Sida Evaluation 98/10

# Swedish Support to the Power Sector in Vietnam

Bo Sedin

Department for Infrastructure
and Economic Cooperation

# Swedish Support to the Power Sector in Vietnam

**Bo Sedin**

**Sida Evaluation 98/10**

**Department for Infrastructure and Economic Cooperation**

*Evaluation Reports* may be ordered from:

Infocenter, Sida
S-105 25 Stockholm
Phone: (+46) 8 795 23 44
Fax: (+46) 8 760 58 95

Author: Bo Sedin.
NCG Sweden AB
Sten Lööf Consultants AB



Sida Evaluation 98/10
Commissioned by Sida, Department for Infrastructure and Economic Cooperation



Registration No.: INEC-199
Date or Final Report: March 1998
Printed in Stockholm, Sweden 1998
ISBN
ISSN 1401—0402
SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
Address: S-105 25 Stockholm, Sweden. Office: Sveavägen 20, Stockholm
Telephone: +46 (0)8-698 50 00. Telefax: +46 (8)-20 88 64
Telegram: sida stockholm. Telex 11450 sida sthlm. Postgiro: 1 56 34–9
Homepage: http://www.sida.se

## TABLE OF CONTENTS

# EXECUTIVE SUMMARY

## Background

Sida is in the process of preparing a new country strategy from 1999. As a part of the preparation for this new country strategy an evaluation of the Sida assistance to the energy sector was organised and implemented in October and November 1997. The evaluation work was carried out by a team of consultants organised by Sten Lööf Consultants AB. This evaluation will serve as a basis for the discussions and decisions on the future Sida assistance to the energy sector in Vietnam.

## Purpose of the Evaluation

The focus of the evaluation work could be summarised as follows:

- A more general assessment of the impact of the programme in terms of economic development, relevance, introduction of new techniques and methods both in the planning and technical fields, adherence to Sida policies, etc.;
- Economic aspects with an emphasis on cost-efficiency and financial soundness;
- Technical aspects with the evaluation concentrating on choice and transfer of technology, as well as questions related to the maintenance of the equipment provided under the Sida programme;
- Institutional and competence development aspects of the assistance;
- Environmental considerations and their role in the programme support activities;
- Gender and poverty aspects of the programme.

## Energy Sector of Vietnam

Vietnam is rich in energy resources. Not counting non-commercial energy sources as wood fuel, straw and charcoal, the main energy sources consist of coal, hydropower, oil & gas and uranium. Presently the backbone in the production of electric power in Vietnam is hydroelectric power with a total installed generating capacity of about 4500 MW. For the past ten years the production of electricity has been increased by approximately 11 % annually. The growth in demand for electricity is expected to continue to grow rapidly and reach 30 TWh in year 2000.

## Main Feature of the Sida Assistance

The Sida assistance to the sector started in 1984 and was at that time focused on improving the supply of electricity to Ho Chi Min City. During the 1990s the assistance has diversified substantially both geographically and in regard to fields covered by the Swedish financed inputs. The assistance provided under the Sida power sector programme could, broadly speaking, be divided into the following main categories of activities:

- *Distribution of Electricity.* The assistance in this field has consisted of the physical rehabilitation and expansion of existing distribution systems in a number of cities and towns in Vietnam. In addition, new planning and load dispatch equipment and techniques have been provided, basically in order to reduce losses and otherwise improve the efficiency and safety of the distribution systems.

- *Generation of Electricity*. In addition to the assistance to the generation of electricity to the Ho Chi Min City, the Sida assistance in the power generation field has been directed to hydro-power. In this field Sida is co-financing the Song Hinh hydro-power project.

- *Capacity Building*. A third and increasingly important field of co-operation has been a number of projects in the fields of management training and skills development.

## Power Sector Reform

In January, 1995, a major reform of the power sector took place in Vietnam. The government bodies responsible for the generation, transmission, distribution and supporting services in the power sector were reorganised and made part of Electricity of Vietnam (EVN) which was given the legal status of a state corporation. The Ministry of Industry, to which EVN reports, retains in principle only policy and control functions. The operational responsibility is left with EVN and its operating companies. The status of implementation of these institutional reforms could be summarised as follows:

- The managerial and financial independence of EVN has not yet been fully implemented, which means that a number of decisions in e.g. the investment and technical fields are taken at Ministerial level. This fact does not only hold back the development of a modern, market oriented managerial structure at EVN, it also creates bottlenecks and delays of an operational nature.

- These major organisational and managerial changes are being implementation during a period of unprecedented development and growth in the power sector. This dual responsibility calls for exceptional management capabilities.

- The establishment of EVN could be seen as a way to encourage alternative sources of finance for power sector development.

The energy sector policies of both the Government of Vietnam and Sida are well in tune with the reform process outlined above.

## Impact of Sida Assistance

The Sida assistance to the power sector has been given the broad objective "to promote a more efficient power supply to facilitate economic growth and development in Vietnam". While it is difficult or outright impossible to measure the impact of the Sida power sector activities in quantifiable terms, it is still possible to have an idea about the usefulness of the sector programme.

- The most direct and visible impact on society of the projects financed by Sida can be traced in the distribution projects. A sample of consumers in Qui Nhon reported that:

  > ”With the improved electricity network, the industry and small production develop strongly, the daily living is getting easier, and more jobs are created”

  Most of the distribution projects have a design and implementation pattern similar to Qui Nhon which could be taken as an indication of the development and poverty alleviation impact on the local population serviced by the Sida assisted project.

- Sida was the first western country providing external assistance in the power sector to the Peoples' Democratic Republic of Vietnam. The Swedish assistance was therefore an early supplier of modern power generating and distribution equipment as well as techniques in the field of power distribution planning and operations. In these fields, the Sida assistance has played a pioneering role in introducing modern techniques to the power sector of Vietnam.

- There is a general appreciation on the Vietnamese side that the Sida assistance has played a helpful role in facilitating the introduction of other aid programmes into Vietnam. It is difficult to objectively verify the validity of this opinion, but other aid donors in Vietnam, e.g. IBRD, obviously share this Vietnamese sentiment.

- Environmental protection has consistently been brought up by Sida during the annual sector reviews with the Vietnamese authorities. This is an indication of environmental concerns being actively pursued not only at policy level but also at an operational level. A case in point is the Song Hinh hydropower project for which Sida has financed an Environmental Impact Assessment (EIA) study.

- One set of problems which are not specific for the Sida activities, but which still influences he performance of the programme, is implementation delays. The problems in this field has been growing since 1994 and could be attributed to:

  - The general level of activity in the power sector which has been growing over the years;

  - The increasing number of aid programmes operating in the sector, which has increased the burden of co-ordination and liaison;

  - The major institutional reform of 1995 which will take a lot of managerial effort and capacity for a long time to come, leaving less time for planning and operational activities.

  These developments have, taken together, certainly been taxing on the capacity of EVN and its subsidiaries. However, the question is whether the centralised decision-making in most investment and technical matters is the real culprit. Most of the delays seem to be connected to decisions at Ministerial level. Only when EVN has been given a higher degree of financial and technical responsibilities will it be possible to resolve this problem in a more fundamental way.

## On-Lending Conditions

A contentious question has been the financial conditions under which the investment type of assistance is provided. The fact that EVN and it's subsidiaries are supposed to operate commercially means that investments in e.g. the generation and distribution fields should be made available to EVN on commercial terms. By specifying on-lending conditions for such investments similar to those charged for commercial projects, donors like Sida could make aid and commercial projects more equal in financial terms. Sida is using this option and has over the last few years slowly increased the on-lending terms (which has now reached 3.5 - 4%) for this type of assistance. This rate is well below commercial rates and what other donors, like the IBRD, are charging. However, Sida has taken the line that during the present, transitional period from the old state run type of operations to a fully commercialised mode, EVN needs access to low cost investments in order to retain low tariffs as a benefit to poor consumers.

## Relevance of the Sida Assistance

A starting point in a discussion about the relevance of the Sida assistance to the power sector is the simple but important fact that the ownership of the programme has been that of the Government of Vietnam. The identification, design and implementation of the projects clearly reflects strongly felt local needs. This central position of the Government of Vietnam

in determining the content of the programme, combined with Sida's "concerned participation" have resulted in a situation where:

- The Sida programme has been flexible and has on the whole been able to adjust to the changing requirements of the power sector in Vietnam.

- Sida has recognised the importance of the institutional reform process and the need to support and assist this process.

## Efficiency of the Sida Programme

The discussion above indicates that although it is impossible to determine the impact of the Sida power sector programme on the economy of Vietnam in a quantitative terms, it is still possible to claim that the programme has had beneficial consequences both for the sector and for the economy as a whole.

- The planning for and implementation of the Sida financed projects have, with the exception of delays in the approval processes mentioned above, improved during the 1990s. A number of factors have contributed to this positive development:

    - The services provided by the Energy Adviser and other backstopping support provided by Sida;

    - The introduction of the Logical Framework Approach (LFA) as an instrument to improve project planning, monitoring and review. It has admittedly taken some time for the LFA tool to work as intended. This is hardly surprising as we are here talking about a learning process involving Sida staff, officers in the power sector as well as consultants and experts. The application standard of the LFA in the different projects varies, but seems to have steadily improved over time

- It is important to note, first of all, that once equipment, material and other aid inputs have arrived in Vietnam (after clearance through customs), they appear to have been put to their intended use without undue delays.

- The design and composition of the individual projects appear to be well balanced (not creating unnecessary bottlenecks or excess capacity). There are of course exceptions to this general rule but the programme as a whole seems to be well put together.

- There is a general complaint from the Vietnamese side that Swedish equipment and material is too expensive. It is difficult to prove that this is the case taking into account quality considerations and supplementary services often provided by Swedish suppliers. On the other hand, much of the equipment and material provided under the Sida programme is fairly standard and it is conceivable that the lowest bidder often enough is providing products of adequate quality. This argument could be taken as an indication that the Sida programme is providing excellent material and service but at too high a cost, thus not being cost effective.

On balance it would appear that the Sida power sector programme has financed a series of worthwhile inputs to the power sector, which also have been put to good use. However, these benefits have been provided at a cost, somewhat above what could possibly have been achieved by a different procurement regime.

## Choices for the Future

Sida has played an important catalytic role in helping Vietnam expand and modernise its power sector. It would be possible to argue that this phase now is successfully completed. A number of other bilateral aid programmes are operational in the power sector and Vietnam is also in a position to tap into the vast pool of financial resources, experience and knowledge available from the large international lending institutions IBRD and AsDB.

In this situation there are in principle two main lines of actions open to Sida:

1. One would be to consider the work done and phase out the whole or most of the sector as a recipient of Sida assistance.

2. The other line would be to realise that much work remains to be done in the power sector and that Sida, thanks to its long and extensive experience still has much to offer Vietnam. What is required is basically to find those specific areas where Sida has a special capacity or competence.

A number of arguments could be advanced for the second alternative of which the strong wish of the Vietnamese authorities to see a continuation of the Sida assistance is maybe the most important one.

## Recommendations

Based on the assumption that there is both scope and need for a continuation of the Sida assistance to the power sector, the following more concrete proposals are proposed for future consideration:

*Support to the Institutional Reform Process*

In addition to the ongoing activities in the management and human resources field Sida could also provide strategic advise and support to the whole reform process through high level management and organisational advise to the Ministry of Industry and EVN. Such advise could cover areas related to the future role of EVN and the concrete planning for the implementation of such changes.

*Rural Electrification*

A rural electrification strategy for Vietnam is being prepared with external assistance. Based on this forthcoming strategy a Sida programme for rural electrification could be developed. Sida assistance to rural electrification would be one way to more explicitly address the priority area of poverty reduction. Project activities in this case could be of two basic types:

- Assistance to villages which are already hooked up to the EVN supply system but which have a poorly designed, wasteful and unsafe local distribution system. Assistance of this type could also be provided to villages which have enough of a demand for electricty and is close enough to the electicity grid to be connected;

- Poor, remotely located villages could be provided with at least a minimum level of electricity through photovoltaic cells, wind power or other types of alternative sources of energy.

It is of considerable importance that any such scheme is based on an expression from the local population of a genuine, felt need for the service provided through the rural electrification scheme.

*Financing of Power Generation, Transmission and Distribution Systems*

Sida has the possibility to finance fully or partially new production or distribution capacity in the power sector of Vietnam. Such loans could be provided for projects which fit within the new Sida energy policy. These projects should provide the investment resources needed by EVN on on-lending terms similar to those of purely commercial projects.

*Engineering Standards*

The ambitious investment programmes in the power sector could result in a shortage of engineering capacity in the planning, design, commissioning, maintenance and operation of plants. An uniform engineering standard used in all the EVN companies could be an effective tool to handle these problems. Swedish utility companies and consulting firms have a long experience of using engineering and operational standards in the power sector and Sida assistance should be used to make this experience available to EVN.

*Strengthening Local EIA Capacity*

In the environmental protection field a long term strategy for Sida could be to support a capacity building progamme with the purpose of strengthening government institutions and non-governmental organizations to mainstream EIAs and resettlement studies and subsequently transforming the results of such analyses into appropriate actions.

# CHAPTER 1 PROGRAMME CONTEXT

## 1.1 THE ENERGY SECTOR IN VIETNAM

### 1.1.1 General

The per capita consumption of energy in Vietnam, at around 150 kilograms of oil equivalent (kgoe), is amongst the lowest in the world. Corresponding figures for the Philippines and Thailand are 225 and 350 kgoe respectively.

Vietnam is rich in energy resources. Not counting non-commercial energy sources such as wood fuel, straw and charcoal, the main energy sources consist of coal, hydropower, oil & gas and uranium. According to the Master Plan for electric power development to 2010, the estimated potential is as follows in TOE (million tons of oil equivalents) or as otherwise stated:

| | |
|---|---|
| Anthracite coal | 700 |
| Oil and gas (Geological reserve) | 1,500-2,000 |
| Uranium ore | 2,300 |
| Hydroelectric power | 13,000 MW |

The above figures should be regarded as estimates but nevertheless provide an indication of the structure and size of the energy resources in Vietnam.

Concerning nuclear power, this energy source is not included in any master plan but has been mentioned as an option after 2010.

It is interesting to note that the use of non-commercial energy is substantial and amounts to over 50 % of the total primary energy consumption at present. As to non-commercial energy consumed, in the northern part of the country rice straws and husks represent the bulk of the energy used. In the Mekong delta in the south, wood along with coconut shells and wood residues make up the major part of the traditional fuels. The government is developing programmes for exploiting non-commercial energy with improved efficiency and comfort.

### 1.1.2 Coal

Vietnam's coal reserves are estimated to be in the order of 3.5 billion tons, most of which are located in the northern province of Quaking Ninth. The annual production during the most recent years is in the order of 7.5 m tons, which is somewhat lower than earlier years. The reason for the decline is that large hydro-electrical capacity has been installed during the last few years. Amongst the hydro-electrical plants which have been added to the generation capacity of Vietnam, the Hoa Binh plant of 1,920 MW is of particular importance. Partly as a result of the commissioning of the Hoa Binh generating facility, the coal production units are operating at about half of their installed capacity.

However, by the year of 2000 the production is expected to have reached 10 million tons of coal annually due to a higher demand from the industry but also from the power sub-sector. While the cost of coal production is low the cost of ocean freight is about three times higher than that for the traditional coal exporters. This is primarily due to the small and inefficient Vietnamese ports.

An alternative to coal export in this situation would be to burn Vietnamese coal in local coal-fired power stations and export the electricity to e.g. China.

### 1.1.3 Hydro-Carbon Products

Oil and gas exploration and exploitation have a relatively short history in Vietnam. The first oil well was tapped in 1987. As Vietnam is lacking domestic refinery capabilities, all oil has so far been exported. Consequently, all refined oil products have to be imported. There are plans, however, to build a refinery with the help of foreign investors. Such a plant could start operations in 1999.

Gas has only been exploited during the last few years but is expected to become an important source for production of electricity in the future. Pipelines will be built to transport gas to several power stations, which today use oil. According to recent estimates gas could, within a decade, be the energy source used for about 30 % of the production of electricity. Comprehensive oil and gas surveys have not yet been completed, which means that the appraisals of the reserves are only in the initial stages.

### 1.1.4 Hydro-electric Power

Vietnam has large hydroelectric resources, particularly in the northern part of the country. The largest plant, commissioned in 1994, is the Hoa Binh plant in the north with an installed capacity of 1,920 MW. This plant was originally a scheme provided by the Soviet Union, with major Ukrainian inputs. The present installed capacity for the whole of Vietnam is 2,900 MW. Another 800 MW of hydropower generation capacity is under construction or has been approved for construction. The Master Plan up to 2010 includes a large number of hydro-electrical plants to be added to the existing power generating system. For further details see 1.2.3 below.

## 1.2 THE POWER SUB-SECTOR

### 1.2.1 General

The backbone in the production of electric power in Vietnam is hydroelectric power generation. The total installed capacity of generating plants is about 4500 MW, of which 64% is hydro, 19% thermal (coal and oil) and 17% gas and diesel turbines. In 1996, the total generation reached 17 TWh, an increase of 16 % compared to 1995.

### 1.2.2 Demand for Electricity

For the past ten years the production of electricity has been increased by approximately 11 % annually, from 5.4 TWh in 1985 to 14.6 TWh in 1995. The growth in demand for electricity is expected to grow rapidly to reach 30 TWh in year 2000.

Industry consumes approximately 40 % of the electricity produced, households and public consumers 37 %, and the balance of 23 % is consumed by agriculture, commerce and others. Reaching 30 TWh in 2000 still means a limited use of electricity per capita (400 kWh/year, compared to Sweden 16,000 kWh/year).

### 1.2.3 Power Generation

As mentioned above, the present generating capacity is about 4,500 MW. 2,900 MW is hydroelectric, coal 645 MW, oil/steam power 200 MW, gas turbines 390 MW and diesel 377 MW. The main part of the hydro-electrical potential is located in the northern part of the country, whereas the oil and gas fields are located offshore in the south.

A large number of generating plants are planned to be built and commissioned during the forthcoming years as outlined in Appendix 1.1

### 1.2.4 Power Transmission

A 500 kV transmission line connecting north to south in Vietnam was commissioned in 1994. The line permits excess power from the north to be transmitted to the south where power shortage was common before the line was built. A new 500 kV line between the southern terminal of the existing line up to the central part of Vietnam is under review. At the end of 1994 the 500 kV system consisted of 1,462 km of lines and 2,850 MVA of transformer capacity. Corresponding figures for the 220 kV and 110-66 kV lines were 2,223 km/2,857 MVA and 5,035 km/3,378 MVA respectively.

For the 1995-2000 period there are plans to expand the transmission capacity with:

| kV | Transmission lines | Transformer Capacity |
|---|---|---|
| 220 | 1185 km | 3500 MVA |
| 110 | 1611 km | 4025 MVA |

### 1.2.5 Power Distribution

The power distribution network comprises approximately 40,000 km of 66-35 kV lines, 18,000 km of low voltage lines and approximately 9,000 MVA of transformer capacity. The government has decided to use only one medium voltage level in the future, 22 kV.
The technical and non-technical losses on the distribution network are very large. In some parts of the distribution system losses up to 50 % have been recorded. A part of this problem is that much of the equipment is outdated and running far above its capacity. Another factor is that unrecorded tapping of the net is common.

At present about 80 % of the population live in rural areas, of which somewhat less than half along the Red and Cuu Long rivers, an area with considerable mineral, forestry and fishing potential. The policy of the Government of Vietnam is that 70 % of the households in the rural areas shall be supplied with electricity by the year 2010.

### 1.2.6 Institutional aspects.

Until 1995, the power sub-sector was divided into three parts:

- Power Company No. 1 (PC1) responsible for the northern part of Vietnam;
- Power Company No. 2 (PC2), responsible for the southern part, and;
- Power Company No. 3 (PC3) responsible for the central part.

These three companies reported directly to the Ministry of Energy. In addition to these three companies there were several entities dedicated to engineering, construction and other services.

Early in 1995 a major restructuring took place. The EVN (Electricity of Vietnam) was formed to become the holding company under the Ministry of Industry, responsible for all generation, transmission and distribution of electricity in Vietnam.

Reporting to EVN are:

- 12 generating and 5 transmission business units which are all subject to dependent accounting, reporting to the Director General through the Deputy Director General in charge of production;

- 5 state enterprises engaged in distribution and as independent accounting enterprises reporting directly to the Director General of EVN;

- Business units providing different types of supporting services. These units are either dependent or independent accounting units.

The idea behind the restructuring was to separate the operational aspects of the electricity sector from the policy making and supervisory functions, which were left with the responsible ministries. These kinds of institutional changes are normally time-consuming and it is therefore hardly surprising that the reform process is far from completed.

There is no regulatory body in Vietnam but studies are under way, with foreign assistance, to help define a suitable regulatory framework for the country, including an electricity law.

### 1.2.7 Economy and Finance

The power sector is in a period of fast expansion. The level of investments during the next few years for generating plants, transmission lines and distribution networks is expected to be in the range of 1-1.5 billion US$ per year. Available domestic financial resources will not be sufficient and major external investments, from both major international lending institutions and the private sector, are expected to play a large role in this future investment programme.

The extent to which the power sector will be able to attract the required investment capital will be related to the managerial capacity and financial competence of EVN and its subsidiaries. The financial status of EVN is at present the subject of a major IBRD funded financial audit. While the outcome of the ongoing audit will be of considerable interest for potential investors, the more long-term questions seem to be related to the level and composition of the electricity tariffs in Vietnam.

The average tariff level per kWh is somewhat over US¢ 5 at present. Special low tariffs are offered to rural subscribers, who pay approximately US¢ 3 per kWh. The government policy is to raise the average tariff level to US¢7 by 1999. Through this increase Vietnam will reach a level of tariffs in line with neighbouring countries. It is also assumed that EVN and its subsidiaries will, at that tariff level, be able to achieve the degree of financial autonomy envisaged as a corner stone of the institutional reform package introduced in 1995.

### 1.2.8 Social and Environmental Aspects

The Government of Vietnam has acknowledged that the rapid expansion of electricity supply to urban and semi urban areas must be supplemented with more forceful measures in the field of rural electrification for social and economic reasons. A rural electrification study is under preparation, which will assist the government in formulating a more concrete policy in this field.

The National Plan for Environmental and Sustainable Development adopted in 1991 is the basis for the process of introducing policies, regulations and programmes for environmental issues. In the power sector, Environmental Impact Assessments (EIAs) form part of any study being made, particularly in the field of power generation.

## 1.3 EXTERNAL ASSISTANCE

External assistance has during the 1990s become an increasingly important actor on the power sector scene of Vietnam. Assistance programmes are providing financial resources for investments in rehabilitation and expansion of the generating, transmission and distribution capacity of the existing system. Technical assistance inputs are helping with the introduction of modern technology and are financing the services of experts and consultants designing everything from new hydro power schemes to major institutional reform programmes.

In addition to the major international lending institutions operating in Asia and the Far East, i.e. IBRD and AsDB, a number of bilateral aid programmes are represented on the "external assistance market" of Vietnam as further discussed below.

### 1.3.1 Sida Assistance

Sida was the first western donor involved in the power sector of Vietnam. At the time of the inception of the Sida programme only the East block (with the Soviet Union in a leading capacity) and the People's Republic of China were providing assistance of any magnitude to the sector.

The Sida assistance to the sector started in 1984 and was at that time focused on improving the supply of electricity to Ho Chi Min City. This was done by rehabilitating and expanding the generating capacity of the Thu Duc Thermal Power Plant. During the 1990s, the assistance has diversified substantially both geographically and with regard to fields covered by the Swedish financed inputs. For further information on Sida programmes and projects see 1.4 below.

### 1.3.2 Other Donors

The embargo imposed by USA effectively kept out the major lending institutions IBRD and AsDB from Vietnam until 1994. The only major multilateral donor agency operating in Vietnam prior to 1994 was UNDP, providing some minor projects in the energy sector. The early-mid 1990s saw the big multilateral lending and aid organisations (IBRD, AsDB and UNDP) initiate their work in the energy sector. Soon after the lifting of the embargo a number of studies and Technical Assistance inputs were provided during this start up phase. The first IBRD lending operation commenced in 1994. These international organisations worked

on a fairly broad front within the energy sector and with power projects featuring fairly predominantly from the beginning.

By the mid 1990s, a number of bilateral aid programmes had joined Sida and the multilateral organisations in their work with power sector assistance. Canada, Japan and UK are the bilateral donors which in addition to Sweden are providing more substantial Technical Assistance inputs. Activities in this field covers everything from feasibility studies, environmental impact studies to more specific rehabilitation programmes and master plans.

## 1.4 PROGRAMME AND PROJECTS UNDER REVIEW

### 1.4.1 Sida Programme

The assistance provided under the Sida power sector programme could broadly be divided into the following main categories of activities:

#### *1.4.1.1 Distribution of Electricity*

The assistance in this field has consisted of the physical rehabilitation and expansion of existing distribution systems in a number of cities and towns of Vietnam from Thai Nguyen in the north to Ho Chi Min City in the south. In addition, new planning and load dispatch equipment and techniques have been provided, basically in order to reduce losses and otherwise improve the efficiency and safety of the distribution systems. An important aspect of all inputs in the distribution field has been the introduction of modern materials and techniques, thus contributing to the technological development of the power system of Vietnam. This transfer of technology has mainly consisted of training Vietnamese staff in the installation, repair and maintenance of the new materials, tools, equipment and techniques.

#### *1.4.1.2 Generation of Electricity*

This was the first major field of Sida assistance to the power sector of Vietnam. By the mid 1990s the assistance to Thu Duc was supplemented with a number of inputs in the hydropower development. A study covering the hydro power potential of the Se San river basin also contained more specific studies for individual projects, including that of the Song Hinh project for which Sida is providing some of the investment capital needed in co-operation with the Nordic Investment Bank and the Nordic Development Fund.

#### *1.4.1.3 Capacity Building*

A third and increasingly important field of co-operation has been management training and skills development. The assistance in this field covers a number of areas, from modern management techniques to the operation of tunnel excavation equipment and training in English. With the major institutional and organisational changes of the power sector introduced in 1995, assistance in this field has taken on a certain degree of urgency.

### 1.4.2 Projects

Each of the individual projects included in the Sida programme since 1991 has been reviewed and assessed. However, this study is more of a programme than a project evaluation, and in order not to burden the main text with project details the individual projects will not be presented in the main text of this report. The projects are instead presented in some detail in Appendix 1.6.

For ease of overview an effort has been made to:

- group together those activities which form coherent projects over the Sida programme cycles;

- collect as much information as possible to allow for a presentation of the individual projects along the LFA lines. It has not always been possible to obtain all the required information but all projects are presented in a standard format, built on the LFA approach.

# CHAPTER 2 SCOPE AND CONTENT OF THE EVALUATION

## 2.1 REASON FOR THE EVALUATION

Sida is in the process of preparing a new country strategy to be in force from 1999. The findings and conclusions of this evaluation study will serve as a basis for the discussions and decisions on the (possible) future assistance to the energy sector. The focus of the evaluation can be summarised as follows:

- A more general assessment of the impact of the programme in terms of economic development, relevance, introduction of new techniques and methods both in the planning and technical fields, adherence to Sida policies, etc.;
- Economic aspects with an emphasis on cost-efficiency and financial soundness;
- Technical aspects with the evaluation concentrating on choice and transfer of technology, as well as questions related to the maintenance of the equipment provided under the Sida programme;
- Institutional and competence development aspects of the assistance;
- Environmental considerations and their role in the programme support activities;
- Gender and poverty aspects of the programme.

## 2.2 METHODOLOGY

The evaluation work has been carried out by the following team of consultants:

*Core Group:*
Mr. Bo Persson, Electrical Engineer
Ms. Anne-Lise Klausen, Sociologist
Mr. Bo Sedin, Economist and Team Leader

*Support Team:*
Mr. Gerald Foley, Energy Specialist
Ms. Ann Kämpe, Economist
Mr, Sten Lööf, Civil Engineer

The evaluation work has been divided into three separate but interrelated phases as outlined below.

### 2.2.1 Phase 1 - Preparatory Work and Desk Study

During a short period immediately prior to the field visit some preparatory activities took place in Stockholm as follows:

- *Mr. Lööf and Ms. Kämpe* made a survey of existing documents and reports and initiated the work on more detailed project descriptions.

- *Messrs. Persson and Sedin* started the review of available information and had also meetings with Sida Headquarters staff, consultants engaged in the programme and the Technical Advisor.

### 2.2.2 Phase 2 - Visit to Vietnam

A field visit to Vietnam took place from 19 October to 2 November 1997, by the three consultants of the Core Group. Messrs. Person and Sedin stayed for the full fortnight while the visit of Ms Klausen was limited to one week. An important part of the visit to Vietnam was a one week field trip covering most of the Power Companies or other organisations receiving Sida support. A copy of the programme for the field visit is enclosed as Appendix 1.4.

The time not spent on the field trip was used for visits to EVN, Ministry of Energy, Hanoi PC and PC1 as well as other organisations involved in the Sida programme. Adequate time was also given during the stay in Hanoi to discuss the programme with the staff of the Sida office. Ms. Klausen, who did not participate in the field trip, visited instead Thai Nguyen, north of Hanoi.

### 2.2.3 Phase 3 - Analysis and Report Writing

Based on the data, studies, surveys and discussions both in Vietnam and Stockholm a draft Evaluation Report was prepared during the month of November. The actual drafting work was carried out by the Core Group, with the Support Team assisting in the work and providing quality assurance inputs into the drafting work. In late January 1998, a seminar was organised at Sida Headquarters in Stockholm to discuss the draft report. Based on the discussions at the seminar and other comments a Final Report was finalised in February 1998.

## 2.3 LIMITATION OF THE STUDY

This study covers the Sida activities in the power sector from 1991.

- This means that assistance to the power sector prior to that date is mentioned but not properly evaluated in the report

- Similarly, activities within the energy sector which falls outside the power sub-sector are also excluded.

It should be stressed in this context, however, that these restrictions are of limited importance for the evaluation as a whole. The activities prior to 1991 are two clearly defined projects which have been carried forward into the 1990s. The results of these early projects can to a certain degree be judged from their successors and the experience thus gained is included in the overall sector assessment. Energy activities outside the power sector have formed a very limited part of the Sida programme and is therefore fairly marginal in the over-all evaluation of the Sida assistance to the sector.

# CHAPTER 3 FINDINGS

## 3.1 GENERAL

### 3.1.1 Basic Policy

*3.1.1.1 Government of Vietnam*

The objectives of the Government for the development of the power sector could be summarised as follows:

- Exploitation of the hydro-power potential of the country
- Reduction of losses in the generation, transmission and distribution of electricity
- Improved availability of electricity in the rural areas
- Promotion of foreign investments in the power sector

The ongoing Sida financed programme in the power sector is well in line with the above mentioned objectives.

*3.1.1.2 Sida Policy*

The Sida financed power sector programme appears a bit old fashioned against the background of the new Sida "Policy for Sida's Assistance to a Sustainable Energy Sector". While the massive inputs in the distribution and generation fields could, with a bit of effort, find their place in the new priority list (Energy Efficiency), it is hardly relevant to demand that projects and activities approved prior to April 1996 should fit snugly within the new priorities. However, for projects approved after the introduction of the new policy the fit is acceptable.

### 3.1.2 Institutional Reform

*3.1.2.1 The Setting*

A major reform of the power sector took place in January 1995. The government bodies responsible for the generation, transmission, distribution and supporting services in the power sector were reorganised and made part of Electricity of Vietnam (EVN) which was given the legal status of a state corporation.

The Ministry of Industry, to which EVN reports, has only policy and control functions. The operational responsibility is left with EVN and its operating companies.

*3.1.2.2 Problems and Prospects*

It should be stressed in this context that the above mentioned major organisational and managerial changes are scheduled for implementation during a period of unprecedented development and growth in the power sector, particularly in the investment field. This dual burden of both managing a major expansion phase and at the same time implementing sweeping institutional changes calls for exceptionally high management capabilities.

An important underlying factor for the reforms in the power sector is the inability of the Government of Vietnam to finance the required development activities from the government budget. The establishment of EVN could against this background be seen as a way to encourage alternative sources of finance for power sector development. At the time of the establishment of EVN the medium term requirements of capital were estimated at an average of US$ 1 billion annually, with a substantial part in foreign currency. In 1997 this figure has been adjusted to US$ 1.0-1.5 billion.

The problem in the investment field appears not to be the availability of capital, but rather how to be able to attract and tap the substantial sources available on the capital markets. To the extent private investors are going to be attracted to the power sector in Vietnam, a convincing case of adequate and secure levels of return on the investments must be presented. The long term nature of investments in the power sector underlines this point.

The question boils down to the ability of EVN or any of it's subsidiaries to service its debts and other financial obligations, which presupposes that sufficient profits for the lifetime of the investments are generated. This in its turn is to a considerable degree dependent on the price policy of the government, including the mechanism for adjusting the level and structure of tariffs. Laws which clearly spell out the way in which electricity is priced and a regulatory body to monitor and supervise the price structure are normally required to provide stability and predictability in this field.

There is still some way to go for the power sector of Vietnam to meet the above mentioned requirements and thus fully realise its possibilities to attract both domestic and foreign investments on the level required for the next 5-10 years. In the meantime, Government guarantees could provide the security required by the investors. However, the long term objective for the power sector must be to attract the capital investments required for its rehabilitation and expansion, basically using its earning capacity and the stability of the financial market of Vietnam as the sole attraction.

In practical terms, this means that not only must EVN be given a higher degree of independence in financial matters, but the internal financial management structure must also be strengthened. An Institutional Strengthening Study[1] concludes that there is a "need for a finance/accounting framework of objectives, policies and systems to guide the company as a whole, and within which PCs can carry out their operational work effectively and efficiently". The Study further underlines that with the enormous borrowing requirements of EVN, the establishment of a well-functioning Treasury is a matter of considerable importance.

The further steps along the reform road outlined in the early 1995 must cover the establishment of a clear distinction between the commercial and non-commercial activities of EVN and the Power Companies. A case in point is the legitimate interest of the government in subsidising the supply of electricity to the rural population and to the poorer strata in urban areas. It is, however, of greatest importance that such services are financed and delivered along clear and transparent policy guidelines, which indicate the type and scope of subsidies provided and their source(s) of finance.

This would require that the existing system of "hidden subsidies" e.g. by providing investment capital to EVN on on-lending terms well below market rates must be phased out.

[1] Vietnam - Power Sector Rehabilitation and Expansion Project: ESB Consultants Limited, Ireland March 1996

There is no regulatory body in Vietnam but studies are under way, with foreign assistance, to help define a suitable regulatory framework for the country, including an electricity law. This is an important step towards further decentralisation of the power sector and the possible introduction of private ownership. As a part of this work the Government has established regulations regarding BOT (Build operate transfer) deals. Presently a number of BOT contracts are being negotiated with foreign suppliers. The first such deal has recently been completed with a Finnish consortium (diesel fuelled power generation).

*3.1.2.3 Sida Support*

Sida was the first donor offering assistance in paving the way for a more market oriented approach to the generation, transmission and distribution of electrical power in Vietnam. This first input has been followed by other activities with the objective of facilitating the institutional reform programme. The Sida inputs in this field is further discussed in 3.3.3 below.

## 3.2 PROJECTS AND STRUCTURE OF THE PROGRAMME

### 3.2.1 Project Briefs

In Chapter 1 the background and general content of the Sida financed Power Sector Programme has been presented. A part of that background is the fairly detailed project description presented in Appendix 1.6. For ease of reference some of the key data for each of the projects is presented below.

| Name | Period | Sida Budget (Million SEK) | Disbursed as of Oct.-97 (Million SEK) | Local Contribution (Billion VND) |
|---|---|---|---|---|
| General Backstopping/Support | 1991-99 | 37.5 | 19.7 | - |
| Management Training | 1991-94 | 6.0 | 6.2 | - |
| Twinning Project | 1994-99 | 10.0 | 0.8 | - |
| Management & Tunnelling Project | 1994-99 | 25.0 | 8.5 | 5.1 |
| Se San Feasibility | 1994-98 | 18.0 | 3.2 | 5.3 |
| Hanoi Distribution/Ba Dinh | 1994-98 | 83.5 | 49.0 | 8.9 |
| PC 1 - Load Dispatch Centre | 1994-98 | 40.0 | 1.7 | 18.0 |
| PC 1 - Thai Nguyen Distribution | 1996-99 | 34.0 | 1.9 | 36.0 |
| HCM City Load Dispatch Centre | 1991-98 | 31.0 | 16.9 | 5.5 |
| PC 2 - Gas Turbine Rehabilitation | 1993-98 | 18.0 | 6.5 | 0.4 |
| PC 2 - Rehab. Thermal Plant | 1991-98 | 34.0 | 10.0 | - |
| PC 3 - Distribution Qui Nhon | 1991-99 | 44.0 | 33.5 | 58 |
| PC 3 - Distribution Danang | 1991-98 | 35.0 | 18.5 | 12.2 |
| Song Hinh | 1997-99 | 251.0 | 0.7 | 871.0 |

While the findings presented in this chapter are based on information and analysis of individual projects, such projects are only mentioned in the text below to illustrate more general aspects of the programme or to highlight specific problems or recommendations.

### 3.2.2 Structure and Composition of the Sector Programme

The Sector Programme consists of a fairly large number of projects, which at a first glance may give a somewhat disjointed impression. However, seen in a more long term perspective the individual projects fall into a discernible pattern of activities well aligned with Vietnamese power sector needs and priorities. The first projects (in the 1980s) were very much geared to help alleviate a difficult power supply situation in Ho Chi Minh City. The early 1990s saw a concentration to urban areas in need of improved and expanded distribution capacity. While inputs in the distribution fields still count for a big portion of the overall assistance there has been somewhat of shift towards organisational and human resources development inputs. The large Song Hinh hydropower project fits into the power generation aspect of the programme.

It would be possible to claim that in the rapid expansion of the power sector in the 1990s any combination of Sida inputs would have been of value for the sector. This may be true, but it is of considerable importance to note that the features of the programme reflect the local needs as seen by the Vietnamese. It is also clear that the areas selected for Sida assistance are areas in which there is solid Swedish experience and knowledge.

## 3.3 IMPACT ASSESSMENT OF THE SIDA SECTOR PROGRAMME

### 3.3.1 Economic Aspects

It is always difficult to decide with any precision how much a separate sector contributes to the economic development of a country, if the ambition is to go beyond the purely accounting exercise of determining the proportion the specific sector contributes to the Gross National Product. The problem hardly diminishes if the effort is to determine the economic impact of an external assistance programme, like Sida's, to such a sector. The fact that Sida will contribute some US$ 100 million during the 1990s to a Vietnamese power sector which is investing ten times as much annually, indicates the limitation of such an accounting approach.

From a development point of view, the main problem is not to determine the numerical consequences of external assistance but rather its dynamic effects, if any. Such an approach requires that both quantifiable and non-quantifiable aspects of the individual projects and the programme as a whole are assessed in financial or economic terms.

#### *3.3.1.1 Quantifiable Costs and Benefits*

*Impact of Individual Projects*

For most of the projects forming part of the Sida power sector programme no, or only very rudimentary, assessments of the economic and financial feasibility of the projects have been quantified. It is admittedly difficult or impossible to quantify the impact of a separate project unless it has costs and benefits, which are possible to assess in financial terms. Examples of this are the planning and training projects.

Even when there might be a possibility of estimating the benefits in financial or economic terms for a project aimed for example at improving the distribution of electricity through improved efficiency (e.g. less losses in the system), fewer and shorter power cuts, most project documents do not contain assessments of this nature. There are exceptions to this rule, but in

those cases where efforts have been made to calculate the rate of return of such a project[2] the data provided tend to be so general (e.g. a rough estimate of the pay back period) that they are useless for evaluation purposes. This lack of basic financial and economic data makes it impossible to present the impact of the Sida financed Power Sector Programme in a simple benefit/cost relation. There are, however, quantifiable aspects of the programme, which need to be highlighted. One such aspect is outlined below:

*Consequences of Delayed Implementation*
A common problem in the implementation of power sector projects financed by Sida is delayed implementation of both individual projects and the programme as a whole (for further details see sub-chapter 3.4 below)

In the power sector, more than in many other sectors, it is of utmost importance that the time plans are met in the various projects. A project delay, particularly in power generation field, could prove very costly, if it results in the need to operate generation plants with high operating costs. If for instance a 100 MW hydro-electric plant is delayed, it can be estimated that it would cause additional costs of between US $ 50,000 -100,000 per each day of delay. (assuming that gas turbine power, with a fuel price of US ¢ 5/kWh and operating 10-20 hours per day, replaces the output of the delayed unit).

A concrete example of such negative consequences is the Song Hinh project where delays due to slow and cumbersome approval procedures at ministerial level[3] may result in a delayed completion date for the whole project. Based on the plant total output of 70 MW, each month of delay would cause an economic loss of between US $ 1-2 million.

*3.3.1.2 On-Lending Conditions*

A question in the economic field which had a tendency to surface and resurface in the discussions with the EVN officials was the on-lending terms specified by Sida. The EVN officials expressed strong support for the old Sida approach of providing assistance in the investment field at little or no cost to EVN. The gradual tightening of Sida terms experienced during the last few years (from 0% to 4%) was obviously neither appreciated nor fully understood.

This concern is understandable but the ongoing institutional reform makes it absolutely necessary to move in the direction of providing EVN and its subsidiaries with investment capital at costs as close to what the financial market requires as possible. For investments in the power generation, transmission and distribution fields on-lending terms similar to what IBRD requires (6.9% in 1996) could be a suitable Sida target for future. This does not mean that IBRD rates must be introduced immediately. Sida has taken the line that during the present, transitional period from the old state run type of operations to a fully

[2] Among the ongoing project this has only been achieved for some of the distribution projects of PC 2 and the Song Hinh hydro-power projects. The result is somewhat patchy. All projects for which such calculations have been carried out are expected to give a positive return on the investment though some of them are well below the rate of return normally required from investments in the power sector (standard IBRD requirements if often around 10%). However, the method of calculation and the assumptions upon which the calculations have been made are for most of the projects carried out in a simplified manner. The main exception to this rule is the feasibility assessment of the Song Hinh projects which appears to have been carried out at the level of detail and with the methodology normally required by international lending agencies.

[3] The pending approval has to do with aspects of the detailed civil engineering design of the turbine and generator halls.

commercialised mode, EVN needs access to low cost investments in order to retain low tariffs as a benefit to poor consumers.

There is in principle no major conflict between the gradualist approach of Sida and the more hard-headed policy of IBRD. It is more a question of timing. EVN should be given the financial and managerial capacity to operate along commercial lines as soon as possible. From a practical point of view the earliest possible date for such a goal to be achieved will be by the end of the century. By that time it is expected that the tariffs have been increased sufficiently for EVN and its subsidiaries to generate enough revenues for full-scale commercial operations.

#### *3.3.1.3 Non-Quantifiable Benefits*

The non-quantifiable benefits are a group of benefits, which could be both large and quite visible but still impossible to measure in financial terms. The Sida Power Sector Programme contains such benefits.

*Impact of Improved Electricity Distribution*
The most direct and visible impact on society of the projects financed by Sida can be found in the distribution projects. Generally, the distribution projects aim at enhancing the quality of eletricity for consumers in areas of towns where the power supply has been extremely weak and unreliable. These projects have a direct bearing on the economic development, as stable electricity supply is a prerequisite for all large scale and most small scale production activities. Although not directly attributed to economic development, stable electricity also gives a qualitative improvement to household uses, such as lighting, ironing, cooling etc. Such positive effects of a Sida financed distribution project has been documented in a recent consumer survey, according to which a sample of consumers in Qui Nonh feels that:

> "With the improved electricity network, the industry and small production develop strongly, the daily living is getting easier, and more jobs are created"

*Introduction of Modern Equipment, Materials and Techniques*
Sida was the first western country providing external assistance in the power sector to the Peoples' Democratic Republic of Vietnam. The Swedish assistance was therefore an early supplier of modern:

- power generating and distribution equipment and materials; and

- techniques in the field of power distribution planning and operations.

These Sida supplied inputs have on the whole been effectively absorbed and mastered by the power sector in Vietnam. In this field the Sida assistance has played a pioneering role in introducing modern techniques to the power sector of Vietnam.

*"Pathfinder" for Other Aid Organisations*
There is a general appreciation on the Vietnamese side that the Sida assistance has played a helpful role in facilitating the introduction of other aid programmes into Vietnam. It is difficult to objectively verify the validity of this opinion but other aid donors in Vietnam, e.g. IBRD, obviously share this Vietnamese sentiment.

*3.3.1.4 Cost Efficiency*

The discussion above indicates that although it is impossible to determine the impact of the Sida power sector programme on the economy of Vietnam in a quantifiable manner, it is still possible to claim that the programme has had beneficial consequences both for the sector and for the economy as a whole. This claim does not necessarily mean that the Sida assistance has been delivered in a cost efficient manner. The aid picture is full of useful inputs, which have been provided at excessive cost.

- It is important to note, first of all, that once equipment, material and other aid inputs have arrived in Vietnam (after clearance through customs) they appear to have been put to their intended use without undue delays.

- The design and composition of the individual projects appear to be well balanced (not creating unnecessary bottlenecks or excess capacity). There are of course exceptions to this general rule[4], but the programme as a whole seems to be well put together.

- There is a general complaint from the Vietnamese side that Swedish equipment and material is too expensive. It is difficult to prove that this is the case taking into account quality considerations and supplementary services often provided by Swedish suppliers. On the other hand, much of the equipment and material provided under the Sida programme is fairly standard and it is conceivable that the lowest non-Swedish bidder often enough is providing products of adequate quality. This argument could be taken as an indication that the Sida programme is providing excellent material and service but at too high a cost, thus not being cost effective.

On balance it would appear reasonable to state that the Sida power sector programme has provided a series of worthwhile inputs to the power sector, which also have been put to good use. However, these benefits have been provided at a cost, somewhat above what could possibly have been achieved by an untied procurement regime.

### 3.3.2 Technical Impact

The Sida programme has had, from the beginning, a heavy technical bias. This does not necessarily mean that the assistance has consisted only of technical hard-ware, but rather that most of the projects have been closely related to the production and distribution of electricity and thus involved with operational aspects of the sector. In the context of this report a fairly arbitrary division has been made between the technical aspects of the assistance, basically dealing with the supply of equipment and materials for generating and distribution, and the more soft-ware related activities dealing with the planning and operations of distribution systems which is presented under the next heading "Institutional Development and Competence Building".

*3.3.2.1 Rehabilitation and Upgrading of Distribution Networks*

Most of the Sida financed projects are found in this field. The projects are fairly straightforward with the supply and installation of equipment and materials in the distribution field (lines, sub-stations, meters and tools for installation, maintenance and repair). These supply and installation activities constitute the core activity supplemented with more specific on-the-

[4] The hardware to the Swednet planning system supplied to PC 2 appears to have been delivered without all required manuals.

job training, often provided by the equipment supplier. The projects financed under this heading have all provided equipment and materials of modern standard.

Visits to several sites to which equipment and materials financed by Sida had been delivered or was in process of being delivered and installed gave a positive impression. The sites were in good order, the local staff competent and well acquainted with the technical documentation accompanying the equipment. Once installed the equipment seems to be kept in an acceptable state of repair.

*3.3.2.2 Power Generating Activities*

There are two projects in this field:

- The existing GT 35 gas turbine unit at the Thu Duc power plant was originally delivered in 1988 as a part of the Sida power sector assistance. The unit is not operational and is being subject to a rehabilitation process, which includes changes of vital parts in the gas generator and the HP compressor. The rehabilitation is planned to be completed by December 1997.

  It should, however, be noted in this context that the planning for the rehabilitation was initiated in 1994, when the unit was taken out of service after between 12-13,000 hours of operation. The unit has admittedly not any longer the important role it once occupied in the supply of power to HCM City (now basically scheduled for peak load operations) but the time from decommissioning to completed rehabilitation must be considered to be excessive. The fact that the turbine required major overhaul after only 12-13,000 hours of operation was looked into during a inspection of the turbine in May 1995. The likely reason for the rapid deterioration were found to be:

  - Lack of fuel additives; and
  - An unreliable turbine air filter.

  These shortcomings appear to have caused the excessive corrosion found on the turbine blades and vanes and the disturbance of the air flow through the compressor which eventually brought the machine to a definite stop.

- By far the largest Sida project in the power sector is the Song Hinh hydro-power project for which Swedish funding is provided for turbines, generators and related equipment. The project is under construction and is expected to start producing electrical power around the end of the decade. The main problem, from the Sida financed project components point of view, is the slow and cumbersome approval procedures for e.g. design work. Most decisions in conjunction with major investment projects like the Song Hinh plant are handled at Ministerial level (at least three Ministries are directly involved in this project; Ministry of Industry, Ministry of Development and Investment and Prime Minister's Office). The fact that not only policy issues are handled at Ministerial level but also technical ones has created bottle-necks in the processing of technical design approvals, which are threatening the timely completion of the project.

### 3.3.3 Institutional Development and Competence Building

The Sida programme of assistance to the power sector has since its inception worked with the Ministry of Energy and from 1995 with EVN and its subsidiaries. For someone working in the power sector there has up to now not been any other organisation to work with, unless

one targets individual rural villages which have been left to their own devices to organise their electricity distribution.

Given the priorities and general direction of the Sida assistance, the institutional partner on the Vietnamese side has for each of the different projects been more or less a foregone conclusion. The only cases where a certain choice has been possible has been for the Twinning and Tunnelling projects. Here another choice of counterpart organisation would in principle have been possible, but there are little evidence either way that another counterpart organisation would have changed the prospect of the project.

There has been a long standing understanding between Sida and the Government of Vietnam that the power sector needs help and assistance in introducing modern management techniques and operational routines. This need has become both more extensive and urgent as a result of the policy decision of the early 1995 for major reform of the institutional structure of the sector.

#### *3.3.3.1 Transfer of Technology in Management and Operations Fields*

*Network Planning*
The power sector has, through the Sida programme, been provided with the Swednet computerised network-planning tool. While the understanding and acceptance of this planning tool has worked well in the places where the technique has been introduced, the availability of the technique has been unnecessarily limited. Two examples could be used to illustrate this point:

- The staff working with the Swednet tool in the Hanoi Power Company has limited the use of Swednet to Sida-financed rehabilitation or expansion schemes only.

- While the staff of PC1 fully realises the potential of Swednet as a general planning tool, they have had difficulties in getting manuals and additional software programmes. The staff would also like to have access to more advanced training in the applications of the system.

These computerised network planning system and programmes for calculations are excellent engineering tools and ought to have a large number of users in the EVN companies. A co-ordinated and over-all EVN policy is required in this field.

*Twinning Project*
The first phase of the sister co-operation project between the HPC/PC3 companies and Swedpower/Sydkraft was completed early in 1997 and a report submitted which identified areas of future co-operation. A review of the proposals for future co-operation indicates that the number of proposed items to be dealt with is large. Furthermore, some of the activities appear peripheral (e.g. management of the hotels operated by the Power Companies). The proposal needs to be revised and scaled down. The application of the LFA method could be of help in finding a more focused approach and a better balance between input and output.

*Engineering Standards*
The ambitious investment programmes in the power sector now being planned or implemented carry the risk of a shortage of engineering capacity as to the planning, design, commissioning, maintenance and operation of plants. One way of facilitating the work in

this field would be by introducing a uniform engineering standard, which could be used in all the EVN companies. Such a uniform standard would provide multiple benefits:

- Only proven engineering solutions would be used;
- Improved management control;
- The engineering solutions would be cost efficient;
- The period of design work would be shortened;
- Purchasing would be simplified;
- It would be easier to relocate engineers since no change in work procedures would be necessary;
- Training time for newly employed engineers would be shortened and more efficient;
- The total project time would be shortened thanks to time savings in the engineering as well as the production and construction phases;
- Total costs would be lower;
- Quality in operation would be enhanced;
- Improved safety level;
- Stock keeping of materials and spare parts would be simplified and less costly.

The system could also include modern standards in the IT field.

Sida is not providing any assistance in this field but Swedish utility companies and consulting firms have a long experience of using engineering and operational standards in the power sector and could easily demonstrate how such standards are being developed and maintained. If a decision is taken to introduce a common corporate engineering standard in the Vietnamese power sector, such work has to be supervised and sponsored from the top management of EVN.

#### *3.3.3.2 Training and Human Resources Development*

The Sida assisted programme in the power sector contains a fairly substantial input of training and manpower development provided as an integral part of the supply of equipment and computer based soft-ware systems. Such training has on the whole worked well. Over and above such specialised, hardware or systems related training, the programme also contains a few more specific training and human resources development activities.

*Management Training*
This training project, which was implemented in the 1991-94 period, had as its objective to train decision makers in the power sector in the organisation and management of the sector according to the requirements of a market economy and provide a platform for a training programme for managers in the power sector. The project contained a number of study tours and training courses as well as teacher training.

The study tours and the training courses were implemented more or less on time and with the number of Vietnamese staff envisaged. While the participants felt that the project met its objectives, the opinion was also expressed that the subjects covered were very broad and the number of participants in each course too large. This made it difficult for the individual participant to concentrate on the issues he or she considered important. What is more of a matter of concern is the fact that the envisaged training of trainers never took place as intended, making it impossible to initiate a local training programme for managers.

*Capacity Building of Construction Companies in Management and Tunnelling*
This project started in early 1997 and is at the time of this evaluation study fully operational. The main tasks are to provide training and advice in modern tunnelling and rock excavation activities. The project is based on the concept that the project activities are open to a number of contractors and government bodies, engaged in one capacity or the other in tunnelling work. Up to now, the majority of trainees consists of staff of the counterpart body, the Song Da Construction Company. EVN is also using this opportunity to train some of its staff. A more broadly based participation has not yet materialised.

The actual training activities are closely related to the ongoing hydro-power projects at Yaly and Song Hinh and the counterpart body Song Da is obviously pleased with the training and advisory services provided under the project. It is of course much too early to make any assessment of the end result of this project. However, the more general question could be asked if the transfer of knowledge and experience in the contractor field is best done in this fashion. A more common method is for one or several local contractors, which are lacking in knowledge and experience in a specific field like tunnelling to join forces with an external contractor with the desired competence. This traditional approach offers a number of advantages, including the possibilities to draw upon the experience of the senior partner in the planning for the project activities, including selection of suitable drilling and excavation equipment. The training in such a case would admittedly be on-the-job only and the possibilities for outsiders to participate would be limited or non-existing, unless a dedicated training component was added to the project.

The high cost for this project (SEK 25 million) suggests that it would be better to add a training component to a joint venture, rather than designing a separate training project.

#### *3.3.3.3 Impact of the Sida Programme on the Institutional Reform Process*

Most of the Sida financed activities in the management and organisational fields have not been directly related to the reform process. The management-training project took place prior to the 1995 reform. The Swednet and SCADA activities are of a more general nature which could be used in both market oriented and centralised state run operations. The ongoing project which could function as a supporter of the move to a more market oriented system is the Twinning project, which has not yet arrived at its operational stage.

This fact does not detract from the efforts made by Sida in this field. The inputs have hardly been crucial, but they have pulled in the direction of market solutions and thus played a positive role in the whole reform process. In a somewhat longer perspective the question must be asked if not the resources made available under the Sida programme should be used for activities which will make it possible for the programme to play a larger and more active role in this field.

### 3.3.4 Environmental Aspects

In its recent policy paper on energy Sida has formulated its overall energy policies within the context of environmental protection[5]. Prior to launching of the policy paper, the issue of environmental protection has consistently been brought up by Sida during the annual sector reviews with the Vietnamese authorities. This is an indication of environmental concerns being actively pursued not only at policy but also at operational levels[6]. In the Sida

[5] Sida. Policy för Miljöanpassat energibistånd. 1996.
[6] Agreed Minutes, Annual Review of the Vietnamese – Swedish Energy Co-operation 6-13 December 1995. A quote from the minutes underlines the importance given to environmental protection: ”Environmental impact

supported project portofolio, it is in particular the hydropower development projects which have obvious environmental consequences.

In connection with the Song Hinh hydropower project, Sida financed in 1992 independent consultants to undertake an Environmental Impact Assessment (EIA). In 1995, project construction was initiated and in January 1996 the Song Con river diversion channel was constructed and the river channel diverted. The environmental evaluation at this stage concluded that the environmental impacts appear to be acceptable. The plan is to consistently monitor the environmental impacts. Sida has in this case been instrumental in ensuring that analysis of environmental consequences are integrated in all stages of preparation and implementation.

As a result of the project, approximately 400 families will be resettled. A socio-economic study concludes that the resettlement is not necessarily a set-back for the families, and given proper consultation with and participation by the involved families and proper compensation to be paid, the resettlement will be voluntary and fairly undramatic. In fact, the families are likely to have increased the economic potential for their future livelihood.

Sida has in the case of Song Hinh acted with foresight and with due and adequate consideration to both environmental consequences as well as resettlement.

In a broader perspective, and with reference to the future, Sida - with its access to grant financing - may be requested to finance the more "soft" elements of large hydro power investments in order to have a donor involved with an awareness of the potentially negative environmental and people related effects. A long term strategy for Sida could be to work with these issues in a capacity building progamme with the purpose of strengthening government institutions and non-governmental organizations to mainstream EIAs and resettlement studies and subsequently transforming the results of such analyses into appropriate actions.

### 3.3.5 Gender

An assessment of the particular benefits extended to women by the Sida projects could be reviewed from three different angels, i.e. the impact in regard to the status, influence and economic opportunities of women. It is also important to assess how gender aspects have been considered in the implementation of the projects.

There are two entry points to such an analysis.

- Gender analysis of career and human resource development in the sector institutions, which will cover the question related to status and influence given to women in relation to men.

- Gender analysis of the projects supported by Sida. This covers both the planning and implementation of the projects as well as the projects' impacts on both genders. Such impacts can cover both status, influence and economic opportunities.

It should be noted here that for reasons discussed below, the evaluation mission can only present fragmented evidence in response to the questions above.

---

(in accordance with the regulations laid down in the Law on Environment Protection and the subsequent decrees) is assessed in the pursuance of the programme – in evaluation of plans as well as of bids and contracts and in the implementation of the different activities of the projects"

*3.3.5.1 Career and Human Resource Development*

An analysis of gender relations in the sector institutions has been carried out at the initiative of EVN with financing from Sida. This study concluded that women professionals are - compared to men - disadvantaged both with regard to salary level, career and training possiblities [7].

Based on these findings Sida has expressed interest in supporting EVN with special human resource development initiatives for women professionals, but such support has not yet materialised. Restructuring of the institutional set-up within the sector, as well as reluctance within the organisations to give priority to gender issues have withheld progress for some time. The Sida approach to wait for initiatives from EVN and at the same time to create a new momentum for gender issues in EVN through a planned gender workshop is fully supported by the evaluation mission.

In recent years, the Sida projects have – besides hardware deliveries – included components on management and training. In the preparation and implementation of such projects or components of projects, gender issues have had no significance at all.

It should therefore be ensured that in the preparation and implementation of all management and organization projects or components of projects, Sida should build on and to the degree possible implement the recommendations of the study above instead of awaiting initiatives from EVN. This requires an upgrading of the professional standards of project documents, as the project documents so far have not included gender aspects.

*3.3.5.2 Particular Benefits of Energy Projects on Women.*

The most direct and visible impact on society of the projects financed by Sida can be traced in the distribution projects. Generally, the distribution projects aim at enhancing the quality of eletricity for consumers in areas of towns where the power supply has been extremely weak and unreliable. These projects have a direct bearing on economic development, as stable electricity supply is a prerequisite for all large scale and most small scale production activities. Although not directly attributed to economic development, stable electricity also gives a qualitative improvement to the households in terms of lighting, energy to ironing and cooling etc.

Whether such impacts are similar to both genders are impossible to answer in the present case. Without a baseline study where socio-economic data and energy use data have been gender disaggregated, it is not possible afterwards to make particular statements in relation to impact on women.

The "Needs and Priorities of Electricity Consumers in Qui Nhon and Thai Nguyen" survey is a case in point. The survey includes a form of baseline study in Thai Nguyen, which is presently at the implementation stage. Almost half of those interviewed in Thai Nguyen are women, and the survey presents a list of the interviewed giving particular characteristics with regard to employment, income, assessts and present energy uses. However, there is no *structured analysis* of gender specific socio-economic and energy use data in the survey presentation and there are no gender specific indicators outlined in the proposal for the planned impact study. The evaluation mission finds that - given the considerable resources

[7] Centre for Women Studies: A Study on Women in the Energy Sector. Hanoi, June 1994.

availed to this survey – and the need for Sida to be able to have access to gender specific impact data - the survey should meet such standards and be amended accordingly.

### 3.3.6 Poverty Alleviation

The overall objective of Swedish development assistance is to better the life conditions for the poor. Within this context, energy assistance aims at improving the the energy situation for people who do not have access to secure and efficient supply of energy (direct poverty reduction measures) and to contribute towards the development of well functioning and sustainable energy systems (indirect poverty reduction measures). Also central to the energy assistance is its contribution towards sound economic development[8] .

Although it is only recently that Sida has published a specific policy for energy assistance and thus placed this sector in a context of overall development policies, the evaluation mission finds that the poverty aspects have - although not explicit in the documentation (!) – indirectly been an important factor throughout Sidas involvement in the sector (i.e. since 1984). The poverty reduction strategy of the Vietnamese government has three elements:

- Rapid - broadly based - economic growth.
- Adequate social services.
- Provision of adequate safety nets for vulnerable groups in the transition process.

Sida's energy assistance primarily contributes to the first element of the national poverty reduction strategy of economic development, which has infrastructure upgrading as an important developmental activity.

Secure and efficient energy supplies are a prerequisite for economic development, and the Sida assistance has been targetted strategically to enhance the capacity for power generation and for improved distribution. Sida thus finances distribution projects in areas of towns, where economic opportunities increase for the population after the power supply has been improved [9]

However, Sida's assistance has so far been limited to providing benefits to consumers in cities and major towns, while project support has not been extended to the rural areas. In the past situation, with an enormous need for rehabilitation of existing systems etc, it is understandable that the Vietnamese Government has requested donors for assistance in rehabiltation and upgrading of existing systems and waited with the extension of the electrification network. Recently, the preparation of a rural electrification strategy has started, and this opens up for donors like Sida in the future to target at least part of its support to rural areas, and to be more explicit with regard to poverty reduction orientation in the assistance[10]. Such poverty focus of the Sida assistance should be explicitly described in the documentation, in particular at the objective level of the supported projects.

[8] Sida 1996: Policy för Miljöanpassat Energibistånd.

[9] Sida: Needs and Priorities of electricity consumers in Qui Nhon and Thai Nguyen. July 1997. Evidence collected in Qui Nhon.

[10] The World Bank: Poverty Assessment and Strategy. January 1995. p ii. The report says: "Rural poverty is much higher than urban poverty. The incidence of rural poverty averages 57% - twice as high as the 27% poverty incidence found in urban areas. About 90% of all the poor are concentrated in rural areas. Government policies to reduce poverty must, therefore, focus primarily on rural areas where the vast majority of the poor live".

### 3.3.7 Tariffs and Accessibility

Electricity tariffs are uniform throughout the country. The tariff structure does reflect different cost levels associated with voltage level and type of consumer.

However, electricity in residential areas are not always provided to the end consumer at the official tariff rate. The situation in the Sida supported areas of Thai Nguyen and Qui Nhon - where electricity in reality is supplied to consumers at different rates - could be used to illustrate the point. The reason for this situation is that there are very few meters in an area. The consumers having a meter are responsible for the distribution from the meter to about 10-20 families. The distributor of power in such a system is often in other countries called a "meter landlord". Households being end-consumers finance poles and cables themselves. A problem with this system is that the power often is of relatively poor quality when it reaches the end consumer; the price is also way above the official tariff.

The official tariff for residential areas is 450 VND/kWh. The needs and priorities survey of Qui Nhon and Thai Nguyen mentioned above reports that households being supplied as "sub-cunsumers" pay from 670 VND/kWh up to 1,300 VND/kWh. Production factories also sell power to households, at a price about double the official tariff.

The Sida financed project in Qui Nhon has given the population access to better quality power supply, but it appears that the end-users still pay considerable more for the power than the official tariff as they do not have their own meter. The full poverty reduction benefits of the assistance are therefore not realised.

## 3.4 PROJECT AND PROGRAMME MANAGEMENT

### 3.4.1 Planning and Project Formulation

*3.4.1.1 General*

The existing system for project formulation, appraisal, approval, monitoring and evaluation seems to work well. The active participation of the recipient bodies in the identification, design and implementation of the projects is an important sign of ownership awareness.

The way Sida has organised its own activities in this field has undoubtly contributed to this development.

- The availability of a full-time technical adviser during the first half of the 1990s undoubtedly facilitated the co-operation and co-ordination between Sida and the Government.

- The system of periodic reports from the counterpart organisations, in combination with annual reviews, appear to have established a reasonable system of project and programme monitoring. What is of particular importance in this regard is the fact that reporting from the field appear to function as a matter of routine.

- The reporting and monitoring activities have also been improved with the help of the LFA system, which has gradually come on stream. The system seems to be well established and accepted, even though there are questinon marks regarding the way the LFA aproach is used in the sector at present.

*3.4.1.2 LFA Approach.*

In 1995, Sida introduced the Logical Framework Approach (LFA) as an instrument intended to improve project planning and project reviews. LFA was introduced in order to augment the quality, efficiency and sustainability of the development assistance.

*General*
The Sida approach to LFA application is different from that of most other donors, as Sida stresses in its cooperation that it is the recipient partner (project owner), who shall spearhead the introduction of the method and therefore initiate the training process within an organization and be responsible for application of the method in planning, implementation and follow-up.

Sida advocates a start-up with a relatively simple form of LFA and not to hire international expertise to hold sophisticated workshops at an advanced level. Instead, Sida has in all embassies an officer responsible for LFA, who will work with the organzation and ensure that preferably local or regional training assistance is procured - to the extent possible by the recipient partner and not by Sida [11].

*Vietnamese Power Sector Application*
In the energy sector all recent project documents have been planned and presented according to the LFA. The process has been elaborate and has required considerable work input both by the organizations and by Sida. Training sessions have been carried out, and generally the partner organizations are interested and find that LFA can improve their planning and reporting. Obviously, the organizations have responded differently to the introduction of the method and are at present using the method with varying degrees of sophistication. Relying heavily upon the recipient organization to set the LFA method in motion, the progress often depends on the interest of one or few professionals within an organization, - this can cause delays but also promote an early and efficient introduction and application of the LFA method.

The process of ensuring ownership of the method with the recipient partner and using the LFA instrument in a simple form certainly has its advantages. There is, however, a danger that the full value of the method is not realised, which seems to be the situation for the Sida supported energy sector projects. It appears that the LFA is primarily used as a reporting system and a communication tool between Sida and the recipient in order to assess progress between activity and output levels in the hierarchy. It is only in the project documents that the objective level is presented, but in all reporting during implementation the objective level is not even mentioned.

In essence, the LFA is a system of objective oriented planning and by omitting the objective level, the LFA becomes amputated. This has a severe draw-back in the long run as the objectives and thereby the overall sector context of a project is lost. The relatively low priority given to the objectives level in the energy projects means that the objectives, when formulated in the project documents, are neither described nor clearly defined in relation to a project´s contribution to sector needs, nor is the project developed with close adherence to the overall objectives of Swedish development assistance.

[11] Sida, Department for Policy and Legal Services: Guidelines for Application of LFA in project Cycle Management. March 1996.

By giving little thought to the objectives these often become too ”hardware and output specific” rather than development oriented. Or they are simply too loose to give meaning in relation to the lower levels in the LFA hierarchy.

An example from the sector programme, presented in the figure below, could be used to illustrate the problem:

| |
|---|
| *Sector Objective*<br>"The project will be part of the re-orientation of the energy sector to open market economy" |
| *Project Objectives*<br>"Up-grade the ability to plan and design distribution system. Introduction of 22 kV medium voltage network.<br><br>"Up-grade ability for international procurement. Improved supply voltage for the customers. Reduced distribution losses in rehabilitated area to 10%".<br><br>"Provide reliable power supply to 15,000 customers"<br><br>"Increase capacity on medium voltage network to operate without overload. Up-grade skills for construction of new installations with modern equipment and tools." |

The example shows that the sector objective is too general, and has no direct link to the project objectives nor to the overall objectives for Swedish development assistance. The sector objective makes a reference to the re-orientation of the sector, but not in any specific terms. In the light of the ongoing sector restructuring and the commercialization of the sector, it is important to be precise at the sector level in order to have a strategic focus for the use of Sida grant funds. This strategic choice is to be explicit at the sector objective level.

Eight project objectives are listed in the example above. That is too many to secure a coherent project structure and implementation. A closer look at the objectives reveal that they vary in importance between "providing power supply to 15,000 customers" to "up-grade of skills for construction of new installations with modern equipment and tools" . If a project has more than one objective (the rule of thumb is to have one or maximum two objectives) these objectives should be at the same level of importance in a project hierarchy. Most of the objectives in the example could with advantage be placed as outputs and activities.

Lastly, some of the objectives are formulated as activities, i.e. something which is within the control of the project to achieve, instead of formulating an objective i.e. "a state of development". A final note of caution in the present application of the LFA is the missing logic between the different levels in the hierarchy.

The evaluation mission commends the process approach to the LFA application taken by Sida. However, the standard in the application of the LFA in the project documents and in the reporting must be raised to a level where the full value of the instrument as an objective oriented project planning tool is realised. This could mean more training sessions, better feed-back from Sida to the recipient organizations or instructions where the simple form of LFA already at the first introduction is replaced by a more advanced form of LFA.

### 3.4.2 Reporting and Monitoring

The existing reporting system, based on the LFA, is fully operational and seems to work well, with the exceptions mentioned under 3.4.1.2 above. The system makes it possible to monitor progress of the programme from the centre, i.e. Hanoi. However, monitoring implies more than reading and responding to reports. A certain minimum level of field visits are required to check on developments. The fact that the programme is geographically disbursed and consisting of many projects makes such field monitoring time consuming. Against this background it could be discussed whether the Sida representation has enough capacity to follow up the Sida projects at sufficiently close intervals. One possible way of increasing the field monitoring capacity of Sida would be to use the Technical Advisor a bit more extensively in this area.

### 3.4.3 Project and Programme Implementation

*3.4.3.1 Schedules and Budgets*

During the bi-yearly Annual Review of the Sector Co-operation the pace of project and programme implementation is assessed. The trend from mid 1994 and onwards has been one of delays as can be seen from the table below:

Table 3.1.1 Time Plans for the Power Programme

| **Project** | **Consultancy Contract in Force** | | | **Supplier Contract in Force** | | | **Project Completed** | | |
|---|---|---|---|---|---|---|---|---|---|
| ***Agreed Plans as of:*** | **April 1996** | **Nov. 1996** | **April 1997** | **April 1996** | **Nov. 1996** | **April 1997** | **April 1996** | **Nov 1996** | **April 1997** |
| ***EVN*** | | | | | | | | | |
| Twinning | | | | | | | | | |
| Phase 1 | June-96 | Oct-96 | Oct-96 | - | - | - | | | |
| Phase 2 | | | Aug-97 | - | - | - | Sep-98 | Jun-99 | Dec-99 |
| Se San III | Aug-96 | Dec-96 | May-97 | - | - | - | Sep-98 | Apr-98 | Aug-98 |
| Thu Duc | Mar-96 | Mar-96 | Mar-96 | | | | | | |
| GT 35 | Mar-95 | Mar-95 | Mar-95 | Jun-96 | Dec-96 | Feb-97 | Mar-97 | Oct-97 | Dec-97 |
| ***PC 1*** | | | | | | | | | |
| RLDC | Jul-96 | Oct -96 | Oct-96 | Aug-97 | Aug-97 | Dec-97 | Dec-98 | Jul-99 | Jul-99 |
| Thai Nguyen | Nov-96 | Dec-96 | Jan 97 | Dec-97 | Aug-97 | Sep-97 | Mar-99 | Dec-98 | Jan-99 |
| ***HPC*** | | | | | | | | | |
| Ba Dinh-2 | Jun-95 | Jun-95 | Jun-95 | Sep-96 | Jan-97 | May97 | Oct-97 | Feb-98 | Jun-98 |
| ***HCMCPC*** | | | | | | | | | |
| SCADA-2 | Nov-95 | Nov-95 | Nov-95 | Feb-97 | Mar-97 | Aug97 | Jun-98 | Sep-98 | Feb-99 |
| ***PC 3*** | | | | | | | | | |
| Danang | Nov-95 | Nov-95 | Nov-95 | Jan-97 | Feb-97 | May97 | Sep-97 | Dec-97 | Mar-98 |
| Qui Nhon | | | | Jun-96 | Jun-96 | Jun-96 | Dec-97 | Dec-97 | Dec-97 |

The overall trend in Table 3.1.1 above is very clear. All three types of activities reviewed are delayed, as well as most of the individual projects. The only exceptions are Se San III and Thai Nugyen which are excepted to be completed prior to the date assumed in April 1996 and the Qui Nhon project which was completed on time.

The delays in the implementation of plans illustrated in Table 3.1.1 above have their corollary in a continuous adjustment in the financial budgets. By the end of 1996, two and a half year into the 1994-1998 programme period, actual disbursement stood only at some SEK 15 million, compared to budgeted disbursements of over SEK 35 million. The delays in disbursements are reflected in the half yearly budget revisions carried out by the Annual Reviews as outlined in Table 3.1.2 below. The table shows how for each year more money is moved forward into the last year of the programme (1999).

Table 3.1.2 Budget Revisions

| **Semi-Annual Review** | **1996**[12] | **1997** | **1998** | **1999** |
|---|---|---|---|---|
| April 1996 | 35.4 | 136.8 | 85.3 | - |
| November 1996 | 23.9 | 108.8 | 67.8 | 57.0 |
| April 1997 | 13.5 | 99.0 | 77.9 | 66.1 |

It is always difficult when comparing budgets and plans to actual performance to determine if delays are the result of unrealistic plans and targets or caused by genuine bottle-necks and bureaucratic slowness. In the case of the power sector programme it appears though that the reason is basically increasingly sluggish formalities rather than too high expectations. The first programme period of the 1990s was implemented with a minimum of delays. Both the scope and content of the ongoing Sida programme is sufficiently similar to that programme to benefit from the same smooth implementation.

It is difficult to pinpoint the real reasons for the slowdown of the programme, but a number of possible causes could be mentioned:

- The general level of activity in the power sector has been growing over the years;
- The increasing number of aid programmes operating in the sector has increased the burden of co-ordination and liaison;
- The major institutional reform of 1995 will take a lot of managerial effort and capacity for a long time to come, leaving less time for planning and operational activities.

These developments have, taken together, certainly been taxing on the capacity of EVN and its subsidiaries. However, the question is whether the centralised decision-making in most investment and technical matters is the real culprit. Most of the delays seems to be connected to decisions at Ministerial level. Only when EVN has been given a higher degree of financial and technical responsibilities will it be possible to resolve this problem in a more fundamental way.

[12] Covers also the second half of 1995

Last but not least, the planning and implementation of the Sida projects have, with the exception of delays in the approval processes mentioned above, improved during the 1990s. A number of factors have contributed to this positive development:

- The services provided by the Energy Adviser and other backstopping support provided by Sida;

- The introduction of the LFA system has gradually improved the design and implementation of projects and programmes. It has admittedly taken some time for this planning and follow up tool to work as intended and the full potential of the system has not yet been realised. This is hardly surprising as we are here talking about an on-going learning process involving Sida staff and officers in the power sector as well as consultants and experts.

#### *3.4.3.2 Procurement Routines*

One of the most common, if not the most common, complaint heard from the Vietnamese side during the evaluation work was the high prices of Swedish supplied equipment and materials. The excess cost quoted was normally 20% compared with equivalent products from other countries and suppliers.

There is no doubt that the Vietnamese, who are working with a least cost procurement policy, feel strongly about this matter. However, it is not always possible to compare the prices offered in an individual procurement with the lowest costs offered for the same items on the world market. A case in point is the situation when the Swedish supplier provides not only his own product but also a range of other products procured on the world market. In such a situation, the Swedish supplier provides a useful procurement service that in one way or the other should be reflected in the total price.

Furthermore, Swedish suppliers are capable of offering low prices in international tenders. In a recently completed tender for an ADB financed project supplying a sub-station to the Northern parts of Vietnam it turned out that the Swedish supplier was the lowest bidder for 5 of the 8 different items offered. Based on this fact, two simple answers could be given to the complaints of high prices:

- The Swedish suppliers are exploiting the limitations of the Sida procurement procedures to their own advantage.

- The Swedish suppliers are providing additional procurement services which justify a higher price than the world market one.

There is a third alternative, which is a bit more involved but which may give a more correct picture of the whole situation as seen from the Sida point of view. The price charged by Swedish suppliers and accepted by Sida can not be seen in isolation:

- The higher quality and thus the higher price of the Swedish equipment should, at least to some extent, be compensated with lower maintenance and repair costs.

- The fact that Sida is offering Swedish assistance on lower on-lending terms than e.g. IBRD should make it possible for EVN to accept somewhat higher prices.

Without taking sides in the argument, it is still possible to claim that the existing Sida procurement policy is an unhappy compromise between open bidding and negotiated contracts. As long as only Swedish suppliers are invited to bid it will be difficult to convince the world, including Vietnam, that sufficiently competitive prices are offered.

# CHAPTER 4 CONCLUSIONS

The power sector of Vietnam is in the demanding situation of attempting major institutional reform in a period of rapid expansion of the generating, transmission and distribution capacity of the sector. The sector has been facing this double challenge since 1995 and while the expansion work is making good progress, the reform process is moving at a considerably slower pace.

In this situation, the external assistance programmes are sharing a similar challenge, i.e. to assist in building up the capacity of the sector to meet the fast growth in the demand for electricity at the same time as ways and means must be found to effectively support the reform process. The second task is in many ways the more difficult one. The Sida programme has been involved with both aspects of these two main tasks. An effort is made in this chapter to summarise the experience of those efforts.

## 4.1 INSTITUTIONAL REFORM

The formal decision of 1995 for a sweeping institutional reform in the power sector is still under implementation. The status of developments in this field could be summarised as follows:

- The managerial and financial independence of EVN has not yet been fully implemented which means that a number of decision in e.g. the investment and technical fields are taken at Ministerial level. This fact does not only hold back the development of a modern, market oriented managerial structure at EVN, it also creates bottle-necks and delays of an operational nature.

- The major organisational and managerial changes are scheduled for implementation during a period of unprecedented development and growth in the power sector.

- The establishment of EVN could be seen as a way to encourage alternative sources of finance for power sector development. For this to succeed the power companies must be able to service their debts and other financial obligations. This in turn presupposes that the companies generate sufficient profits for the lifetime of the investment. All these things will be difficult to achieve without a greater degree of autonomy for the power sector in general.

The power sector of Vietnam has not yet achieved the long-term objective of attracting the capital investments required for its rehabilitation and expansion, basically by using its earning capacity and the stability of the financial market of Vietnam as the sole attraction.

As indicated above, the reform decision of early 1995 has in a number of areas not yet been converted into practical action. One area which requires early attention and which has a special bearing on the Sida programme is the need to establish a clear distinction between the commercial and non-commercial activities of EVN and the Power Companies. Among other things this will require that the existing system of "hidden subsidies" is phased out.

Both the letter and spirit of the reform process are well in line with the energy sector policies of the Government of Vietnam and Sida.

## 4.2 BASIC OBJECTIVE OF SIDA ASSISTANCE TO THE POWER SECTOR

The Sida programme in the power sector has been given the broad objective " to promote a more efficient power supply to facilitate economic growth and development in Vietnam". It would be possible to answer the question whether this objective has been met with a simple yes, but the composite parts of such a general yes need to be discussed in some detail.

### 4.2.1 Economic Aspects

While it is difficult or outright impossible to measure the impact of the Sida power sector activities in terms of e.g. GNP growth, it is still possible to have an idea about the usefulness of the sector programme in more general terms:

- The most direct and visible impact on society of the projects financed by Sida can be traced to the distribution projects which have had a positive impact on the daily life of the population served by the Sida financed projects.

- Sida was the first western country providing external assistance in the power sector to the Peoples' Democratic Republic of Vietnam. The Swedish assistance was therefore an early supplier of modern power generating and distribution equipment and materials as well as techniques in the field of power distribution planning and operations. In these fields the Sida assistance has played a pioneering role in introducing modern techniques to the power sector of Vietnam.

- There is a general appreciation on the Vietnamese side that the Sida assistance has played a helpful role in facilitating the introduction of other aid programmes into Vietnam. It is difficult to objectively verify the validity of this opinion but other aid donors in Vietnam, e.g. IBRD, obviously share this Vietnamese sentiment.

### 4.2.2 Technical Aspects

The Sida programme has had, from the beginning, a heavy technical bias. Most of the Sida financed projects are found in the field of rehabilitation and upgrading of distribution networks. Visits to several sites to which equipment and materials financed by Sida had been delivered or was in process of being delivered and installed provided the overall impression that the sites are in good order. The equipment is obviously well taken care of upon arrival and there appears to be no unnecessary installation delays. The personnel seemed in general to be competent and well acquainted with the technical documentation accompanying the equipment. Once installed the equipment seems to be kept in an acceptable state of repair.

### 4.2.3 Environmental Aspects

The issue of environmental protection has consistently been brought up by Sida during the annual sector reviews with the Vietnamese authorities. This is an indication of environmental concerns being actively pursued not only at policy level but also at an operational level.

Most of the projects included in the Sida power sector programme do not contain specific enviromental components. The main exception to this rule is projects in the hydro-power sector. A case in point is the Song Hinh hydropower project for which Sida has financed an Environmental Impact Assessment (EIA) study, the recommendations of which now are under implementation.

### 4.2.4 Benefits of Energy Projects for Women.

As mentioned above, the most direct and visible impact on society of the projects financed by Sida are found among the distribution projects. When such impacts are similar to both genders it is impossible to determine the specific gender impact of the project unless a baseline study is carried out where socio-economic data and energy use data have been gender disaggregated. This has not yet been done within the power sector programme (even though a more general impact study has been carried out).

## 4.3 CHANGING NEEDS

### 4.3.1 A Changing Scene

As mentioned in other sections of this report, the whole power sector is going through a period of change and reform. In a somewhat longer perspective, the priorities of the sector could be divided into the following main phases, which overlap but could still be used as a basis for a discussion on the relevance of the Sida assistance.

*4.3.1.1 Rehabilitation*

At the end of the war there was a considerable need for rehabilitation activities, including steps to integrate the generating and distribution capacities located in different parts of the country. The first Sida inputs were closely related to the efforts to rehabilitate and expand the power supply to HCM City, through the assistance to the Thu Duc thermal power station

*4.3.1.2 Expansion*

The rehabilitation and integration efforts went hand in hand with early efforts to expand the power generating, transmission and distribution capacity of the power system. During this phase of the development of the power sector Sida expanded its field of assistance to include an number of projects in the distribution field. Similarly, the continuing support to the Thermal Power Plant of Thu Duc and the financial commitment towards the hydro-power scheme in Song Hinh (in co-operation with the Nordic Investment Bank and the Nordic Development Fund) could be seen as activities well in line with actual requirements.

A contentious question in this area has not so much to do with the field of activity chosen, but rather with the financial conditions under which the assistance is provided. The Sida financed assistance provided in the generation and distribution field consists on the whole of equipment, materials and services, which equally well could have been provided on purely commercial terms. The possibility of an aid organisation like Sida to specify the on-lending conditions for investment type of projects makes it possible to equate aid projects with commercial projects in financial terms.

Sida is using this option and has over the last few years slowly increased the on-lending terms (which has now reached 3.5 - 4%) for this type of assistance. This rate is well below commercial rates and what other donors are charging. However, Sida has taken the line that during the present, transitional period from the old state run type of operations to a fully commercialised mode, EVN needs access to low cost investments. This in order for EVN to retain low tariffs basically as a benefit to poor consumers.

There is in principle no major conflict between the gradualist approach of Sida and the more hard-headed policy of IBRD. It is more a question of timing. EVN should be given the financial and managerial capacity to operate along commercial lines as soon as possible. From a practical point of view the earliest possible date for such a goal to be achieved will be by the end of the Century. By that time it is expected that the tariffs have been increased sufficiently for EVN and its subsidiaries to generate enough revenues for full-scale commercial operations..

#### *4.3.1.3 Institutional Change*

*Sida Financed Activities*
Over the years, substantial efforts have been made in the institutional development and competence building sectors under the Sida programme

- to introduce the Swednet computerised network planning tool and the SCADA type of load dispatch centres;

- to provide management training in the field of market oriented operations through study tours and training courses as well as training of instructors;

- to provide training and advise in modern tunnelling and rock excavation activities.

Most of the Sida financed activities in the management and organisational fields have not been directly related to the reform process. The management-training project took place prior to the 1995 reform. The Swednet and SCADA activities are of a more general nature that could be used in market oriented as well as centralised state run operations. The ongoing project which could function as a supporter of the move to a more market oriented system is the twinning project, which has not yet arrived at its operational stage.

The Sida inputs have hardly been crucial in the institutional field, but the assistance provided has pulled in the direction of market solutions and thus played a positive role in the whole reform process.

*Future Challenges*
One of the most crucial challenges faced by the power sector at present is the early implementation of the institutional reform programme mentioned at the beginning of this chapter. There are a number of reasons for this urgency, some of them highlighted in this report, i.e.:

- The Government of Vietnam has realised that the BOT type of private investments is an important future source of funding for the sector. However, the ability of the sector to attract such investments will to a considerable degree be dependent on that e.g. privately financed generating capacity can compete with EVN's own facilities on equal terms. This will only be the case when EVN has financial independence and is denied "hidden" Government subsidies.

- Delays suffered by the Sida assistance programme is to a considerable degree the result of EVN being denied the managerial and technical independence normally associated with a holding company.

Technical and other types of assistance aimed at facilitating and speeding up the whole institutional reform process thus constitute a field of activity of considerable importance, particularly in the short and medium term.

### 4.3.2 Relevance of Sida Assistance

A starting point in a discussion about the relevance of the Sida assistance to the power sector is the simple but important fact that the ownership of the programme has been that of the Government of Vietnam. The identification, design and implementation of the projects clearly reflects strongly felt local needs.

This strong position of the Government of Vietnam in determining the content of the programme, combined with Sida's "concerned participation" have resulted in a situation where:

- The Sida programme has been flexible and has on the whole been able to adjust to the changing requirements of the power sector in Vietnam;

- Sida has recognised the fact that the institutional reform process is in need of support and assistance, without necessarily appreciating the large scope of assistance required.

## 4.4 MAIN SUCCESSES AND FAILURES

### 4.4.1 Absorptive Capacity and Transfer of Technology

The success of the Sida programme is maybe best represented by the following examples:

- Most of the Sida financed projects are found in the field of rehabilitation and upgrading of distribution networks. The equipment and materials financed by Sida have been properly installed and the sites are in good order. The local staff responsible for the installation and operation of the new facilities seems competent and well acquainted with the technical documentation accompanying the equipment. Most of the equipment and materials delivered have been modern and represents new and more efficient ways of generating and distributing electricity. The relative ease with which the Sida inputs have been absorbed by the power sector and brought to gainful use is an example of successful transfer of technology.

- Similarly, the capacity in the areas provided with planning and operational inputs (Swednet and SCADA) appear equally useful. There have been some problems or question marks in the application of these systems but on a minor scale only.

### 4.4.2 Bottle-necks and Delays

A common problem in the implementation of the power sector projects financed by Sida is delays in the implementation of both individual projects and the programme as a whole.

The first programme period of the 1990s was implemented with a minimum of delays. Both the scope and content of the ongoing Sida programme is sufficiently similar to that programme to benefit from the same smooth implementation. Instead there have been major delays in the implementation of the programme which was initiated in 1994.

It is difficult to pinpoint the real causes for the slow down of the programme, but a number of possible reasons could be mentioned:

- The general level of activity in the power sector has been growing over the years;

- The increasing number of aid programmes operating in the sector has increased the burden of co-ordination and liaison;

- The major institutional reform of 1995 and its implementation absorb a fair amount of managerial effort and capacity, leaving less time for planning and operational activities.

These developments have, taken together, certainly been taxing on the capacity of EVN and its subsidiaries. However, the question is if not the centralised decision making process in most investment and technical matters (requiring approval at Ministerial level) is the most important reason for the present situation of delays.

Only when EVN has been given a higher degree of financial and technical responsibilities will it be possible to resolve this problem in a more fundamental way. Such greater autonomy for EVN would also make it possible for that organisation to delegate some of the approvals to e.g. the Power Companies, thus further reducing the lead time for approvals in the technical and financial fields.

In the power sector, more than in many other sectors, it is of utmost importance that the time plans are met in the various projects. A project, delay particularly in the power generation field, could prove very costly, if e.g. the delay results in the need to operate generation plants with high operating costs. A concrete example of such negative consequences is the Song Hinh project where too slow and cumbersome approval procedures at Ministerial level[13] may result in a delayed completion date for the whole project. Based on the total output of 70 MW of this hydro-power plant, each month of delay would cause an economic loss of between US $ one to two million.

## 4.5 EFFICIENCY OF THE SIDA PROGRAMME

The discussion above indicates that although it is impossible to determine the impact of the Sida power sector programme on the economy of Vietnam in a quantifiable manner, it is still possible to claim that the programme has had beneficial consequences both for the sector and for the economy as a whole. This claim does not necessarily mean that the Sida assistance has been delivered in a cost efficient manner. The aid picture is full of useful inputs, which have been provided at excessive cost.

- The planning for and implementation of Sida projects have, with the exception of delays in the approval processes mentioned above, improved during the 1990s. A number of factors have contributed to this positive development

    - The services provided by the Energy Adviser and other backstopping support provided by Sida

[13] The pending approval has to do with aspects of the detailed civil engineering design of the turbine and generator halls.

- It has admittedly taken some time for the LFA planning and follow up tool to work as intended. This is hardly surprising as we are here talking about a learning process involving Sida staff, officers in the power sector as well as consultants and experts. The application standard of the LFA in the different project varies, but seems to have steadily improved over time. There is, however, still work to be done in this field as further discussed under 4.3.2 below.

- It is important to note, first of all, that once equipment, material and other aid inputs have arrived in Vietnam (after clearance through customs) they appear to have been put to their intended use without undue delays.

- The design and composition of the individual projects appear to be well balanced (not creating unnecessary bottle-necks or excess capacity). There are of course exceptions to this general rule[14], but the programme as a whole seems to be well put together.

- There is a general complaint from the Vietnamese side that Swedish equipment and materials are too expensive. It is difficult to prove that this is the case taking into account quality considerations and supplementary services often provided by Swedish suppliers (see also below). On the other hand, much of the equipment and materials provided under the Sida programme is fairly standard and it is conceivable that the lowest bidder often enough is providing products of adequate quality. This argument could be taken as an indication that the Sida programme is providing excellent material and service but at too high a cost, thus not being cost effective.

On balance it would appear prudent to state that the Sida power sector programme has provided a series of worthwhile inputs to the power sector, which also have been put to good use. However, these benefits have been provided at a cost, somewhat above what could possibly have been achieved by an untied procurement regime.

[14] The hardware to the Swednet planning system supplied to PC 2 appears to have been delivered without all required manuals.

# CHAPTER 5 RECOMMENDATIONS

The fact that the whole power sector is going through a period of major institutional reform is bound to have a major impact on the scope and content on the Sida assistance as further discussed below.

## 5.1 BASIC CHOICES

The ongoing institutional adjustments within the power sector will over time have a profound impact on the scope and content of the external assistance to the sector. The need to attract private capital investments into new facilities makes it necessary for EVN and its subsidiaries to obtain all other financial inputs on commercial terms. The on-lending conditions of e.g. IBRD is a step in this direction. This requirement means that the relatively soft on-lending conditions offered by Sida to the Power sector should gradually be phased out.

Sida has played an important catalytic role in helping Vietnam expand and modernise its power sector. It would be possible to argue that this phase now is successfully completed. A number of other bilateral aid programmes are now established in the power sector. Vietnam is also in a position to tap into the vast pool of financial resources, experience and knowledge available from IBRD and AsDB.

In this situation there are in principle two main lines of action open to Sida:

1. One would be to consider the work done and phase out the whole or most of the sector as a recipient for Sida assistance.

2. The other would be to realise that much work remains to be done in the power sector and that Sida, thanks to its long and extensive experience of working within the sector, still has much to offer Vietnam. What is required is basically to find those specific areas where Swedish resources have a special capacity or competence.

A number of arguments could be advanced for the second alternative, in addition to what has been stated above. In this context, the strong wish of the Vietnamese authorities to see a continuation of the Swedish assistance is maybe the most important one.

## 5.2 ONGOING ACTIVITIES

### 5.2.1 Individual Projects

The assessment of the ongoing activities indicate that although there are problems and question-marks with individual projects the programme as a whole is sound. For some of the ongoing projects there are specific recommendations either for immediate remedial actions or for further investigations. These recommendations could be summarised as follows:

*Network Planning*. The Swednet computerised network planning system is an excellent engineering tool, which should be adopted by all the power companies. It is strongly recommended the EVN introduces a well co-ordinated and coherent policy for the use of this planning tool

*Twinning Project*. The second phase of this project must be revised and scaled down. It is recommended that the revision is carried out with the help of the LFA method.

### 5.2.2 Programme Aspects

The ongoing activities could basically be divided into two main groups.

*5.2.2.1 Commercial Type of Activities*

This group consists of activities, which in the future should be provided on commercial terms. This is the only way of turning EVN into an organisation operating on the market according to commercial principles. The ongoing projects in this category should be allowed to run their course as scheduled and in accordance with existing agreements. This means that Sida continues to provide a certain degree of subvention to the power sector, albeit on a diminishing scale, over the next few years as the individual projects are being phased out. This will help EVN through the present transitional period, where low revenue levels appear to be one of its major problems. There are, however, concrete plans to substantially increase the tariff level over the next few years, which would in a fairly short time substantially improve the financial standing of EVN.

The ongoing Sida financed activities which will fall into this category would be:

- All ongoing distribution projects;
- The existing assistance in the field of power generation.

An orderly completion, but no further extension of these projects, should be the preferred line of action in this field. The argument could actually be taken a step further. Most, if not all investments in generation, transmission and distribution, should be provided on commercial terms and supplied along commercial channels. The IBRD loans to the power sector, with fairly stiff on-lending conditions, could be a model to be adopted by all aid organisations for the above mentioned types of investments.

*5.2.2.2 Non Commercial Activities*

The ongoing activities in the training and management development field belong to the second group of projects i.e. project activities which are well in line with the future requirements of the power sector and the sector policy of Sida. This type of projects should be continued and evolved to meet the institution development requirements of the power sector. Possible project ideas in this field are outlined in 5.4 below.

## 5.3 POSSIBLE NEW ACTIVITIES

### 5.3.1 Support to the Institutional Reform Process

In addition to the ongoing activities in the management and human resources field Sida could also provide strategic advise and support to the whole reform process through high level management and organisational advise to the Ministry of Industry and EVN. Such advise could cover areas related to the future role of EVN and the concrete planning for the implementation of such changes.

In this field there could be a certain division of labour between different aid donors. While for example the IBRD might assist the Government in evolving its policy in the institutional field, an organisation like Sida could provide the required assistance for the implementation of such policies.

### 5.3.2 Rural Electrification

A rural electrification strategy for Vietnam is being prepared with external assistance. This strategy should provide a firm basis for the extensive expansion of electricity supply to these areas. This development will open up for donors like Sida to target its support to rual areas. Rural electrification would be well in line with Sida's new energy sector policy and would be one way to more explicitly address the priority area of poverty reduction orientation in the assistance. Project activities in this case could be of two basic types:

- Assistance to villages which are already hooked up to the EVN supply system but which have a poorly designed, wasteful and unsafe local distribution system. Assistance of this type could also be provided to villages which have enough of a demand for electricty and are close enough to the electicity grid to be connected;

- Poor villages, remotely located, could be provided with at least a minimum level of electricity through photovoltaic cells, wind power or other types of alternative sources of energy provided they meet minimum financial and economic criteria.

It is of considerable importance that any such scheme is based on an expression from the local population of a genuine, felt need for the service provided through the rural electrification scheme.

### 5.3.3 Financing of Power Generation, Transmission and Distribution Systems

Sida has the possibility to finance fully or partially new production or distribution capacity in the power sector of Vietnam. Such loans could be provided for projects, which fit within the new Sida energy policy. These projects should provide the investment resources needed by EVN on on-lending terms similar to those of purely commercial projects. The preparation of projects in this field could be combined with the EIA inputs discussed under 5.3.5. below

### 5.3.4 Engineering standards

It is recommended that EVN develops, with Sida assistance, a uniform engineering standard and which could be used in all the EVN companies.

### 5.3.5 Strengthening Local EIA Capacity

In the enviromental protection fied a long term strategy for Sida could be to support a capacity building progamme with the purpose of strengthening government institutions and non-governmental organizations to mainstream EIAs and resettlement studies and subsequently transformaing such results of analyses into appropriate actions.

## 5.4 PROJECT FORMULATION AND MONITORING

The evaluation mission has noted the progress made in the field of project design, assessment, monitoring and evaluation with the help of the LFA system. At the same time notice

should be taken of the fact that work still remains in this field. In particular, the following issues should be considered.

### 5.4.1 LFA Application

The standard in the application of LFA in the project documents and in the reporting must be raised to a level where the full value of the instrument as an objective oriented project planning tool is realised. This could mean more training sessions, better feed-back from Sida to the recipient organizations or instructions where the simple form of LFA already at the first introduction is replaced by a more advanced form of LFA.

### 5.4.2 Gender Issues

It is proposed that in the future in the preparation and implementation of all management and organization projects or components of projects, Sida should ensure that gender aspects are taking into account in a much more systematic manner than what is the case at present.

# TERMS OF REFERENCE

## Evaluation of the Swedish Support to Vietnam's Power Sector

---

## 1. Background

### General

Vietnam and its energy sector have changed dramatically since the Swedish-Vietnamese energy cooperation started in the 1980's. Before the collapse of the Soviet Union, the cooperation between Vietnam and the eastern block within the power sector was intense. The largest hydro power station in Vietnam, Hoa Binh with the capacity of 1920 MW, was constructed with Soviet assistance and many of the staff in the Vietnamese power industry have been trained in the East.

Vietnam introduced the Doi moi (renovation) reform in 1986 and the country started to slowly open for foreign trade and investment. More reforms for trade liberalization have later been introduced. This has changed the procedures for procurement in the power sector. During the cooperation with the eastern block, the trade was based on barter trade and Vietnam had no knowledge and experience from trade with the West. Procurement according to international rules was new to Vietnam.

A new feature, in the globalization, was the modern techniques that suddenly became available. Also international standards like IEC was new to Vietnam. Project planning and management has also been done in a different way in the centrally planned economy.

### The sector

The energy sector in Vietnam has been reorganised during he past years. Until 1994, generation, transmission and distribution of electricity was carried out by the three power companies, PC1, PC2 and PC3 under the direction of Ministry of Energy. 1 January 1995, Vietnam established Electricity of Vietnam (EVN) and Ministry of Energy merged the same year, with Ministry of Light Industry and Ministry of Heavy Industry into one Ministry of Industry. EVN is a state owned umbrella company responsible for the entire electricity supply and operations in the country. It consists of several dependent and independent daughter companies.

13 "independent" companies include the 5 power companies (PC), PC1, PC2, PC2, Hanoi Power Company and Ho Chi Minh City Power Company. Part of the responsibilities in financing, accounting and business for some activities has been delegated to the PCs. EVN

decides individual bulk tariffs based on the profit targets for each PC. The PCs need to report to EVN, which provides the capital.

Directly depending on EVN are 17 companies including the Power Plants (Thu Duc).

A 1,500 km, 500 kV transmission line, constructed with local funds, was commissioned in May 1994. Since then, Vietnam has an interconnected power grid as the transmission line connected the 3 separate grids in the north, central and south region.

The installed capacity is today around 4 400 MW and yearly energy production is around 16,000 GWh (1996). The demand for power is increasing with more than 15% per year and it has been estimated that Vietnam needs to invest 1 billion USD per year to meet the demand.

## Donors

Sida was, during a long period, the only western donor in the sector. Presently, the World Bank, Asian Development Bank and Japan are the 3 biggest donors to the sector. The World Bank assists the Ministry to develop an Electricity Law and EVN to reorganize the sector as well as to develop a framework for BOT-projects. The World Bank also finances investment in power generation, transmission and distribution through soft loans which are on-lent on commercial terms to EVN. ADB is helping with studies like financial management within the power companies and tariff studies. ADB finances distribution projects with soft loans, also on-lent to EVN with similar terms as the World Bank. Japan is mainly supporting investment in generation. Other actors are Norway with support to hydro power development and Finland with concessionary credits to transformers.

## Sida's support to the energy sector

Due to the severe power situation in the south of Vietnam in the beginning of the 80's, Sida agreed to include energy as a new sector for cooperation. The first energy cooperation agreement between Vietnam and Sweden was signed in 1984 for support to rehabilitation of Thu Duc Thermal Power Plant and the distribution network in Ho Chi Minh City.

The continued cooperation, 1987-1990, consisted of delivery of a 15 MW gas turbine to Thu Duc power station and repair of the turbine in Da Nhim hydro power station.

In may 1990, Sida and Vietnam preliminary agreed on the content of a new 3-year power sector agreement, where all 3 power companies, PC1 in the north, PC2 in the south and PC3 in the center would be involved. To involve all geographical areas in the support was a strong wish from the Vietnamese side.

The present sector agreement was signed in October 1994 and is in many ways a continuation of the former agreement. It covers mainly the same geographical areas and concentrates on the same kind of projects.

Sida's support to the energy sector was firstly intended to ease the power situation in the south. After the transformation from planning economy to market economy the assistance, one of Sida's aims was to pave the way for the World Bank, ADB and other big donors which could be expected to enter the energy sector. The World Bank was, in the beginning of the 1990's, preparing to enter Vietnam but was hindered by the US embargo.

Presently, many actors are active within the sector, both big and small donors and private investors. Sida is still playing a role. but is now a donor among others and relatively small (Japan….., World Bank 345 MUSD ongoing, 200 MUSD in line, ADB 80 MUSD ongoing, 100 MUSD in line). Sida's support has changed so as to include concessionary credits, the equipment to Song Hinh hydro power project and a planned credit line for substations. The grant assistance is more and more focusing on consultancy services, studies and training and geographically concentrating to the central part of Vietnam. Financing of equipment is planned to be made with soft loans or concessionary credits in the future.

Three reports worth mentioning as background materials are:

1) Evaluation of two distribution networks projects financed by Sida in Vietnam, Stockholm Energy, 1994

2) Reports from the audit of the Swedish Support to the Energy Sector in Vietnam, Ernst and Young 1996, and

3) Consumer Survey, Interforest and Hanoi Architectural Institute, 1997.

## 2. Reason for Evaluation

Sida will prepare a new country strategy to be in force from 1999. The evolution will serve as a basis for the discussions and decisions on the (possible) future Swedish assistance to the energy sector.

## 3. Scope and focus

### 3.1 Scope

This evaluation shall concentrate on the energy cooperation programme implemented from 1991 to 1994 and the ongoing programme 1994 to 1999. Information concerning the newly started projects Song Hinh Hydro Power Plant and Capacity Building in Management and Tunnelling (CBMT) shall be collected and used as much as possible in the overall judgment of the effectiveness of the energy programme. The projects under the two agreements are briefly described in annex 1 and 2. The Song Hinh projects and CBMT are described in annex 3.

### 3.2 Focus

The evaluation shall focus on the following questions:

#### General

- Has the overall objective 'to promote a more efficient power supply to facilitate economic growth and development in Vietnam' been met? If not - why not? How has each different project contributed to the fulfillment of the objective?

- Has (and is) the Swedish support been relevant in relation to the changing needs and problems as identified and experienced by the recipient? If not - why not?

- Has the Swedish support had the intended effect to 'pave the way' for bigger donors and private investors? If not - why not?

- Has the support contributed to prepare the Vietnamese power sector to work in a market economy? If not - why not?

- Has the mix of projects been relevant, i.e. institutional support, studies, training and investments in transmission, distribution and generation?

- Has the support been given to relevant organizations?

- What have been the main problems and constraints?

- How does the Sida setup with adviser - Sida-staff - consultant and the way Sida follows up and supports the programme implementation through seminars in LFA, distribution planning, environment economics etc. affect the result of the programme?

- How has the introduction of LFA influenced the Vietnamese project preparations and implementations?

- What implications has the limitation to procure from only Swedish companies had?

- To what degree does the ongoing programme support comply with 'Policy for Sida's Assistance to a Sustainable Energy Sector"? Annex 4.

## Economical aspects

- Has (and is) the support been cost-efficient. If not - why not?

- Has the investment been financially sound?

- What effect on the result, if any, has the condition that Sida assistance for equipment are on-lent to the end-recipient?

- How much has the local contribution been to the different projects?

## Technical aspects

- Has the choice of technology been appropriate for Vietnamese conditions?

- Has transfer of technology and know-how been successful and have the Vietnamese project staff been interested and adequately prepared to receive the information.

- Have the investments been sufficiently maintained over the years? Has the need for spare parts been sufficiently met? If not - why not?

### Institutional and competence development

- What impact has Sida's support had on organizational development?

- To what extent has the support contributed to improvements in Vietnam's capacity to develop its power sector?

### Environmental aspects

- What environmental considerations have been taken in the Sida programme support?

### Gender/poverty aspects

- In what way has the Swedish support to the power sector affected the status, influence and economic opportunities of women? How were the interests and roles of women (in comparison to those of men) examined and considered during the implementation of the projects?

- To what extent has the development of the sector affected or impacted poverty?

### Conclusions

The conclusions should cover all aspects specified above. Particular emphasis should be put on the following:

- Has the overall objective 'to promote a more efficient power supply to facilitate economic growth and development in Vietnam' been met? If not - why not?

- Has the Swedish support been relevant in relation to the changing needs and problems as identified and experienced by the recipient?

- What were the main successes/failures of the projects to-date. What were the causes underlying the outcome?

- Do the effects/impacts justify the costs involved?

## 4. Methodology, Evaluation Team and Time Schedule

The evaluation shall include the following steps:

1) Preparation
2) Field work in Vietnam, interviews, visits to projects, preliminary formulation of conclusions, approximately 2 weeks
3) Draft final report
4) Final report

The evaluation shall be performed in close cooperation with an officer at EVN who will assist the evaluation team in finding relevant information and organizing a visiting programme. Interviews shall be made with Sida-staff at HQ and embassy, the Sida energy advisor for Vietnam, the advisers at Stockholm Energy, staff at former Ministry of Energy

(MOE), present Ministry of Industry (MoI), Ministry of Planning and Investment (MPI), Electricity of Vietnam (EVN), project personnel at the Power Companies and local authorities in the provinces. Relevant publications and reports will be made available from the Swedish Embassy in Hanoi and Sida/INEC, Stockholm.

LFA analyses shall be used whenever applicable (see LFA-guide, annex 5).

The intended evaluation approach and methodology shall be specified in the tender.

The evaluation team shall be composed of 2-4 persons possessing competence in the fields of macro and business economics, power systems, environment and sufficient knowledge of gender and poverty aspects. The team members should neither have been assigned by a company or as an individual within the Sida financed energy sector programme in Vietnam in the past, nor at present being assigned by a company with Sida financed contract in the energy sector. However, experience from Asia or other developing countries would be an asset. The team shall assign a full time interpreter during the 2 weeks in Vietnam.

The visit of the evaluation team to Vietnam should preferably take place during September-October 1997.

## 5. Reporting

Before leaving Vietnam, a summary covering the preliminary findings and conclusions, shall be presented in writing, to relevant authorities and to Sida's representation in Hanoi. A draft final report shall be presented to Sida within three weeks after the completion of the visit to Vietnam, followed by a seminar at Sida in Sweden. The final report shall be submitted to Sida within one week after receiving comments from Sida.

The report shall be written in English and in accordance with the Standardized Format as described in the Sida Evaluation Manual 1994, annex 3. Word for Windows or a compatible programme shall be used and the report should be presented in a way that enables publication without further editing. Sida shall be provided with 10 copies and on diskette. Subject to decision by Sida, the report will be published within the Sida Evaluation Series.

The evaluation assignment includes production of a summary in English according to the guidelines for Sida Evaluations Newsletter, annex 6, and the completion of a Data Work Sheet, annex 7.

# List of Persons met during the Mission

| Organisation | Name | Position |
|---|---|---|
| **EVN** | Mr Nguyen Sy Phong | Member of Management Board |
| | Mr Truong Bao Ngoc | Deputy General Director |
| | Mr To Quoc Tru | Director of International Co-operation Department |
| | Mr Chu Van Tien | Deputy Director of International Co-operation Department |
| | Mr Phan Chau Hai | Expert of International Co-operation Department |
| **Ministry of Planning and Investment (MPI)** | Mr Nguyen Quang Dung | Director of Industrial Department |
| | Mr Pham Cong Dinh | Expert of Industrial Department |
| | Mr Do Xuan Thong | Expert of International Economic Department |
| **Ministry of Industry** | Mr Hoang Trung Hai | Deputy Minister |
| | Mr Nguyen Manh Hung | Expert of Planning and Investment Department |
| | Ms Nguyen Ngoc Thanh | Expert of International Co-operation Department |
| **Power Company Number 2** | Mr Nguyen Van Giau | Deputy Director |
| | Mr Bui Lieu | Expert of International Co-operation Department |
| | Mr Nguyen Huynh Duc | Expert of International Co-operation Department |
| | Mr Do Manh Cham | Chief Accountant |
| **Ho Chi Minh City's Power Company** | Mr Tran Cong Dien | Deputy Director |

| | | |
|---|---|---|
| | Mr Tran Van Tai | Manager of Load Dispatch Center |
| | Mr Do Van Canh | Vice Manager of International Relations & Import Export Division |
| | Mr Le Van Thu | Deputy Manager of Finance and Account Department |
| | Mr Thai Doan Hoang Cau | Expert of International Co-operation Department |
| | Mr Le Tan Thanh | Deputy Manager of Load Dispatch Center |
| | Mr Pham Ngoc Minh | Expert of Load Dispatch Center |
| **Thu Duc Thermal Power Plant** | Mr Huynh Van Cua | Director |
| | Mr Nguyen Canh | Deputy Director |
| | Mr Chau Thanh Can | Director of Planning and Technical Department |
| | Mr Do Thanh Tuyen | Expert of Planning and Technical Department |
| | Ms Mai Anh Tuyet | Expert of Planning and Technical Department |
| **Song Hinh Management Board** | Mr Tran Van Hai | Vice Project Manager |
| | Mr Le Nhu Hiep | Deputy Director of Financial and Account Department |
| **Binh Dinh Power Supply Department** | Mr Nguyen Mau Tu | Deputy Director |
| | Mr Vuong Thai Hoa | Director of Technical Department |
| | Mr Vo Van Loc | Deputy Director of Technical Department |
| | Mr Nguyen Huu Duc | Expert of Technical Department |
| | Ms Le Thi Le Oanh | Expert of Technical Department |
| **Power Company Number 3** | Mr Ta Canh | Director |
| | Mr Tran Quoc Anh | Deputy Director |
| | Mr Nguyen Huu Tam | Chief Accountant |

| | | |
|---|---|---|
| | Mr Le Kim Hung | Director of Personnel Department |
| | Mr Nguyen Xuan Cuong | Vice Director of Planning Department |
| | Mr Le Luong Dung | Vice Director of Construction Management Department |
| | Mr Thai Van Cuong | Expert of Construction Management Department |
| | Mr Phan Minh Tuan | Vice Director of International Relations Department |
| | Ms Phan Thi Dieu Lien | Expert of International Relations Department |
| | Mr Tran Thua Hang | Project Manager of Distribution Network Management Board |
| | Mr Nguyen Hong Lam | Expert of Distribution Network Management Board |
| | Mr Truong Chi Thong | Deputy Director of Da Nang Power Supply Department |
| | Mr Le Dac Trung | Vice Director of Technical Department of Da Nang Power |
| | Mr Doan Van Thinh | Expert of Construction Department |
| **Hanoi Power Company** | Mr Nguyen Van Trong | Deputy Director |
| | Mr Pham Hung | Director of International Co-operation Department |
| | Mr Nguyen Ngoc Kiem | Vice Director of Planning Department |
| | Ms Nguyen Dinh Hoi | Chief Accountant |
| | Ms Do Kim Oanh | Vice Director of Project Office |
| **World Bank** | Mr Van Tien Hung | Operations Officer |
| | Mr Anil K. Malhotra | Regional Energy Adviser |
| **Power Company Number 1** | Mr Dang Duc Ha | Director |
| | Ms Nguyen Thi Phuong Dung | Director of Project Management Department |
| | Mr Nguyen Van Chien | Director of Northern Dispatch Center |

| | | |
|---|---|---|
| | Mr Duong Van Hap | Vice Director of Thai Nguyen Power Department |
| | Mr Bui Van Thanh | Expert of Thai Nguyen Power Department |
| | Mr Bui Van Tuan | Expert of Project Management Department |
| | Ms Tran Thi Huyen | Expert of Thai Nguyen Power Department |
| **Power Investigation & Design Company No.1** | Mr Luong Van Dai | Deputy Director |
| | Mr Tran Van Tho | Deputy Manager of Investigation Group 2 |
| | Mr Dang Khanh Toan | Deputy Manager of International Co-operation Department |
| | Mr Nguyen Minh Khoa | Expert of International Co-operation Department |
| **Song Da Construction Corporation** | Mr Nguyen Chi Oanh | Administrator of Project Management Office |
| | Ms Luyen Thi Minh Thai | Assistant of Project Management Office |
| | Mr Lars Jennemyr | Project Manager of Skanska |
| **Sida (Stockholm)** | Mr. Anders Hagwall | |
| | Ms Ann-Charlotte Malm | |
| | Mr. Mikael Söderbäck | |
| **Sida (Hanoi)** | Mr. Bengt Ekman | |
| | Ms. Annika Johansson | |
| **Consultants** | Mr. Hans Johansson | |
| | Mr. Curt Voxby | |

## LIST OF RELEVANT DOCUMENTS (in chronological order)

### 1. General Information about Vietnam

*Environmental Profile - Vietnam*, Anders Thurén, 1992

*Fältguide Vietnam*, Sida, uppdaterad 1994

*Vietnam - LanDöversikt*, Sida, 1994-02-04

*Vietnam - Resultatredovisning 1988/89 - 1992/93*, Sida, 1994-02-04

*Utvecklingssamarbete med Vietnam 1994/95 - 1996/97*, Sida, 1994-02-08

*Decree of the Government on the Issuance of the Regulation on Management and Utilization of Official Development Assistance*, the Government of the Socialist Republic of Vietnam, 15 March, 1994

*Landstrategi för utvecklingssamarbetet med Vietnam*, Regeringsbeslut, UD, 1994-06-23

*Förslag till intensifierad planering av biståndet till Vietnam*, Ambassaden i Hanoi, 1995-02-05

*Förslag till miljöplan för utvecklingssamarbetet med Vietnam*, Ambassaden i Hanoi, 1995-02-05

*Vietnam: The Dynamics of Institution Building under Doi Moi*, Börje Ljunggren, April, 1995

*Inriktningsbeslut för utvecklingssamarbetet med Vietnam för budgetåret 1995/96,* Verkschefsbeslut, Sida, 1995-06-29

*Vietnam Survey*, The Economist, July 8th, 1995

*Women in Development: Viet Nam*, Country Briefing Paper, Asian Development Bank, October, 1995

*Environmental Profile Viet Nam*, Hans Friederich and Anders Thuren, Draft, 3 December, 1995

*Environmental Profile Viet Nam*, Hans Friederich and Anders Thuren, 3 December, 1995 (OBS! Sidor saknas!)

*Förslag till fokusering av biståndet till Vietnam*, Ambassaden i Hanoi, 1995-12-15

*From Plan to Market - The Economic Transition in Vietnam*, Adam Fforde and Stefan de Vylder, Westview Press, 1996

*Vietnam 1995. Sustainable Growth and the Issue of Capital*, Henny Andersen, Sida Macroeconomic Report, 1996:6

*VIET NAM - Policy Framework Paper, 1996 to 1998*, IBRD, SecM96-109, February 5, 1996

*Inriktningsbeslut för utvecklingssamarbetet med Vietnam för budgetåret 1995/96,* Beslut, Sida, (ersätter GD-beslut 1995-12-21)

*MR/Demokrati-plan VIETNAM 1997*, PM; Sveriges Ambassad, Hanoi, 1996-09-30

*Swedish-Vietnamese Development Cooperation, Semi Annual Report*, May-September 1996, Embassy of Sweden, Hanoi, 1996-10-11

*Möre om utveckling av infrastruktur i Indokina, 26-27 september i Sydney*, Sveriges Ambassad, Canberra, 1996-10-10

*Vietnam 1997. Managing the Transition to Free Trade: Vietnamese Trade Policy for the 21st Century*, Ari Kokko, Sida Macroeconomic Report, 1997:4

*Development Cooperation with Vietnam, Semi Annual Report*, October 1996 - March 1997, Embassy of Sweden, Hanoi, 1997-04-07

## 2. The Energy Sector in Vietnam

*A study on Women in the Energy Sector*, Centre for Women Studies, Ministry of Energy Ministry of Labour, War Invalids and Social Affairs, June 1994

*Insatspromemoria - Stöd till energisektorn i Vietnam*, Sida, 1994-06-23

*Energisektorstöd till Vietnam 1994-1997*, Avdelningsbeslut, Sida, 1994-06-30

*Debriefing Note to Ann-Charlotte Malm, Energy Cooperation*, Danielsson, Embassy of Sweden, Hanoi, 1994-07-15

*Review of Power and Evaluation of Power Projects in Vietnam*, Final Report, BECO for BITS, 1994-11-24

*Notes from meetings on the Swedish - Vietnamese Cooperation in the Energy Sector, 10-12 January 1995*, Embassy of Sweden, Hanoi, 18 January, 1995

*Power Sector Rehabilitation and Expansion Project*, Viet Nam, Staff Appraisal Report, World Bank, February 8, 1995

*Status of Energy Projects 15 June 1995*, Sida

*Inriktningsbeslut för utvecklingssamarbetet med Vietnam för budgetåret 1995/96,* Verkschefsbeslut GD 20/95, 1995-06-29

*Summary of the Audit, Sida funded projects, Hanoi Power Company, Ministry of Energy*, Ernst & Young, July 1995

*Energy Sector Cooperation Norway - Vietnam*, Letter from NORAD to Sida, 27 July, 1995

*Power Sector Refom and Restructuring in Viet nam, Final Report to the Steering Committee*, ESMAP, Report No. 174/95, September 1995

*Vietnams kraftsystem*, information från SWECO till INEC, November 1995

*Électricité de Frances erfarenheter från Vinh' Sonprojektet i Vietnam*, Sveriges Tekniska Attachéer, Paris, november 1995

*Vietnam Renewable Energy Assessmant, Mission Report of Findings and Recommendations,* Reconnaissance Report prepared for the World Bank by NRECA International Ltd, December 1995

*Household Energy End-Use in Hanoi, Vietnam*, Master Thesis (MFS), Emmeli Virolainen, 1996

*Vietnam Household Energy technical Assistance: Improved Coal Briquetting and Commercialized Dissemination of Higher Efficiancy Biomass and Coal Stoves*, Activity Completion Report No 178/95, UNPD/World Bank ESMAP, January 1996

*Vietnam Power Sector Rehabilitation & Expansion Project - Institutional Strengthening Study*,Volume I: Executive Summary (Interim Reoport) ESB International, March 1996

*Beslutsmandat till INEC avseende energiinsatser i Vietnam*, Beslut REMA 17/96, 1996-03-21

*Inventory of Vietnamese organizations working on women issues*, Draft, Agneta Dau Valler, June, 1996

*World Bank Mission - Supervision: Power Sector Rehab and Expansion project (PSREP); Supervision: Power Development Project (PDP); Preparation: Dai Ninh Hydropower Project (DNHPP); Preparation: Transm. and Distrib. Development Project (TDDP),* Aide Memoire, October 10, 1996

*Identifiering av energiinsatser för perioden 1997 - 2000*, PM, Sveriges Ambassad Hanoi, 1996-12-05

*Solar Energy Subsector Review Mission*, UNDP, 17 February, 1997

*The Swedish -Vietnamese Energy Cooperation - some reflections on administrative procedures on the basis of our bilateral experiences,* letter from the Swedish Ambassador to the Minister of Industry, Hanoi, March 26, 1997

*Mandat till INEC att bereda samt fatta beslut om stöd inom Energisektorn i Vietnam,* Avdelningsbeslut REMA 102/97, 1997-06-27

## 3. Agreements on Energy Sector Support

Specific Agreement on Support to the Energy Sector in Vietnam 1991 - 1993, May 30, 1991

Agreed Minutes from Energy Sector Cooperation Review in Vietnam 14-23 September, 1992

Extension of Specific Agreement of Support to the Energy Sector in Vietnam, Sveriges Ambassad, Hanoi, March 25, 1993

Agreed Minutes from Energy Sector Cooperation Review in Vietnam May 3-13, 1993

Prolongation of the Specific Agreement on Support to the Energy Sector in Vietnam for the period May 1991 - June 1994, Embassy of Sweden, Hanoi, 1994-06-10

Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, signed 19 October, 1994

Agreed Minutes from Energy Sector Cooperation Review between Ministry of Energy, Vietnam and Sida, November 22 - 27, 1994, November 27, 1994

Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on General Terms and Conditions for Development Cooperation 1995 - 2000, signed 1995-06-08

Extension of the Specific Agreement on Energy Cooperation between Vietnam and Sweden, Re. 110 kV transformer to Qui Nhon and Thai Nguyen Distribution Project, Embassy of Sweden, 13 June, 1995

Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Provision of Financial Resources to the Song Hinh Multi Purpose Project, signed on 18 October, 1995

Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Development Cooperation 1 July 1995 - 31 December 1997, signed 1995-11-17

Agreed Minutes, Annual Review of the Vitenamese - Swedish Energy Cooperation Programme, 6-13 December, 1995

Agreed Minutes, Semi - Annual Review of the Vitenamese - Swedish Energy Cooperation Programme, 22-29 April, 1996

Increase of the Swedish Contribution in and Extension of the Specific Agreement on Energy Cooperation July 1994 - June 1998, Decision No. Vie 86/96, 24 June, 1996

Extension of the Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, Embassy of Sweden, Hanoi, 24 June, 1996

Agreed Minutes, Annual Review of the Vitenamese - Swedish Energy Cooperation Programme, 19-30 November, 1996

Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Capacity Buildning in Management and Tunnelling 1997 - 1999, signed 30 January, 1997

Agreed Minutes, Semi - Annual Review of the Vitenamese - Swedish Energy Cooperation Programme, 14-23 April, 1997

Memorandum of Understanding among Sida, NIB and NDF for the Financing of the Song Hinh Hydro Power Project, 25 April, 1997

# 4. Documents Related to individual Sida-supported Energy Projects in Vietnam


*Technical Evaluation of the Rehabilitation, Thu Duc Power Plant, Vietnam*, December 1990

*Evaluation of Gas Turbine Projects Financed by Sida*, Allan Mauritzson, April 1992

*Needs Assessment and Feasibility Study for Rehabilitation Thu Duc Thermal Power Station, Final Mission Report*, Edelborg/Eriksson/Johansson, ÅF Energikonsult Syd AB, May 27, 1993

*A Detailed Report on Qui Nhon Network upgrading Project, Stage 1*, MoE, Power Company No. 3, February 15th, 1994

*Management Training Programme, Final Report for the period Dec.1992 - Dec. 1993*, ICS Interconsult Sweden AB, February 28, 1994

*Report from Completion of Major Inspection Thu Duc Gas Turbine GT 35*, ABB 1994-05-18

*Report from a Project Identification Mission on a Training/Organization Development Programme in the Energy Sector in Vietnam*, Draft, May/June 1994

*Conceptual Master Plan on the Hierarchy of Load Dispatch Centres in Vietnam*, Draft Report, Addendum to Contract 159/93, SwedPower, June 1994

*Rehabilitation of Thu Duc Thermal Power Station, Evaluation of PC-2 Proposal*, Draft Report, ÅF Energikonsult Syd AB, 6 October, 1994

*Evaluation of two distribution network projects finenced by Sida in Vitenam*, Stockholm Energi, 1994-12-30

*Conceptual Master Plan on the Hierarchy of Control Centres in Vietnam*, SwedPower, January, 1995

*Project Document for Regional Load Dispatch Centre in Hanoi*, Ministry of Energy, Electricity of Vietnam, Power Company No 1, February, 1995

*Yali Falls Hydroelectrical Power Project, Draft Appraisal Report*, Voxby/Hilding, May 1995

*Rehabilitation of GT-35 Gas Turbine, Inspection Report*, SwedPower, 1995-06-30

*Song Hinh Hydropower Project, Environmental Review*, Jaakko Pöyry, October 6, 1995

*Song Hinh Multi-Purpose Project, Vietnam - Project Appraisal Report, Preliminary Report,* SwedPower, October 9, 1995

*Song Hinh Multi-Purpose Project, Vietnam - Project Appraisal Report, Final Report,* SwedPower, November 1995

*Song Hinh Hydro Power Station, Project Report*, Electricity of Vietnam, 1996

*Song Hinh Appraisal Report, Agreed Minutes clause 6 (Project Cost Budget), "Construction Supervision,* SwedPower, 1996-02-05

*Utökning av eldistributionsprojektet i Qui Nhon, Vietnam*, Beslut INEC/ENE 489/96, 1996-05-31

*Rehabiltation and Fuel Conservation of Thu Duc Thermal Power Station,Environment Impact, Final Report,* ÅF-Energikonsult Syd AB, June, 1996

*Rehabiltation and Fuel Conservation of Thu Duc Thermal Power Station, Training Needs Assessment and Organisational Overview, Final Report,* ÅF-Energikonsult Syd AB, June, 1996

*Training Needs for Underground Tunnelling Works in Energy Projects in Vietnam*, Project Identification Mission, Final report, Wallberg/Voxby, June 1996

*Study on Conditions for Resettlement in Song Hinh district, Phu Yen province, Vietnam,* Interforest AB, June 12, 1996

*Design Report for HCMC District Control Centre, SCADA Project, Phase II*, SwedPower, August 1996

*Rehabiltation and Fuel Conservation of Thu Duc Thermal Power Station, Scope of Work and Feasibility Study, Final Report*, ÅF-Energikonsult Syd AB, 1 September, 1996

*Assessment/Monitoring on Environmental Impact and Mitigation Measures, Song Hinh Multi Purpose Project, Phu Yen, Vietnam*, CITEC/IEM, October 1996

*Song Hinh Multi-Purpose Project, Phu Yen, Viet Nam, Assessment/Monitoring of Environmental Impact and Mitigation Measures*, CITEC/IEM, October 1996

*Upgarding Danang DistributionNetwork (Phase II), Project Proposal*, Power Company No. 3, November, 1996

*Annual Plan of Operation of: Rehabilitation of GT-35 Gas-Turbine; Rehabilitation and Fuel Conversion of Thu-Duc Power Station*, Electricity of Viet Nam, (Updated to Nov. 13, 1996), November, 1996

*Report on Participatory Planning for Resettlement in Song Hinh District, Phu Yen Province, Vietnam*, Interforest, November 24, 1996

*Feasibility Study of Rehabilitation and DevelopmentProject for Annhon Town Network,* Brief Report, Electricity of Viet Nam, Power Company No. 3, February 5, 1997

*Song Hinh Multipurpose Project, Vietnam, Monitoring Visit, Report No 1*, Final Report 1997-03-07

*Song Hinh Multi Purpose Project- Participatory Resettlement Planning Process - Follow Up on Conditions and Measures for a Participatory Approach*, Interforest AB, March 10, 1997

*Rehabilitation and Expansion Project for Danang City Distribution Network - Phase II*, Brief Report, Electricity of Viet Nam, Power Company No. 3, April, 1997

*The Construction of Song Hinh Hydropower Project*, Report, Electricity of Viet Nam, April 1997

*Plan of Operation: 1) Rehabilitation of GT-35 GasTurbine; 2) Rehabilitation & Fuel Conversion at Thu-Duc Power Station*, Semi-annual Report, April 1997

*Project Appraisal Report, SCADA System Phase II,* Ho Chi Minh City Power Company, IVO Power Engineering Ltd., June 1997

# Evaluation mission - Energy Sector
# Tentative Programme

---

20 October - 1 November 1997

| Date | Day | Time | Activities |
|---|---|---|---|
| 20 Oct | Mon | 12.30 | Arrival check in Quoc Hoa hotel |
| | | 15.00 | Meeting with Sida |
| | | 16.30 | Meeting with Björn at the Embassy |
| 2l Oct | Tues | 08.00 | EVN |
| | | 14.00 | MPI |
| 22 Oct | Wedn | 09.00 | Meeting with Ministry of Industry<br>Vice Minister Hoang Trung Hal<br>54 Hal Ba Trung |
| | | 19.00 | Fly to HCMC<br>Check in Rex Hotel |
| 23 Oct | Thurs | 08.00 | Meeting with PC2<br>Ms Giang, 8 231303 |
| | | 10.00 | HCM Power company<br>Mr. Cau, 8 228525 |
| | | 14.00 | Thu Duc Power Plant<br>Ms Tuyet 8 961986 |
| 24 Oct | Fri | 14.40 | Fly to Tuy Hoa |
| | | 15.40 | Check in Cong Doan Hotel |
| 25 Oct | Sat | 08.00 | Meeting with the Song Hinh Management Board<br>2C Tran Hung Dao 825391<br>Visit the site |
| 26 Oct | Sun | 07.30 | Go by car to Qui Nhon |
| | | 10.00 | Arrival to Qui Nhon |
| | | 13.00 | Meeting with Binh Dinh Power Supply Dept.<br>Mr. Hoa, 821850<br>(Anne-Lise arrives from Sweden)<br>Stay overnight in Tourist Hotel. |

| | | | |
|---|---|---|---|
| 27 Oct | Mon | 06.00 | Go by car to DaNang |
| | | 12.00 | Arrival at Da Nang |
| | | 13.30 | Meeting with PC3 and Da Nang Power Supply Dept<br>Ms Lien, 823931<br>315 Trung Nu Vuong<br>Stay overnight in Tien Sa Hotel |
| 28 Oct | Tuesday | 10.10 | Fly to Hanoi |
| | | 11.20 | Arrival at Hanoi |
| | | | 13.30 Meeting with Hanoi Power Company<br>15.30 Meeting with PID<br>17.00 Meeting with the World Bank Office |
| 29 Oct | Wedn | 09.00 | Meeting with PC1 |
| | | 13.30 | Meeting with PIDC1 |
| 30 Oct | Thurs | 09.00 | Meeting with Sida |
| | | 14.00 | Meeting with EVN |
| 3l Oct | | | Open |
| 1 Nov | | | Leave for Sweden |

Members of the team:

Mr Bo Persson
Mr Bo Sedin
Ms Anne-Lise Klausen (Arrives from Sweden on 26 October)
Mr Phan Chau Haj EVN
Mr Do Xuan Thong MPI
Ms Ha Ngoc Bich, lnterpreter

**Appendix 1.5**

# Major plants scheduled for construction during the period 1997-2005

| | | | |
|---|---|---|---|
| 1997 | Ba Ria Gas turbines | 2*37,5 MW | 763 MW |
| | F6 Gas Turbine Can Thu #3,4 | 2*144 MW | |
| | Gas turbine part of Phu My 1#1 | 1*200 MW | |
| | Gas turbine part of Phu My 2#1 | 1*200 MW | |
| 1998 | Song Hinh Hydro | 1*35 MW | 779 MW |
| | Gas turbine part of Phu My 1#2 | 1*200 MW | |
| | Gas turbine part of Phu My 3#2 | 1*200 MW | |
| | Steam part of Ba Ria CC | 1*56 MW | |
| | Gas turbine part of Phu My 1 #3-4 | 2*144 MW | |
| 1999 | Song Hinh Hydro | 1*35 MW | 1271 MW |
| | Pha Lai Coal 2#1 | 1*300 MW | |
| | Steam part of BA Ria 2 CC | 1*56 MW | |
| | Quang Ninh #1 | 1*300 MW | |
| | Steam part of Phu My 1#1 | 1*200 MW | |
| | Steam part of Phu My 3 | 1*200 MW | |
| | Yaly hydro power plant #1 | 1*180 MW | |
| 2000 | Pha Lai Coal 2#2 | 1*300 MW | 804 MW |
| | Yaly hydro power plant #2,3 | 2*180 MW | |
| | Steam part of Phu My 1#2 | 1*144 MW | |
| | Ham Thuan - Dami H-E plant | 1*472 MW | |
| 2001 | Yaly hydro power plant #4 | 1*180 MW | 724 MW |
| | Steam part of Phu My 2-1 | 1*144 MW | |
| | Gas turbine part of Phu My 2-2 | 2*200 Mw | |
| 2002 | Gas turbine part of Phu My 4#1,2 | 2*200 MW | 1155 MW |
| | Buan Kuop hydro power plant | 1*85 MW | |
| | Se San 3 hydro power plant | 1*220 MW | |
| | Steam part of Phu My 2-2 | 1*200 MW | |
| | Dai Thi hydro power plant | 1*250 MW | |
| 2003 | Dai Ninh Hydro power plant | 1*300 MW | 910 MW |
| | Ban Mai hydro power plant | 1*350 MW | |
| | Kon Tum Up hydro power plant | 1*260 MW | |
| 2004 | Pleikrong hydro power plant | 1*120 MW | 798 MW |
| | Dal Thi hydro power plant | 1*250 MW | |
| | Dong Nai 8/3C hydro power plant | 1*140 MW | |
| | Gas turbine part of Phu My 4#3,4 | 2*144 MW | |
| 2005 | Quang Ninh #2,3 | 2*300 MW | 1000 MW |
| | Gas Turbine # 1,2 | 2*200 MW | |

# Vietnam Power Sector - Project Descriptions

This Appendix contains separate project descriptions which provide information on all Sida financed projects since 1991. An effort has been made to present the projects in accordance with the standard LFA structure. It will be apparent from the presentation of the individual projects below that it has not been possible to fully fulfil this ambition.

There are a number of reasons for this, including the fairly pedestrian one that individual projects have been based on project documents lacking one or more essential pieces of information. However, the most important reasons for incomplete data and information on projects are:

- As a result of the reorganisation of the power sector in 1995, some projects moved from one organisation to another (e.g. from PC 2 to HCM City) In this process it appears that the knowledge of what happened to the project prior to the re-organisation was lost.

- The introduction of the LFA system is a process which must be given some time to take hold. The proper identification and presentation of objectives, activities, inputs, outputs etc. have therefore only gradually been adopted and brought into use in the project formulation and assessment process.

In spite of the shortcomings in the background material and the limited time available to search for supplementary information, it is felt that the presentation of the individual projects along the lines required by the LFA approach provides a useful basis for the presentation and discussions of the Sida power sector activities in Vietnam.

## Ministry of Industry/EVN/General Backstopping and Support

**Background**:

**Agreement**: Specific Agreement on Support to the Energy Sector in Vietnam 1991 - 1993, signed May 30, 1991.

Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, signed 19 October, 1994

**Period**:

1991-1994
1994-1999

**Financial contributions:**

| | **Sida** | | **Gov. of Vietnam** |
|---|---|---|---|
| | Budgeted SEK | Actually Disbursed SEK | Million VND |
| 1991-1994 | 12.5 million | 11.7 | - |
| 1994-1999 | 35.0 million | 8.0 | - |

**Channels of support**: Electricity of Vietnam(EVN)

**Sector Objectives**: To assist in the development of an effective power sector, thus facilitating the economic growth and general development of the country.

**Project/Immediate Objectives**: Through specific inputs of programme advise, feasibility studies and follow-up of all programme activities assist in a smooth planning and implementation of the sector programme

**Expected Results**:

**Activities**:
Provision of the following type of services:
- Technical Advisory Services
- Feasibility Studies
- Programme and Project Follow-up

**Inputs**: Advisory and consultancy services

**Present Project Status**: Ongoing

**References**:

## Ministry of Industry: Management Training

**Background**: The purpose of the Management Training Programme was to support the work with defining a new national organisation for the electric energy sector and support the introduction of new routines and procedures at the Ministry of Energy and its companies within the new national policy of introducing a market economy. The total number of management staff to be trained was estimated at 2,000, out of which 120 would be covered by this project. In order to provide training for the remaining staff it was planned that the project should also support the strengthening of a newly established management training institute for the energy sector within the Ministry's organisation.

**Agreement**: Specific Agreement on Support to the Energy Sector in Vietnam 1991 - 1993, signed May 30, 1991.

**Period**: 1991 - 1994

**Financial contributions**:

| | **Sida** | | **Gov. of Vietnam** |
|---|---|---|---|
| | Budgeted SEK | Actually Disbursed SEK | Million VND |
| 1991-1994 | 6 million | 6.2 million | n.a. |

**Channels of support**: Ministry of Energy. Consultant: ISC Interconsult Sweden AB.

**Sector Objectives**: To improve the functioning of the power sector through better management.

**Project/Immediate Objectives**: To train decision-makers within the power sector (at the Ministry of Energy and the Power Companies) in the organisation and management of the sector in a market economy and to provide a platform for a training programme for managers in the energy sector.

More specifically, the Project should:

1. Provide management training to 120 high level managers in the energy sector to enable them to start modifying their organisations, routines and procedures for the introduction of a system based on market economy;
2. Establish a nucleus for future management training programmes in a way that training can continue with Vietnamese teachers and training materials developed in the project;
3. Provide information in the form of a study tour for 10 high level managers at the ministry for investigating national organisations of the energy sector in different countries
4. Provide equipment to the Ministry's Secondary Economic School to help the continuation of management training

**Expected Results**: The support will give managers at different levels a better capacity to direct and operate power companies under market conditions, and prepare the ground for local training of middle-management staff in the energy sector.

By connecting a number of (about ten) Vietnamese trainers to the seminars/courses, who should prepare translations and assist in the training, it was envisaged that these would after participation in the seminars be able to conduct similar training activities without external support.

**Activities**:

- Sector-specific managerial training in the organisation of the energy sector in a market economy, international procurement, project financing, tariff policy and general modern management techniques.
- Study tours to Thailand, Malaysia and Sweden.
- Development and translation of training material

**Inputs**:

- Consultancy services
- Re-equipment of training facilities

**Outputs:**

- 120 key personnel in managerial positions having carried out 4 and 3 weeks respectively of sector-specific management training in Hanoi and in Bangkok at the Thai energy company EGAT.
- 11 key decision makers at the Ministry of Energy, led by a vice-minister, having visited Sweden, Thailand and Malaysia during two weeks.
- Training material developed and translated into Vietnamese
- Nine persons should after the completion of the project be capable of training personnel at mid-level in energy sector management.

**References**:

Project Document for a Management Training Programme at the Ministry of Energy, Hanoi, December 1991

Energi - Vietnam, Kompetensutveckling, PM, Sida, 1992-01-15

General Report on the Management Training Programme (1991-1993)

MoE/ICS Interconsult Sweden AB, Project Management Training Programme, Final report, February 28, 1994

## Ministry of Industry: Sister Cooperation Project (Twinning)

**Background**: The aim of the Swedish support to the Sister Cooperation Project between Hanoi Power Company (HPC) and Power Company No. 3 (PC3) and Sydkraft is to reinforce the institutional development of the two Vietnamese power companies. From the summer 1996, Sydkraft has been engaged by HPC and PC3 of EVN to carry out Step 1 of the project, with the purpose of identifying the most important areas on which to focus the sister cooperation, to agree on how the cooperation shall be carried out and to prepare the Terms of Reference for Step 2, the implementation phase. The Final Report for Step 1 was submitted in March 1997. A proposal for Step 2 has been presented by the Swedish consultant, but has not yet been approved by Sida.

**Agreement**: Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, signed 19 October, 1994

**Period**: 1994 - 1999

**Financial contributions**:

| | **Sida** | | **Gov. of Vietnam** |
|---|---|---|---|
| | Budgeted SEK | Actually Disbursed SEK | Million VND |
| 1994-1999 | 10 million | 0.8 million | Not yet determined |

**Channels of support**: Ministry of Industry, EVN

**Development Objectives**: To improve the functioning of the power sector through better management.

**Project Objectives**: The main objectives of Step 2, the implementation phase of the project, have been proposed (but not yet decided) to be the following:

- To provide assistance and advice as expected and asked for by HPC and PC3 in due course of the project in the process to develop and improve the efficiency of their respective organisations and functions;

- To get a thorough review and analysis of the most important functions within HPC and PC3 related to Business Control Management, Human Resources Management and Technical Management;

- To achieve significant improvement of certain procedures and functions within HPC and PC3 related to Business Control Management, Human Resources Management and Technical Management;

- To introduce and implement some new systems and/or improvements of existing systems for computer support in different relevant processes;

- To achieve improvements and simplify procedures between EVN and HPC/PC3 for review, approval and decisions for planning and projects preparation and implementation;

- To establish procedures for a continued improvement process of the respective organisations and functions within HPC and PC3;

- To establish internal audit for all organisational levels;

- To introduce customer demand side management (DSM).

**Expected Results**:

**Activities**: (proposed)

- Executive exchange visits to Sweden and Vietnam
- Study visits to Sweden from HPC and PC3
- Resident experts in Vietnam
- Management training
- Computer programming

**Inputs**: Consultancy services

**Present Project Status**: Step 1 completed. Step 2 to be decided.

**References**:
Insatspromemoria - stöd till energisektorn i Vietnam 1994-06-23
Final Report for Step 1 of HPC and PC3 Sister Cooperation Project, March 1997

## Capacity Building of Construction Companies in Management and Tunnelling

**Background**: In 1994, the Vietnamese construction company Song Da, through the Ministry of Construction, made a request to the Swedish Government for management support and technical assistance to the civil works management organisation for the Yali Falls hydropower construction. The required support would focus on rock excavation and tunnelling works, and purchase of certain tunnel construction equipment. An appraisal of the request was made in 1995, and the appraisal report recommended the requested support.

In order to broaden the scope of technical assistance to Vietnam and open the intended training for other civil works enterprises and state organisations, Sida required a wider perspective with the training aspects more in focus. The support to purchase of equipment was also declined. A second appraisal and project formulation mission was then set up to discuss a possible training programme focused on rock excavation and tunnelling works. This report was presented in the beginning of 1996. A Project Document was completed in September 1996. In December 1996, tenders were submitted to Sida for the training programme. The Agreement with Ministry of Construction was signed in January 1997. A contract with SKANSKA, and SMEC as sub-consultant was signed on 10 February 1997. The work started in March 1997. An Amended Inception Report was presented in April 1997.

**Agreement**: Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, signed 19 October 1994

**Period**: 1994-1999

**Financial contributions:**

| **Sida** | | **Gov. of Vietnam** |
|---|---|---|
| Budgeted SEK | Actually Disbursed SEK | Billion VND |
| 25 million | 8.5 million | 5.1 |

**Channels of support**: Ministry of Construction (MOC). MOC has set up a Project Management Board, PMB, with members from participating companies/organisations. PMB will manage the contract. Besides Song Da Construction Corporation as the main participant in the Training Project, other companies and organisations will participate in it.

**Sector Objectives**: The main objective of the project is to increase the competence in Management and Tunnelling to benefit the energy sector.

**Immediate Objectives**:
Objectives for each training component has been defined. The stated benefits of the training programme as a whole is that it will result improved technical and management competence and capacity for rock excavation and tunnelling works in Vietnam. This will mean more

realistic planning and cost effective use of equipment. Better quality and output of work will also mean improved economy for the country's development of its hydropower resources.

**Expected Results**:

- Improved technical competence and capacity for rock excavation and tunnelling works in Vietnam in general and for hydropower projects in particular;
- Improved quality of tunnel works;
- Foremen and workers have learnt new, improved techniques
- Work safety has increased;
- Realistic plans for rock excavation works have been made and implemented by the Project Management on site;
- Routines for supervision and follow-up of work results on the site have been established;
- Maintenance management on site has been improved and accessible time rock excavation equipment has increased.
- The profitability of rock excavation and tunnelling enterprises has increased, giving room for greater independence;
- Corporate strategies as regards rock excavation and tunnelling work have been established, including strategies and policies for international cooperation and both national and international bidding;
- A greater understanding for the need to look at human resources management and competence development as an ongoing, never-ending process has been developed.

**Activities**: Training courses in Corporate Management, Procurement, Construction Planning, Maintenance and Repair Management, English, on-the-job training for tunnel excavation crews, and study tours.

**Inputs**: Consultancy services

**Present Project Status**: on-going

**References**:
Appraisal Report, Yali Falls Hydroelectric Power Project, Technical and Managerial Assistance for the Construction of the Project, Sven Hilding/Curt Voxby, May 1995

Appraisal Report, Project Identification Mission - Training Needs for Underground Tunnelling Works in Energy Projects, Börje Wallberg/Curt Voxby, Draft Report 1996-01-31

Project Document, Capacity Building of Construction Companies in Management and Tunnelling, Hanoi, September, 1996

Amended Inception Report, Capacity Building of Construction Companies in Management and Tunnelling, Viet Nam, SKANSKA/PMB, 21 April, 1997

## Ministry of Industry: Support to Feasibility Studies for the Expansion of Hydro Power Generation (Se San)

**Background**: The Ministry of Industry (Pre-Investment Department) presented a request in February 1995 for the financing of a study for a Master Plan of the river Se San, and a feasibility study for the hydro power plant Se San 3. The Se San River is the third largest in Vietnam in terms of hydropower potential, and hydropower projects in the river have been studied for several years, among them the Yali Project, now under construction, and the Plei Krong Project to feasibility level. Other projects have been studied to reconnaissance and pre-feasibility level.

**Agreement**: Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, signed 19 October, 1994

**Period**: 1994-1998

**Financial contributions**:

| **Sida** | | **Gov. of Vietnam** |
|---|---|---|
| Budgeted SEK | Actually Disbursed SEK | Million VND |
| 18 million | 3.2 million | 5.3 |

**Channels of support**: Pre-Investment Department (PID), Ministry of Industry.

**Sector Objectives**: Development of the hydro power potential in Central Vietnam

**Project/Immediate Objectives**: The preparation of a power Master Plan for the Se San river area, including a feasibility study of the Se San 3 hydro power project

**Expected Results**: Studies and plans for the project area and recommendations to decision- makers and international financiers regarding the design of a energy production system and future investments in hydro power generating capacity.

**Activities**: Consultancy services divided into two parts and involving the preparation for:
- A Master Plan for the Se San river
- A Feasibility Study covering the proposed Se San 3 Hydro Power project

**Inputs**: Consultancy Services

**Present Project Status**: Ongoing

**References**:
Insatspromemoria - stöd till energisektorn i Vietnam 1994-06-23
Review of the Master Plan for Se San River, SWECO/Statkraft Engineering,1997-08-27

## PC1/Hanoi PC: Hanoi Distribution Project / Ba Dinh (Phase 1 and 2)

**Background**: The expansion of power supply and transmission networks in Northern Vietnam was extensive in the beginning of the 1990s. Little attention was, however, paid to local distribution networks where substantial power losses were made. In order to support this weak link in the power distribution system, Sida decided to assist Power Company 1 (later the Hanoi Power Company) in making a Master Plan for parts of the distribution net and providing advisory services, standardised equipment and spare parts for the implementation of the plan in selected areas of Hanoi. A computerised planning system and training was also included. Ba Dinh District in Hanoi was chosen as the pilot area for testing the proposed improvements set out in the Master Plan. In 1993, Sida decided to expand the support to Ba Dinh, resulting in a pilot area twice the size originally intended. Delays in project implementation led to a prolongation of the agreement between Sweden and Vietnam up to June 1994.

The second phase of the Hanoi Distribution Project, Ba Dinh - 2, is covered by the Specific Agreement July 1994 - June 1998. This project is similar to Ba Dinh - 1, but encompasses a larger city area with 12,000 inhabitants. A modified version of the new planning method which was tested under Ba Dinh 1 should be used.

**Agreement**: Specific Agreement on Support to the Energy Sector in Vietnam 1991 - 1993, signed May 30, 1991.

Extension of Specific Agreement on Support to the Energy Sector in Vietnam 1991 - 1993, signed by exchange of letters dated March 25, 1993 and April 20, 1993

Prolongation of the Specific Agreement on Support to the Energy Sector in Vietnam for the period May 1991 - June 1994 (to 31 December, 1994), Embassy of Sweden, Hanoi, 1994-06-10

Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, signed 19 October, 1994

**Period**: 1994-1998

**Financial contributions**:

| | **Sida** | | **Gov. of Vietnam** |
|---|---|---|---|
| | Budgeted SEK | Actually Disbursed SEK | Billion VND |
| 1991-1993: | 43.5 million | 43.0 million | 8.9 |
| 1994-1999: | 40.0 million | 6.0 million | |

**Channels of support**: Power Company No 1 and Hanoi Power Company

**Sector Objectives**:

**Project/Immediate Objectives**: To improve the distribution of electricity in parts of the Hanoi area through the following project components:

*Master Plan* with the aim to

- Introduce modern systems for planning and standards based on one area in Hanoi.
- Prepare the planned ADB financed district project in Hanoi

*Ba Dinh 1* with the aim to improve the distribution of electricity in Ba Dinh district, Hanoi

*Provision of spare parts, communication equipment, electrical meters*

*Ba Dinh 2* with the aim

- to increase the distribution capacity in the area subject to reinforcement so that no need for investments during the coming 10 years
- reduce losses

**Expected Results**: The following two main results are expected:

- Increases in the capacity of distribution of electricity of the project area sufficient to postpone any expansion of distributive capacity for a 10 year period.
- Reductions in the losses of energy from 27% to 17%.

**Activities**:

- Proposal for new 22kv standard
- Preparation and approval of Master Plan
- Delivery of Swednet computer programme for distribution planning
- Planning of pilot area in Ba Dinh
- Procurement of substation
- Provision of 30 000 refurbished meters, test equipment for control and calibration.
- Training
- Procurement and installation of one 110 Kv sub-station and distribution network equipment
- Training of 10 electrical engineers. 3 engineers on study tour to Sweden.

**Inputs**: consultancy services, equipment, spare parts

**Present Project Status**: Completed

**References**:

Insatspromemoria - stöd till energisektorn i Vietnam 1994-06-23

Project of Hanoi Distribution, Power Company No 1/Hanoi Power Supply Department, 20 August, 1990

Project of Meters and Test Equipment, Power Company No 1/Hanoi Power Supply Department, 20 August, 1990

Project Document, Ba Dinh - 2, , Power Company No 1/Hanoi Power Supply Department, November 1993

## PC1: Regional Load Dispatch Centre

**Background**: A national load dispatch centre is being established in Vietnam. A regional load dispatch centre is required for each region of Vietnam to enable remote control of production and transmission of power. A Master Plan for the three regions' load dispatch centres have been formulated with Swedish assistance, as well as a feasibility study for the control centres in the Northern and Central parts of the country. Sweden is financing the regional load dispatch centre in the Northern part, while the World Bank intends to finance the equivalent in the Central and Southern regions.

**Agreement**: Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, signed 19 October, 1994

**Period**:

**Financial contributions**:

| **Sida** | | **Gov. of Vietnam** |
|---|---|---|
| Budgeted SEK | Actually Disbursed SEK | Billion VND |
| 40 million | 1.7 million | 18.0 |

**Channels of support**: Power Company No.1 (PC1)

**Sector Objectives**: Improved electricity supply in Vietnam to contribute to the development of economy and society.

**Project Objectives**:
- PC1 using improved operation management of the power system in Northern Vietnam;
- Modern operation management equipment installed and in use at PC1;
- Improved electricity supply in the PC1 power system.

**Planned Outputs/Expected Results**:
- Revised plan and approved feasibility study;
- Tender documents;
- Tender evaluation;
- Supply contract;
- Detailed design;
- Planning guidelines;
- Revised FS for RLDC;
- 15 or 20 people qualified in operation & management of power system (dispatcher);
- 10 people qualified in hardware and software computerised control;
- 5 people qualified in telecommunication system management;
- SCADA installed.

**Activities**:

- Review of existing SCADA system of the Northern power system;
- Documentation of existing SCADA system. Implementation approvals, etc.;
- Study tour;
- Proposal, approval and purchasing of a computerised planning system;
- Project workshop;
- Revision of the planning process;
- Preparation of tender documents for materials;
- Contracting;
- Design courses;
- Detailed design;
- Approval of design and other documents;
- Courses in erection and maintenance;
- Construction, supervision and commissioning;
- Preparation of a Master Plan;
- Review of existing plans for the whole of North Vietnam;
- Handing over from project organisation to use;
- Modification of operational routines for the power system.

**Inputs**:

- Consultancy services
- Computer equipment and software

**Present Project Status**: The project was started in November 1996. Tender documents are expected to be completed by the end of November, 1997.

**References**:

Insatspromemoria - stöd till energisektorn i Vietnam 1994-06-23

Project Document for Regional Load Dispatch Centre in Hanoi, November 1995

## PC1/EVN: Thai Nguyen Distribution

**Background**: The distribution system in the city of Thai Nguyen is in a very bad technical condition and unable to provide electric energy with acceptable quality. Distribution losses are estimated at 50%. The purpose of the project is to rehabilitate the system in combination with training, especially in loss reduction methods. The work will concentrate on the northern parts of the city. The Swedish support to equipment for the project will be financed through a soft loan in order to gradually create a situation where the energy sector operates on a commercial basis.

A study to verify the effects of the project and to investigate consumer patterns and possible energy efficiency measures (coordinated with a similar study in Qui Nhon) forms part of the project.

**Agreement**: Extension of Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, by exchange of letters, 24 June, 1996 (34 MSEK for the period 15 June 1996 - 31 December 1999)

**Period**: 1996 - 1999

**Financial contributions:**

| **Sida** | | **Gov. of Vietnam** |
|---|---|---|
| Budgeted SEK | Actually Disbursed SEK | Billion VND |
| 34 million | 1.9 million | 36.0 |

**Channels of support**: Power Company No 1, Electricity of Vietnam (EVN)

**Sector Objective**: The overall objective is to improve the supply of electricity in Thai Nguyen in order to facilitate economic development. The project will be part of the re-orientation of the energy sector to an open market economy.

**Project Objectives**: To improve the distribution of electricity in Thai Nguyen through the reduction of the high losses and improve the service level in the city. More specifically, the Project should:

- Up-grade the ability to plan and design distribution systems
- Introduction of 22 kV medium voltage network
- Up-grade ability for international procurement
- Improved supply voltage to customers
- Reduced distribution losses in rehabilitated area to 10%
- Provision of reliable power supply to 15,000 customers
- Increase capacity on medium voltage network to operate without overload
- Up-grade skills for construction of new installations with modern equipment and tools

**Expected Results**:
- An organisation well trained for distribution system management, operation and maintenance
- Reinforced transformer capacity from 110 kV side to supply the increased load
- Reinforced medium voltage distribution system using the 22 kV level
- Reinforced low voltage distribution system for at least 12,000 customers
- Modified distribution standards

**Activities**:
- Review of plans for rehabilitation
- Preparation of project description for rehabilitation
- Advice on administrative or other procedures to reduce technical and non-technical losses
- Formulation of a training programme
- Preparation of tender documents for procurement of material, equipment and tools
- Assistance in tender evaluation and contract negotiations
- Review of distribution standards
- Detailed design for 110 kV transmission line and 25 MVA 110/22 kV substation
- Supervision of substation construction, final inspection and commissioning
- Competence development through active participation by Vietnamese project staff

**Inputs**: Consulting services, material and equipment

**Present Project Status**: The project commenced in February 1997, and is slightly behind time schedule.

**References**:
Bedömningspromemoria, Stöd till eldistributionsprojekt i Thai Nguyen, Vietnam, 1996-06-18

Project Document, Thai Nguyen

Needs and Priorities of Electricity consumers in Qui Nhon and Thai Nguyen, Vietnam, Interforest AB/HAU/RCAICE, 27 July, 1997

## PC2: SCADA System, Load Dispatch Centre in Ho Chi Minh City

**Background**: Support to the installation of a SCADA (Supervision, Control and Data Acquisition) system in Ho Chi Minh City (HCMC) was part of the agreement between Sweden and Vietnam on cooperation in the energy sector 1991-1993. Due to the American embargo the selected manufacturer (ABB Network Control) was unable to supply the main computers. It was therefore decided to divide the project in two phases, of which the first phase comprised immediate delivery and installation of necessary equipment at the Load Dispatch Centres. The second phase included an option in the contract of delivery of the main computers and software for upgrading the SCADA system at the lifting of the embargo. The first phase was implemented and the system taken into operation in June 1993. The embargo was lifted in February 1994, at a time when the option in the contract had expired. It was then decided that the completion of the SCADA system should wait for financing from the new Specific Agreement for the period 1994 - 1997.

**Agreement**: Specific Agreement on Support to the Energy Sector in Vietnam 1991 - 1993, signed May 30, 1991.

Prolongation of the Specific Agreement on Support to the Energy Sector in Vietnam for the period May 1991 - June 1994 (to 31 December, 1994), Embassy of Sweden, Hanoi, 1994-06-10

Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, signed 19 October, 1994

**Period**: 1991 - 1998

**Financial contributions**:

| | **Sida** | | **Gov. of Vietnam** |
|---|---|---|---|
| | Budgeted SEK | Actually Disbursed SEK | Billion VND |
| 1991 - 1994: | 16.5 million | 16.0 million | 2.3 |
| 1994 - 1999: | 15.0 million | 0.9 million | 3.2 |
| | 31.5 million | | |

**Channels of support**: Power Company No 2/Ho Chi Min City Power Company

**Sector Objectives**:
To improve the distribution of electricity in Ho Chi Min City, through

- A reduction in the length of time of power cuts
- Improved utilisation of the distribution network
- Improved information about loads in the network which means that unnecessary investments can be avoided
- Better safety

**Project/Immediate Objectives**:
*Phase 1*
Determine the scope and operations of a SCADA system for HCMC and provide the technical services and equipment to establish a limited but operational SCADA system.

*Phase 2*
To develop the system provided under phase 1
- to cover most of the substation.
- deliver and install the main computer
- upgrade the software to the level of normal control room operations

**Expected Results**: A fully fledged SCADA system for HCMC

**Activities**:
*Phase 1*
- The preparation of a Conceptual Master Plan (LDC) with the specific objective
    - To function as a guideline when designing the different individual LDCs
    - To define tasks and responsibilities of the local dispatch centre to achieve maximum efficiency and reliability at minimum cost
- Delivery and installation of material needed for the modification of the sub-stations, including
    - remote terminals for data collection
    - radio transmitters
    - Establishment of a Load Dispatch Centre
- Delivery and installation of the SCADA system temporarily installed on a PC.

*Phase 2*
Consultancy services
- Review and update of the technical description for the completion of the SCADA system
- Preparation of tender documents and assist in the whole procurement process
- Provide training and support to HCMC Power Company in the use of the new system.

Provision and installation of equipment and software
- main computer, operator consoles
- software extension
- additional equipment for sub-stations

**Inputs**: Consultancy services, equipment, spare parts

**Present Project Status**: Phase 1 completed. Phase 2 under implementation

**References**:
Project Document for Completion of HCMC SCADA System, May 18th, 1994

Progress Report of HCMC SCADA System Project, Phase 2, 11/10/1997

## PC2: Thu Duc Thermal Power Plant, Gas Turbine Rehabilitation

**Background**: With the aim of increasing the capacity for the Southern provinces of Vietnam, the Swedish government has assisted Vietnam by providing a gas turbine (GT35), which was installed an put into operation at the Thu Duc Power Plant in August 1988. The contract for this gas turbine included a maintenance service agreement up to the end of 1990. A new service agreement was financed for the period 1991-1993. A feasibility study for the rehabilitation of the Thu Duc Power Plant also included recommendations for rehabilitation of the gas turbine.

**Agreement**: Specific Agreement on Support to the Energy Sector in Vietnam 1991 - 1993, signed May 30, 1991.

Extension of Specific Agreement on Support to the Energy Sector in Vietnam 1991 - 1993, signed by exchange of letters dated March 25, 1993 and April 20, 1993

Prolongation of the Specific Agreement on Support to the Energy Sector in Vietnam for the period May 1991 - June 1994 (to 31 December, 1994), Embassy of Sweden, Hanoi, 1994-06-10

Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, signed 19 October, 1994

**Period**: 1993 - 1998

**Financial contributions**:

| | **Sida** | | **Gov. of Vietnam** |
|---|---|---|---|
| | Budgeted SEK | Actually Disbursed SEK | Billion VND |
| 1991 - 1993: | 3 million | 3.7 million | n.a. |
| 1994 - 1998: | 15 million | 2.8 million | 0.4 |

**Channels of support**: Thu Duc Thermal Power Plant

**Sector Objectives**: To improve the value, quality and economy of power production

**Project/Immediate Objectives**:

*Phase1*
Provide spare parts and technical services for the maintenance and repair of the unit

*Phase 2*
To assess the feasibility of the rehabilitation of the Turbine. Provided the rehabilitation is found feasible:

- Restore the available capacity to 15 MW
- Restore the efficiency of the unit to 32%

**Expected Results**:
To secure a stable operation of the turbine during a coming period of 3-4 years.

**Activities**:

*Phase 1*
Implementation of service agreement between ABB Stal and PC2

*Phase 2*
- Determine the condition of the turbine and its possible future rehabilitation
- Assessment of organisational and technical skills
- Programme for technical/non-technical rehabilitation, including budget and financial viability
- Implementation of rehabilitation work if found feasible.

**Inputs**: Consultancy and repair services, spareparts and new components.

**Outputs**
- Increase in the available capacity of the unit as follows:
  - Base load 14.5 MW (30°C)
  - Peak load 15.725 MW (30°C)
- Efficiency to be increased to 32-33%
- Improvement in the reliability of the unit (reducing the unscheduled shut off periods to 15 days/year)
- Reduction in the production costs.
- Improved skills in operation and maintenance.

**Present Project Status**: Under implementation, with deliveries taking place in November 1997.

**References:**
Project Document, Rehabilitation of GT35 at Thu Duc Thermal Power Plant

Plan of Operation GT-35 Gas-Turbine Rehabilitation, and Rehabilitation and Fuel Conservation at TDPS, Electricity of Vietnam, 1997

## PC2: Rehabilitation of Thu Duc Thermal Power Plant

**Background**: In 1993, Sida financed the study "Needs Assessment and Feasibility for Rehabilitation of Thu Duc Thermal Power Station". The study recommended rehabilitation of the three steam turbine units; fuel conversion for four units; and training and management support.

**Agreement**: Specific Agreement on Support to the Energy Sector in Vietnam 1991 - 1993, signed May 30, 1991.

Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, signed 19 October, 1994

**Period**: July 1994 - December 1999 (excluding spare parts during 1991-1993)

**Financial contributions**:

| | **Sida** | | **Gov. of Vietnam** |
|---|---|---|---|
| | Budgeted SEK | Actually Disbursed SEK | Billion VND |
| 1991 - 1993: | 9 million | 9 million | n.a. |
| 1994 - 1998: | 25 million | 1 million | no budget established |

**Channels of support**: Electricity of Vietnam

**Sector Objectives**: To increase the value and quality of the electricity produced at the Thu Duc Thermal Power Plant

**Project/Immediate Objectives**:

*Phase 1*
To assess the need and feasibility for rehabilitation of the Thu Duc Thermal Power Station

*Phase 2*
Increase the capacity of 4 production units and at the same time reduce the environmental pollution through conversion to gas for the units.

**Expected Results**:
Provided the Phase 1 study confirms the feasibility of the proposed rehabilitation and that the rehabilitation works is carried out, the rehabilitated units should operate safely and economically up to year 2010-2015

**Main Activities**:
- Rehabilitation of the three steam turbine units
- Fuel conversion (from oil to gas) for the three steam turbine units and one F6 Gas Turbine unit
- Training and management support

**Inputs**: Consulting services

**Present Project Status**: The project is not being implemented due to uncertainties about the provision of natural gas to the Power Plant

**References**:
Plan of Operation GT-35 Gas-Turbine Rehabilitation, and Rehabilitation and Fuel Conservation at TDPS, Electricity of Vietnam, 1997

## PC3: Rehabilitation and Upgrading of Distribution Network in Qui Nhon City

**Background**: During 1991-1993 Sida financed the first phase of the rehabilitation of the distribution system in Qui Nhon City. Before this phase of the project was implemented, the distribution network in Qui Nhon suffered from overload, high energy losses and low reliability of power supply due to old and out-dated equipment, and the main network was not accessible in the poverty-stricken residential and outskirt areas of the city. Some of these problems were partly solved during the first rehabilitation phase. The second phase of the rehabilitation is part of the energy cooperation agreement between Sweden and Vietnam for the period 1994-1999.

**Agreement**: Specific Agreement on Support to the Energy Sector in Vietnam 1991 - 1993, signed May 30, 1991.

Prolongation of the Specific Agreement on Support to the Energy Sector in Vietnam for the period May 1991 - June 1994 (to 31 December, 1994), Embassy of Sweden, Hanoi, 1994-06-10

Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, signed 19 October, 1994

Extension of Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, by exchange of letters, 24 June, 1996 (25 MSEK for the period 15 June 1996 - 31 December 1999)

**Period**: 1991 - 1999

**Financial contributions**:

| | **Sida** | | **Gov. of Vietnam** |
|---|---|---|---|
| | Budgeted SEK | Actually Disbursed SEK | Billion VND |
| 1991 - 1994: | 9 million | 13.0 million | (SEK10 million) |
| 1994 – 1999: | 35 million | 33.5 million | 58 |
| | 44 million | | |

**Channels of support:** Power Company 3

**Sector Objectives**: Better power supply services.

**Project/Immediate Objectives**: To improve the distribution of electricity in Qui Nhon and thereby to facilitate economy in development and a higher standard of living for the households

**Expected Results**:

| | Phase 1 | Phase 2 |
|---|---|---|
| • Increase capacity of power source: | From 6.3 MVA to 20 MVA | From 20MVA to 40 MVA |
| • Increase load carrying capacity: | From 10 MW to 30 MW | From 30 MW to 52 MW |
| • Increase consumption capacity: | From 37 GWh to 61.4 GWh | From 61.4 GWh to 130 |
| • Increased number of consumers: | From 10 100 to 14 600 | From 14 600 to 26 000 |
| • Improved quality of energy | | |
| - Voltage at main-kwh meter | 140-230V up to 175-230V | 175 - 230V to 210-230V |
| - Number of outages | From 42 to 20 | From 20 to a minimum |
| • Reduced energy losses | From 17% to 11% | From 11% to 6% |
| • Improved environmental impact | | |
| - Unsafe position in network | From 182 to 40 | From 40 to a minimum |
| - Electrical Accidents | From 13 to 3 | From 13 to a minimum |
| - Growth of trees | Improved | Improved |
| - Public lighting | Additional 15 km | Additional 31 km |
| • Enhanced staff capacity | 2 engineers and 8 other staff | 4 engineers and 18 other staff |

**Activities**:

- Delivery and commissioning of equipment
- Training
  - Management and engineering staff in fields like international procurement, negotiating contracts for equipment based on IEC, planning and calculation of networks
  - Workers and foremen in erection and maintenance using new technology

**Inputs**:

| | |
|---|---|
| 110 KV Line | 2x10km |
| 35/15kv Substation | 20MVA+6 feeders |
| 110/22-15 KV Substations | 40MVA+8 feeders |
| 15-22KV Line | 80 km |
| 15-22/0.4KV Substations | 58 sub/8370KVA |
| Converting 15 KV Substation to | 22KV 157 sub/35390KVA |
| Capacitor | 13250 KVAr |
| 0.4KV Line | 137 km |
| 0.2KV Line and kwh meter | 35 km/5500kwhm |
| Public lighting | 31 km |
| Testing devices and tools | 2 Systems |
| Training | 6 Engineers, 26 other staff |
| Mini-SCADA | 1 System |
| Computer programme | 1 System |

**Outputs**:

**Present Project Status**: Phase 1 completed (1995) Phase 2 ongoing

**References**:

The Up-Dated Quinhon 110 kV, 22 kV Network Project, PC3, June 1996
Quinhon Network Project, 26/10/97

## PC3: Danang Master Plan and Distribution Network Project

**Background**: The Danang Master Plan and Distribution Network Project is based on PC3's experience of the rehabilitation of the distribution system in Qui Nhon, and lessons learned from the Sida financed Master Plan for Ba Dinh in Hanoi. The project has two components: 1) Revision of PC3's planning methodology for distribution networks, and 2) implementation of the results by rehabilitation of the network in a pilot area. In addition, a Master Plan for the Danang distribution area shall be produced.

**Agreement**: Specific Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Energy Cooperation July 1994 - June 1998, signed 19 October, 1994

**Period**: 1994-1998

**Financial contributions:**

| **Sida** | | **Gov. of Vietnam** |
|---|---|---|
| Budgeted SEK | Actually Disbursed SEK | Billion VND |
| 35 million | 18.5 | 12.2 |

**Channels of support**: Power Company No. 3 (PC3)

**Sector Objectives**: Improved electricity supply in Vietnam to contribute to the development of economy and society.

**Project Objectives**: The main objective of the project is transfer of knowledge about methods for planning of distribution systems with both technical and economical optimisation. To maximise the learning for PC3 staff as much as possible of the work shall be done in Danang in cooperation between PC3 and the consultant. More specifically, the immediate objectives of the project are:

- PC3 using improved distribution planning methodology;
- Modern distribution planning equipment installed and in use at PC3;
- Improved electricity supply in a pilot area.

**Expected Output/Results**:

- Revised plan for pilot area;
- Tender documents;
- Tender evaluation;
- Supply contract;
- Detailed design;
- Distribution system installed in pilot area;
- Planning guidelines;
- Revised Master Plan for Danang city;
- 8 people qualified in distribution system installation;
- 8 people qualified in operation and maintenance;
- 8 people qualified in distribution system planning
- Installed distribution planning equipment.

**Activities**:

- Review of existing distribution system and selection of pilot area;
- Documentation of existing procedures for planning, implementation, approvals, etc.;
- Study tour;
- Proposal, approval and purchasing of a computerised planning system;
- Technical and economical planning and translation to English,
- Project workshop:
- Revision of the planning process;
- Preparation of tender documents for materials,
- Contracting;
- Design courses in electrical and mechanical design;
- Detailed design,
- Approval of design and other documents;
- Courses in erection and maintenance;
- Construction, supervision, commissioning;
- Review of existing plans for the whole of Danang,
- Preparation of a Master Plan for Danang.

**Inputs**: Consultancy services, computer equipment

**Present Project Status**:

**References**:

Project Document, Danang Distribution Network Project, PC3, December 1994

Time Schedule for the Implementation of Danang Distribution Network Project, PC3/SwedPower

## Song Hinh Multipurpose Project

**Background**: A feasibility study for the Song Hinh Hydropower project was made in 1985. The final technical design of the headworks and the waterway were completed in 1994 and 1995, respectively. The hydropower station, which is located on the Song Hinh river in Central Vietnam, will have an installed capacity of 70 MW, an annual output of 370 million kWh and a firm capacity of 28.7 MW. The main purposes of the project is to supply electricity to the national network, to develop the downstream irrigation areas by its regulating storage, and to introduce fish farming in the reservoir as a means to develop the local economy.

**Agreement**: Agreement between the Government of Sweden and the Government of the Socialist Republic of Vietnam on Provision of Financial resources to the Song Hinh Multi Purpose Project, signed 18 October, 1995

Memorandum of Understanding among Sida, NIB and NDF for the Financing of the Song Hinh Hydro Power Project, 25 April, 1997

**Period**: 1997 - 1999

**Financial contributions:**

| | **Sida/NDF/NIB** | | **Gov. of Vietnam** |
|---|---|---|---|
| | Budgeted SEK | Actually Disbursed SEK | Billion VND |
| Sida | 251 million[15] | 0.7 million | 871 |
| Ndf/NIB | 159 million | | |

**Other donors / Co-financiers**: Nordic Investment Bank, Nordic Development Fund. Total project financing (including the Swedish contribution): USD 36.27 million.

**Channels of support**: Electricity of Vietnam

**Development Objectives**: The overall aim of the project is to promote the economic and social development of Phu Yen and adjacent provinces in the Central region, currently being one of the least developed in Vietnam.

**Project/Immediate Objectives**: The main project objective is to provide additional power generation in the Central region of Vietnam and to stabilise the power system. A second objective is to enable an expansion of irrigated areas downstream the power plant. A third objective is to introduce fish farming in the water reservoir of the Song Hinh dam.

**Expected Results**:
- The constructed plant has a transmission system;
- The staff of EVN has "a fine formation on" maintenance and operation and on construction and design of power plants.

[15] 213 million (concessionary credit)
38 million (grant)

**Activities**:
- Construction works
- Supply and erection of mechanical and electrical equipment
- Training for operation and maintenance staff
- Studies and monitoring

**Inputs**: equipment, consultancy services

**Present Project Status**: ongoing

**References**:
Project Report, Song Hinh Hydropower Station, May 1996

## Recent Sida Evaluations

97/37 Energy, Environment and Development Programme of the Stockholm Environment Institute. Daniel M Kammen
Department for Research Cooperation, SAREC

97/38 Biotechnology Research Projects: Tree Tissue Culture and Proteins/Enzymes as Biosensors. Indra K Vasil, Howard H Weetall
Department for Research Cooperation, SAREC

97/39 Sida Support to World University Service - South Africa (WUS-SA). Marcella Ballara, Shireen Motala, Lesley-Anne Wilkinson
Department for Democracy and Social Development

97/40 Swedish Labour Market Projects in Estonia 1994-1996. Susanne Oxenstierna, Henrik Huitfeldt
Department for Central and Eastern Europe

98/1 Sida Support to Telecom in Southern Africa. Lennart Königson, Karl Erik Olofsson, Kalevi Nykänen, Åsa Königson
Deparment for Infrastructure and Economic Cooperation

98/2 Sida Support to the Banking Sector in Vietnam. Nguyen Van Dinh, Peter Gisle, Lisa Román, Börje Wallberg
Department for Infrastructure and Economic Cooperation

98/3 Swedish Labout Market Projects in Lithuania 1995-1997. Susanne Oxenstierna, Henrik Huitfeldt
Department for Central and Eastern Europe

98/4 Den mänskliga faktorn. Samarbete mellan svenskt postväsende och den regionala posten i St Petersburg, Ryssland. Lars Rylander
Department for Central and Eastern Europe

98/5 Apoyo de Asdi al Programa Nacional de la Mujer en Bolivia. Marina Subirats, Åsa Westermark
Department for Latin America

98/6 Sustainability and Partnership. Sida supported cooperation between Swedish and Baltic Non-governmental Organisations. Peter Winai
Deparment for Central and Eastern Europe

98/7 Sewerage and Water Sector Projects in Egypt. Nigel Nicholson, Nemat Guenena
Deparment for Infrastructure and Economic Cooperation

98/8 Sida Support to ten Projects at the Geological Surveys of Estonia, Latvia and Lithuania. Torsten Toksvad, Janis Prols.
Department for Central and Eastern Europe

98/9 Programas de MCED/DERECHOS del Niño de UNICEF en América y en el Centro Internacional para el Desarrollo del Niño de UNICEF(ICDC). Benno Glauser, Eva Lithman, Riccardo Lucchini
Department for Latin America

**Sida Evaluations may be ordered from:**

Infocenter, Sida
S-105 25 Stockholm
Phone: (+46) 8 795 23 44
Fax: (+46) 8 760 58 95

**A complete backlist of earlier evaluation reports may be ordered from:**

Sida, UTV, S-105 25 Stockholm
Phone: (+46) 8 698 5133
Fax: (+46) 8 698 5610

SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
S-105 25 Stockholm, Sweden
Tel: +46 (0)8-698 50 00. Fax: +46 (0)8-20 88 64
Telegram: sida stockholm. Telex 11450 sida sthlm. Postgiro: 1 56 34–9
Homepage: http://www.sida.se