

PROJECT DOCUMENT

FOR

**PROGRAMME AREA 1:
STRENGTHENING THE IMPLEMENTING CAPACITY OF
RENEWABLE ENERGY POLICIES**

FINAL DRAFT

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ACRONYMS

CEMMA	Committee for Ethnic Minorities and Mountainous Areas
CPC	Commune People's Committee
DARD	Department of Agriculture and Rural Development
DoF	Department of Finance
DoI	Department of Industry
DoNRE	Department of Natural Resources and Environment
DoST	Department of Science and Technology
DPC	District People's Committee
DPI	Department of Planning and Investment
ENERTEAM	Energy Conservation Research and Development Center
ESMAP	Energy Sector Management Assistance Programme
EVN	Electricity of Vietnam
GWh	GigaWatt-hour = 1,000,000 kWh
hh	Household
IA	Implementing Agency
IE	Institute of Energy, within EVN
JICA	Japan International Cooperation Agency
kW	kilowatt
kWh	kilowatt-hour
MARD	Ministry of Agriculture and Rural Development
MoF	Ministry of Finance
Mol	Ministry of Industry
MoNRE	Ministry of Natural Resources and Environment
MoST	Ministry of Science and Technology
MPI	Ministry of Planning and Investment
MW	Megawatt = 1,000 kW
MWh	Megawatt hour = 1,000 kWh
NEDO	New Energy & Industrial Technology Development Organisation
PC	Power Company, within EVN
PCC 1, 2, 3, 4	Power Construction Company, within EVN
PECC 1, 2, 3	Power Engineering and Consulting Company
PIDC 1, 2, 3	Power Investigation and Design Company, within EVN
PMB	Programme Management Board
PMU	Programme Management Unit
PPC	Provincial People's Committee
RCEE	Research Center for Energy and Environment
RRE	Rural Renewable Energy
Sida	Swedish International Development Agency
SOLARLAB	Department for Development of Solar Electricity, HCMC
VRES	Vietnam Rural Energy Study
VSRE	Vietnam-Sweden Rural Energy Programme
WB	World Bank

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1. BACKGROUND

On 5 July 2004, the Ministry of Industry (MoI) of Vietnam and Sida signed a Contract with “Carl Bro International” and “entec” to be Programme Consultant to the Vietnam – Sweden Rural Energy (VSRE) Programme for the period 2003–2008. The services delivered by the consultant are divided into two phases: a one year Preparation Phase and a three year Implementation Phase.

The Preparation Phase aims to specify the activities and the expected outcome from the Programme Consultant beyond the description in the Project Document. The programme is implemented in MoI, and two provinces: Ha Giang and Quang Nam.

The role of the consultants, (“Carl Bro”, “entec” and local consultants) is strictly advisory and supportive. The responsibility for the project preparation and implementation rests with MOI and the Implementing Agencies (IAs).

The Programme includes six Programme areas. Four of these are covered by this Contract.

This document deals with Programme Area 1– “Strengthening the implementing capacity of renewable energy policies”. It was prepared based on the ToRs, and the Contract Document attached to the Contract.

1.1 General about country and sector policy

1.1.1 General information about Vietnam

Vietnam is bordering China, Laos and Cambodia as well as the Gulf of Thailand, the Gulf of Tonkin and South China Sea. The country has a total area of 329,560 km² and a population of 82,700,000 (July 2004 est.). It consists in:

- flat deltas in the South and in the North,
- central highlands,
- hilly and mountainous in the far North and Northwest with the highest point (Fan Si Pan) at 3,144m.

The country is stretched over 1,650 km from North to South. It is divided in 60 provinces and 4 central municipalities. The capital is Hanoi.

The country has natural resources like phosphates, coal, manganese, bauxite, chromate, offshore oil and gas deposits and forests.

From 1986 to 1996, Vietnam achieved growth rates at an average of around 9% per year. Growth then fell somewhat in 1998 and 1999 and again raising in the following years to 6 to 7% in 2000-02 despite the global recession. GDP then rose to 7.1-7.7% in 2003-04. Growth is forecast at 8.1% in 2005. The estimated purchasing power parity (2003) is 2,500 USD GDP-per capita. In 2004, the GDP by sector was 20.4% for agriculture, forestry & fisheries, 41.1% for industry & construction and 38.5% for services. The labour force by occupation is 57.9% for agriculture, forestry &

fisheries, 17.4% for industry & construction and 24.7% for services. The unemployment rate in urban areas is 5.6 %¹.

1.1.2 The electricity industry

Although Vietnam's per capita electricity consumption is among the lowest in Asia, demand has risen in recent years, straining the country's limited generating capacity. Rapid commercial sector growth, population migration to major cities, and higher living standards have all contributed to a growing demand for electricity.

By 2003, Vietnam had a total electric generating capacity of 9,895 GW of which 8,374 MW was from EVN power plants and 1,521 MW was from non-EVN power plants. In 2004, the electricity generation was 46.2 billion kWh of electricity of which 40.2 billion kWh (86.9%) was generated from EVN power plants and the remaining (13.1%) was generated from non-EVN power plants. 56.1% of the electricity generated from EVN power plants were from fossil fuel fired power plants and 43.9 % from hydropower. The total losses and self-consuming electricity for power plants were about 14%. The amount of traded electricity was thus around 39.7 billion kWh².

The transmission system consists of the following facilities (2003):

Voltage	Line length, km	Transformer capacity, MVA
500 kV	1,530	3,150
220 kV	4,649	9,077
110 kV	8,965	11,369

The distribution system comprises today many voltages 0.4, 6, 10, 15, 22 and 35 kV. In the future the distribution should only consist of 0.4 and 22 kV. The total length of the distribution lines is 184,672 km and the installed transformer capacity is 25,330 MVA (2003)³.

In 2004, the electricity consumption was 39.7 billion kWh, giving a per capita consumption of 480 kWh/year. The structure of electricity consumption by sectors was:

Industry and construction	45.1%
Agriculture, forestry and fisheries	1.4%
Service	4.5%
Public and residential sector	44.5%
Other activities	4.5%

Electricity demand in Vietnam is forecast to grow in average by 10% a year until 2020. On 5 October, 2004, the Government of Vietnam approved the Strategy for Vietnam Power Development for the period 2004-2010 with orientation up to 2020⁴. According to the Strategy, the planned electricity generation should be as follows:

¹ Vietnam Economy in 2004: The remarkable features. Kinh te Viet Nam nam 2004: Nhung van de noi bat. Nguyen Van Thuong & Nguyen Ke Tuan. Hanoi, 2005.

² EVN report on Annual Plan Implementation 2003 and 2004.

³ EVN Website

⁴ Vietnam Government Decision No. 176/2004/QD-TTg dated 5 October, 2004.

Planned electricity generation	Billion kWh
2005	53
2010	88 – 93
2020	201 – 250
Average growth rate	%
2005 – 2010	10.7 – 11.9
2010 – 2020	8.6 – 10.4
2005 – 2020	9.3 – 10.9

Ministry of Industry (MOI), Electricity of Vietnam (EVN) are the responsible entities for the electricity industry in the country. Within EVN, there are 7 Power Companies (PC). PC 1 in the North, PC 2 in the South and PC 3 in the Centre, are the Power Companies involved in rural electrification.

1.1.3 Rural Electrification

As of 31 December 2004, around 98% of the rural districts (525/536 districts), 94.6% of rural communes (8,524/9,008 communes) were connected to the national electricity grid⁵. A small number of rural communes were electrified by local power sources, such as small hydropower and diesel generators (off-grid electrification).

There are approximately 13.1 million rural households (hh) that need to be supplied with electricity. Currently, around 12% of rural hh (1.57 million) have still no access to power. Over 400 remote or mountainous villages will be supplied with electricity through off-grid systems based on least cost options such as small hydro, diesel systems, solar photovoltaic systems, etc. The target is to increase the rate of electrified rural households to 90% by 2010 and 100% by 2020⁴.

About 1,000 projects have been completed in Vietnam with financing from the World Bank. Another 1,000 projects have been completed with local Vietnamese financing and some additional ones with bilateral financing.

Ha Giang province is a mountainous region with plenty of hydropower resources. It is situated in the North of the country and has a total of 117,945 hh. 69,768 hh are connected to the electricity grid and 11,061 hh are connected to isolated electricity systems, powered mainly by hydro power plants. The remaining 37,116 hh, i.e. 31 % of the hh, have no access to electricity. Many of those are situated far from the grid and most of these will, for a long period, rely upon connection to isolated electricity networks⁶.

Quang Nam province is located in the Center of the country, not far from Da Nang city. Its electricity grid is reaching all 17 district centers and 206 urban wards and rural communes. However, 21 communes still have no access to electricity. 9 are in Nam Tra My, 6 in Tay Giang, 4 in Nam Giang and 2 in Phuoc Son districts. The total

⁵ EVN Website

⁶ Consultant Notes on the visit to Ha Giang province on 12-15 April, 2005.

number of hh in Quang Nam is 314,826 hh. Around 91.6% (288,345 hh) have access to electricity. 287,745 hh are connected to the national electricity grid. 600 hh are connected to a diesel-based isolated grid in Cham Island in Tan Hiep commune. 26,481 hh, i.e. 8.4 % of the hh have currently no access to electricity⁷.

1.1.4 Renewable energy in Vietnam

- **Potential and use of renewable energy in Vietnam**

Small hydropower: Vietnam is rich in hydropower resources. These resources are mainly in the North and Central areas, near the border with Laos and China. The total potential of hydropower is estimated at 80 billion kWh/year. 80 sites on 11 major rivers can generate 64 billion kWh/year. The potential of small hydropower is around 16 billion kWh/year.

According to the National Master Plan of small hydropower, 408 potential sites ranging from 1 to 30 MW (PECC1, 2004) were identified. These sites can generate 13.5 billion kWh/year for a total capacity of 2,887 MW. The estimation of hydropower resources for capacities lower than 1 MW per site is not available at national level.

There are now about 99 MW of small/mini hydro plants installed at 125 sites, with capacities ranging from 100 to 10,000 kW. However, only 55 of these plants are operating with the total capacity of about 87.5 MW (44% of sites and 88.5% of installed capacity). Most plants with smaller capacity failed due to poor maintenance.

53 hydropower plants ranging from 1.6 to 150 MW are under development. The total installed capacity of these plants is 1,631 MW⁸.

Wind: Vietnam has more than 3,000 km of seashore, thousands of Islands and 70% of mountainous areas. The potential for wind energy is quite good, but only in the coastal areas and islands. The average wind speed can reach 5.6 m/s in the seashore areas and over 8.0 m/s on islands. In the mountainous areas, wind speed varies from site to site and is generally lower (< 4 m/s). The wind direction is unstable. In recent years, systematic wind resource measurements were carried out in several sites. The wind power potential can be estimated at 1,700-4,500 kWh/m²/year for islands, 400-1,000 kWh/m²/year for mainland areas and 2,000-3,000 kWh/m²/year for mountainous areas⁹.

Wind energy has been used for a long time in Vietnam, powering water pumping systems, especially in salt extraction sites along the coast. The installation of small wind power generators with capacity from 100 to 700 W_p were started in Vietnam since 1980. These systems were usually installed in the remote areas and islands.

⁷ Consultant Notes on the visit to Quang Nam province on 3-6 April, 2005.

⁸ National Master Plan for Small Hydropower (5-30 MW). PECC1, 2004.

⁹ Report on feasibility study on investment of industrial scale wind power plants in selected areas. RCEE, 2003.

As for large wind power generators, around ten potential sites for wind power development have been investigated. The average wind speeds measured at these sites vary from 6.1 to 11.2 m/s. The total installed capacity of wind power plants could reach 200 to 400 MW⁹.

There are some wind power plants in operation or under development. The Bach Long Vy wind power plant with capacity of 850 kW has been in operation since the end of 2004. The 15 MW Phuong Mai wind power plant is under construction. The development of three other wind power projects is in progress. They are 3.5 MW Phu Quy (in central Khanh Hoa province), 50 MW Phuong Mai 2 (in central Binh Dinh province) and 2 MW Phu Quoc (in southern Kien Giang province) plants.

Solar: The potential for development of solar photovoltaic (PV) energy is quite large in the central and southern provinces of Vietnam, with stable radiation levels throughout the year. The average total solar radiation is about 5 kWh/m²/day in most provinces. In Northern Vietnam, the average solar radiation is lower by 20% to 4 kWh/m²/day approximately, but it varies a lot from place to place¹⁰. Due to a more stable and higher solar radiation, the PV installations in the central and southern part of the country would be more economical than those installed in the northern provinces.

Solar PV systems for a variety of energy uses (household lighting, rural community cultural services, powering of schools and health clinics, telecommunications) have been installed under several government and donor projects since 1988. According to SOLARLAB, Vietnam had installed approximately 537 kW_p or about 5,600 solar PV systems by the end of year 2000.

Biomass: Vietnam possesses abundant biomass resources which can be more efficiently utilised to supply an important part of the fuel and electricity needs of the country. Major biomass sources in Vietnam include (i) wood residues, (ii) municipal wastes, and (iii) crop residues.

Wood residues include those discharged from sawmills and plymills (wood slabs, chips and sawdust), firewood (wastes after pruning the trees) and other wooden wastes (old and damaged wooden construction). The crop residues can be classified into two main groups: (i) agricultural wastes after harvesting: this group includes rice straw, cane trash, corn leaves, cassava stem, coconut leaves, etc, and (ii) agro-industrial residues after processing: this includes rice husks, bagasse, cassava peels, peanut shells, coffee husks, corn cobs, coconut shells, etc. The annual output of the major biomass residues is around 92.8 million tonnes which is equivalent to 1,250 TJ of primary energy¹¹.

Wood residues as well as firewood are still currently used as the main fuel for cooking in households in rural areas of Vietnam. They are also preferable types of fuel

¹⁰ Renewable Energy in Vietnam, SOLARLAB, 2001.

¹¹ Identification of biomass energy projects in South East Asia (Cambodia, Laos and Vietnam) likely to be financed by global environment programmes, Vietnam Report. ENERTEAM, 2003

in many commercial and industrial activities. Obviously, this kind of biomass residues could not be used for electricity production in a near future. For paddy straw, although its energy potential is very high, it still not be exploited for power generation due to the difficulties in its collection, transportation and combustion.

Rice husk and bagasse are the major potential resources likely to be exploitable. The potential for rice husk-fired and bagasse-fired electricity generation was estimated at 50 and 150 MW respectively¹¹.

Presently, more than 40 cogeneration systems with a total electric capacity of around 150 MW have been installed in the sugar sector. Most of the existing cogeneration systems in the Vietnam sugar sector are old and inefficient due to the use of low pressure boilers (18-25 bar @ 300-400°C). If these old and inefficient cogeneration systems could be replaced by modern and high efficiency equipment using high steam pressure boilers (60-70 bar @ 480-500°C), the total electric capacity could be increased to 500-700 MW.

A 50 kW rice husk fired cogeneration system has been installed as a demonstration plant in Long An province. A rice husk-fired power plant project is being planned¹². The Nippon Mining Research & Technology Group, one of the five biggest petroleum groups in Japan, informed that the group had agreed upon the investment of around 15 million USD in construction of a 10 MW rice husk-fired power plant in Can Tho City.

Biogas: In 2002, the total number of livestock in Vietnam was estimated at around 23.2 million pig-heads, 4.1 million cattle-heads, 2.8 million buffalo-heads and 233 million poultry-heads. Numbers of other livestock (horses, goats, sheep, etc.) are much smaller than the above mentioned.

The livestock farm sector in Vietnam mainly consist of small individual household farms with between 5 to 20 heads (above 99%). In recent years, there was a tendency to move to larger-scale farms. However, it did not succeed so far, as large scale farms seem unable to compete with the small scale private farms. Currently, the majority part of livestock wastes (dung) is re-used, mainly to feed fish and to fertilize fields and gardens. The non re-used livestock wastes are mostly disposed in streams or rivers, posing a serious threat to the environment.

Biogas production could be an effective option for utilizing livestock wastes. However, the number of large-scale livestock farms in Vietnam is very small, so there are only a few large biogas plants, which could be used for electricity production. If 100% of livestock wastes would be used for biogas production, the theoretical potential for biogas would be 1.5 billion m³/year or 2 billion kWh/year¹¹.

Biogas technology was introduced into Vietnam since the early 1960s. There is no record on number of biogas digesters installed in Vietnam. Some sources stated that more than 25 thousand family-size biogas digesters of 1 to 50 m³ had been installed in rural areas¹³. The on-going "Support project to the Biogas Programme for

¹² Liberated Saigon Newspaper, Issue of April 23, 2004

¹³ International Workshop on Research and Development of Use of Biodigesters in South East Asia region. March, 2002

the Animal Husbandry Sector in some provinces of Vietnam” funded by the Netherlands Government was started in February, 2003. This project aims to install 12,000 family-size biogas plants by 2006.

Geothermal power: No information is available about the geothermal resource potential in Vietnam. One developer (ORMAT, USA) has estimated that about 200 MW is available in central provinces of Vietnam. Based on their initial assessment they are preparing a prefeasibility study for three plants generating at least 50 MW of power. Six sites have been identified. Their total potential capacity is estimated at around 100 MW.

- **Renewable Energy Policies in Vietnam**

Before 2000, Vietnam developed the power sector based on conventional power sources: large hydro power, coal fired, oil fired and gas fired power plants and focused on the extension of national electricity network.

For the last 5 years, Vietnam has started to pay more attention to renewable energies, to the progress in renewable energy technologies and to the benefits in terms of environment protection.

There is no single renewable energy policy. However, some statements can be found in several government legal documents.

The Decision of Prime Minister No. 22/1999/QD-TTg dated 13 February 1999 stated that rural electrification should be implemented in combination between the extension of the national power grid and the development of the local power sources such as small hydro power, wind power, solar power, biomass/biogas power, etc., based on the evaluation of project costs and other related factors, and on the selection of an optimal solution. It should be based on the joint-implementation scheme (Government and people, central and local) in order to mobilize various capital sources for investment in the rural electrification projects.

The Decision of Prime Minister No. 95/2001/QD-TTg dated 22 June 2001 also stated that it should classify the rural areas in two categories: those which could be electrified by the extension of the national power grid, and those which should be electrified by using local power sources such as diesel generators, small hydro power, biomass/biogas power, solar power and wind power. These households are normally located in the remote areas where the connection to the grid is impossible or ineffective. Even in the rural areas being connected to the national grid, attention should be paid on the development of local power sources if they are economically viable.

On 5 October, 2004, the Prime Ministry issued the Decision No. 176/2004/QD-TTg approving the Strategy for Vietnam Power Development for the period 2004-2010 and towards 2020. This Decision encouraged “the use of new and renewable energy sources for supplying electricity to remote, border areas and islands”.

Luat Dien Luc Viet Nam (Vietnam Power Law) issued on 3 December 2004 also required “to promote the development and use of renewable energy resources for power electric generation”.

The National Renewable Energy Master Plan No. 5 (2000-2005) is soon to be replaced by the new Master Plan No. 6 (2006-2015) to continuously promote the use of renewable energy in Vietnam.

1.1.5 Renewable energy in Ha Giang & Quang Nam provinces

- **Ha Giang province**

Ha Giang has a high potential for hydropower. According to the estimation of the Institute of Energy, the potential for medium and small hydropower plants could reach 500 MW. There are 23 hydropower systems installed with the total capacity of 21.3 MW. These systems range from 50 kW to 12 MW. However, due to an inefficient operation and maintenance, the actual generated capacity of these systems is only 14.5 MW. Out of these 23 hydropower systems, 5 are owned by Power Company No.1. These systems are being connected to the grid. The remaining 18 systems were implemented by private and joint stock companies. These systems are being connected to the isolated mini-grids.

The wind energy potential in Ha Giang is not investigated yet. According to the provincial DoI, Ha Giang has very limited potential for wind power because of the low wind speed and unstable wind direction. So far, there is no wind power system installed in Ha Giang.

Although the ambient temperature in Ha Giang is not high (9-28°C), the average annual solar radiation and sunny hours are quite high, 110.2 kcal/m²/year (or 1,280 kWh/m²/year) and 1,707 hour/year respectively. There are now about 4 kW of solar systems installed at 13 sites (telecommunication, border posts, health clinics, etc.) ranging from 40 to 300 W capacity¹⁴.

There are some pilot biogas digesters installed in the lowland areas in Ha Giang. The provincial DoI thinks that the biogas technology is not suitable for the highland areas of the province due to the low temperature there. Biomass resources are not exploited in Ha Giang.

Separate Provincial Rural Electrification and Renewable Energy Plan do not exist yet. However, the development plan for medium and small hydropower and solar PV have been integrated into the Provincial Plan for Power Development for the period 2005-2010, with perspective up to 2015. This plan was prepared by the Institute of Energy.

According to this plan, 18 medium and small hydropower plants (1-50 MW) will be installed by 2015. More than 2,470 family hydropower systems (300 W each) were also planned to be installed by 2010. For solar PV, 386 systems (55 W_p each) will be implemented by 2010.

¹⁴ Plan for Electric Power Development in Ha Giang for period of 2005-2010 and perspective up to 2015. Institute of Energy, 2004.

- **Quang Nam province**

Quang Nam offers a high potential for hydropower. However, there are now only 12.6 MW of small/mini hydropower systems installed in 12 sites. However, only 7 plants with the total capacity of 7.4 MW are in operation. These hydropower plants were implemented before 1995 and are connected to the grid.

A Provincial Plan of large (60-200 MW) and medium & small (0.6-30 MW) hydropower plants in Quang Nam has been approved by the Ministry of Industry and the Provincial People's Committee. There are 8 large hydropower plants with the total capacity of 1,220 MW. For medium and small hydropower it consists of 30 plants having a total capacity of around 140 MW. All these hydropower installations were planned to be connected to the grid. There is no plan for off-grid mini and micro hydropower plants.

Quang Nam offers a good potential for wind energy in coastal areas. However, up to now, no wind power system was installed. The study on wind speed to estimate the wind potential in Cham Island (in Tan Hiep commune) is in progress. This study was planned to be completed by July, 2005. A proposal on wind-based water pump development is being introduced by a private company. DoI is assessing this proposal.

For solar, biomass, biogas and geothermal energy, no study report or project do exist.

1.2 Problem analysis

Despite a very high potential for the use of renewable sources of energy, Vietnam has a rather limited experience in the prioritising, planning and implementation of off-grid power generation projects in rural areas. Renewable energy has, so far, been given a low priority. Indeed, as there was an urgent need to electrify the whole country, priority, for the last decade, was given to the grid extension and the implementation of conventional power plants such as large hydro and thermal plants.

Now that most of the country is electrified, it is timely to look at the best options for electrifying the most remote regions which can not have access to the grid in a near future and where affordable indigenous renewable sources of energy can be tapped.

Previous activities for implementation of rural energy projects have mainly been carried out by EVN. Except for a few, the rural electrification projects that were being implemented by EVN were grid-connected. Now, the Vietnamese government has identified around 200-400 villages, which are so remotely located that they will not likely be connected and supplied with electricity from the national grid. Their electrification shall be the responsibility of Mol and PPC as stipulated in the Government Decision No. 45/2001/ND-CP dated 2 August, 2001. This decision is creating a need for capacity building at Mol and on provincial authority levels for the implementation of this government decision.

From several meetings at Mol, in the provinces and in the districts, it appears that there is a lack of capacity for the preparation of rural renewable energy plans and

project proposals at provincial and district levels. At MoI, there is a lack of capacity for the assessment of these plans and projects. There is also an urgent need for staff at district/commune level to be trained in all basic aspects of the development and implementation of renewable energy projects.

Capacity building programmes should include:

At national level (MoI and other relevant national institutions):

- General information on technical, economical, financial and environmental aspects of renewable energy;
- Assessment and approval of a rural renewable energy plan and project proposal.

At provincial level (PPC/DoI and other relevant provincial institutions):

- General information on technical, economical, financial and environmental aspects of renewable energy.
- Introduction to the most appropriate renewable energy technologies for off-grid application;
- Rural renewable energy planning and project proposal preparation (renewable energy resource assessment, system analysis of remote off-grid applications, energy demand forecasting for rural areas, technical, economic and financial analysis of rural renewable energy projects, socio-economic and environmental impacts, project financing, etc.).

At district/commune level (DPC/CPC and other relevant district/commune institutions):

- General information on technical, economical, financial and environmental aspects of renewable energy;
- Development and implementation of rural renewable energy projects.

Appropriate trainings on the above matters need to be organised. Tools, methods and working procedures developed by the Consultant for the preparation, assessment and/or implementation of rural renewable energy plans and projects will be used as main materials for training.

1.3 Identification of target groups

1.3.1 Government authorities at national level

Ministry of Industry (MOI)

MoI is responsible for the national management of the power sector, for policymaking and for the implementation of energy development, energy efficiency and conservation, demand side management and rural electrification. In MoI, there is the Project Management Board for Independent Power Producer and Rural Electrification Projects, which facilitates the implementation of IPP, including off-grid rural electrification. MoI plays the role of VSRE programme management and chairs the Programme Management Board that consists of representatives of several ministries. MoI has also established the programme management unit (PMU) that is an executive organization of the programme.

The Electricity of Vietnam (EVN)

EVN is under Mol's authority and is responsible for power sector development, organization of electricity production, transmission and distribution for areas supplied from the national grid. That covers 90% of the country, with more than 90% of total households. EVN will actively participate in the implementation phase of the VSRE Programme, especially in Area 2 (Technical Standards), and in Area 4 (pilot projects). EVN's provincial electricity companies are expected to have a key role in the programme implementation.

The Ministry of Planning and Investment (MPI)

MPI is responsible for preparing national strategies and policies of social economic development, and executing state management on domestic and foreign investment. In the VSRE programme, MPI plays the role of policy making and execution.

The Ministry of Science and Technology (MoST)

MoST is responsible for policymaking and management of science and technology. MoST designs and manages the national energy conservation strategy. It has some experience in renewable and decentralized energy sources. In the VSRE programme, MoST can contribute in standards and renewable technology issues.

The Ministry of Agriculture and Rural Development (MARD)

MARD executes the state management over agriculture, forestry, water resource and rural development. In VSRE programme, MARD plays the role as advisor on rural development.

Ministry of Natural Resources and Environment (MoNRE)

MoNRE is responsible for strategy, policy making, and management of national resources and environment protection. In the VSRE programme, MoNRE plays an important role in environment issues.

The Committee for Ethnic Minorities and Mountainous Areas (CEMMA)

The CEMMA is responsible for state management and government consultation on issues related to ethnic minorities that are the main population of remote rural areas. CEMMA can also be advising for the VSRE programme on issues related to minority policies.

Besides these stakeholders, some central social organizations such as Vietnam Woman's Union, Youth Union, etc can also play a role in rural energy development and therefore can be important stakeholders of the VSRE programme.

The National and Joint Stock Banks

These banks, including foreign and joint venture banks can play an important role in financial issues of the programme.

1.3.2 Government authorities at provincial level

The Provincial Peoples Committees (PPCs)

The PPCs will be the implementing agencies for the new projects for remote electrification in the provinces. They are well aware of local conditions, which may have an effect in the implementation of the VSRE programme. The People's Committees at district and commune levels will also be involved in the implementation of VSRE programme.

The Department of Industry (DoI)

DoI is responsible for state management on local (off-grid) energy development. Like MoI at national level, DoI, at provincial level, plays the role of VSRE programme management and chairs the Programme Management Board that consists of representatives of several provincial departments. DoI has also established the programme management unit (PMU) that is an executive organization of the programme in the province

Other directly related departments such as Department of Science and Technology (DoST), Department of Planning and Investment (DPI), Department of Agriculture and Rural Development (DARD), as well as the provincial electricity companies obviously play important relative roles in the VSRE programme. Some other Departments such as the Department of Labour, Invalid and Social Affairs (DOLISA) could have a role to play in the programme.

Provincial Electricity Companies that belong to EVN also play an important role for the programme implementation in the provinces.

1.3.3 The World Bank and other financing bodies

The participation of the World Bank, which is planning to start a substantial rural electrification project in the near future and have a long experience of rural electrification in Vietnam, is essential. This is also valid for other donors to rural electrification projects (such as JICA, NEDO, etc.)

1.3.4 International and local consulting firms

The consulting firms are those, who have designed the standards used in various countries for rural electrification projects although the clients in respectively country are those who have decided to accept the design of a project.

1.3.5 International and local contractors

The Contractors are those, who have actually erected the rural electrification facilities and to some extent prepared the detailed design. The Contractors therefore together represent an in deep knowledge of the rural distribution networks and their technical specifications.

1.3.6 Local manufacturing companies

Much of the material used for distribution networks are available from domestic producers. It is therefore important, when defining material for a new standard, that the new standards do not discriminate domestic producers. Further, the manufacturers need, due warning to change and upgrade their products in order to compete quality wise with international manufacturers.

1.3.7 The electricity consumers

The new standards will also include the service connections to be fixed to the consumer's premises. The consumer's interests will be taken into considerations, when the new standards are compiled.

1.4 Policies/guidelines relevant to the project

1.4.1 Vietnam Government socio-economic development policy

The ten-year socio-economic development strategy 2001-2010 by the Government of Vietnam envisions an improvement of standard of living through a wide range of policy measures, including in the energy sector.

1.4.2 Vietnam Renewable Energy Action Plan

This study, completed in 2001, has identified potentials and barriers for rural electrification in Vietnam. The barriers were:

- Inadequate policy and regulatory framework to encourage renewable electricity;
- Inadequate awareness about the technologies, their costs and performance in Vietnam;
- Lack of commercial business to provide renewable electricity equipment and services;
- Lack of access to financing for consumers, business, and project developers;
- High quality technologies are not available at affordable prices;
- Inadequate resource data to plan a major programme.

1.4.3 Decree No 45/2001/ND-CP

This decree is providing guidelines for the electricity activities and usage in Vietnam.

The role & responsibility of Mol in the electric power development planning were stated in this Decree as follows:

- Mol arranges the preparation of national electric power development master plans for a ten-year period with orientation for the next ten years and submits it to the Prime Minister for approval. Mol then monitor the implementation of the approved plan. In case that there is a need for changes in the approved national electric power development master plan, Mol shall submit the suggested amendment to the Prime Minister for his review and approval;
- Mol stipulates the contents and procedures of establishing national electric power development master plan;
- The Minister of Industry is responsible for chairing and coordinating with concerned ministries and branches the evaluation of the national electric power development master plan as well as, Hanoi and Ho Chi Minh city electric power development plans, and to submit to the Prime Minister for approval;

- The Minister of Industry arranges the evaluation and approval of provincial and central cities' electric power development plans, except for Hanoi and Ho Chi Minh cities;
- MOI stipulates the contents of proposal, evaluation and approval procedures and supervises the implementation of the provincial electric power development plans.

The role and responsibility of the PPCs in electric power development planning are as follows: "Based on the socio-economic development plan, requirements of national defence and security within the local territories and approved national electric power development master plan by the Prime Minister, provincial and central cities' People's Committees arrange the establishment of local electric power development plans, to be submitted for approval by Minister of Industry"

1.4.4 Decision No. 95/2001/QD-TTg and Decision No. 40/2003/QD-TTg

The Decision No. 95/2001/QD-TTg was issued on 22 June, 2001 to approve the National Power Development Master Plan for the period 2001-2010 and towards 2020. The Decision No. 40/2003/QD-TTg dated 21 March, 2003 aimed to adjust some contents of the above mentioned master plan.

1.4.5 Luật Điện Lực (Power Law) 2004

This Law addresses the following issues: policy on electric power development, planning and investment, saving in electric power generation, transmission, distribution and electricity use, electricity market, power operation license, rights, obligation of power utilities and power clients, protecting power equipment/appliances, power projects and power safety, electricity for rural, mountainous and island areas, state management of power operations and uses.

Regarding the policy on electric power development for rural, mountainous and island areas, the Law is in favour of:

- attracting all resources to invest in power infrastructure; speeding-up the electrification of rural, mountainous and island areas;
- creating good conditions for people in rural, mountainous and island areas, ethnic minority groups and people living in the areas that have specially difficult socio-economic conditions to use electricity for production and life;
- organizations and individuals of all economic sectors which do business in electricity generation, distribution in rural, mountainous and island areas that have specially difficult socio-economic and which should receive investment and financial preferential treatments and other preferential treatments in accordance with the regulations on investment encouragement;
- encouraging body and individual to invest in electric power generation using local energy sources, renewable energy for supplying the rural, mountainous and island areas.

In term of planning of electric power development, the Power Law stipulates that:

- Planning of electric power development includes national electric power development master plan and local electric power development plans. The power development plan must be prepared and approved to become a foundation for investing in power development and corrected in accordance with the socio-economic conditions of every period;
- The national electric power development planning is prepared based on the national socio-economic development strategy. The national electric power development master plan is prepared for every period of ten years with orientation for the next ten years;
- The local electric power development plans are prepared for provinces and cities directly under the central government, and for districts, towns and cities directly under the provinces. These plans should be prepared based on local socio-economic development strategy and must be in accordance with the national electric power development master plan and other related plans. Local electric power development plans are prepared every five years period with orientation for the next five years;
- All organizations and individuals must comply with the electric power development plans which were approved by the appropriate authorities.

The role and responsibility of MoI and local appropriate authorities in preparation, approval and promulgation of electric power development plans are also stipulated in the Vietnam Power Law:

- MoI is responsible for the preparation of the national electric power development master plan and for submitting to the Prime Minister for approval, for stipulating the specific contents, procedures for preparation and approval of electric power development plans, for promulgating, guiding and monitoring the implementation of the approved national electric power development master plans;
- The People's Committees of provinces and cities directly under the central government are responsible for the preparation of local electric power development plans and for submitting to the same level People's Council before submitting to the Ministry of Industry for approval. The People's Committees of provinces are also responsible for guiding the preparation and approval of electric power development plans for districts, provincial towns and cities directly under provincial government, for promulgating, guiding and monitoring the implementation of approved local electric power development plans;
- The authority that approved the electric power development plan will decide to correct the plan.

1.4.6 Policy on Rural Electrification, Socialist Republic of Vietnam

This document presents a broad view of the principles of rural electrification policies on which all projects should be based.

1.4.7 Vietnam-Sweden Poverty Alleviation Programme or "Chia Se"

As this programme supports in the Ha Giang province, possible mutual benefits with the current activities in the province will be considered.

1.5 Documentation available

Legal documents:

- [1] Vietnam Government Decision No. 22/1999/QD-TTG dated 13 February, 1999
- [2] Vietnam Government Decision No. 95/2001/QD-TTg dated 22 June, 2001
- [3] Vietnam Government Decree No. 45/2001/ND-CP dated 2 August, 2001
- [4] Vietnam Government Decision No. 40/2003/QD-TTg dated 21 March, 2003
- [5] Vietnam Government Decision No. 176/2004/QD-TTg dated 5 October, 2004
- [6] Luật Điện Lực Việt Nam (Vietnam Power Law) dated 3 December, 2004

Studies and Reports:

- [7] Vietnam Rural Energy Study, Final Report, Volume 1-4. Hifab International AB, May 2000.
- [8] Options for renewable energy in Vietnam, ESMAP, July 2000
- [9] Vietnam Renewable Energy Action Plan, Mol/World Bank, 2001
- [10] Renewable energy in Vietnam, SOLARLAB, March 2001
- [11] Renewable energy master plan, summary, March 2002
- [12] International Workshop on Research and Development of Use of Biodigesters in South East Asia region, March 2002.
- [13] Plan for medium and small hydropower in Quang Nam. PECC 1, August 2003 (in Vietnamese).
- [14] Identification of biomass energy projects in South East Asia (Cambodia, Laos, and Vietnam) likely to be financed by global environment programmes, Vietnam Report. Energy Conservation Research and Development Center (ENERTEAM), Dec. 2003.
- [15] 2004-2009 ASEAN Plan of Action for Energy Cooperation (APAEC), 2004
- [16] COGEN 3 reports. 2002-2004 EC-ASEAN COGEN programme Phase 3, 2004.
- [17] National master plan for small hydropower (5-30 MW). Power engineering and consulting company no. 1 (PECC 1), Nov. 2004 (in Vietnamese).
- [18] Plan for electric power development in Ha Giang, period 2005-2010 and perspective up to 2015. Institute of Energy, Nov. 2004 (in Vietnamese).
- [19] Report on feasibility study on investment of industrial scale wind power plants in selected areas. RCEE, 2003.
- [20] EVN's Report on annual plan implementation 2003 and 2004 (in Vietnamese).
- [21] Vietnam Economy in 2004: The remarkable features. Nguyen Van Thuong and Nguyen Ke Tuan, 2005 (in Vietnamese).
- [22] Support project to the Biogas Programme for the Animal Husbandry Sector in some provinces of Vietnam, Progress reports, 2005 (www.biogas.org.vn).
- [23] Consultant Notes on the visit to Quang Nam province on 3-6 April, 2005.
- [24] Consultant Notes on the visit to Ha Giang province on 12-15 April, 2005.

2. THE PROJECT

2.1 Overall VSRE Programme objective

The overall objective of the programme is that the rural population of Vietnam has increased access to options for rural energy services that are reliable, affordable, appropriate, and sustainable.

2.2 Project objective

The objective of Programme Area 1 is to strengthen the rural renewable energy policy implementation capacity within government, the Provincial Peoples Committees and at district level in order to facilitate the development of renewable energy resource plans in rural areas.

2.3 Expected results

The expected outputs are the following:

- Tools, methods and working procedures are established at the MoI in assessment of rural renewable energy plans and project proposals and staff trained in the application.
- Tools, methods and working procedures are established in Ha Giang and Quang Nam provinces in preparation of rural renewable energy plans and project proposals and staff trained in the application.
- One rural renewable energy plan for each of the four selected districts in Ha Giang and Quang Nam provinces have been prepared and assessed by MoI.

2.4 Activities

In order to meet the Programme Area 1 objectives and to achieve the expected results, the following activities should be organised. The ToRs of the various experts involved will be prepared by the Area Leaders.

Activity 1: Appraisal of the existing capacity at MoI and at provincial Implementing Agencies (PMUs).

The first task will be to study, analyse and appraise the background documents and information collected during the Preparation Phase. The first step will be to process the material concerning the MoI organisation and its capacity to assess rural renewable energy plans. The second step will be to work on the Provincial PMUs material and assess their capacity to prepare and implement rural renewable energy plans.

Questionnaires will be prepared and used in meetings with the relevant stakeholders in order to have a more in depth understanding of the existing capacity of

the MoI, DoI, PPCs and DPCs. The analysis will be carried out and the conclusions prepared in close cooperation with the respective parties.

Outputs:

- Appraisal reports, including answers on survey questionnaires. The reports will be submitted to MoI for approval.

Inputs:

Duration: 3 months

Manning: International experts: 2 weeks of field work and 10 days for home support

Local experts: 63 working days.

Activity 2: Preparation of tools and methods.

This activity includes the reviewing, selection, adjustment and/or development of the tools and methods for the preparation of Rural Renewable Energy (Rural RE) plans and project proposals and their implementation for provincial and district stakeholders (DoI, PPC, DPC). Tools and methods will also be provided for MoI to assess rural renewable energy plans and project proposals.

The first step will be to review existing local and international tools and methods for the preparation, assessment and implementation of RRE plans and project proposals. Questionnaires will be prepared and used during meetings with the relevant stakeholders in order to find out which existing tools and methods are used by MoI, DoI, PPCs and DPCs.

The second step will be to select the most appropriate tools and methods, and if necessary, to adjust and further develop them, before their submission to MoI for approval.

A thorough search on internet and meetings with consulting and software companies will be carried out in order to identify the most relevant softwares and other tools that can be downloaded or obtained for free and those for which licenses should be acquired. A budget should be foreseen for the purchase of software and licenses.

The newly proposed tools and methods will address, among others, the following aspects:

For MoI and related institutions at national level:

- Assessment and approval of rural renewable energy plans and project proposals,
- Criteria for selection of Rural RE plans and project proposals,
- Evaluation spreadsheets,

For PPC/DoI and related institutions at provincial/district/commune level

- Strategic planning, i.e. identification of main potential options for electrification of a broad area.
- Electricity demand forecasting.
- Renewable energy resource estimation.
- Technical analysis and selection of appropriate renewable energy technologies.
- Generation and transmission planning.
- Identification and preliminary costing of production options.
- Economic and financial analysis
- Environmental impact assessment.
- Project implementation (construction, installation, supervision, etc.)
- RRE system operation and maintenance.

Outputs:

- One set of tools and methods for the provincial PMUs to prepare Rural RE plans and project proposals, which can be adjusted to the local conditions in both Ha Giang and Quang Nam provinces.
- One set of tools and methods for MoI, to assess Rural RE plans and project proposals.

All manuals related to the use of the tools and methods will be translated into Vietnamese.

Inputs:

Duration: 5 months

Manning: International experts: 15.8 weeks of field work and 70.8 hours for home support

Local experts: 303 working days.

Activity 3: Proposals of Working Procedures for the preparation and Assessment of Rural Off-grid Electrification Plans

Working procedures for the provincial/district authorities for preparation of electrification plans for villages, which will not, for a long time, receive electricity supply from the national grid, will be developed and submitted to MoI for approval. A proposal of working procedures for MoI for the assessment and approval of such plans will also be prepared and submitted to MoI for approval.

The existing working procedures for the preparation of off-grid rural electrification plans and for their assessment and approval will be reviewed, such as the World Bank's Operation Manual which contains operational procedures to be applied for the preparation of an application by PPCs to MoI for implementation of a rural renewable energy project. When applicable, the same procedures will be used in order to have consistent procedures for dealing with the same type of projects in Vietnam. When not applicable, alternative procedures will be developed and proposed.

Regular meetings with MoI and DoI will be organised to make sure that these working procedures are in line with the existing procedures stipulated in related government legal documents.

The working procedures will be translated into Vietnamese.

Outputs:

- One set of approved working procedures for provincial PMUs (preparation of RRE plans).
- One set of approved proposals of working procedures for use at MoI (RRE plan assessment and approval).

Activity 4: Proposals of Working Procedures for the Development and Assessment of Rural Off-grid Electrification Projects

A proposal of working procedures for the development and assessment of off-grid rural energy projects in Vietnam will be prepared. Procedures to be used by the provinces for the planning and preparation of projects shall be formulated in close consultation with concerned authorities. Procedures shall also be provided for the MoI to assess and approve projects proposed by the provinces. All working procedures shall be submitted to the MoI for approval.

The existing working procedures for the development and approval of off-grid rural energy projects will be reviewed such as the World Bank's Operation Manual. When applicable, the same procedures will be used in order to have consistent procedures for dealing with the same type of projects in Vietnam. When not applicable, alternative procedures will be developed and proposed.

The development and formulation of working procedures will be done through a participatory process. Regular meetings with MoI, DoI and other provincial authorities will be organised to make sure that these working procedures are in line with the existing procedures stipulated in related government legal documents.

The working procedures will be translated into Vietnamese.

Outputs:

- One set of approved working procedures for provincial PMUs (development of Rural RE project proposals), and
- One set of approved proposals of working procedures for use at MoI (assessment and approval of Rural RE project proposals).

Inputs for Activities 3 and 4:

Overall duration for Activities 3 and 4: 6 months

Manning: International experts: 14 weeks of field work and 60 hours for home support

Local experts: 274 working days.

Activity 5: Preparation and Implementation of a Training Programme for staff at the MoI

A comprehensive training programme in assessing off-grid Rural RE plans and projects will be prepared for the staff at MoI according to the findings and conclusions of Activities 1 to 4. This programme will be elaborated in close cooperation with the PMU at MoI. After approval of the suggested programme by MoI, participants and trainers will be selected.

The training programme will consist of three modules:

Module 1: Seminar on general aspects of rural off-grid electrification project planning, assessment and approval. The objectives of this seminar are to present the approved tools and methods for assessment and development of Rural RE plans and project proposals and working procedures for rural off-grid electrification plans and projects. Regional and local experiences on Rural RE will be shared with the participants. The seminar programme will also address policy, technical, economic, financial, environmental, socio-economic and sustainability aspects of Rural RE projects.

Number of participants: max. 25, including representatives from MoI (10), Quang Nam DoI (2), Ha Giang DoI (2), MARD (1), MoNRE (1), MoST (1), MPI (1), MoF (1), CEMMA (1), EVN/IE/PCs (4), WB (1).

Duration: 1 day

Module 2: Training on tools and methods for assessment of Rural RE plans and project proposals and on working procedures for rural off grid electrification plans and projects. Practical exercises will consist of the assessment of Rural RE plans prepared by DoI and DPCs. Additional exercises will be given to the participants as preparation to the follow-up workshop.

Number of participants: max 10 from MoI

Duration: 2 days

Module 3: Follow-up workshop. The workshop will consist in the presentation and evaluation of Rural RE plans and projects assessed by the participants of Module 2.

Number of participants: max 10 from MoI

Duration: 1 day

The training programme will be conducted in English with translation to Vietnamese or directly in Vietnamese. All training materials shall be translated into Vietnamese.

Each module of the training programme will be subject to an evaluation by all participants.

Outputs:

- Training programme (Seminar/Training/Workshop) organised,
- 10 staff from MoI and other relevant national institutions have been trained,
- Four Rural RE plans each in Ha Giang and Quang Nam provinces have been assessed by trained MoI staff.

Activity 6: Preparation and Implementation of a Training Programme for staff at Provincial Level and Support to the provincial PMUs in the preparation of rural renewable energy plans

A comprehensive training programme in planning and preparation of off-grid Rural RE plans and projects will be conducted for the staff at provincial and district levels. It will be prepared according to the findings and conclusions of Activities 1 to 4. This programme will be elaborated in close cooperation with the PMUs at DoI. After approval of the suggested programme by MoI and DoI, participants and trainers will be selected.

This on-the-job training will be conducted in Quang Nam and Ha Giang provinces for the staff that will be responsible for working with such projects in the future and will be adapted to the local conditions..

This staff will be trained in such a way that they will become the future trainers for capacity building in other provinces.

The training programme will consist of three modules:

Module 1: Seminar on general aspects of off-grid Rural RE project planning and preparation. The objectives of this seminar are to present the approved tools and methods for preparation of Rural RE plans and project proposals and working procedures for rural off-grid electrification plans and projects. Local experiences on Rural RE will be shared with the participants. The seminar programme will also address policy, technical, economic, financial, environmental, socio-economic and sustainability aspects of Rural RE projects.

Number of participants: max. 25, including representatives from PMU/DoI (10), DPCs (8), DARD (1), DoNRE (1), DoST (1), DPI (1), DoF (1), CEMMA (1), PC (1).

Duration: 1 day

Module 2: Training on tools and methods for planning and preparation of Rural RE plans and project proposals and on working procedures for rural off-grid electrification plans and projects. The practical exercises will consist of the preparation of rural renewable energy plan for the participating districts. Additional exercises will be given to participants as preparation of a follow-up workshop (Module 3). Special support will be provided to the provincial PMUs in applying the established tools and methods for preparation of Rural RE plans.

Number of participants: max 15, including PMU/DoI and DPCs.

Duration: 2 days

Module 3: Follow-up workshop. The workshop will consist in the presentation and assessment of the plans prepared by the participants of Module 2.

Number of participants: max 15, including PMU/Dol and DPCs.
Duration: 1 day

The training programme and all documents shall be in the Vietnamese language. They will be prepared in such a way that they can be used for future capacity building projects in other provinces to be conducted by Vietnamese organizations.

Each module of training programme will be subject to an evaluation by all participants.

Outputs:

- Training programme (Seminar/Training/Workshop) organised,
- 2 on-site special supporting trainings provided to each Ha Giang and Quang Nam provinces,
- 15 staff in each Ha Giang and Quang Nam province (provincial PMU and other relevant provincial/district institutions) have been trained,
- One Rural RE plan in each of the four selected districts in Ha Giang and Quang Nam provinces have been prepared by trained staff.

Inputs for Activities 5 and 6:

Overall duration for Activities 5 and 6: 12 months
Manning: International experts: 17.4 weeks of field work and 77.6 hours for home support
Local experts: 336 working days.

2.5 Use of resources

2.5.1 Consultants resources during the Implementation phase

During the Implementation Phase, the project organisation team will consist of one group of International Experts composed of the Team Leader and four Area Experts, and one group of Vietnamese experts composed of one full time Area Team Leader and eight Area experts.

The total amount of resources for this area is:

- International experts: 82.7 weeks in Vietnam and 218.4 hours at home office
- Local experts: 1,344 days
- Supporting staff

The resources are distributed as follows:

International team of experts

Position of experts	Name of experts	No. weeks field work	No. hours home support
Area Leader & Biomass Exp.	Mr Ludovic Lacrosse	33.6	
RE & Solar Expert	Mr Thomas Egnell	7.6	33.6
RE & Hydro Expert	Ms Hedi Feibel	3.8	16.8
Planner & Modelling Expert	Mr Lennart Larsson	18.6	84
Economist, Planner & RE & Wind Expert	Mr. Niels Juhl Thomsen	20	84

Local team of experts

Position of experts	Name of experts		No. days work
Local Area Leader	Mr Nguyen Kinh Luan		368
Capacity Building Expert	Mr Tran Nguyen Manh Tuan		129
Planner & Modelling Expert	Mr Bui Huy Phung		114
Planner & Economic Expert	Mr Nguyen Manh Hien		168
Regulation Expert	Mr Dang Quoc Thong		76
RE, Hydro	Mr Ho Hao		114
Capacity Building Expert	Mr Dam Xuan Hiep		114
RE, Wind and Solar	Mr. Nguyen Tien Nguyen		147
RE, Bio	Mr Tran Minh Tuyen		114

Apart from these experts, a number of interpreters and translators will be engaged to meet the needs in the Area activities.

The total volume of manpower resources for international and local experts remains the same as in the original contract. Some experts have been replaced, as their role is not essential any more in the context of the revised planned activities. As the concept of “training of trainers” will be applied, whenever possible, the experts involved in the preparation of the training documents will also be delivering the training.

Mr Tran Quan Cu, expert in Capacity Building, will also, through his role in Option 1, be advising the Area team on capacity Building aspects.

In addition to the above list of the core team experts, a pool of back-stop experts according to the following list is appointed for different short time missions as required and agreed for each case throughout the execution of the programme.

Back-stop Pool Experts

Arter, Alex

Renewable Energy Expert, Hydro

Eichenberger, Peter	Rural Electrification Policies and Renewable Energy Expert, Hydro
Henrysson, Jessica	Renewable Energy Expert, Solar
Larsson, Ann-Katrin	Renewable Energy Expert, Wind
Linde, Elon	Project Management, Power Markets and Financing Expert
Nyström, Per-Olof	Renewable Energy Expert, Biomass
Rydell, Torsten	Renewable Energy Expert, Hydro
Öberg, Rolf	Rural Energy Expert, Diesel

2.5.2 Duties and Responsibilities of each Consultant

International Experts:

- 1) International Area Leader/Biomass Expert, Dr. Ludovic Lacrosse
33.6 weeks in Vietnam/ based in Vietnam
He will, with the local Area Leader, be responsible for the management of Area 1. He will prepare the ToRs for each consultant. He will supervise the work of the international and local experts, and check the quality of the documents produced by the consultants. He will participate in implementation of all Area 1 activities and jointly manage all activities with the local team leader.
- 2) Renewable Energy/Solar Expert, Mr. Thomas Egnell
7.6 weeks in Vietnam and 34 hours in home office/ 2 trips to Vietnam
He will, together with all international experts be involved in the review and development of tools and methods for preparation, development and assessment of RRE plans and projects (3.8 weeks). He will also be involved in the preparation and implementation of the capacity building activities at MoI (3.8 weeks).
- 3) Renewable Energy/Hydro Expert, Ms. Hedi Feibel
3.8 weeks in Vietnam and 17 hours in home office/ 1 trip to Vietnam
She will, together with all international experts, be involved in the preparation and implementation of the capacity building activities at MoI (3.8 weeks).
- 4) Planner/Modelling Expert, Dr. Lennart Larsson
18.6 weeks in Vietnam and 84 hours in home office/ 5 trips to Vietnam
He will, together with all international experts, be involved in the review and development of tools and methods for preparation, development and assessment of RRE plans and projects (6 weeks). He will, together with the Planner/Economic international expert and the relevant local experts, review the existing working procedures for the preparation and assessment of rural, off-grid electrification plans and project proposals (8 weeks) He will also be involved in the preparation and implementation of the capacity building activities at MoI (4.9 weeks).
- 5) Economist, Planner & RE(Wind) Expert, Mr. Niels Juhl Thomsen
20 weeks in Vietnam and 84 hours in home office (could be converted into weeks in Vietnam, if convenient).
He will, together with all international experts, be involved in the review and development of tools and methods for preparation, development and assessment of RRE plans and projects (6 weeks). He will, together with the Planner/Modelling international expert and the relevant local experts, review the existing working procedures for the preparation and assessment of rural, off-grid electrification

plans and project proposals (8 weeks) He will also be involved in the preparation and implementation of the capacity building activities at Mol (4.9 weeks).

Local Experts:

- 6) Local Area Leader, Mr. Nguyen Kinh Luan
368 working days for the project
He will have the same responsibilities and duties as the International Area Leader
He will work full-time on Area 1. The Local Area Leader will coordinate and supervise the work of other local experts in order to make sure the quality of the activities carried out by the local experts. He should be involved in implementation of all activities of the Area 1. The local Area leader will be responsible for the documentation in Vietnamese language.
- 7) Capacity Building Expert, Mr. Tran Nguyen Manh Tuan
129 working days for the project
He will be involved in the appraisal of the existing capacity at Mol and at provincial IAs (63 working days), in the preparation and implementation of training programme for staff at Mol and at provincial/district level (66 working days). He will be responsible for writing the training reports.
- 8) Planner/Modelling Expert, Mr. Bui Huy Phung
114 working days for the project
He will work full-time on the review and development of tools and methods to be used for the preparation of RRE plans and projects by the provincial IAs and for their assessment and approval by Mol (105 working days). He will also be involved part-time in the preparation and implementation of the training programme for staff at Mol and at provincial/district level (42 working days).
- 9) Economist/Planning Expert, Mr. Nguyen Manh Hien
168 working days for the project
He will work part-time on the review and development of tools and methods (54 working days), the review and development of working procedures to be used for the preparation of REE plans and projects by the provincial IAs and for their assessment and approval by Mol (84 working days). He will also be involved in the preparation and implementation of the training programmes for staff at Mol and at provincial/district level (30 working days).
- 10) Regulation Expert, Mr. Dang Quoc Thong
76 working days for the project
He will work part-time for the review and development of working procedures to be used for the preparation of REE plans and projects by the provincial IAs and for their assessment and approval by Mol (46 working days). He will also participate in the preparation and implementation of the training programmes (30 working days)
- 11) Renewable Energy Expert (Hydro), Mr. Ho Viet Hao
114 working days for the project.
He will work part-time for the review and development tools and methods (36 working days) and for review and development of working procedures (36 working days). He will also participate in the preparation and implementation of the training programmes (42 working days).

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- 12) Capacity Building Expert , Mr. Dam Xuan Hiep
114 working days for the project.
He will work part-time for the review and development tools and methods (36 working days) and for review and development of working procedures (36 working days). He will also participate in the preparation and implementation of the training programmes (42 working days).
- 13) Renewable Energy Expert (Wind & Solar), Mr. Nguyen Tien Nguyen
147 working days for the project.
He will work part-time for the review and development tools and methods (36 working days) and for review and development of working procedures (36 working days). He will also participate in the preparation and implementation of the training programmes (42 working days).
- 14) Renewable Energy Expert (Biomass/Biogas), Mr. Tran Minh Tuyen
114 working days for the project.
He will work part-time for the review and development tools and methods (36 working days) and for review and development of working procedures (36 working days). He will also participate in the preparation and implementation of the training programmes (42 working days).

3. CONDITIONS AND ASSUMPTIONS RELATED TO PROJECT IMPLEMENTATION

3.1 External/Internal factors affecting the implementation

The overall environment is extremely favourable to the implementation of such a project. Indeed, there is a global, regional and national trend to promote and support renewable energy projects, as it encourages the use of indigenous energy sources, while mitigating the emission of GHGs. The Kyoto Protocol, the ASEAN Plan of Action for energy co-operation (2005-2009) and the new national renewable energy master plan (2006-2010) are all moving into that same direction.

One of the top priorities in Vietnam is poverty alleviation, especially in rural areas. The production of power from renewable energy sources in the non grid connected remote areas can also contribute to poverty alleviation by stimulating income-generating local activities. Synergy with the Vietnam-Sweden Poverty Alleviation Programme (Chia Se) should be established.

As already mentioned in section 1.1, there is a very large potential for the electricity production from renewable sources of energy in Vietnam. The willingness and motivation to use these renewable energy sources in remote areas seems high. It can not only be perceived at national (MoI) and provincial levels (DoI), but also, and even more, at the district, commune and village levels.

EVN and the Power Companies, as well as some private companies, have experience in the implementation of grid-connected and/or off-grid renewable energy plants, especially hydropower plants. Their expertise can be tapped for the implementation of off-grid projects.

Some international agencies, such as the World Bank and JICA, are already involved in the funding of rural electrification projects. Close collaboration with these institutions should be established to avoid duplication of efforts and to maximise synergy.

3.2 Assessment of risks

3.2.1 Project related risks

Renewable energy-based power projects are often perceived as more risky than conventional, mainstream power projects. As a consequence, they are more difficult to finance and implement.

Renewable energy technologies are less known than the conventional ones. Their benefits (socio-economic, environmental, etc.) are not clearly understood.

Renewable energy projects are generally more costly and require more O&M than conventional power projects. Moreover, they are implemented in remote conditions, where the local populations have not necessarily got appropriate skills.

Consequently, the power production cost is higher than the price of electricity produced and distributed by the national grid.

Project developers and financiers do not feel comfortable with such projects as they perceive high risks in their economic and financial viability as cash flow problem can arise from a lack of revenue generation from the project.

Therefore, the selected technologies will have to be fully proven and perfectly appropriate to the local resources and energy requirements. The latter will have to be carefully assessed. Indeed, the future electricity use will be much higher than the current one, as such projects should stimulate the development of new income generating businesses.

There is a need for a clear renewable energy policy and an appropriate regulatory framework proposing incentives and, if necessary, subsidies, to facilitate the implementation of such projects.

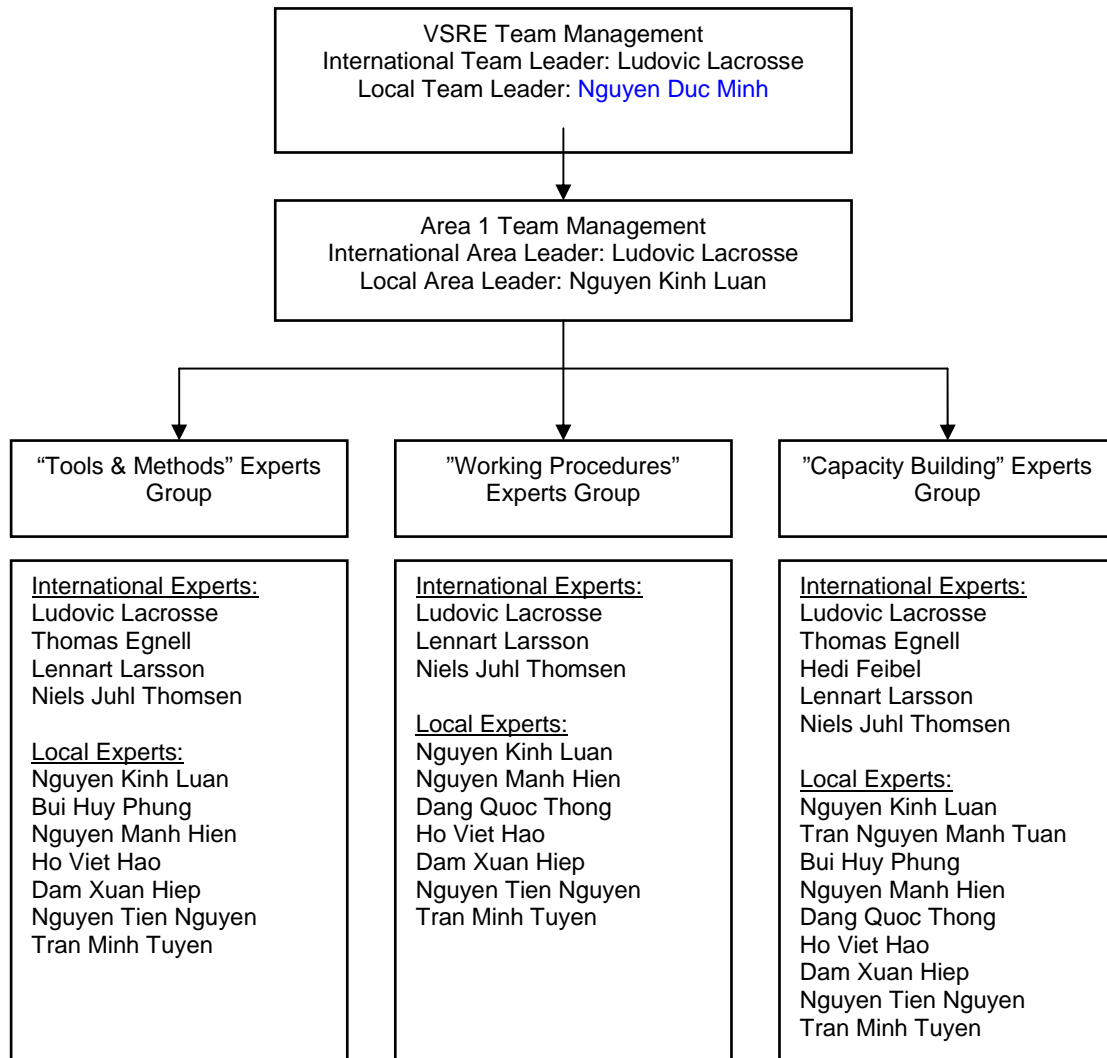
3.2.2 Capacity building related risks

Capacity building activities will be carried out at different levels (Mol, Dol and district). There is a risk that the participants in these activities do not have the necessary basic knowledge to fully benefit from the training. Hence, the selection of the candidates will have to be done very carefully.

There is also a risk that the participants, once trained change job and/or shift to other places and that the “local” competence is lost. Therefore, once the participants have been trained, they should themselves train other people in their provinces and in other relevant provinces. That’s why the concept of “training of trainers” will be applied in all capacity building activities. The recruitment of the training experts for these activities will have to take this issue into consideration.

4. PROJECT IMPLEMENTATION

4.1 Organisation and implementation of organisation



4.2 Capacity of implementing organisation

From meetings with the various stakeholders during the preparation phase, it seems that the capacity of the implementing organisation is good. The people met at Mol, Dol and at district level were knowledgeable about the various issues related to the implementation of the VSRE.

The capability related to Area 1 will be more specifically assessed in the early part of the Implementation Phase.

4.3 Time schedule

See next page

4.4 Budget and financing

The budget for the implementation phase will be according to the budget of the Contract. Some reallocations were needed, but the total envelope remained unchanged, except for some minor adjustments for the organisation of Trainings and Seminars, as reported in Annex 1, section 13.

5. ECONOMICALLY SOUND AND SUSTAINABLE DEVELOPMENT

5.1 Policy and legislation to support implementation

The effective implementation of renewable energy projects requires a strong commitment and support by the Government and MoI. A clear policy, as well as practical implementation mechanisms have to be designed.

The Vietnam Power Law (Luat Dien Luc) was ratified by the Vietnam National Assembly on December 3, 2004. This document paves the way for the promotion and use of renewable energy resources for electric power generation. More specific decisions will have to be taken by the Government and MoI to practically encourage a wide implementation of renewable energy projects in the most remote areas. These decisions should include the possible provision of incentives (grants, soft long-term loan) and subsidies from the national, provincial and district authorities. Local manufacturers should also be supported in order to reduce the renewable energy equipment costs.

5.2 Choice of technology in relation to prevailing conditions

The selection of the technologies for the pilot projects will have to be carefully done and take into account:

- the resources availability (for isolated systems, mostly year-round availability is required),
- the investment and O&M costs,
- the available know-how and expertise in Vietnam, specially in the pilot project areas,
- options for later connection to the national grid.

Preliminary investigations showed that mini-hydro power plants are very appropriate to the selected areas. Other technologies will also be investigated.

5.3 Management and institutional capacity building

Most VSRE activities are related to capacity building at national, provincial and district levels.

Management capacity building will be done under the activity of the “Project Management Capacity Building” component of VSRE programme (Option 1).

Institutional capacity building will be broadly developed under Area 4. However, under Area 1, several capacity building activities will be specifically designed for MoI and DoI. They mainly consist in the preparation, assessment and approval of RRE plans and projects (see Activities 5 and 6). All administrative levels from national to district/commune/village will be involved.

5.4 Environmental consideration

All activities carried out in Area 1 will have a strong environmental component, as the renewable energy projects are generally considered as environmentally friendly. The participants in the capacity building activities (seminars, trainings, workshops) will be presented the environmental impact of implementing of RRE projects. Global and local environmental impacts will be addressed.

It is expected that the implementation of the pilot projects will have a positive impact on the local environment, as the access to electricity produced from renewable energy sources and, biogas, if applicable, is expected to reduce the consumption of firewood for cooking at household level. It could be a good way to tackle the serious deforestation problem of these remote areas.

The GHG mitigation effects of the project will also be further investigated and presented during the capacity building activities.

5.5 Socio-cultural aspects & gender equality

The access to electricity in the most remote areas should have a strong socio-cultural impact on the local population and more specifically on women and children. Several positive impacts have been identified such as:

- Development of new activities by the local women who would spend less time for the collection of firewood;
- Electricity lighting in evenings can give access to educational TV programmes and allow children to do their homework and read educational books.
- Health conditions in these areas should be improved as the use of electricity driven equipment and cooling means for refrigeration for vaccines and other medicines, could be used in the local clinics.
- Women will be able to be more involved in the local social activities and in the decision making at local level, hence improving their social status.

Altogether, the overall living standards of the local population should be considerably improved and poverty reduced through the development of additional income generating activities.

Effort will be made to make sure that there is equal gender participation in all capacity building activities.

The socio-cultural and gender equality aspects will be analysed and reported under Area 4.

5.6 Financial and economic sustainability

The issues will definitively be addressed by Area 3 experts.

It is essential for the financial and economic sustainability of RRE projects, that these are strongly related to the development of new income generating activities. Indeed, it is rather difficult to reach financial and economic sustainability by only considering the social and socio-cultural impacts of RRE projects. The selection of the pilot project sites will have to take that factor into consideration. It is expected that the pilot projects will need some exceptional financial supports for their implementation. The success of replication of such projects will depend on their economic sustainability.

The use of indigenous renewable energy resources and of reliable locally manufactured equipment will also strongly influence the economic and financial sustainability of RRE projects.

6. FOLLOW-UP AND EVALUATION

The VSRE programme and the progress of all activities developed under the various areas will continuously be monitored by the Programme and Area Team Leaders. The monitoring will be looking at the programme achievements as regards the objectively verifiable indicators (OVIs) of the LFA matrix in relation with the programme objectives, expected outputs and the planned schedule of activities.

6.1 Time schedule for follow-up

Quarterly reports will contain a section where the achieved results will be compared to the expected results, as specified in the project document and LFA-matrix. Regular assessment will be done at the end of each major activity.

6.2 Indicators for follow-up

Indicators for follow-up are those specified in the LFA-matrix (see Section 6.7).

6.3 Division of roles and responsibilities for follow-up

Programme and Area Team Leaders will be directly responsible for the continuous monitoring of the implementation and quality of activities. They will make sure that the Area experts are performing according to the programme objectives and expected results.

Mol and Sida will be informed of the progress through the submission of the Quarterly Reports. Mol and Sida will decide on the most appropriate time for the monitoring of VSRE programme. It seems appropriate to have an external mid-term monitoring mission (18 months after the start of the implementation phase). The most appropriate timing will be decided by Mol and Sida.

6.4 Indicators for fulfilment of objectives

Indicators for fulfilment of Area 1 objectives are those specified in the LFA-matrix (see Section 6.7)

6.5 Time schedule for evaluation

Programme evaluation should be done 3 to 6 months after completion of the VSRE programme.

Intermediate evaluations should take place after completion of each major activity.

6.6 Division of roles and responsibilities for evaluation

The overall evaluation of VSRE programme will be done by an external team of experts contracted by Mol and Sida.

The intermediate evaluation of activities will be done by the Team Leaders and will be reported to Mol and Sida through the Quarterly Reports.

6.7 LFA-matrix

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LFA-Matrix

Programme Area 1	Intervention Logic	Objectively measurable and verifiable indicators	Sources of verification	Important assumptions and conditions
Overall Vietnam-Sweden Rural Energy (VSRE) Programme Objective	The rural population of Vietnam has increased access to options for rural services that are reliable, affordable, appropriate and sustainable.	Number of rural household provided with electricity thanks to pilot projects	District information on connected households	Pilot projects implemented
Programme Area 1 Objectives	To strengthen the implementing capacity of rural renewable energy policies within central government, provincial and district level organizations in order to facilitate the development of renewable energy plans in rural areas.	Rural renewable energy (RRE) plans have been prepared and assessed	MOI/DOI documents	<ul style="list-style-type: none"> • Right training candidates with reasonable basic knowledge are selected at MOI, DOI and DPCs. • Trainees do not change their jobs
Expected Outputs	<p>1) Tools, methods and working procedures established at the Ministry of Industry (Moi) in assessment of rural renewable energy (RRE) plans and project proposals and staff trained in the application.</p> <p>2) Tools, methods and working procedures established in two provinces (Quang Nam and Ha Giang) in preparation of rural renewable energy plans and project proposals and staff trained in the application.</p> <p>3) Four rural renewable energy plans each in two provinces have been prepared and assessed by Moi</p>	<p>1a) Assessment tools, methods and working procedures for RRE plans and project proposals are available 1b) Trainings have been conducted</p> <p>2a) Tools, methods and working procedures for preparation of RRE plans and project proposals are available 1b) Trainings have been conducted</p> <p>3) RRE plans prepared and assessed</p>	<p>1a) Approved tools, methods and working procedures</p> <p>1b) Training reports, incl. list of participants</p> <p>1a) Approved tools, methods and working procedures</p> <p>1b) Training reports, incl. list of participants</p> <p>3) Approved RRE plans</p>	<ul style="list-style-type: none"> • Easy access to existing tools, methods and working procedures at Moi and other relevant institutions. • Right training candidates have been identified • Easy access to existing tools, methods and working procedures at DoI and other relevant institutions. • Right training candidates have been identified • Availability of required information for preparation of the plans

Activities	<p>1) Appraisal of existing capacity at the Mol to assess and at provincial IAs to prepare renewable energy plans and project proposals.</p> <p>2) Preparation of tools and methods for assessment, development and preparation of rural renewable energy plans and project proposals.</p> <p>3) Proposals of working procedures for rural off-grid electrification plans.</p> <p>4) Proposals of working procedures for rural off-grid electrification projects.</p> <p>5) Preparation and implementation of a training programme for staff at Mol.</p> <p>6) Preparation and implementation of a training programme for staff at provincial level, and support to the provincial IAs in the preparation of RRE plans.</p>	<p>Appraisal reports, incl. answers to questionnaires</p> <p>Tools and methods prepared</p> <p>Working procedures prepared and proposed</p> <p>Working procedures prepared and proposed</p> <p>Seminar/Training/Workshop completion reports RRE plans assessed</p> <p>Seminar/Training/Workshop completion reports RRE plans prepared</p>	<p>Approved reports</p> <p>Approved tools and methods</p> <p>Approved working procedures</p> <p>Approved working procedures</p> <p>Seminar/Training/Workshop completion reports incl. list of participants and their evaluation Approved RRE plans</p> <p>Seminar/Training/Workshop completion reports incl. list of participants and their evaluation Approved RRE plans</p>	<p>Active participation of Mol and DoI in appraisal exercise</p> <p>Easy access to existing tools and methods at Mol, DoI and other relevant institutions</p> <p>Easy access to existing working procedures at Mol and other relevant institutions</p> <p>Easy access to existing working procedures at DoI and other relevant institutions</p> <p>Right training candidates have been identified</p> <p>Right training candidates have been identified</p>
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