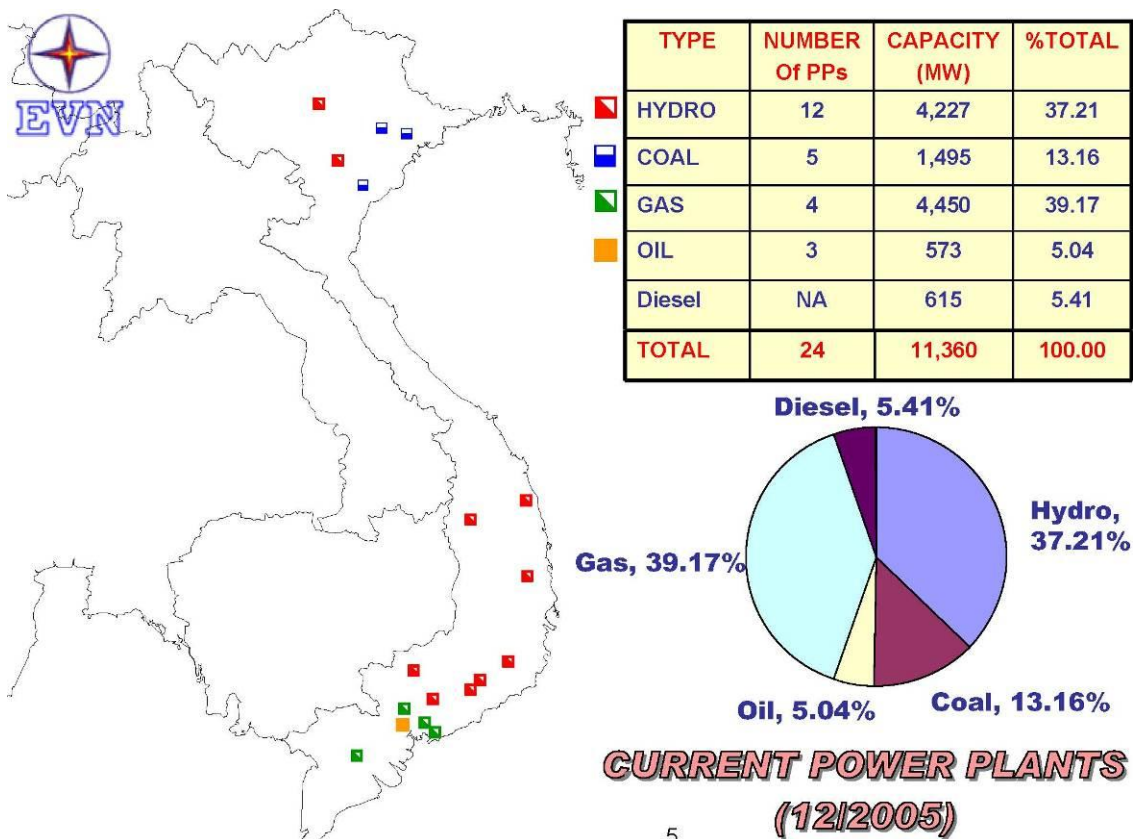
Over the last two decades, Vietnam has achieved rapid economic development . The average growth rate of GDP has continually risen over the past 10 years from 6% in the 1990s to 7.4% in the 2000s. The population also rapidly increased from 66 million people to 87 million people in 2009 (Office of Statistics, Annual Statistics of Vietnam, 2009). With increased economic development and population growth, the need for power is also rapidly increasing. Annual power demand growth rate is projected to range from 10% to 12%. Hydropower has been identified as an important potential contributor to the national grid and its development has been encouraged by the Government of Vietnam with a low tariff (4.17 cents/Kwh) (Law on Water Resources, 1998, Article 29).

Vietnam promulgated the Electricity Law in 2004. The Law encourages all economic sectors to invest in power sources while the State monopolizes the transmission and regulation of the national electricity network, construction and operation of major hydropower plants. Hydropower development is seen as strategically significant in sustaining socio-economic development, and national security (Law on Electric Power, 2004, Art. 4). The development of national power is directed by the National Master Plan for Power Development (PDP) that is approved by the Government. The PDP is updated every five or 10 years. The recent PDP VI was approved by the Government in 2005 for the period 2006-2015. The PDP VIII for period of 2012-2017 is being developed.

1.5.1 Country water resources

Vietnam has a natural area of 331,690 km² and its climate ranges from sub-humid in the extreme north to sub-tropical in remaining areas. The average rainfall is 1,600 mm and it ranges from 700 mm to 4,000 mm per year in different regions of the country.

Figure 1.1 Power composition and power plants in Vietnam



5

Source: EVN, 2005

Vietnam has 2,360 river basins having a length of more than 10km each. Of these, 13 have catchment areas over 10,000 km², including the systems of Red- Thai Binh, Bang Giang-Ky Cung, Ma, Ca, Vu Gia -Thu Bồn, Ba, Đồng Nai and Cửu Long and 4 large tributaries of Đà, Lô, Sê San and Srêpôk. Large river basins are trans-provincial. 10 out of 13 are transnational (international rivers). The catchment area outside Vietnam territory is 3.3 times larger than Vietnam. Total surface water volume in Vietnam territory is 830-840 billion m³ per annum. The water volume formed in Vietnam is only 310-315 billion, making up 37% whereas water coming from other countries is 520-525 billion m³, making up 63% of total water volume (MONRE, 2006). Water resources in river basins (both surface and ground water) play such an important role to socio-economic development and environment protection (Vietnam Water Sector Development Strategy by 2025, 2006).

1.5.2 Country's Energy and Hydropower Development

Over the last decade, hydropower has contributed significantly in helping Vietnam and the Mekong region to meet rapid increasing power demands for development of the nation (ADB and SEI, 2008).

Vietnam's demand for electricity is projected to grow around 11.4% to 15% per year for the foreseeable future. Vietnam has promoted economic development that would lift millions out of poverty and transform the country to a situation where the goal defined in the 2006 – 2010 Socio-Economic Development Plan of becoming a modern economy in the next 20 years becomes realistic (ADB and SEI, 2008).

The Government of Vietnam has planned for expansion of electricity generation capacity and energy trade to meet anticipated future demand. The generation capacity more than tripled between 1995 and 2005, from 2,796 MW in 1995 up to 9,255 MW in 2005 (ADB and SEI, 2008). An average growth rate of 12.7% per year is observed and it is expected that the capacity can potentially increase to 26,209 MW by 2010 (ADB and SEI, 2008).

The Master Power Development Plan No VI -2005 (PDP VI) envisages that the majority of viable capacity will be developed over the next 10-15 years (ADB and SEI, 2008). It remains unclear, however, how much of the remaining 77.2% of hydropower potential will be technically, economically, financially and environmentally feasible. Development of these hydropower plants depends on: (i) projected and actual electricity demand and supply growth in Vietnam and other Mekong countries; (ii) how much of this potential can be developed in a socially, environmentally and economically desirable and sustainable manner; and (iii) what alternative sources of power generation and management options are available.

Vietnam has signed up to implement the World Convention on Sustainable Development, which ensures harmony between economic, social protection and social benefits (Agenda 21, 2002). In this regard, adopting a sustainable development framework in dam and hydropower development needs to be encouraged in order to harmonize economic development, environmental protection and social purposes. The Hydropower Sustainable Assessment Protocol (HSAP) therefore is expected to contribute to sustainable development of the hydropower sector worldwide and in Vietnam in particular (IHA, 2010).⁴

1.5.3 Legal framework for energy and hydropower development in Vietnam

In Vietnam, Ministry of Industry and Trade (MOIT) is a governmental body that manages activities relating to energy, power and hydropower development. Under the Constitution (1992 version), Vietnam adopted a Law on Electricity in December 2004. This Law regulates planning and investment in electricity development and energy saving; rights and obligations of organizations and individuals working in the electricity sector and other electricity users; protection of electrical equipment and electrical safety.

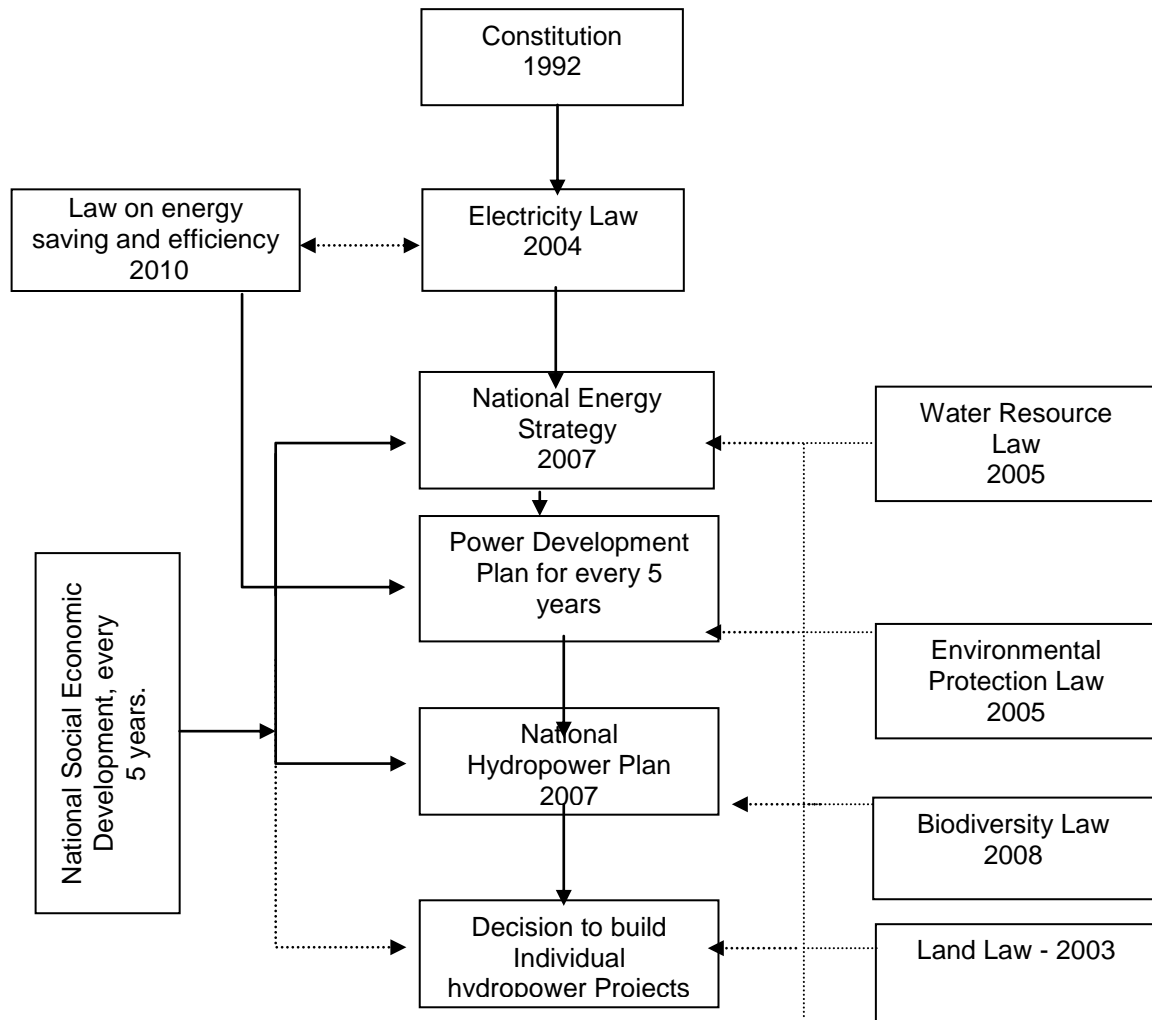
The State will act its monopoly role in the transmission and regulation of the national grid; construction and operation of large-scale electricity plants having important significance in socio-economic development, national defense and security.

Following the Law on Electricity, in 2007 the Vietnamese Government approved the National Energy Development Strategy up to 2020 and with a vision up to 2050 at the request of MOIT.⁵ This Strategy identifies that development of energy sources has to be well aligned with the socio-economic development of the country. The development of energy should take the initiative in this process at a high and sustainable rate. The energy market should be gradually formed with diversified ownership and business modes. Regarding hydropower development, the Decision stated that the development of hydropower plants will be prioritized suitably, ensuring sustainable development and reducing negative effects on environment.

⁴ IHA, 2010. Press Release Breaking News: IHA adopts Hydropower Sustainability Assessment Protocol, 23 December, 2010 - London, UK.

⁵ Both National Energy strategy and all PDP are study / prepare by Institute of Energy (IE) as an internal consultant for MOIT. These documents are officially submitted by MOIT to the Prime-Minister for approval.

Figure 1.2 Legal framework for energy and hydropower development in Vietnam



The Power Development Plan (PDP) is developed under the framework of the energy development strategy and needs to comply with the National Social Economic Development Plan (SEDP). The PDP includes both national and local electricity development. National electricity development is based on the national socio-economic development strategy projected for 5 to 10 years (Electricity Law, 2004). The current PDP was PDP VI approved by the Prime Minister in 2007 for the period 2006-2015, with an outlook to 2025.

Under PDP VI, in 2006 with assistance from SWECO, Sweden, the MOIT developed the National Hydropower Plan (NHP), which mainly focuses on 22 hydropower projects from 2006 to 2020. These hydropower projects are already presented in the PDP VI. The study finished in 2007, and a Strategic Environmental Assessment (SEA) for hydropower was carried out in 2008 (ADB and SEI, 2009). Unfortunately, due to procedural delays, these documents were not officially approved by the Government and thus have had limited effect to the overall implementation of the PDP VI.

The decision on an individual hydropower project is based on the approved PDP. MOIT is responsible for decisions on large hydropower (over 100 MW), while medium and small projects are approved by the Peoples' Committee in the provinces.

2.0 DISCUSSION OF RESULTS: RAPID SUSTAINABILITY ASSESSMENT OF MEKONG ELECTRICITY PLANNING IN VIET NAM

The results of the assessment of each perspective and aspect are presented below with explanation on the scoring.

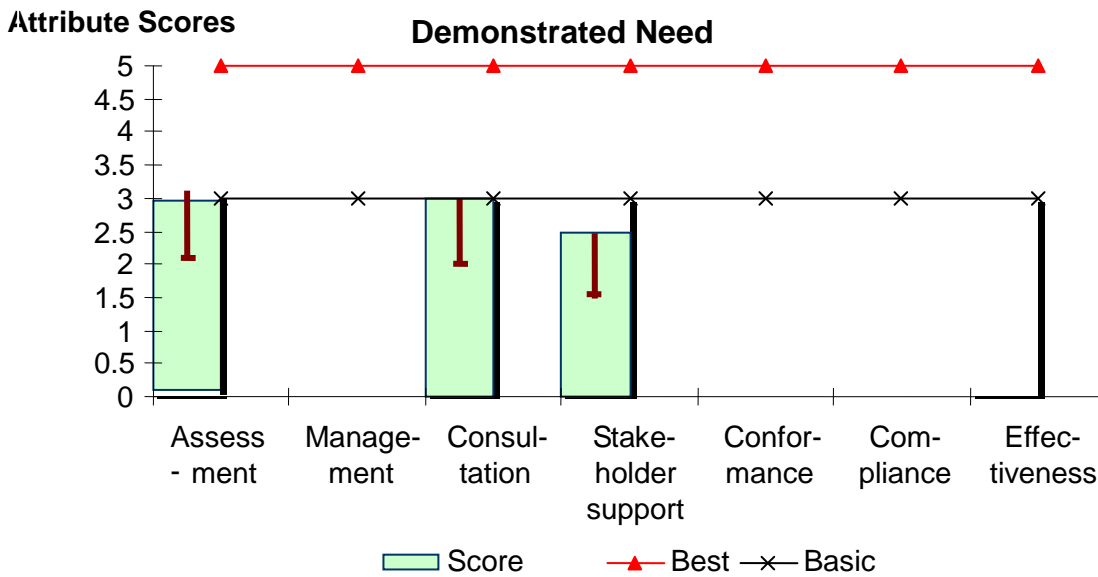
2.1 DEMONSTRATED NEED

Objective of Demonstrated Need

This aspect addresses the needs that justify management and infrastructure investments in water and energy services. The objective is to establish the needs and objectives for water and energy services in response to sustainable development objectives over the short term and long term. This aspect is important in order to support sustainable development objectives at the local, regional, national and transboundary levels; and avoid over- or under-investment in energy and water services.

One assessment team member was responsible for assessing the demonstrated need for hydropower development by examining the 2006-2015 Master plan for power development N°6 (PDP VI) with a vision to 2025 as a case. The assessment covered both the PDP VI, consisting of the plan for development of all power sources such as gas turbines; hydropower; thermal power plants etc; and the National Hydropower Development Plan (NHP) – an integral part of PDP VI. The HSAP guidelines are used to check to what level this aspect has been considered during planning and development of PDP VI.

Figure 2.1 Demonstrated Need



2.1.1 Assessment

Quality of the process leading to an understanding of local, regional, national and international need for energy services

The PDP VI and NHP are seen as logical responses to the projected increase in energy demand and the need for sustaining GDP growth in period 2006 to 2010. The power demand is projected to be growing fast and requires a huge amount of investment to meet the demand. All potential sources for power development are being considered to meet the rapidly increasing power demand (Institute of Energy, 2005). The current PDP VI is built upon a series of National Master Plans for Power Development (Master Plan) starting from 1994. The process that led to developing PDP VI included:

- (i) Methodology for power generation planning
- (ii) Conditions for developing power generation planning
 - a. Ranking of potential hydropower projects based on technical, environmental and social aspects
 - b. Consideration of gas supply capacity
 - c. Consideration of in- country coal mining and coal import
 - d. Consideration of nuclear power plant potential
 - e. Consideration of power import from neighbouring countries
 - f. Consideration of demand side management program
- (iii) Scenarios for power generation development
- (iv) Recommended power generation development plan (Institute of Energy, 2004).

The need for energy seems to be very carefully assessed during preparation of the Master plan. The energy need forecast of high, medium and low levels of power demand is based on various methodologies such as, direct forecast (sector and

regional planning; development plans of power-consuming industries; provincial power network plans; and indirect forecasts (GDP forecast; forecast on power consumption of main economic sectors (industry, agriculture, service, commercial and residential) (Institute of Energy, 2001). The energy demand forecast also takes into account demand-side management (DSM), energy saving technology, and consideration of power demand, power development of the region and international practices (Government of Vietnam, 2004). The power demand as well as power structure (composition between thermal, hydropower, gas turbine, renewable) and other related aspects were studied and reviewed in order to select the most appropriate option for Vietnam.

It seemed that the assessment process was thorough, leading to an understanding of local, regional, national and international need for energy services. However, the assessors noted that the international demand and supply for energy was not studied during preparation of the PDP VI.

Participation of Related ministries, sectors and communities during preparation and approval of the Master plan:

The Ministry of Industry and Trade (MOIT) is the responsible agency for preparation of the Master plan for power development. In order to have a good estimation of the power demand, the master plans for development of many main electricity consuming sectors such as steel production, cement production, industrial clusters were gathered and served as baseline data for calculation of scenarios for power demand.

Line ministries such as the Ministry of Finance (MOF), Planning and Investment (MPI), Ministry of Environment and Natural resources (MONRE), Agriculture and Rural development (MARD) among others were involved with MOIT during preparation of the Master plan. Their participation was in the form of giving comments on the draft plan; providing necessary information such as planning for development; and preparation of budget plans for implementation of the Master Plan.

In addition, several rounds of workshops have been organized for stakeholders to learn about the process and contents of the draft version of the Master Plan. Relevant ministries were invited and their comments were considered during the preparation of the Master Plan.

The final draft of the Master Plan was sent to all related Ministries for final comment and objections. After receiving comments from line ministries, MOIT revised the Master Plan accordingly and then sent the Final draft of the Master Plan to the Prime Minister for approval.

Other sectors have also been actively involved with development of the Master Plan. For instance, VINACOMIN (Vietnam National Coal, Mineral Industries Holding Corporation Limited) provided information about the amount of coal the corporation can provide for coal-fired power plants in the targeted period of the Master Plan. Other electricity consuming sectors such as cement production, steel production and textiles provided their planning for the MOIT in order to have to contribute towards a well-planned power sector supply.

The **involvement of communities** in development of the Master Plan seems to be less active than the involvement of the Ministries and industrial sectors. The Master Plan for power development is based on provincial power development plans. The procedure for development of the provincial power development plan is regulated by Decision No42/2005-QD- BCN dated 30/12/2005 on content, order, and procedure for

preparation and approval of the planning for power development. This regulation required the involvement of related departments and sectors in the province during preparation. There is no specific requirement for the involvement of local communities, local peoples, and civil society as a whole in the process. In practice, the involvement of local communities was not observed. There might be some involvement of a few representatives from mass organisations such as the Women's Union, Farmer associations or representatives of Peoples' Committees, but wider public participation was not standard practice in the process for provincial power development planning. During preparation of the National Master Plan for Power Development, no additional public consultations with the provinces was required, so involvement of communities in this process is not actively implemented.

In conclusion, line ministries, and major electricity consumption sectors are involved with the preparation and approval of the Master Plan. Participation of the line ministries is a mandatory requirement of the process specified in the Law of Electricity. It is important to note that every 5 years, MOIT needs to revise the Master Plan. However the involvement of local communities is still not yet active.

MOIT plays a leading role in the preparation of the PDP and usually, MOIT have hired the Institute of Energy as a consulting company for preparation of the PDP. The final draft for the PDP is appraised by MOIT. In some cases MOIT hires another agency for additional appraisal of the PDP.

The need for hydropower development has been studied more intensively during NHP (National Hydropower Planning). Similar to the National Master Plan, NHP also discussed other alternatives to hydropower such as coal-fired power plants, energy saving programs, nuclear power introduction in Vietnam and importing of energy from Laos or China (EVN, 2007).

Quality of the process leading to an understanding of local, regional, national and international need for water services

The NHP provides Government with strategic options for hydropower development to cover the Nation's long term energy demands while taking cognizance of the environmental and social impacts of the proposed projects, as well as addressing the river basin management and development implications (Sweco, 2005). However, it is not yet clear how NHP considered local, regional and international needs for water services, given its lack of river basin planning consideration.

Until the time when NHP was developed, there was not yet any river basin planning in Vietnam. This might mean that water demand for other sectors might not be adequately and comprehensively considered (Sweco, 2005). During preparation of the NHP, the proponents of the NHP and their consultants considered water demand for other sectors such as irrigation, and water supply, but the data of water demand for irrigation and water supply was not sufficient to support them to make an informed consideration (Sweco, 2005). Hydrological models (e.g. Mike Basin Model) were used to generate water balance, model multi-purpose benefits and minimum flow requirements for the NHP. The same was the case for estimation of flood control benefits in terms of reduced flood damages (Sweco, 2005). The multipurpose benefits were optimized against the power production cost of each scenario. Minimum flow requirements were assessed by considering prevention of saline water intrusion; waste water flushing and pollution dilution; navigation; international water releases; and ecological flow requirements (EVN, 2007).

Stakeholder participation during preparation of the NHP was considered to be done well. The following information was extracted from the report of NHP (Sweco, 2005).

The National Stakeholder Meetings were arranged in connection with each of the four phases of the NHP Study, and were intended for interaction and information about the outcome of the Study. An account of the National Stakeholder Meetings in NHP Stage 1 is given in Section 5.2 of Volume III, and the National Stakeholder Meetings in NHP Stage 2 in Section 6.3.2 of Volume III of the NHP. Three Stakeholder Workshops with direct involvement of representatives (province, district and commune levels) of affected people were held in NHP Stage 1 in Son La (Da River Basin), Pleiku (Se San River Basin) and Da Lat (Dong Nai River Basin). Issues raised at these workshops were further discussed at a workshop in Hanoi. Working Group Sessions were arranged for workshop participants to discuss two questions, namely, the main issues for the hydropower projects in the basin and demands of the groups and how to rank them. The responses to the two questions from the groups in each basin were quite diverse, but the issues around resettlement of people were important for all.

The village level stakeholder interaction was carried out by the field teams both in NHP Stage 1 and NHP Stage 2. Two villages per project site were studied in depth by utilising PRA (Participatory Rural Appraisal) methods. The criterion for selection was to study one village to be directly affected by a potential hydropower project, and one village to be partially or indirectly affected. The purpose was to achieve in-depth targeted studies as an effort to pick up key issues, not least in connection with resettlement.

The province level workshops were carried out during Phase II. The Provincial Stakeholder Workshop Series aimed at consensus-based identification of benefits and problems specifically for district, commune and province development due to an implementation of a hydropower project.

The River Basin Workshops, implemented in April 2005, were based on representative stakeholders, in accordance with international recommendations. In the principles for sustainable development (Agenda 21) nine prime categories of stakeholders are identified. Transformed into Vietnamese circumstances these are represented by Womens' Union, Farmers Association, Fatherland Frontier and decision-makers at district and province levels. In the stakeholder analysis the target is not the directly affected people but the set-up of regional consequences.

The output was a stakeholder assessment of the potential for regional development from the introduction of a hydropower project. The beneficial and detrimental sides were addressed, the special case of resettlement was gone through, and the NHP Study approach to identifying key social and environmental issues was analyzed. Strengths and weaknesses in both current situations and future possible situations of hydropower project implementation were assessed.

The series of stakeholder interaction workshops involved a variety of local and national decision-makers. While the content has varied, ranging from the effects at the village, commune, district and provincial levels to the potential for regional development, the process of the workshops has proven useful.

A participatory process has been built, which seeks consensus around key issues and solutions, and stakeholders expressed their satisfaction with being involved. But this achievement can only be the beginning of what must emerge

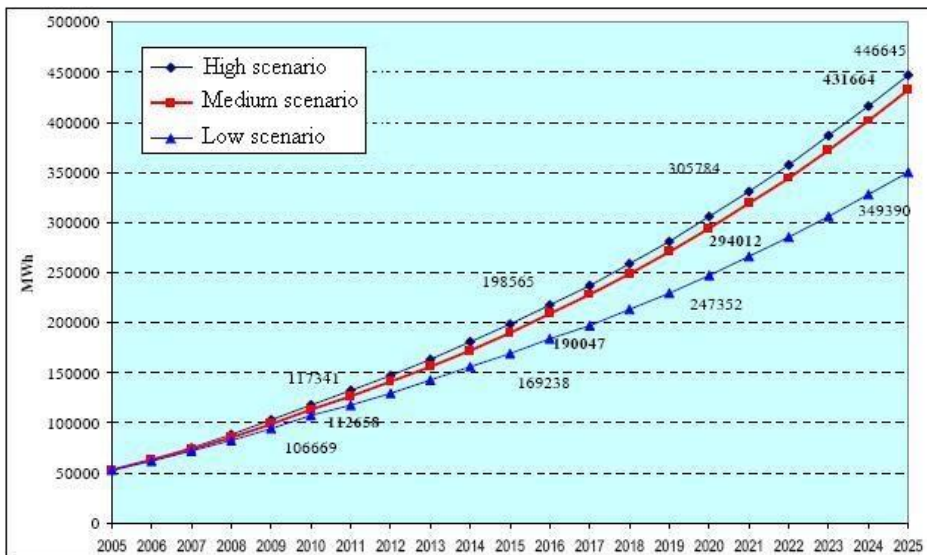
as an informed stakeholder process as the hydropower plan evolves in the future. The awareness and the competence levels among stakeholders of all walks needs to be continually upgraded. This goal can be reached through continued interaction between Stakeholders and the Developer. Furthermore, the different stakeholder interests may not always lead to consensus decisions. In such situations, an agreement on conflict resolution needs to be reached before acute stages appear. In both cases the recommendations from the WCD (2000) should be used when applicable (Sweco, 2005).

Quality of the process leading to an understanding of local, regional, national and international development objectives

The PDP VI is believed to be built upon statistical data - electricity consumption per capita (KWh/person; power capacity (kWh/1000 USD GDP) and installed capacity composition by generation types in the world and region (Institute of Energy, 2001) This data helps to see how and where Vietnam is in comparison with other developed and developing countries.

In Vietnam, forecasts were made based on historical data on power consumption in each region. However, the statistical data was not enough or not available in terms of historical consumption by each economic sector in each region. The PDP VI also notes that the data on power consumption of different economic sectors was extrapolated out for the whole country based on the provincial development plans. This is seen as a weakness of the forecast (IE, 2007).

Figure 2.2 Scenarios for power demand in period 2005 to 2025 (IE, 2007)



The PDP is based on the high development scenario; hence it may tend to err on the maximum side.

This assessment attribute can be scored at level 3 (good)

2.1.2 Management

This attribute is not relevant at strategic assessment stage (HSAF, 2009).

2.1.3 Consultation

During the NHP development, it was believed that stakeholder participation was allowed for through the presence of representatives of national institutional stakeholders, provinces located in the respective river basins; directly affected districts and communes, and directly and indirectly-affected villages (Sweco, 2005).

Series of consultations were conducted during the preparation of the PDP with the involvement of representatives of Government ministries; and academia to discuss the methodology and feasibility of the Master Plan. The Province and District governments were informed about the Master Plan when MOIT and consultants (Institute of Energy) were collecting data for preparation of the PDP. However, the draft of the Master Plan was not officially consulted with the provincial and district Peoples' Committees. In addition, civil society (non-governmental organizations and communities) were not consulted during preparation of the Master Plan.

During preparation of specific project pre-feasibility studies and feasibility studies, developers and their consultants work closely with local Peoples' Committees and other related departments for information sharing and, to some extent, hearing from related stakeholders.

The new Environmental Law of Vietnam (which came into force in July 2006) requires public consultation during preparation of the EIA (Parliament of Vietnam, 2005). In normal practice of the consultation process, the consultation is organised only to obtain a formal letter of support from the Commune Peoples' Committee and Farther Land Front in the affected communes. However, this process does not include participation of local peoples. Normally local people are not well informed about a project, hence affected people (directly or indirectly) may not have a chance to express their concerns, or ask questions about a project.

In case of resettlement issues, directly and indirectly affected people may have a chance to get information on the compensation and resettlement plan. This consultation mechanism is believed to have performed rather well. However, mechanisms for information sharing and public hearings are focused exclusively on resettlement and compensation issues. Local people and broader civil society does not have a chance to participate during project preparation in term of technical issues such as selection of project sites, objectives of the project, etc.

The assessor took note of the recent efforts by EVN and donors to introduce international standards on hydropower development in Vietnam – see e.g. Song Bung 4 Project and Trung Son hydropower project (EVN, EIA for Trung Son HPP, 2009; and EVN, EIA for Song Bung 4, 2007)

This attribute can be scored at level 3 (good)

2.1.4 Stakeholder support

For Government, stakeholder support for the determination of development needs and objectives is ensured through involvement of related ministries/ sectors/ governments in information provision such as provincial planning, sector planning etc. Relevant ministries, representatives of different sectors, scientists, and researchers are reportedly involved in providing comments on the draft of the Master plan as well as NHP (Sweco, NHP 2005).

The Institute of Energy is the lead agency in preparing all Master Plans for Vietnam. There were many rounds of meetings, as well as data collection, presentation to stakeholders on the number of draft versions of Master plan. At strategic stages,

stakeholders included are the Government agencies, Peoples' Committees at different levels and researchers.

As discussed above, there is a lack of participation of local communities, local people, and affected people during preparation of the Master Plan. Since the Master Plan is only a strategic direction for project implementation affected groups are identified in general as representatives of provincial Peoples' Committees. No directly affected groups by specific projects were identified, and invited for consultation so their involvement is not observed. However in later stages, during project implementation, these stakeholders are called more intensively and their involvement is more active.

The information given in the PDP is very general and technical, and no specific local issues are raised, so participation of the stakeholders is at a macro level. The participation of line ministries and sectors is therefore restricted to generalities also.

This attribute can be scored at level 2.5 (between good at planning level and poor at the project level)

2.1.5 Conformance with the Plan

Generally not relevant at strategic assessment stage (HSAF, 2009).

2.1.6 Effectiveness

Generally not relevant at strategic assessment stage (HSAF, 2009).

2.2 OPTIONS ASSESSMENT

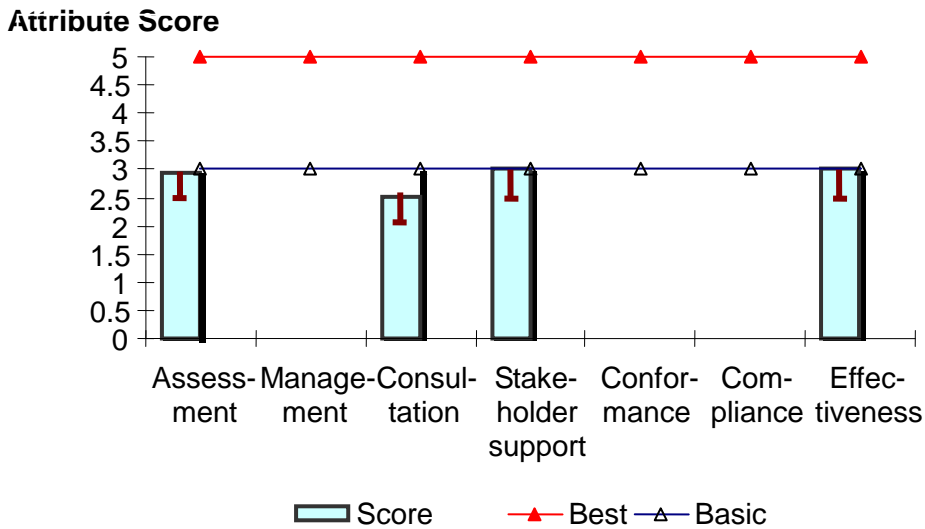
Objective of Option Assessment

The objective is to ensure that hydropower development is supported as a priority for addressing development needs, in particular those identified under "Demonstrated Need".

Description

This aspect describes the choices available for meeting energy and water needs in terms of both infrastructure and management approaches. This aspect is important because it compares hydropower options with other options such as other resource types (thermal energy) and/or conservation (e.g. energy efficiency, alternatives to irrigation). It adopts a sustainability perspective to ensure a realistic and comprehensive comparison of options across a range of economic, technical, environmental and social factors.

Figure 2.2 Options assessment



The justification and evidence for each relevant assessment criteria are provided below.

2.2.1 Assessment

For Government, degree to which the options assessment covers the full range of planning approaches to meet demonstrated need

It is evident that evaluation of a range of alternative options has been made during preparation of the NHP (EVN, 2007), where 22 hydropower projects were reviewed. In view of the rapid growth of the Vietnamese economy and subsequently increasing demand for electric power, practically all known sources have been explored. This is evidenced by the growing attention to importation options and the plans for studying nuclear power options. All power development strategies examined contain a variable mix of hydropower and thermal power plants (Government of Vietnam, 2004).

Import of power from neighbouring countries has been included as a future possibility, and the most likely sources would be hydropower from Lao PDR and Cambodia, and thermal/hydro import from China. The import has been assumed to reach 1,000 MW in the year 2010 and close to 5,000 MW by the year 2020 (EVN, 2007; ADB and SEI, 2008).

During preparation of Master Plans No 5 and 6, development of thermal power plants, gas combined cycles, renewable energy, power importation and introduction of nuclear power plants were considered (ADB and SEI, 2008). Similar to the Master plan, NHP also considered and assessed demand for hydropower development and other power sources.

Quality of the analytical framework used to compare options

The quality of the analytical framework for options assessment is good, except that social and environmental issues were not well integrated into the PDP. However, social and environmental issues were considered during the preparation of NHP.

The PDP VI is developed by the Institute of Energy under MOIT with support from national and international experts and by relevant agencies such as EVN, MoIT, and

the Prime Minister’s Office. From a technical aspect, most models and software are available for consultants to prepare both the Master plan and NHP

General Methodology of Integrated Ranking

In the NHP there are several steps of analysis, in which the final stage of the Ranking Study is the integration of the Technical/Economic Preference Index with the Environmental/Social Preference Index into a Total Preference Index (TPI).

The Total Preference Index (TPI) is based on combining two non-comparative values, namely Technical/Economic and Environmental/Social Preference Indices. Sensitivity analyses are warranted on the basis of different weights assessed to the preference indices. Some stakeholders, such as affected people, may give higher weight to the impact of the projects. Other stakeholders, such as the implementing agency, may give higher weight to the economic viability of the projects.

Table 2.1 Integrated Ranking of the 22 selected hydropower projects

Rank	Normalized Total Preference Index	
	Project	Normalized TPI
1	Nho Que 3	100
2	Srepok 4	93.2
3	Lai Chau	92.0
4	Upper Kontum	86.2
5	Huoi Quang	80.8
6	Srepok 3	80.0
7	Song Con 2	79.3
8	Song Bung 2	76.5
9	Trung Son	75.5
10	Ban Uon	73.9
11	Song Bung 5	68.8
12	Ban Chat	67.6
13	Song Bung 4	66.6
14	Hua Na	63.8
15	Dak Mi 1	62.8
16	Khe Bo	60.8
17	Nam Na	57.8
18	Dong Nai 2	57.3
19	Dak Mi 4	56.9
20	Hoi Xuan	55.8
21	Bac Me	53.1
22	Duc Xuyen Main	50.4

Quality of the options assessment input data

Data used for options assessment is from different sources such as: from site investigation; from local authorities; statistical data; and others. Some criteria used are not easily measurable, especially sustainability assessment. During NHP preparation, consultants tried to give a score and weight for social and environmental parameters, hence the NHP was done in the very first stage of planning, given the limited data quality. However technical data input for Master planning (PDP VI) is good and from credible sources.

This input data quality attribute can be scored at level 3 (good)

2.2.2 Management

This attribute is not relevant at the strategic assessment stage.

2.2.3 Consultation

For specific projects, local government (provinces, districts) are only informed and consulted during preparation of the feasibility study (FS). For projects without international donors there is usually no consultation on environmental issues or water resource management with local, affected people or civil organizations. However affected people and civil society such as the Farmers' Association and the Women's Union are involved in preparation of Resettlement Plans.

During NHP preparation, several rounds of consultation meetings were organized. Government agencies, experts, and representatives of affected people were informed about the NHP and consulted (this is described in more detail in the Aspect Demonstrated Need).

This attribute can be scored at level 2.5 (between good planning level and poor at the project level)

2.2.4 Stakeholder support

This attribute more or less used the same analysis and information in the Aspect of 'Demonstrated Need'.

This attribute can be scored at level 3 (good).

2.2.5 Conformance with plan

Generally not relevant at the strategic assessment stage (HSAF, 2009)

2.2.6 Compliance

Generally not relevant at the strategic assessment stage (HSAF, 2009)

2.2.7 Effectiveness

At the present time, power does not yet meet demand. Since the assessment of this attribute is similar to the Aspect for Demonstrated Need see 2.1.6 for more details.

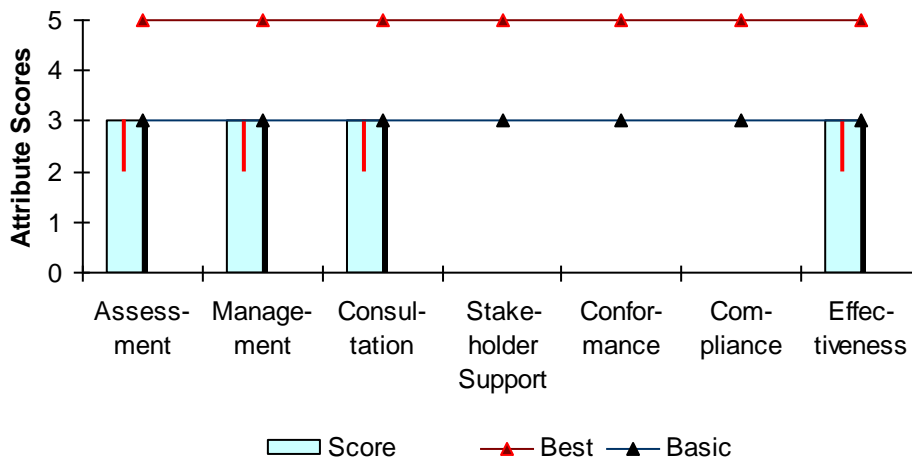
This attribute can be scored at level 3 (good)

2.3 REGIONAL AND NATIONAL POLICIES AND PLANS ASPECT

Objective: HSAP (HSAF, 2009) suggested that this aspect addresses the context set by regional and/or national plans for energy services, water resources management, biodiversity / conservation, and social and economic development as well as the relevant policies on human rights, resettlement, strategic environmental assessment, environmental impact assessment, climate change, and benefit sharing, which set the scene for project planning, implementation and operations.

As shown in Figure 2.3 this aspect scores at "basic good practice" or level 3 for all applicable attributes due to a number of gaps.

Figure 2.3 Regional and National policies and plan aspect.



2.3.1 Assessment

Quality of the process leading to an understanding of relevant regional and national policies and plans

At national level: The Power Development Plan (PDP VI) has significant impacts on the entire economy of Vietnam (VUSTA, 2007).

The Assessment Team could not access the information on the quality of the process that led to an understanding of relevant national policy and plans (PDP VI), however, according to Dr. Nguyễn Khanh Toan, Director General of the Institute of Energy within the Ministry of Industry and Trade (MOIT), the Agency has been assigned by the Government to prepare of PDP VI. The consultation process have been conducted with the participation of only related Ministries and Governmental agencies, but not civil society and communities. Japanese experts were invited to help in preparing the PDP VI. The preparation of PDP VII is in preparation but it is different from PDP VI, as the consultation process of PDP VII will have been conducted with participation not only of Governmental agencies and organizations but also of civil society, scientists etc. The PDP VII consultation process has been supported by ADB (an interview with Toan, 2010).

Relating to the preparation of the NHP, different aspects of the hydropower planning process were identified by several respondents. In addition to the issue of providing proper compensation, there was a feeling that the whole process should be more transparent, with wider involvement and inputs on social and environmental issues and far greater participation of people who were immediately affected by hydropower development. The planning should also take more account of risks and uncertainties and should follow existing laws more effectively. More effective coordination with other sector plans (e.g. water, agriculture) and with overall national development plans is also needed. Some respondents also identified specific gaps in the regulatory framework: for example in relation to compensation for people who lose land where they have customary use rights but not formal land titles (ADB and SEI 2007).

No article in the Electricity Law of Vietnam stipulates about the right of, or a mechanism for, the participation of other stakeholders rather than State agencies/organizations in the preparation process of PDP and as well the other stakeholders' participation in the process of monitoring the performance of PDP.

Water sector: There are some gray areas in terms of legal and institutional arrangements. The Law on Water Resources seems inconsistent and needs urgent review. Roles of different institutions are not clearly specified leading to confusion and at times conflicting messages to stakeholders. This is not only confined to lack of clear responsibilities between MoNRE, MOIT and MARD, but more generally to the relationship between Ministries and Departments and Provinces, and the hierarchy of Laws governing activities of both the public and private participants. There is also considerable work required to properly implement institutional arrangements based on the separation of resource manager/regulator from the operators. (KBR.VICA, 2008)

Conflicting/uncoordinated uses: There is little planning or coordination between the sectors, which leads to unintended, un-costed and unmitigated impacts of one sector on another (KBR.VICA, 2008)

River Basin Coordination: Viet Nam has found it difficult to embrace this approach in a meaningful and practical way. Lack of clarity over the respective roles of MoNRE and MARD has hindered progress. However, this appears to have been resolved, although the GoV is yet to approve a new river basin management decree (KBR.VICA, 2008)

At regional level: Vietnam is a member of three important regional cooperation mechanisms, namely Mekong River Commission (MRC), Greater Mekong Sub-region (GMS), and ASEAN. Vietnam has actively participated in the process of formulation of regional cooperation policies and the plans. The regional policies and plans have, at different levels been reflected in national policies and plans. For example, the plans for cooperation among MRC members in implementation of MRCs' programmes (by National Mekong Committee of Vietnam); the plans in implementation of fields of cooperation among GMS countries are coordinated by Ministry of Planning and Investment and implemented by different ministries.

However, relating to the utilization and development of the international river basins (especially the Mekong and the Red –Thai Binh river basins), Vietnam is faced with new challenges. A cooperation mechanism for development and management of Red-Thai Binh river basin does not exist. No regional plan for sustainable development of the Red-Thai Binh river basin has been discussed. The plans for development of hydropower plants in upstream in China and in lower Mekong basin (Laos, Thailand and Cambodia) are of increasingly concern to Vietnam and environmentalists in the world (Vnexpress, 2010).

Quality of the process leading to an understanding of gaps, shortfalls or complexities in regional and national policies and plans

In this part the focus will be given to the reflection of opinions from some studies on the policies and plans of PDP VI. The opinions may lead the readers to understand the quality of the process leading to an understanding of gaps, shortfalls or complexities in the regional and national policies and plans.

According to VUSTA (2007) Vietnam's admission as a full member of the World Trade Organization (WTO), has brought about big changes to the Vietnamese economy, including its energy sector, in the international integration. In this context, planning for national electricity development should change substantially, taking into account not only the domestic dynamics but also aspects of regional and global integration. Master Plan VI partly considers the above circumstances and offers appropriate solutions.

One of big gaps of PDP VI was its inability to include clear investment or financial schemes, or sound calculation of inputs variation and financial and economic analysis. The construction of Master Plan VI does not state clearly how and where to mobilize capital and investment, nor provide financial options. In addition, input data are not reliable (VUSTA 2007).

The gap results in slow completion of many planned power plants that, in turn, causes electricity shortages across the country, mainly due to a lack of capital. EVN lacks \$4-5 billion and the whole electricity sector lacks \$10 billion each year. Why does the sector lack capital? Because power prices (tariff set by the government) are too low, which leads to low profit ratios and makes it difficult for those who invest and operate in the sector to borrow from domestic and foreign banks. This is why only a few foreign investors have invested in power plant projects in recent years. (Tran Viet Ngai, Chairman of the Vietnam Energy Association (VEA) (2010).

In building the Master Plan for national electricity development of Vietnam, the Institute for Energy under the umbrella of EVN, Ministry of Industries and Trade, is always assigned to consult with other relevant agencies and map out the draft plan. Then, the final draft is submitted to the appraisal committee formed by the MOIT. Based on the advice of the committee, the Institute revises the plan, which is sent by the Ministry to relevant ministries. The ultimately revised plan is submitted to the government for approval. The Institute for Energy falls short of coordination and cooperation with other relevant agencies in making the master plan, thus coming short of making full use of the data sources and human resources from relevant institutions (VUSTA 2007).

Data on energy saving for various industries and data on new technologies are found sketchy, incomprehensive and inaccurate. Data provided by the Institute of Energy, including information on electricity production provided by EVN, seems to lack objectivity. In the forecast, direct and accumulative calculation is subjective. Data on energy consumption and efficiency for each period of consumption are not available, thus preventing it from using the modeling (VUSTA, 2007)

For project developers, quality of the process leading to an understanding of project strategic fit with regional and national policies and plans

Electricity Law, (2005) is the first law to govern activity in the country's electricity sector. The Electricity Law was passed in accordance with Vietnam's Strategy for Electricity Development, which set ambitious targets for electricity output up to the year 2020. The Law aims to stimulate development and diversify forms of investment in the electricity sector, encourage economical use of electricity, protect the country's electricity infrastructure and develop a competitive electricity market.

The state will maintain its monopoly over electricity transmission, regulation of the national electricity system, and the construction and operation of large power plants considered significant for socioeconomic or national defense and security reasons. Under the Electricity Law, the Ministry of Industry will be responsible for administering electricity activities and use, and the People's Committees will manage electricity activities and use within their jurisdiction. (Freshfields Bruckhaus Deringer, 2005)

The activities should conform to the electricity development plans that have been approved by related authorities (Electricity Law, 2006) However, in practice many hydropower plants developed are not in compliance with the approved plan. In March 2010, Ministry of Industry and trade (MOIT) issued a Report on the revision of plans of all existing and planned hydropower plants in country wide. Following the Report of

MOIT, 35 hydropower plants planned are not allowed to be built and 38 hydropower plants in provinces are subjected to reconsideration.

At the regional level, Vietnam is very concerned about the impacts of hydropower dams to be built in the mainstream in Laos, Thailand and Cambodia, but a state enterprise of Vietnam, PETROVIETNAM Power Corporation (Vietnam) has entered an agreement with Laos's Government to conduct a study and construct one of the biggest hydropower on mainstream of Mekong in Laos. The dam in question is the proposed Luang Prabang hydropower dam with an install capacity of 1,500 MW and estimated cost of the dam USD 3.685 Billion (MRC-SEA, 2010).

This attribute can be scored at level 3 (good).

2.3.2 Management

For governments, planning to address gaps, shortfalls or complexities in regional and national policies and plans

Government tends to review national periodical plans (5 year plan) for amendments, adjustments or supplements in order to respond to situation changes. Development plans of the electricity sector and hydropower subsector have been constantly adjusted (during 1990 – 2007, 6 master plans have been developed and updated). The intervals between adjustments tend to get shorter suggesting problems with forecasting electricity deficits.

However, one issue in forecasting electricity demand in Vietnam is that long-term economic development planning is always delayed and constrained by availability of information on the general socio-economic development orientations provided by the state planning agencies. This reveals a weakness in economic development planning, which should be addressed (VUSTA 2010)

For governments, where relevant, planning to address trans-boundary issues

Viet Nam is heavily dependent on international rivers it shares with other countries. The total average yearly surface water discharge in Viet Nam is about 830 billion m³ and more than 60% this is generated outside the country. Six basins depend on water inflows from other countries - the Cuu Long (Mekong Delta), where almost 95% of the average yearly surface water flows are generated in the upstream Mekong River countries; the Red-Thai Binh where nearly 40% of basin surface water originates in China; Ma and Ca basins, where 30 % and 22% of the flows respectively come from Lao PDR; and the Dong Nai basin where almost 17% come from Cambodia. The Bang Giang-Ky Cung River flows from China through Viet Nam, and then back to China. Surface water in Se San and Sre Pok basin generated in Viet Nam account for 75% and 50% respectively of the total water in those basins (KBR VICA 2008). So the policy and legislation relating to water and related resources (Law on Water Resources, 1998, Decree 120/2008 on the River Basin Management, etc.) of the state have addressed transboundary issues.

The Mekong 1995 Agreement defines the areas of cooperation between the Mekong River Commission (MRC) member countries: This gives MRC a very clear mandate to deal with water resources related issues that concern more than one riparian country (i.e. "of mutual concern") – or in other words trans-boundary issues. However, its effectiveness remains a big issue (MRC 2009).

This attribute can be scored at level 3 (good)

2.3.3 Consultation

MRC: A number of Stakeholder consultations have been conducted. The information and views exchanged among stakeholders seemed to significantly improved the awareness of stakeholders. The evidence suggests that voices from many sides in the region and internationally would like to see construction of dams on the Lower Mekong Mainstream postponed for at least 10 years (ICEM, 2010)!

Country: The **Grassroots Democracy** Decree 79/ND-CP, issued in 2003, aimed to increase community participation in local decision-making, especially planning and budgeting. Grassroots Democracy provides a legal instrument for community priorities to be presented to local decision-makers for inclusion in the planning process. Decree 79 increased the responsibility of commune and township administrations to use democratic principles in decision-making. However, the capacity of local officials to effectively implement this varies greatly and is often very limited. (ADB_GMS_SEI 2007). However, in the process of formulation of PDP VI, the content of this Decree was not applied. The consultation happened with the state agencies/organizations (Toan, 2010).

This attribute can be scored as level 3 (good).

2.3.4 Stakeholder Support

Generally not relevant at this stage (HSAP, 2009)

2.3.5 Conformance with plan

Generally not relevant at this stage (HSAF, 2009)

2.3.6 Compliance

Generally not relevant at this stage (HSAP, 2009)

2.3.7 Effectiveness

In Vietnam, the Government is making great efforts in establishing integrated policies and transparent plans in order to produce integrated energy development in general and hydropower development in particular (relating to PDP and NHP). However, in practice, the plans and policies are understood and applied in different ways by sectors, especially by provinces. According to the report of MOIT in March 2010, in many cases the procedures of approval and capital construction were not followed strictly. In the basins with some cascades of reservoirs, no inter-reservoir regulations guidance was established. The guidance, plans and policies poor effectiveness in the reservoirs' construction and operation are evidenced by severe damage which occurred during the recent flood in the Central Region of Vietnam (Vnexpress, 2010).

This attribute can be scored at level 3 (good)

2.4 INSTITUTIONAL CAPACITY

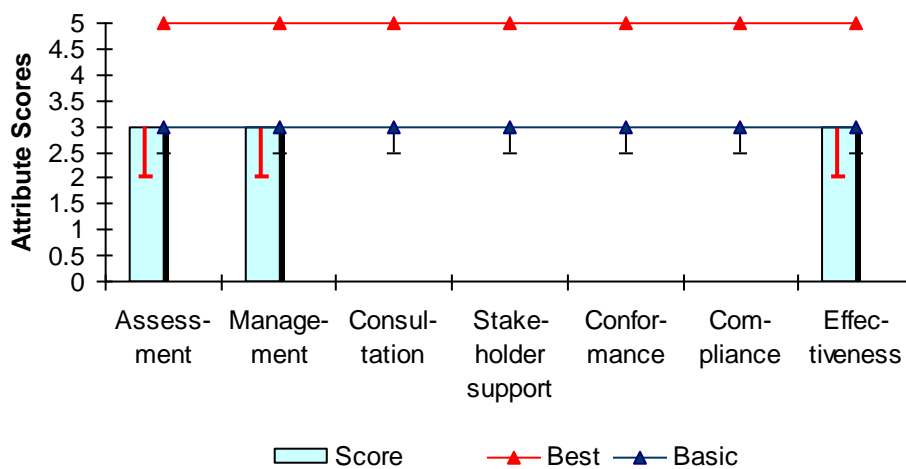
Objective: The HSAP indicated the need to have a comprehensive and balanced set of capacities amongst a range of stakeholders, namely governments/regulators, developers, financial institutions, contractors, suppliers, labour force, civil society and affected people (HSAP, 2009). The way of dealing with shortage of relevant skills and

capacities of stakeholders is to draw on externally available resources with the eventual objective of developing local capacity by transferring skill and technology.

Comment of Assessor. The assessment of institutional capacity of various stakeholders at the strategic level is crucial in determining who and what types of institutional capacity need to develop.

As shown in Figure 2.4, this aspect scores at level 3 (basically good practice) for all applicable attributes due to a number of gaps in institutional and organization capacity and effectiveness from the points of view of strengths, weaknesses and plans to compensate for shortfalls in law enforcement and compliance. There are also certain shortfalls in corruption risks, and grievance conflict management mechanisms.

Figure 2.4 Institutional Capacity Aspect



2.4.1 Assessment

Quality of the process leading to an understanding of legal, judicial and institutional structures and capacity

As presented in Figure 1.2 of this report; Vietnam has quite a good legal framework for energy, electricity and hydropower development. Legal documents relating to the investment and capital construction are also sufficient and clearly promulgated and published in the website of Government and related Ministries. Stakeholders such as developers, administrative agencies (Minister/sector, local authorities) can review and download relevant documents from the government websites. Concerned government agencies (Ministries, sector, local governments) are expected to understand the respective roles in the investment decision making process of any hydropower project or of a hydropower development plan.

According to these legal documents, MOIT is responsible for managing the power development and decisions to build a hydropower project. Institute of Energy (IE) plays a role of consulting for all study and assessment relating to these issues. The capacity of IE is assessed as good as proven in the process of formulating PDP VI (Institute of Energy, 2006).

This attribute can be scored at level 3 (good)

2.4.2 Management

The National Steering Committee was created for implementation of Master Power Development Plan No. VI (PDP VI). This committee consists of representatives of relevant line agencies. The Committee also provides evaluations and comments on the capacity of relevant agencies.

The members of the National Steering Committee are leaders of line agencies concerned, hence in principle they are in a position to nominate suitable staff to implement tasks relating to the implementation of PDP VI. However, there are slow changes in personnel and institutional arrangements in relevant ministries that makes the implementation of PDP VI a challenge. Each ministry and line agency has set their missions for overseeing the progress in implementation of PDP VI. Some key agencies such as EVN, Oil and Gas Incorporation and Da River Incorporation, have made explicit changes to improve capacity and organization for implementation of the projects. However, it is not clear that a training program designed by state agencies will be able to keep up with the rapid growth in number and complexity of the development projects, especially in electricity grids and hydropower projects. It is important that appropriate training programs are in place for the preparation of human resources for the construction and operation of existing and future hydropower projects (Institute of Energy, 2006).

This attribute can be scored at level 3 (good)

2.4.3 Consultation

Generally not relevant at strategic assessments stage (HSAF, 2009)

2.4.4 Support of Stakeholders

Generally not relevant at strategic assessments stage (HSAF, 2009)

2.4.5 Compliance

Generally not relevant at strategic assessments stage (HSAF, 2009).

2.4.6 Conformance with Plan

Generally not relevant at strategic assessments stage (HSAF, 2009).

2.4.7 Effectiveness

The comprehensive legal framework and procedure of developing energy planning and decision to build hydropower project in the

of this report has enabled MOIT to have a clear vision and function in coordinating the process of building PDP and managing the implementation of the different hydropower. The only problems that MOIT currently face is lack of professional staff in both central and provincial level to monitor the process of implementing these policies / plans (interview with leader of energy department of MOIT in May, 2010).

This attribute can be scored at level 2.5 (good with some gaps)

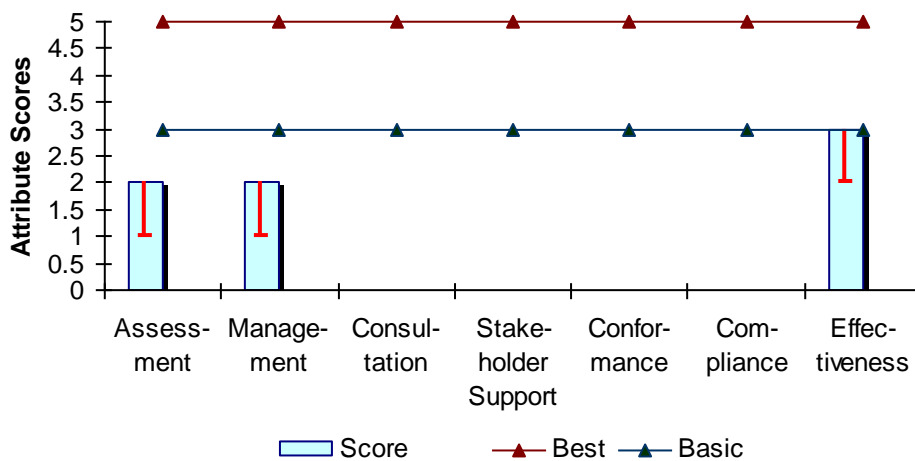
2.5 POLITICAL ISSUES AND RISK

Objective: HSAP (HSAF, 2009) suggested that political risks include war and political violence; currency inconvertibility, transfer restrictions and depreciation, expropriation of a company and political interference in institutional and regulatory functions. The political risks of specific hydropower development cover the complexities of the regulatory framework as well as complexities of projects that cross national borders.

Comment of Assessor: The identification and analysis of political risk is a crucial step before making decision by investors and government whether to invest in the power sector in general and in hydropower sector in particular.

As shown in Figure 2.5, this aspect is slightly below level 3 due to a number of factors.

Figure 2.5 Political issues and risks



2.5.1 Assessment

Quality of the process leading to an understanding of political risks relevant to PDP, NHP and projects:

The HSAP defines political risk as “risk of financial loss or inability to conduct business faced by investors, corporations and governments due to government policy changes, government action preventing entry of goods, expropriation or confiscation, currency inconvertibility, politically-motivated interference, government instability, or war” (HSAF, 2009). Political risk is a new concept in the development planning of the power sector in Vietnam and mostly only covers the aspect of financial accessibility, but not as broadly as defined by HSAP.

In the current procedures of planning, political issues and risks have not been addressed explicitly in planning and strategy documents of PDP VI and NHP (Institute of Energy, 2006). There is no risk assessment of potential impacts that include likelihood and consequences of particular impacts occurring and addressing of uncertainties. There has been limited evaluation of scenarios including alternative projects’ siting and design options and alternative management and mitigation measures. Some efforts to do this have been suggested in the Strategic Environmental Assessment (SEA) of PDP VI but only in the form of recommendation for the future PDP VII.

Under the current body of law, generally, assessment of political issues and risks in planning and implementing expansion of the power sector have not been defined and addressed explicitly.

This attribute can be scored at level 2 (poor)

2.5.2 Management

The **Strategic Environmental Assessment for Sustainable Hydropower Development in Viet Nam (SEA)** has provided analysis of other risks and impacts of hydropower development in comparison with risks and impacts of alternative development including the non-development of power generation capacity or the increase in thermal power generation based on natural gas or coal. It is not clear if the political risks were evaluated. The SEA study concludes that these risks and impacts can be measured and be mitigated to a great degree if effective actions are taken. However, experience indicates that the existing procedure of applying SEA as a strategic planning tool for a sustainable hydropower development does have a certain degree of planning to address the political risks of the hydropower by the concerned government agency (Ministry of Industry and Trade) and developer (EVN) (ADB and SEI, 2008).

This attribute can be scored at level 2 (poor)

2.5.3 Consultation

Generally not relevant at strategic assessment stage (HSAF, 2009)

2.5.4 Support of Stakeholders

Generally not relevant at strategic assessment stage (HSAF, 2009)

2.5.5 Compliance

Generally not relevant at strategic assessment stage (HSAF, 2009)

2.5.6 Conformance with plans

Generally not relevant at strategic assessment stage (HSAF, 2009)

2.5.7 Effectiveness

For governments, level of likelihood of political risks

The SEA of PDP VI provided options to mitigate negative risks and enhance positive potentials with specific measures. The developers such as EVN can use this framework to foresee the likelihood of the need for mitigation of negative political risks before deciding investment for a particular hydropower project (Institute of Energy, 2006).

Political stability is not mentioned in the PDP and NHP reports. Due to political stability, the donor community keep providing funds to Vietnam (up to nearly 8 billion USD for year 2011), and the Government also promised to work more in order to use the loan effectively (VietnamNet, 2010); therefore the effectiveness of political issue management in Vietnam can be regarded as a good.

This attribute can be scored at level 3 (good)

2.6 TECHNICAL ISSUES AND RISKS

The HSAP suggested this aspect applies mainly to developers who are considering a particular hydropower project or system of projects to identify and analyze technical issues and risks that may influence decisions to invest in preparation of the hydropower project or system of projects (HSAP, 2009).

Comment of Assessor: This Aspect can only be applicable for individual projects so that the investor can realize and analyze foreseen technical issues, e.g. complex topography, project approach, possible complexity to be faced if the project is implemented, and risks, especially risks relating to concentrated population and economic areas downstream.

Hydropower involves large scale structures requiring large investments. This is true in Vietnam and the Mekong region. However, hydropower also requires large numbers of inputs, including materials and machines, as well as intensive technology for construction. Hydropower is expected to produce significant impacts on environment, biodiversity and community depending on those resources. Any hydropower related disasters will mean a tremendous loss to human and nature. Therefore, ensuring technical criteria are achieved must always be a priority for all nations. In the Mekong region, before any hydropower is constructed (in China, Cambodia, Thailand and Lao PDR), besides legal issues relating to using shared waters, upstream nations consider technical specifications thoroughly to mitigate structural impacts on downstream riparian countries, e.g. building fish-ladders to reduce damages and changes to habitats and hatching sites of fish, reducing negative effects on livelihoods of fishermen; building ship locks to ensure normal navigation; designing sediment flushing outlets). Technical criteria should ensure absolute safety for the structure during accidents (e.g. earthquake) without causing any catastrophe to downstream areas.

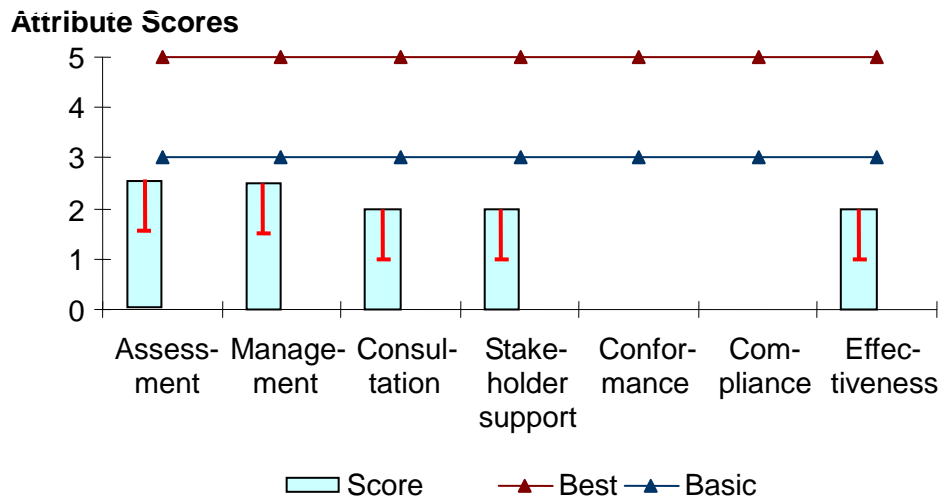
2.7 ENVIRONMENTAL ISSUE & RISK ASPECT

Objective: The HSAP suggests the environmental issues and risk aspect “*applies to developers who are considering a particular hydropower project or system of projects*”. This aspect addresses an early identification and analysis of environmental issues and risks that may influence decisions to invest in preparation of hydropower project or system of projects. However, after studying the practice and related legal frameworks in Vietnam (e.g. Environmental Protection Law providing for the compulsory SEA for strategic planning; and EIA for invested projects), the Assessment Team found that this aspect is relevant and crucial for decision makers and planners at the strategic planning for energy and hydropower development.

Comment of Assessor: The Assessment Team believes that identification and analysis of the environmental issues and risks will help decision makers to make the best decisions for planning and strategic stages. We have thus used his aspect to assess the strategic planning of the PDP in Vietnam.

As shown in Figure 2.6, this aspect scores slightly below the basic good practice (< level 3) for most attributes due to a number of factors to be discussed below.

Figure 2.6 Environmental issues and risks



2.7.1 Assessment

Quality of the process leading to an understanding of environmental issues and risks relevant to a potential project

According to Environmental Protection Law of 2005, Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) are **compulsory** for hydropower projects before planning and submission for approval. However, the Institute of Energy (IE), Ministry of Industry and Trade (MOIT) that are in charge of developing PDP VII, have said that government agencies require an SEA for development of PDP VII only. In practice, this SEA process has faced several difficulties, especially as the allocated budget for SEA in is extremely low (equivalent to 7% of the total planning cost). Hence this budget limitation makes it is difficult to organize an SEA effectively and comprehensively enough (interview with head of IE and MOIT).

In the process of PDP VI development, SEA was not carried out on the grounds that there was no such assessment guideline, or the consultancy firms had no SEA experience and expertise (interview with head of IE on 17 May 2010).

The environmental issues were considered in the PDP report. For example, Chapter 11 of PDP VI, the “environment and environmental protection in power development” were discussed in more than 29 pages. However, this presentation covers only basic and secondary data. There is not an effective solution for environmental issues and risk mitigation and remediation (EVN, 2007).

Generally, assessment on environmental issues and risks in planning and implementing hydropower projects is compulsory by law. However, in reality, research and assessment on the environmental impacts of hydropower planning and projects is still limited and irrelevant.

This attribute can be scored at level 2.5 (between good and poor).

2.7.2 Management

Quality of planning to manage project environmental issues and risks

Management planning and implementation are key measures of present and likely future sustainability performance. The assessment included key criteria such as integration of the assessment process as the basis for development of planned arrangements to avoid, minimize, mitigate, compensate risks and enhance opportunities.

In 2007, together with the international consultancy firm - SWECO, Vietnam developed a National Hydropower Plan (NHP). In principle, the NHP was developed based on 21 hydropower plans in 9 watersheds throughout the country (SWECO and NORPLAN, 2007). Previously, the hydropower on watersheds was planned and implemented in isolation from each other. Therefore, the NHP was based on the review of the previous planning more or less in an integrated manner. After the establishment of NHP, the government issued an approval for NHP. However, the effectiveness and utility of NHP is very low after most of the projects in NHP have been implemented (interview with MOIT on 15 May 2010). It is noted that SEA was not undertaken, but the NHP was still approved by the government.

SEA for National Hydropower Planning was implemented in 2008-2009 by the ADB and Stockholm Environmental Institute (SEI) with the cooperation of the Science Technology Department of the Ministry of Industry and Trade (MOIT). This SEA exercise could be qualified as rather systematic. Most of the environmental issues were researched (such as CO₂ emissions, impacts upon biodiversity, forest, etc.). However, the effectiveness and utility of the SEA for NHP is low because the EIA of its component projects were implemented before SEA was conducted (ADB and SEI, 2008).

Deeper research for pilot hydropower projects such as the Lai Chau and Huong Son hydropower projects showed that most of the investors have prepared an EIA before submitting for approval. However, the quality of those EIA was limited because investors just fulfilled the formality of the legal requirements. Moreover, capacity of consultancy firms for EIA is still limited (EIA reports for Huong Son hydropower (2000), and Lai Chau hydropower (2006)).

One of the other issues is lack of sufficient monitoring mechanisms and processes for implementing recommendations in the EIA and SEA. In reality most recommendations in those reports are not followed by the companies and there is a missing mechanism from Government and society to force companies to comply to recommendations (PanNature, 2008).

This attribute can be scored at level 2.5 (in between good and poor)

2.7.3 Consultation

Quality of the consultation process on the part of the developer in building understanding of project environmental Issues and Risks

The NHP collated assessment data and opinions from different provincial agencies, and social organisation such as the Vietnamese Union of Science and Technology Association (VUSTA). However, those consultations focused too much on technical issues related to hydropower construction (how many hydropower plants can be constructed, their location and factories, etc.). Environmental issues were scarcely mentioned (EVN, 2007).

During the conduct of the SEA (ADB and SEI, 2008), four consultation workshops were organized for scoping, scenario development, discussion and presentation of final results to different stakeholders (Governments, civil society and consultant firms). The

process was partly good. However, no affected local people were invited for consultation.

At the specific project level, Environmental Law requires public consultation during preparation of EIA (Parliament of Vietnam, 2005). However, in most cases, especially domestic investment projects, the environmental consultation process was not implemented seriously. On the one hand local people were not informed about the project and impacts of the project on their livelihoods. Therefore, it is difficult for local people to be able to give any comments and attend the consultation meaningfully. On the other hand the local consultation is normally done through the Fatherland Front (main mass organizations). In many cases, the heads of the organisations are not well informed about potential impacts of the project on the livelihoods and environment of local people. Their function is only to stamp in the document to prove that the EIA consulted with relevant stakeholders (PanNature, 2008).

Only in a few recent projects implemented by EVN (with funding from WB or ADB) including Song Bung 4 or Trung Son Project, was the environmental consultation undertaken seriously and systematically. Local direct affected people, civil society organizations and environmental experts have been involved in research and raising opinions.

This attribute can be scored at level 2 (poor)

2.7.4 Stakeholders support

Likelihood of stakeholder support for the project

The SEA and environmental consultation was not carried out in PDP and NHP therefore the stakeholders had no chance to discuss and give their opinion on the environmental issues. During SEA of NHP, four main consultation workshops were conducted, but the local people (directly affected stakeholders) were not involved in the consultation (ADB and SEI, 2008). Hence, it is difficult to qualify that the PDP and NHP enjoy full support from all concerned communities and stakeholders.

At the project level: Most projects did not take into account the concerns and opinions of local people and related stakeholders (except for some projects which were requested by international funding institutions – e.g. Trung Son project). Therefore, it is hard to conclude whether all stakeholders are in support of them.

This attribute can be scored at level 2 (poor).

2.7.5 Compliance

Normally not relevant in this period (HSAF, 2009)

2.7.6 Conformance with plans

Normally not relevant in this period (HSAF, 2009).

2.7.7 Effectiveness

Likelihood of the project delivering environmental benefits

Since the SEA (including tools and solutions to mitigate negative environmental impacts) was not carried out in the PDP and it was implemented late in the NHP, the environmental issues and risks were not mentioned and implemented at strategic and planning stages.

In the specific projects, there are solutions to mitigate the environmental impacts. However, except for some certain projects, most of solutions are still general, just to deal with the requirement of the Law. Moreover, lack of mechanisms and low capacity of Government agencies to monitor processes also causes low effectiveness of environmental mitigation solutions (PanNature, 2008).

This attribute can be scored at level 2 (poor).

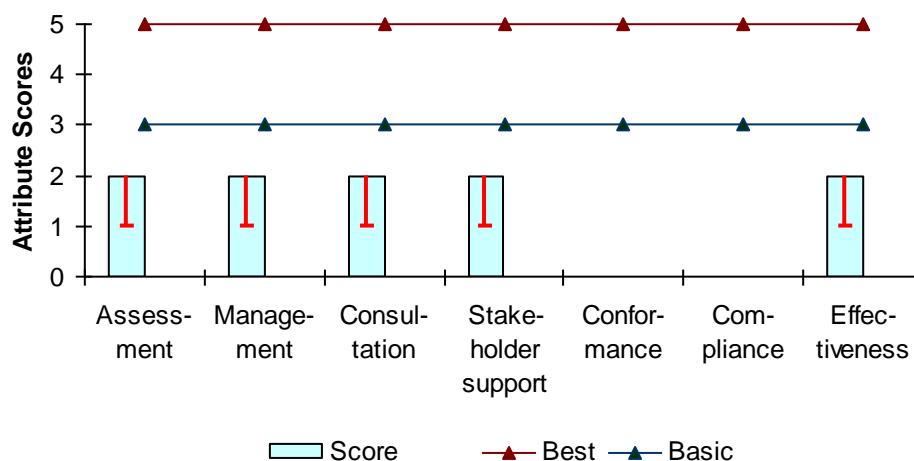
2.8 SOCIAL ISSUES AND RISKS

Objective: HSAP suggested that this aspect applies to developers who are considering a particular hydropower project or system of projects. This aspect addresses early identification and analysis of social issues and risks that may influence decisions to invest in preparation of hydropower projects or system of projects. This aspect is important because without an early stage analysis, social issues and risks may be encountered after the developer has made significant investments into project preparation and it may be difficult to consider an alternative project. The intent is that social issues and risks are well understood at a very early stage, and decisions to invest in project preparation are well-informed on these matters.

Comment of Assessor: Similar to environmental aspects, we believe that assessment on social issues and risks is crucial and needs to be implemented with all related stakeholders in the first stage, including policy makers, planners at project level and investors as well.

As shown in Figure 2.7, this aspect scores below basic good practice for most attributes due to a number of factors, such as gaps in social risk assessments and management, limited stakeholder engagement, and disclosure of information.

Figure 2.7. Social issues and risks



2.8.1 Assessment

Quality of the process leading to an understanding of social issues and risks

In Vietnam, there is no separate regulation about social impact assessment; it is seen as a part of the environmental impact assessment. Normally, social impact assessment in SEA and EIA reports are very simple and just a “formality”. For instance, the EIA

report of Huong Son hydropower project includes 96 pages but only 1.5 pages relate to social impacts and mitigation solutions. The assessment and solutions are also general (PECC1, 2000). For instance: “*project will have negative social impacts, such as the increasing unemployment and social evils for local people. Therefore, we recommend solutions that are integrated with related stakeholders to propagate and create jobs for local people, etc*”. It doesn’t say how many people will lose or will have their employment affected or what kinds of assistance are needed to help people to overcome unemployment problems. Other ‘profound’ assessments also mention the number and ethnicity of affected people (PECC1, 2000).

This attribute can be scored at level 2 (poor).

2.8.2 Management

Planning to manage project social issues and risks

The limitation in identifying the project affected community (breakdown by groups, vulnerability assessment, and identification of special needs or assistance), need for resettlement, labour and workforce capacity (needs for capacity development, and/or bringing in external workers), safety, public health, cultural heritage, also has its implication in planning to manage the social issues and risks.

Most members of SEA and EIA teams have expertise on technical and environmental issues and social expertise is rarely found. Therefore, there is usually no project research on social structures and traditional cultures as a basis for developing strategic solutions for cultural and social issues and risks (PanNature, 2008). Only the SEA for the NHP proposes assessments specifically on social issues. However, similar to environmental aspects, the SEA for NHP was carried out late rendering its effectiveness very low (ADB and SEI, 2008).

In summary, in Vietnam social impact assessment and management is not seen as a separate section, but it is integrated with environmental impact assessments. Normally, social impact assessment is carried out as formality and simplistically done due to lack of involvement by those with social science expertise.

This attribute can be scored at level 2 (poor).

2.8.3 Consultation

Quality of the consultation process on the part of the developer in building understanding of project social issues and risks

Because social issues are integrated into the environmental assessment report, consultation on the social impact, especially with affected communities is almost never implemented, except the process of SEA for NHP (ADB and SEI, 2008) and some recent projects such as Trung Son, which is funded by the WB.

This attribute can be scored at level 2 (poor).

2.8.4 Stakeholder support

Likely stakeholder support for the project

Similar to environmental aspects, the likelihood of stakeholders to support the social issue and risk assessment and management is hard to qualify, considering limitations in assessment and inclusiveness (PanNature, 2008).

This attribute can be scored at level 2 (poor).

2.8.5 Compliance

Normally irrelevant in this period (HSAF, 2009)

2.8.6 Conformance with Plan

Normally irrelevant in this period (HSAF, 2009).

2.8.7 Effectiveness

Likelihoods of avoidance, mitigation or compensation of the social issues, risks and social benefit

Similar to the explanation for environmental aspect, the recent research and assessments in Vietnam show that social issues such as lack of employment and social evils are increasing in resettlement projects, including ones for hydropower projects.

Compensation for affected / resettled people from hydropower in Vietnam is carried out as a “package”, in which resettled houses are built by contractors and then “handed over” to local people. Money from compensation for land, crops is given once only, without sufficient training for people on how to use the money and start new livelihood and income generation activities. Therefore, frequently, people just spent compensation money on luxury things (such as building a beautiful house or buying a motorcycle...), and as a consequence, the money is finished in a short time and people remain faced with many difficulties because of lack of income alternatives (PanNature, 2008).

A study done by Consultancy on Development (CODE) in 2009 and 2010 in the hydropower resettlement in Vietnam identified four main problems in the resettlement communities as (1) The location of resettlement and housing style was not appropriate to the tradition and customs of people, (2) People were faced with the recovery of livelihoods because of lacking agricultural and suitable land for cultivation, (3) traditional culture of ethnic minorities was eroded, and (4) environment and natural resources were degraded (CODE, 2010).

The common direction of the Government of Vietnam for all resettled communities due to infrastructure and hydropower projects is “to secure the resettled communities to have better or equivalent life as at their former location”. However, this aim does not appear to have been achieved by most of hydropower resettlement projects. In the 15 years review workshop on resettlement of hydropower projects, both Government and the National Assembly concluded that resettlement projects had not reached the expected objectives (MARD, 2004).

A survey by CODE in early 2010 with 467 households in four hydropower project sites in Vietnam (Hoa Binh, Tuyen Quang, Ban Ve and Yali) shows that: 83% of households claimed that their livelihoods got worse off since they resettled for the hydropower projects; 76.9 % of households said that they were not satisfied with their current life in the resettlement area and 78.77% of households said that they had limited opportunities to access the natural resources in the resettlement areas (CODE, 2010).

This attribute can be scored at level 2 (poor).

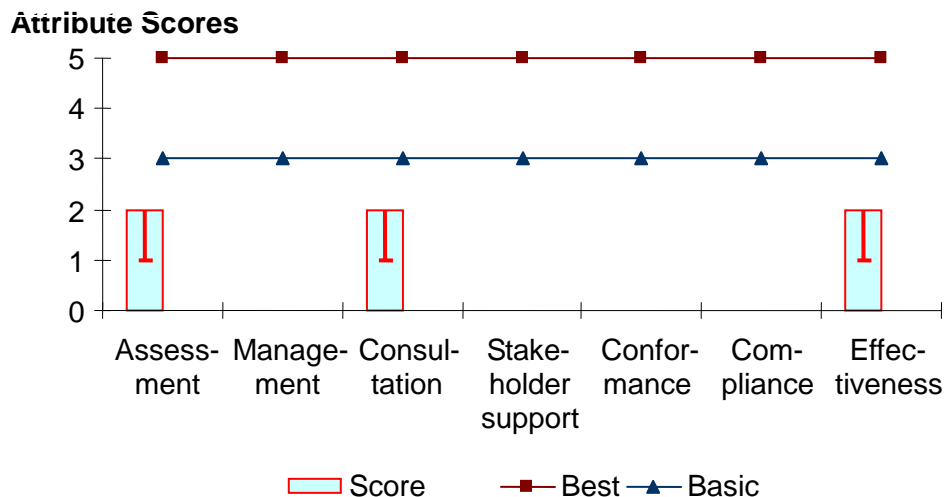
2.9 ECONOMIC & FINANCIAL ISSUES & RISKS

Objective: HSAP suggested that this aspect applies to developers who are considering a particular hydropower project or system of projects (HSAP, 2009). This aspect addresses early identification and analysis of economic and financial issues and risks that may influence decisions to invest in preparation of hydropower project or system of projects. This aspect is important because without analysis at an early stage, economic and financial issues and risks may be encountered after the developer has made significant investments into project preparation and it may be difficult to consider an alternative project. The intent is that economic and financial issues and risks are well understood at a very early stage, and decisions to invest in project preparation are well-informed on these matters.

Comment of Assessor: The Aspect of Economic & Financial Issues & Risks is most relevant to the assessment of a specific hydropower but not very much relevant for assessment of a national energy/hydropower plan. However, some Attributes that address the financial issues and risks can be applied for assessment.

As shown in Figure 2.8, this aspect is scored as between “levels 2 and 3” for most attributes due to a number of factors discussed below.

Figure 2.8 Economic and Financial Issues and Risk



2.9.1 Quality of Assessment

Quality of the process leading to an understanding of economic and financial issues and risks

During the development of policies and strategies, policy makers cannot deeply analyze economic and financial aspects of one or a system of hydropower projects. This is the responsibility of planners of a specific project defining in the project preparation phase (Pre-FS, FS and technical design). However, during the development of short term or medium term strategies or plans (every 5-10 years), policy makers should recognize financial issues (e.g. Where is financing coming from? State budget? Domestic or international loans?) and possible risks (e.g. budget deficits, regional or global financial crisis).

Financial issues are vaguely mentioned in hydropower development policies of Vietnam. Studying the PDP VI, the following characteristics can be observed:

- Due to lack of competitiveness in production and business, investment and development, the management effectiveness is not high;
- State monopoly is visible which can lead to an authoritarian approach;
- Accounting of electricity development and transmission is not separated; and
- The capacity of balancing financial sources for investment and development is not good.

This attribute can be scored at level 2 (poor).

2.9.2 Management

Generally not relevant at strategic assessment stage (HSAF, 2009).

2.9.3 Consultation

In the process of building PDPVI and NHP, the financial issue was not mentioned in any stakeholder meeting as the financial issue was seen to be the responsibility of the Government and Investors (interview with leader of IE in May 2010).

This attribute can be scored at level 2 (poor).

2.9.4 Stakeholder Support

Generally not relevant at strategic assessment stage (HSAF, 2009).

2.9.5 Compliance

Generally not relevant at strategic assessment stage (HSAF, 2009).

2.9.6 Conformance with Plans

Generally not relevant at strategic assessment stage (HSAF, 2009).

2.9.7 Effectiveness

As mentioned in the assessment and consultation attributes, the financial issue was vaguely mentioned in PDP VI and was not mentioned in the stakeholder consultation.

This attribute can be scored at level 2 (poor).

3.0 CONCLUSION OF RAPID ASSESSMENT

Table 3.1 presents the overall outcomes of our rapid assessment. They present both the high and low attribute scores and the total average of each aspect. The graph also shows the majority levels of the attribute scores. In this study, most of the attributes obtain lower scores for both process and performance attributes.

Table 3.1 Summary table of overall outcomes of the assessment

ASPECT NAME	Process Attribute Scores			Performance Attribute Scores				For Plotting		
	Assessment	Management	Consultation	Stakeholder Support	Conformance with Plans	Compliance	Effectiveness	Lowest Attribute Score	Highest Attribute Score	Average
Demonstrated Need	3		3	2.5				2.5	3	2.9
Options Assessment	3		2.5	3			3	2.5	3	2.9
Policies & Planning	3	3					3	3	3	3.0
Institutional Capacity	2	2					3	2	3	2.3
Political Risks	2	2					3	2	3	2.3
Technical Risks								0	0	0.0
Environmental Risks	2.5	2.5	2	2			2	2	2.5	2.2
Social Risks	2	2	2	2			2	2	2	2
Economic & Financial Risks	2		2				2	2	2	2

The integrated results of the assessment show that there are certain discrepancies in the scoring. This resulted from either: i) lack of clear guidelines in HSAP; ii) quality of data and information for evaluating; or iii) professional background and affiliation of the assessors. Nonetheless the exercise of the rapid assessment of water and energy planning in Viet Nam provides two main benefits. First of all the team and participants have got better understanding of the HSAP. Secondly, the evaluation process led to a better understanding of the progress and challenges that Viet Nam has in ensuring sustainable water and energy planning and development in the coming years and decades.

4.0 EXPERIENCE WITH APPLICATION OF 2009 DRAFT HYDROPOWER SUSTAINABILITY ASSESSMENT PROTOCOL

In general, theoretically, Section I is a good tool for the strategic assessment phase of energy and water development in order to know whether to continue with the project preparation phase or not. The HSAP was appreciated by the participants as a potential participatory tool to assess hydropower sustainability. Participants in discussions held during the development of this report felt that HSAP (HSAF, 2009) was an applicable assessment tool which bore some connection with the essential values of WCD. At the same time, they found that HSAP content is complex and not easily understood, and needs to be simplified, and proper training should be provided to the assessors. It would be useful to provide HSAP to stakeholders in their local language and clarify the place of HSAP, its legality and applicability in the national system (VNWP, 2009).

The assessment team also had some difficulties during the assessment:

- HSAP enables the production of a sustainability profile for a project through the assessment of performance within important sustainability topics, so the use of HSAP (Section 1) to assess the planning process for power and hydropower development is challenged as many Attributes for assessment are found not relevant or not clear yet.

- In the updated version in May 2010, some Aspects have been simplified for assessment. However, some Aspects in Section 1 are still difficult to implement or not suitable for the strategic assessment phase. For example with Aspect 1, given the current economic development situation of a nation and of the Mekong region in general, once energy demands increase then energy deficits will be prevailing in all countries.
- Section 1 of the HSAP should be used for assessment of the energy and hydropower planning and strategy; it is not much relevant for assessment of an individual hydropower project.

For Vietnam, once Master plans for power development have been developed and updated (every 5 years), the nation will find ways to best exploit this hydropower resource (for energy security reasons) at its full scale. This means in 5 years' time, the hydropower potential of Vietnam will be basically exploited.

5.0 REFERENCES

ADB and SEI (2008) *Strategic Environmental Assessment for Sustainable Hydropower Development in Viet Nam Policy Summary July 2008*, accessed on line at <http://www.gms-eoc.org/CEP/Comp1/docs/Vietnam/Hydropower/PolicySummary.pdf>

ADB (2007) *Benefit Sharing Mechanisms for People Adversely Affected by Power Generation Projects in Viet Nam*, Hanoi, Vietnam

Chien, Bui Ba. (1999) *Synthetic report on designing for resettlement of hydropower projects*.

CODE (2010) "Resettlement situation and satisfactory of resettled communities in hydropower in Vietnam". Hanoi, Vietnam.

CRES (2001) *Study into impact of Yali Falls Dam on resettlement and downstream communities*. Vietnam National University. Hanoi.

EVN (2007) *National Hydropower Development Plan*. Hanoi, Vietnam

Freshfields Bruckhaus Deringer (4/2005) Vietnam - New Electricity Law. Online at: <http://www.freshfields.com/publications/pdfs/practices/11269.pdf>. Accessed 28/1/2011.

Government of Vietnam (2004) *Strategy for development of power sector from 2004 to 2010 with vision to 2020*. Hanoi, Vietnam.

ICEM (2010) MRC Strategic Environmental Assessment for Hydropower on the Mekong Mainstream Impacts Assessment (Opportunities and Risks), Discussion Draft, MRC initiative on Sustainable Hydropower (ISH), Mekong River Commission Secretariat, Vientiane, Lao PDR.

Institute of Energy (IE) (2001) National power development plan during period 2001-2010 with respective towards 2020.

Institute of Energy (IE) (2004) Development strategy for power generation during the period 2004-2010 and orientation towards 2020.

Institute of Energy (2007) National power development plan during period 2006 – 2015 with viewing to 2025.

Ledec, G. Quintero, J.D. (2003) *Good Dams and Bad Dams: Environmental Criteria for Site Selection of Hydroelectric Projects*, the World Bank, Washington, USA. Online at: [http://siteresources.worldbank.org/LACEXT/Resources/258553-1123250606139/Good and Bad Dams WP16.pdf](http://siteresources.worldbank.org/LACEXT/Resources/258553-1123250606139/Good_and_Bad_Dams_WP16.pdf). Accessed 28/1/2011.

Luong Van Dai (2007) *Figures on Vietnam Electricity Sector: Potential and plan of hydropower Development* – <http://www.vncold.vn/Web/Content.aspx?distid=833>

Nguyen Quoc Khanh (2010) *Review of power demand forecast in PDP VI*, Experience sharing: Electricity Development in Mekong Region and Mee Net partners' meeting 2010 Hanoi, 18-19 August, 2010.

MARD (2004) *National workshop of sharing experiences on compensation and resettlement in the hydropower and irrigation projects*. Workshop proceedings, dated 2 June 2004, Hanoi, Vietnam.

MONRE (2006) *National Strategy for Water Resources Up To 2020*, Cultural and Information Publish House, Hanoi, Vietnam.

PanNature (2008) *Environmental Assessment in Vietnam: From legal to practice* workshop held by PanNature and VUSTA. Hanoi, Vietnam.

Parliament of Vietnam (1992) *Constitution of Socialist Republic of Vietnam*, Hanoi, Vietnam.

Parliament of Vietnam (2003) *Land Law*, Hanoi, Vietnam.

Parliament of Vietnam (2004) *Electricity Law*, Hanoi, Vietnam.

Parliament of Vietnam (2005) *Environment Protection Law*, Hanoi, Vietnam.

Parliament of Vietnam (2003) *Biodiversity Law*, Hanoi, Vietnam.

Prime-Minister of Vietnam (2007) *Decision to approve National Electricity Development Planning period 2006-2015, viewing to 2025*, Hanoi, Vietnam.

Prime-Minister of Vietnam (2007) *Decision of the Prime-Minister on approval of the National Energy Strategy to 2020, viewing to 2050*, Hanoi, Vietnam.

PECC1 (2000) *Report on Environmental Assessment for Huong Son hydropower Project*". Hanoi, Vietnam.

PECC1 (2006) *Report on Environmental Assessment for Lai Chau hydropower Project*. Hanoi, Vietnam.

Quintero, J.D. (2007) *Mainstreaming Conservation in Infrastructure Projects: Case Studies from Latin America*, the World Bank, Washington, USA.

SWECO (2005) *National Hydropower Plan (NHP) Study, Vietnam Draft Final Report: Volume 1 – Executive Summary*. Hanoi, Vietnam.

SWECO and NORPLAN (2007) *Final report of National Hydropower Plan Study, Vietnam*. Hanoi, Vietnam.

VNWP (2009) *The Report on National Meeting on Introduction of International Hydropower Sustainability Assessment Forum's draft of Hydropower Sustainability Assessment Protocol*. Vietnam Water Partnership, Hanoi, Vietnam.

VUSTA (2007) *Study Report on "Assessment of Vietnam Power Development Plan"*. Hanoi, Vietnam.

WB (2000) *Operational Policy/Bank Procedures OP/BP 4.12 on Involuntary Resettlement*. World Bank.

WCD (2000) *Dam and Development: A New Framework for Decision- Making*. The report of the World Commission on Dam. London: EarthScan.

<http://vietnambusiness.asia/vietnam-signs-us200m-credit-deal-with-wb-for-power-policy-program/>

<http://news.vneconomy.vn/20100824114222331P0C6/forever-following.htm>

APPENDICES

Appendix A1

Assessment Team

Assessment team comprises 4 experts who have experiences in the fields of energy and hydropower development, environment, socio-economic development are mobilized for rapid assessment.

- Dr. Đào Trọng Tứ, An institutional, water resource management and international river basin development expert with 35 years of experiences in different fields: hydraulic and hydropower planning, management and planning of water resources; institutional building in water sector of Vietnam. He participated in the formulation and management of many projects funded by ADB, WB as Vice Director of International Cooperation Department of Ministry of Agriculture and Rural Development (1994-2003). He also has many years of experience working in Mekong River Commission as member of Study Team of International Water Law (1992-1993), Acting Office In Charge Mekong River Commission (10/2004-4/2004), Director of Operations Division of MRCS) (2003-1/2007), Deputy Secretary of Vietnam Mekong River Committee. Dr. Tu participated as manager and formulator of projects as Hydropower Program, Flood Management and Mitigation, navigation components, aquaculture component etc. of MRC. Dr. Tứ is responsible for following Aspects: AI-3 (Regional & National & Policies & Plans); AI-6 (Technical Issues & Risks) and AI-9 (Financial and Economic Issues & Risks). He is responsible for general coordination and synthesis of Draft Report.
- MSc. Lê Thị Ngọc Quỳnh, Environment Expert who has participated in many State and Sector Level Programs in environment field in hydropower projects. At present, she is Deputy Director of Science and Technology Board of EVN. Ms. Quỳnh is responsible for the assessment of following aspects AI-1 (Demonstrated Needs) and AI-2 (Options Assessment).
- MA. Phạm Quang Tú, Socialist and Environment Specialist, who has took part in many studies in the field of development and environment protection, community development both nationally and internationally. Mr. Tu is presently Vice Director of Consultancy on Development (CODE). In this assessment he is responsible for the assessment of Aspect AI-7 (Social Issues & Risks) and AI-8 (Environmental Issues & Risks).
- Dr. Bạch Tân Sinh, Institutional, Capacity Building and Intentional Cooperation. He has many experiences in fields of environment, social issues and development in

Vietnam and overseas. He is a member of M-POWER. Dr. Sinh participated in the assessment of Aspect AI-4 (Political Issues & Risks), and AI-5 (Institutional Capacity).

Appendix A2

Water/Energy in Viet Nam

1. Water resources and hydropower potential in Vietnam

Vietnam has a natural area of 331,690 km² with a population of 86 million people (statistic yearbook in 2007). Vietnam climate ranges from sub-humid climate in the Extreme North to sub-tropical in remaining areas. The average rainfall in many years is 1,600 mm and changes by region from 700 mm to 4,000 mm.

Vietnam has 2,360 river basins having length of more than 10km each. Of which, 13 have catchment area over 10,000 km², including systems of Red- Thai Binh, Bang Giang-Ky Cung, Ma, Ca, Vu Gia -Thu Bồn, Ba, Đồng Nai and Cửu Long and 4 large tributaries of Đà, Lô, Sê San and Srêpôk. Large river basins are trans-provincial. 10 out of 13 are transnational. The catchment area outside Vietnam territory is 3.3 times as large as one in Vietnam. Total surface water volume in Vietnam territory is 830-840 billion m³ per annum. The water volume formed in Vietnam is only 310-315 billion, making up 37% whereas water coming from other countries is 520-525 billion m³, making up 63% of total water volume.⁶ Water resources in river basins (both surface and ground water) play such an important role to socio-economic development and environment protection [Vietnam Water Sector Development Strategy by 2025-VNSPWRS -2006]

2. Energy sector in Vietnam

The Power Development Plan or Master Plan is a basic planning tool for the Government of Vietnam to decide on the power projects to be implemented to cover the future increase in electricity demand. Power development plans are established for the coming 10 years (with the outlook for the next 10 years). According to PDP VI (Master Plan 6) (2006-2015) which was approved by the Government in 2007, total installed capacity of EVN and independent electricity producers are 9,844 MW and 3,668 MW respectively. There are different types of electricity production (see Table 1). Hydropower makes up the largest part in electricity production. This means hydropower development in Vietnam is rapid and holds an important position in the energy development system of the country.

⁶ MONRE, National Strategy For Water Resources Up To 2020, Cultural and Information Publish House, Hanoi 2006.

Table 1: Electricity Production in Vietnam

Type	Quantity	Installed capacity, MW	% compared to total capacity	Electricity production GWh	% compared to electricity production
Hydropower	12	4,393	32.50	20,833	31.20
Thermal-electricity (coal)	3	1,545	11.40	8,925	13.40
Electricity (oil and gas)	2	654	4.50	818	1.10
CCGT	4	4,248	24.00	19,424	29.10
IPP and BOT	NA	3,668	27.60	16,772	25.20
Total	21	13,512	100.00	66,773	100.00

Source: Master Plan No. 6-2007

According to assessment of a Scientific Study at State level No. 09: “Development of Strategy and Policies for sustainable hydropower development”, the hydropower engineering potential of Vietnam is approx. 123 billion KWh, equivalent to an installed capacity of 31,000MW. After taking into account social, economic and environmental factors, this potential is likely to be 75 - 80 billion kWh or an installed capacity of 18,000 - 20,000MW. By 2008, total installed capacity of existing hydropower plants is 4,198 MW (22.8% of engineering potential), equivalent to an annual average electricity production of 18 billion KWh (reaching 22% of engineering potential of 83 billion KWh) (Master Plan No. 6-2007 and Water Sector Review-WSR-ADB & MONRE, 2008)

Table 2: Economic – Technical potential hydropower development in Vietnam

No	River basin	Capacity (MW)	Electricity (TWh)	Distribution (MWh/km ²)	Ratio, %
1	Lô - Gâm - Chảy	1470	5.81	212	7,0
2	Đà	6960	26.96	1400	32,3
3	Mã	890	3.37	74	4,0
4	Cả	520	2.09	147	2,5
5	Vũ Gia -Thu Bồn	1120	4.29	475	5,1
6	Trà Khúc-Hương	480	2.13	531	2,6
7	Ba	670	2.70	150	3,2
8	Sê San	1980	9.36	700	11,2
9	Srêpok	700	3.32	143	4,0
10	Đồng Nai	2870	11.64	436	14,0
	10 main river basins	17660	71.67	423	85,9
	Entire territory	20560	83.42	250	100

Source: Vietnam PDP VI – June, 2007

Comparing to the other countries having large hydropower potential in the world, e.g. Japan 130 billion KWh per annum, India 320 billion KWh per annum and China 1,300 GWh per annum, Vietnam has relatively small hydropower potential. By 2010, about 50% of technical and economic potential of hydropower will be realized. However, by 2025, this rate is expected to be as high as 83%, making Vietnam a nation having highest exploitation rate of hydropower potential (WSR 2008). Up to 2007, there are 9 large and medium scale hydropower plants with total installed capacity of 4,147 MW have built in Vietnam as follow:

Thác Bà: Thác Bà hydropower plant is constructed on Chảy river which is 44km away from Yên Bái town. The Plant has an installed capacity of 108MW (3x36MW), maximum capacity 120MW. The plant was constructed in 1961 and completed in 1972. The plant was funded by the former Soviet Union. The Plant has average electricity production of 430GWh in many years (lowest year 290GWh, highest year 490GWh). The Plant has been stably operated during the last 30 years and has produced more than 12 billion KWh. At present, the plant is undertaking an overhaul to replace old turbines. In July 2004 the overhaul of turbine No.2 was completed. Beside electricity

production, the plant also controls floods during flood season. The plant has much importance to irrigation, transportation and aquaculture.

Hoa Binh: Hoa Binh Hydropower Plants was constructed on Da River, in Hoa BINH town, 100km away from Hanoi. Multi-purpose goal of the plant: controlling flood for Northern Delta and Hanoi Capital + electricity generation + water supply for cities, industry and irrigation for agriculture; improvement of navigation in Da and Red River. This dam was funded by the former Soviet Union. The dam was commenced in 1979. The 1st turbine operated in the late 1988 and all turbines were operational in the late 1994. Total installed capacity of Hoa Binh Hydropower Plant is 1,920MW (8x240); average electricity production in many years is 8,160GWh. During the last 10 years, the plant has been always stably operated, bringing high economic benefits. Since the operation of turbine No.1, this largest hydropower plant in the Southeast Asia Region has supplied electricity production of more than 83 billion KWh (in equivalent of 42 million tons of coal).

Đa Nhim: Đa Nhim hydropower plant is built on the tributary of Dong Nai river system, which is 50km away from Da Lat City in the North East. The plant was completed in 1964 with funding from the Japanese Government. The installed capacity of the plant is 160MW (4x40MW), electricity production 1,000GWh. This is a hydropower plant having high water head (800m), small storage capacity and high hours using installed capacity (Tmax=6300h). For many years, the plant has been always stably operated, bringing high economic benefits. In forthcoming time, the plant will be upgraded by the Japanese Government with the rehabilitation of some components.

Trị An: Trị An hydropower plant is built on Đồng Nai river, 65km away from Ho Chi Minh city in the Northern East. The plant was funded by former Soviet Union and completed in late 1989. The installed capacity of the plant is 400MW (4x100MW), electricity production 1700 GWh. Equipment of the plant is still good condition. For many years the plant has been always stably operated, bringing high economic benefits. The plant meets a large part of electricity demands of the Southern Region of the country since it was built.

Thác Mơ: The hydropower plant of Thác Mơ is built on Bé river (a branch of Đồng Nai river system), about 120km from Ho Chi Minh city in the North. The plant was completed in 1995 with the cooperation of Ukraine. Installed capacity of the plant is 150MW (2x75MW), electricity production 600GWh. At present, there are plans to build another turbine with capacity of 75MW in 2009.

Vinh Sơn: The hydropower plant of Vinh Sơn has a capacity of 66MW (2x33MW), electricity production 230GWh. The plant is located in Con river in Bình Định province, and 120km away from Quy Nhơn City in the Northern West. The plant was completed in 1994. Equipment of the plant was supplied by French Company of Cogelec.

Sông Hinh: the hydropower plant of Song Hinh has a capacity of 70 MW (2 x35MW). The plant is located in Sông Hinh district in Phú Yên province. The plant was completed in 2000. The annual electricity production is 250GWh.

Yalmy: This plant is constructed on Sê San river in Gia lay province, 30km away from Plêiku city. The plant has 4 turbines with capacity of each turbine is 180MW. Turbine No. 1 was operated in 2000 and all 4 turbines completed in 2002. The plant produces an average electricity production of 3.65 billion KWh.

Hàm Thuận Đa Mi: Hydropower plant of Ham Thuận - Đa Mi on La Nga river in Bình Thuận province. La Nga is a tributary of Đồng Nai river. This work has two plants: Ham Thuận hydropower plant with capacity of 300MW and Đa Mi hydropower with capacity of 175 MW. These plants were constructed from preferential loan of Japanese

Government. By the end of 2001 the 1st turbine has been operated. Annually the plant contributed 1.5 billion KWh to national electricity grid. The plant also supplies irrigation water to La Nga river delta.

Cần Đơn (78MW) the hydropower plant is built on Bé river in Bình Phước province. This is a BOT type structure. Its owner is the Da River Incorporation. The structure was completed in 2004.

In the context of the new Water Law (1998), increased emphasis on environment and social issues, and severe limitations on overall investment in the water resources sector, the Government of Vietnam wishes to examine alternative strategies for meeting projected power demand, in which factors other than technical/economical have receive full consideration. This objective of the Government has, among others, resulted in the **National Hydropower Plan** (NHP) Study.

The NHP is not a “legal” document, but is intended to serve as guidance, or input, for EVN and their agencies in their planning of the development of the hydropower resources in the country and the nationwide power development plan. 22 Hydropower plants were studied in the NHP as follows overleaf:

Table 3: Main Hydropower projects in National Hydropower Plan (2007)

No	Name of Hydropower Project	Year of Operation
1	Srepok 3	2013
2	Song Bung 2	2015
3	Ban Chat	2012
4	Song Con 2	2016
5	Huoi Quang	2012
6	Song Bung 4	2016
7	Srepok 4	2013
8	Thuong Kon Tum	2013
9	Hua Na	2015
10	Dak Mi 4	2012
11	Dak Mi 1	2014
12	Dong Nai 2	2017
13	Lai Chau	2014
14	Dong Nai 5	2012
15	Song Bung 5	2016
16	Duc Xuyen	2017
17	Khe Bo	2015
18	Nho Que 3	2013
19	Trung Son	2012
20	Hoi Xuan	2012
21	Bao Lac	2017
22	Nam Na	2017