



Annual Report

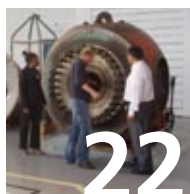
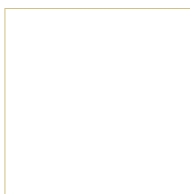
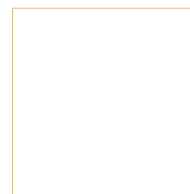
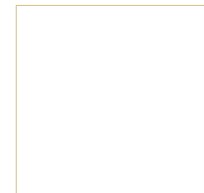
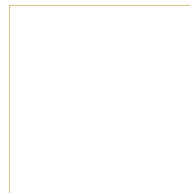
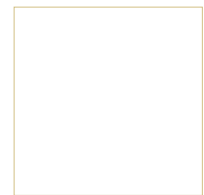
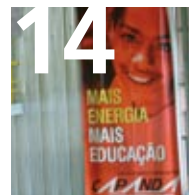
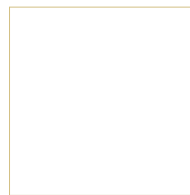
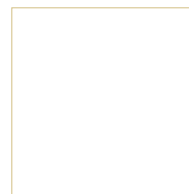
The cooperation between
NVE and Norad

2006

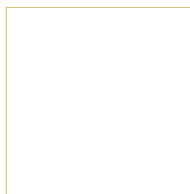
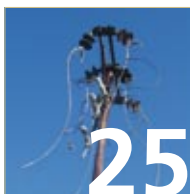
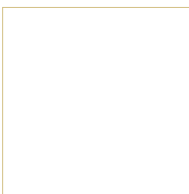
«Water and energy for a sustainable development»

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Preface



Sound management of a country's natural resources is important in the fight against poverty. To exchange experience in management and public administration through institutional cooperation between similar institutions can be an effective tool in reaching such a goal. Institutional cooperation must, however, be of a long-term perspective if objectives are to be achieved. This is how NVE's contributions have been in recent years, as can be seen in this annual report. Although our projects are usually of a long-term nature, our methods are continually revised and improved to keep up with developments for the benefit of our institutional partners.

Recent trends in institutional cooperation have been to steer away from bilateral cooperation to a regional assistance based approach (for example our cooperation with the Southern African Power Pool and the Nile Basin Initiative). Another trend has been the switch back to assistance in infrastructure development, as described in the write-up of the new project in Bhutan. Norway has important challenges in the years to come in the struggle to alleviate global poverty. We believe that NVE, with its responsibility for the public administration of the water and energy sectors in Norway, can make a good contribution in this field in the future, in cooperation with other public and private stakeholders.

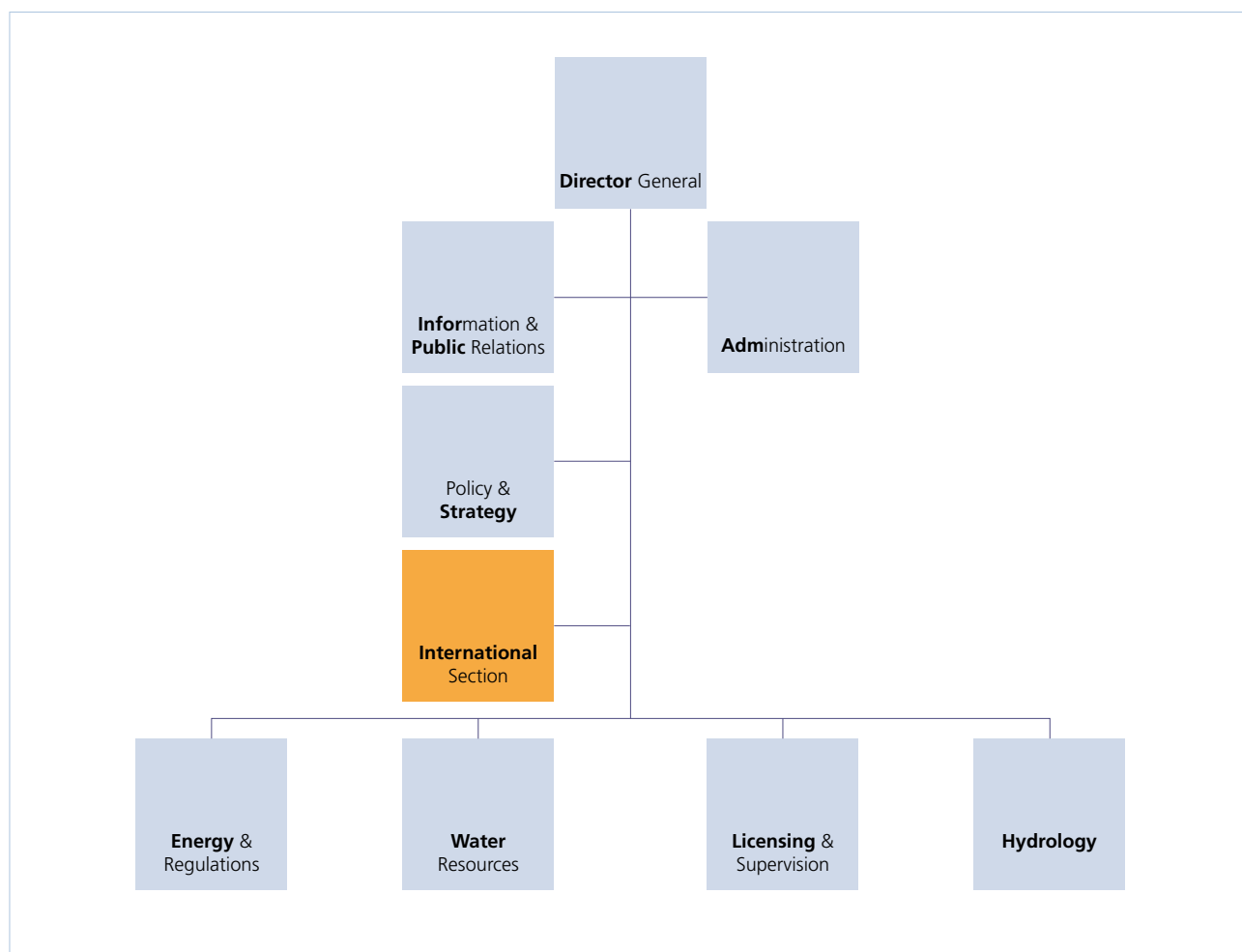
Oslo, March 2006

A handwritten signature in blue ink, reading "Agnar Aas". The signature is written in a cursive, flowing style.

Agnar Aas
Director General

Organisation of NVE

Established in 1921, the Norwegian Water Resources and Energy Directorate is a directorate under the Ministry of Petroleum and Energy and is responsible for the management of Norway's water and energy resources. Our mandate is to ensure an integrated and environmentally sound management of the country's water resources, to promote efficient energy markets and cost-effective energy systems and contribute to the economic utilization of energy. We are Norway's national centre of expertise for hydrology, and play a central role in national flood contingency planning. NVE also has the overall responsibility for maintaining national power supplies. NVE is based in Oslo and has five regional offices in Norway and a total of 420 employees.



Contacts in International Section

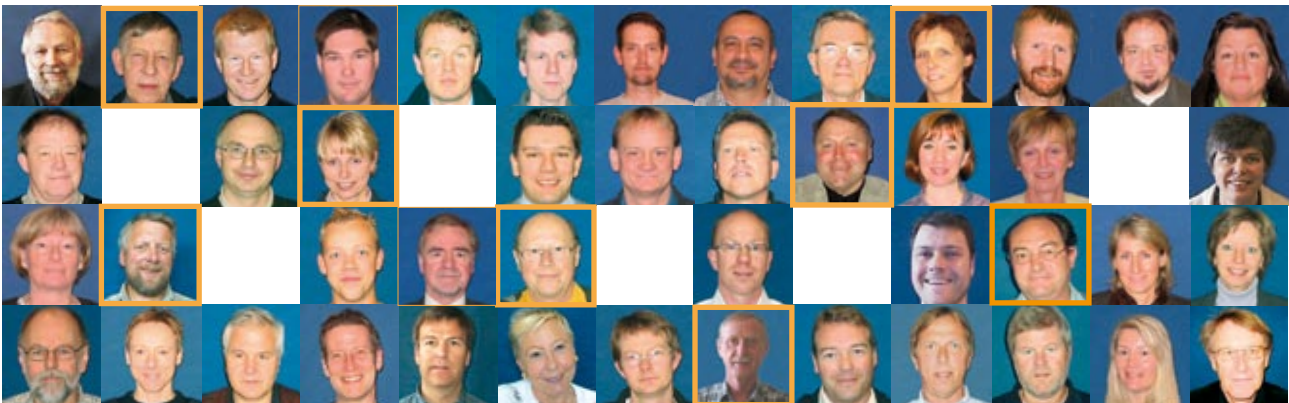
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Contributors to NVE's development assistance

International Section 

NVE's development assistance is organised and coordinated through the International Section which in 2006 counted 7 persons. The main tasks of the International Section are project preparation of energy and water resources related projects, and cost and quality control of projects and programmes during execution. Some projects require posting of advisers in recipient countries. In 2006 resident advisers were posted in Mozambique and Timor-Leste. The major part of the professional work is carried out by staff from the various departments and sections of NVE. During 2006 a total of 46 persons were involved in the assistance. In addition several private consultants and professionals from other directorates and research institutions were sub-contracted to assist NVE in cases where NVE either lacked competence or was temporarily short of capacity.

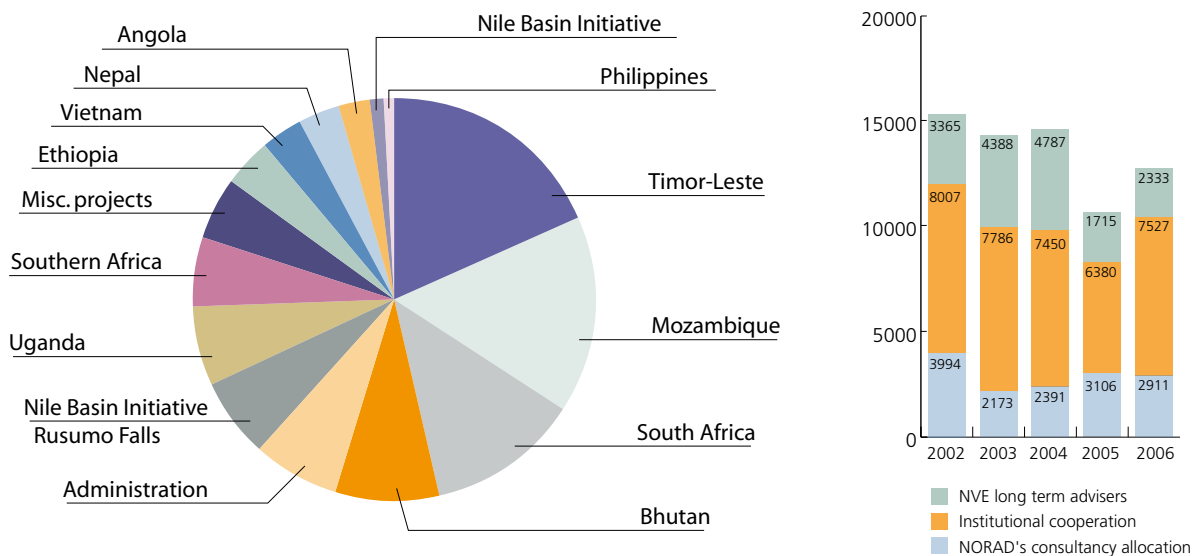


Some of the specialists and administrative staff whose joint efforts assured the success of the activities

Overview of activities and time consumption

The volume of activities in 2006 was recorded at approximately 9 person-years (one person-year being 1400 effective working hours), compared to 8 person-years in 2005. As can be seen in the figure below, both the assignments for Norad and Institutional Cooperation activities have increased. The number of resident advisers has decreased from three in 2005 to two in 2006. This development is expected to continue, and in 2007 it is foreseen that only one resident adviser will remain (Timor-Leste).

Recorded hours, including resident advisers





Assignments for **Norad**

The Norwegian Agency for Development Cooperation (Norad) is the principal government agency for international development. Being organised as a directorate under the Ministry of Foreign Affairs, its main tasks are to provide advisory services to the Ministry, to embassies in developing countries, and to multilateral development organizations. According to a recently revised strategy, Norad shall aim at maximising the effectiveness of its work with focus on quality and results.

In order to support Norad, NVE and many other organisations assist Norad in its many endeavours within their specialities. Thus NVE, through the institutional cooperation contract, has assisted Norad in separate engagements within the fields of water resources and energy. The engagements have varied from appraisals of projects and assessment of reports, to preparatory work for new projects.

Appraisal of proposed development project of **Hydro Lab**, Kathmandu, Nepal

Hydro Lab Pvt Ltd has been in operation since 1998 carrying out hydraulic model studies and other specialized sediment and hydraulic measurements at the laboratory and in the field. The studies have mainly included intake and outlet design and sediment handling for hydropower projects. The laboratory was developed with financial assistance from Norad and has been supported professionally by the International Centre for Hydropower and the Norwegian University of Science and Technology in Trondheim.

A programme proposal was prepared by Hydro Lab In 2005 to further expand its capacity and expertise. In addition to conducting hydraulic model testing on large-scale projects, more emphasis would be put on analysis based on field measurements and improved sediment handling of existing plants in order to improve turbine efficiency. Norad was requested to support the programme with NOK 6.5 million over a 5-year period. Through initiatives by the Norwegian Embassy in Kathmandu, NVE was engaged by Norad to carry out an appraisal of the proposed programme.

The appraisal found that the project will have a significant positive impact

on the operation and thereby economic performance of existing hydropower plants, and that it may have a positive influence both on planning and operation of hydropower projects in neighbouring countries.

It was concluded that Nepal benefits greatly from having such a facility as Hydro Lab, and recommendations for its further enhancement were made.

ACHIEVEMENT

- Report with analysis and recommendations with respect to conditions for further support by Norad. A list of indicators of programme results and their verification was included



Hydro lab in Katmandu

Course in **Integrated water management** for development

This course was organised for the third time by NVE in cooperation with the State Pollution Control Authority, the Directorate for Nature Management and the Geological Survey of Norway. Previous courses have been held in 2000/2001 and in 2002, all with financial support from Norad.

The current course was held in two sessions; 3 days in November 2006 and 3 days in January 2007. The venue was the town of Fagernes in central-eastern Norway. The course aimed to further improve Norwegian development cooperation in the water management sector through lectures and discussions and with group works during and between the

two gatherings. The course had 17 participants from Norwegian governmental and regional agencies, consultants, and research and educational institutions who have personal experience from field work or otherwise being professionally involved in water management for development.

Lecturers came from relevant Norwegian and international authorities and academic institutions as well as NGOs, providing basic and applied knowledge, including an ample number of case studies. The final evaluation and reporting of the course will take place in 2007.

ACHIEVEMENTS

- Course successfully conducted with 17 participants
- Informal networks established between course participants strengthening cooperation in integrated water management for development

Nile Basin Initiative

The Nile Basin Initiative is a collaboration between the ten countries in the Nile Basin with the vision of a leading to sustainable development based on sharing of the resources of the Nile. The Nile Basin Regional Power Trade is one of seven projects within the shared vision programme where Norad is the main donor and has the role of Partner Focal Point. NVE has followed the development of the initiative and contributed with professional advisory services since 2000.

The Nile Basin Initiative's goals are described as "To achieve sustainable socioeconomic development through the equitable utilization of, and benefit from the common Nile Basin water resources" and with objectives as follows:

- to develop the water resources of the Nile in a sustainable and

equitable way to ensure prosperity, security and peace for all its people

- to ensure efficient water management and the optimal use of the resources
- to ensure cooperation and joint action between the riparian countries, seeking win-win gains
- to target poverty eradication and promote economic integration
- to ensure that the programme results in a move from planning to action



ACHIEVEMENTS

- NVE participated in meetings with the Nile Basin Initiative Technical Committee on Power Trade
- Planning of seminar in Africa on regional power trade initiated with the objective of learning from experience from other regions and power pools in Africa
- NVE and the Project Management Unit on Power Trade followed up the discussions of developing cooperation between NBI and NVE for transferring power trade experience to the Nile region

Seminar on electricity regulation [ELRI]

ELRI (the Electricity Regulators' Initiative) is a training programme for electricity regulators, primarily from developing countries.

The initiative was started in 2002 by the Norwegian regulator (NVE) in cooperation with ECON Analysis and Nordpool Consulting. NVE has institutional cooperation with several regulators in Africa and Asia, and numerous training programmes and seminars have been executed under this cooperation. Annual training seminars for regulators have been arranged under the ELRI programme since 2002, and the seminar in 2006 was the fifth in the series. The seminar is an important meeting place for staff from organisations having institutional cooperation with NVE.

In 2006, ECON Analysis was responsible for the professional input, while the International Centre for Hydro-power was responsible for practical arrangements, and NVE contributed with experts for the various sessions.

ACHIEVEMENT

- Most of the participants have afterwards expressed high satisfaction with the seminar. The seminar is contributing to increased knowledge and capacity building in the participating countries

Rusumo Falls Hydroelectric & Multi-Purpose Regional Project

Expert Opinion on Kagera Basin Hydrology and Sediment Transport at Rusumo Falls

On request by Norad, NVE was asked to carry out a review of earlier hydrological and sedimentological investigations in the Kagera River Basin and the catchment upstream of Rusumo Falls. The main objective of the review was to provide the necessary hydrological expert opinion for evaluating the hydropower potential and related sediment transport issues of the proposed project, in order to guide subsequent planned feasibility and development work by the proponents of the project.

Three field trips were carried out, the first one in February to collect hydrological, meteorological and sedimentological data, and other relevant information and reports. On the second visit the preliminary results were presented for the donors and the Nile Equatorial Lakes Subsidiary Action Program. Training on the use of a hydrological model was carried out in June/July at the University of Butare in Rwanda, after which a Draft Final Report was submitted in August. In the report due consideration was given to comments received from the World Bank regarding the studies and results. At the same time it was decided to carry out a supplementary study on land use, mainly to obtain more information on the erosion within the catchment. The study will be completed in early 2007, after which a final comprehensive report will be produced.

All work has been carried out in close collaboration and consultation with the Nile Equatorial Lakes Subsidiary Action Program Coordination Unit, Norad, the World Bank and Sida.

ACHIEVEMENT

→ Report confirming the hydropower potential at Rusumo Fall and satisfactory results on erosion and reservoir sedimentation



Rusumo Falls Hydroelectric & Multi-Purpose Regional Project.

Preparation of Terms of Reference for feasibility study

The Rusumo Falls multipurpose project is a part of the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) under the Nile Basin Initiative. The hydropower element of the project concerns the harnessing of the Rusumo Falls, which is located on the Kagera River about 2 kilometres downstream of the Kagera/Ruvubu River confluence, where the river forms the border between Rwanda and Tanzania.

In addition to hydropower, irrigation and flood control and rural development are important aspects of the project. Under earlier studies the installed capacity of the power plant would be around 60 MW, with a 13 m high dam impounding approximately 390 km² of land in Rwanda, Burundi and Tanzania. The feasibility study and tender documents will be prepared by a consulting firm financed by Norad, Sida and the World Bank - with the NELSAP Coordination Unit as the Client.

NVE was engaged by Norad to assist the NELSAP Coordination Unit in the preparation of a draft Terms of Reference for the consultancy ser-

vices to be carried out. Following a brief field visit, a draft document was prepared, discussed and submitted to the NELSAP Coordination Unit.

ACHIEVEMENT

→ Draft Terms of Reference for the consultancy services prepared

Bhutan

Rural Electrification Project Proposal

The Royal Government of Bhutan follows the development philosophy of Gross National Happiness, introduced by His Majesty the King as a holistic approach that encompasses economic growth, emotional security and spiritual development. The concept of Gross National Happiness is an attempt to balance economic progress with the maintenance of Bhutanese cultural and spiritual values, the improvement of social well being, the preservation of the environment and the promotion of good governance. In line with the National Vision, electricity for all by 2020 as a central theme of the new 5-Year Plan, greater efforts are being made by the Department of Energy (DoE) to meet the national vision by mobilizing resources and extending the rural electrification programme across the country.

The Rural Electrification Programme is considered as one of the Basic Infrastructure Development Programmes for socio-economic development of the country and is given one of the highest priorities for the sustainable development and poverty alleviation of the people, especially in the remote rural areas of Bhutan. NVE has assisted DoE in the formulation of a Project Proposal for the project. Bhutan Power Corporation will be the executing agency for the project which covers the provinces of Sarpang, Samdrupjongkhar, Trashigang and Zhemgang and is expected to start in 2007.

ACHIEVEMENTS

- Project Proposal finalised and submitted to Norad
- Basis laid for continued development of rural electrification throughout Bhutan



Project Document for DoE-NVE Phase III Institutional Cooperation

Bhutan’s Department of Energy (DoE) intends to extend the cooperation with NVE into a third phase starting in 2007/2008 which will help it embrace Bhutan’s accelerated hydropower development programme – a part of Bhutan’s new five-year development plan. NVE has assisted DoE in the formulation of a Project Document regarding the institutio-

nal cooperation. The Project Document is expected to be finalised in early 2007 with a view to starting Phase III of the institutional cooperation before the end of 2007.

ACHIEVEMENTS

- Discussions held in workshops and individual meetings to map out the necessary content of the third cooperation programme between DoE and NVE
- Preparation of key inputs to Project Document formulated



The 4th World Water Forum and Ministerial Conference

The 4th World Water Forum was held in Mexico City in 2006. More than 20,000 participants from 148 countries attended 200 sessions. The main theme was “Local Actions for a Global Challenge”, regarding human requirements for water, economic development and aspects of water scarcity. The compromise formula agreed by the government delegates was “Water is a guarantee of life for all of the World’s people”.

NVE gave a presentation from an international project within the area “flood risk in a changing climate”. Norway has conducted the project in cooperation with countries in the EU. The scope of the project was perception among people who live in areas with flood risk and the need for communication from the authorities (FLOWS). NVE also gave a presentation of small hydropower projects within a session of water for economic development. The Global Water Partnership, East Africa, and NVE arranged a side-event regarding communication and “Risk related water issues”.



In a cooperative effort between several research and governmental institutions in Norway, the delegation presented Norwegian competence in the water sector at a stand in the exhibition area.

A Ministerial Conference and The Children’s WWF2 were held concurrently. NVE participated in the official Norwegian delegation led by the Deputy Minister of Petroleum and Energy, Ms. Anita Utseth.

Tanzania

Some services have been provided by NVE to the Norwegian Embassy in Dar es Salaam. An End Review of Phase IV of the Electrification Programme at Zanzibar was carried out by NVE in May 2006. The review had mainly positive conclusions, i.a. with the project being implemented well within the initial cost estimates and savings were utilised to increase the extent of the project. However the connection rate in those areas electrified through Phase IV were considered as disappointingly low, mostly caused by the inability of local utility to provide the required meters.

At the same time an appraisal of a requested Phase V representing a completion of the electrification programme was undertaken. The appraisal had a positive recommendation towards a continued support more or less in line with the set-up utilised during the previous phases,

but special attention needed to be paid towards solving the problems giving the low connection rate. Zanzibar had requested Norway for financial assistance for a submarine cable from mainland Tanzania to the island of Pemba. NVE provided some advisory services related to the implementation procedures for such a project recommending tendering processes being undertaken for both the engineering and commodity parts of the project.

ACHIEVEMENTS

- An End Review of Phase IV of the Electrification Programme at Zanzibar was carried out by NVE in May 2006
- An appraisal of a requested Phase V representing a completion of the electrification programme was undertaken
- NVE provided some advisory services related to the implementation procedures to connect mainland Tanzania and Pemba with a submarine cable



Institutional cooperation

Most of NVE's activities connected to development assistance are part of institutional cooperation with partner institutions in the developing country as elaborated in the following pages. Of NVE's recorded hours on development assistance in 2006, 77 % (or 7 person-years) was spent on cooperation with 14 institutions in 12 countries, of which two are secretariats for regional cooperation. This cooperation is always based on signed contracts, clearly defining objectives, scope and mode of work, time schedule, obligations of the two parties, reporting, and total budget.

The table shows that on average 20% of the project funds is spent on activities directly linked to institutional cooperation with NVE. Besides the NVE fees and reimbursable expenses, this includes training in various forms. The remaining 80% is spent on local expenses or assignments of consulting firms, either in direct contract with the Cooperating institution or with NVE. What this in fact means is that, in the development cooperation sphere, NVE aims to act as a catalyst to involving resources and know-how from the private sector in realising Norway's development cooperation policies.

Institutional cooperation



The following Institutional contracts have been in force in 2006

Country	Cooperating institution	Project Period	Total budget	Budget for NVE Institutional cooperation
Angola	National Directorate of Energy	2000-2004	52,000	4,500
Bhutan	Directorate of Energy	2003-2007	15,000	8,400
Ethiopia	Ministry of Water Resources	2003-2006	40,000	1,300
Mozambique	Ministry of Energy	1998-2006	36,700	17,200
Nepal	Department of Electricity Development	2004-2007	10,000	1,500
Philippines	Provincial Government of Oriental Mindoro	2006-2009	3,810	
South Africa	Department of Minerals and Energy	2002-2005	2,700	0,700
South Africa	Department of Minerals and Energy, Chief Directorate of Electricity	2006-2009	6,350	
South Africa	Department of Minerals and Energy, Chief Directorate of Hydrocarbons	2006-2009	6,400	
South Africa	Department of Minerals and Energy, Central Energy Fund	2006-2009	3,000	
South Africa	National Electricity Regulator	2001-2005	9,400	2,500
Timor-Leste	Ministry of Natural Resources, Minerals and Energy Policy	2003-2009	26,800	12,800
Uganda	Ministry of Energy and Mineral Development	2006-2007	2,800	2,200
Vietnam	Electricity of Vietnam	2003-2006	38,000	1,900
Vietnam	Ministry of Natural Resources and Environment	2006-2009	8,850	6,155
Regional coop.	Regional Electricity Regulators Association (Secretariate in Namibia)	2003-2006	7,500	2,200
Regional coop.	Southern African Power Pool Cooperation (Secretariate in Zimbabwe)	2004-2007	35,000	0,950
TOTAL (NOK 1000)			304,310	62,305

Angola



Capanda Hydropower Plant. Spillway in full flow

Ministry of Energy and Water Affairs [**MINEA**], National Directorate of Energy [**DNE**]

The cooperation between MINEA and NVE dates back to 1996. It was extended by a new contract in 2000 with the aim to strengthen the energy sector. Activities under the cooperation continued into 2006 based on the remaining funds. The cooperation

started during the civil war and continued into a post-war period with different challenges and increased possibilities for the future of the energy sector.

The overall goal is to promote economic development in Angola through sustainable and efficient use of the country's energy resources. This is achieved through strengthening competence and decision-making skills at MINEA and the Luanda Electricity Utility (EDEL) through training in technical, economic and administrative fields, improving the reliability of electricity supply in the country by making available a fund for purchase of spare parts.

Work in 2006 was mainly to complete the different activities of the cooperation. An interesting new development may be initiated by a proposal to establish an aluminium smelter which will require increased electricity production in Angola.

Contact: Aud K. Skaugen

ANGOLA

Capital: Luanda
GDP (US \$): 51.9
Population: 12.1 million
Total installed Capacity: 700 MW
Main Energy Sector Authorities:
 Ministry of Energy and Water Affairs
 Empresa Nacional de Electricidade

ACHIEVEMENTS

- The Norwegian consulting firm, Norplan, completed their assistance to EDEL. The project has strengthened EDEL's commercial management capacity, improved the financial and accounting quality, and improved the capability of good network planning
- Spare Parts were provided for Empresa Nacional de Electricidade and EDEL in order to reduce the amount of fall out in the electricity sector. The post-war situation also made it necessary to connect new immigrants in Luanda

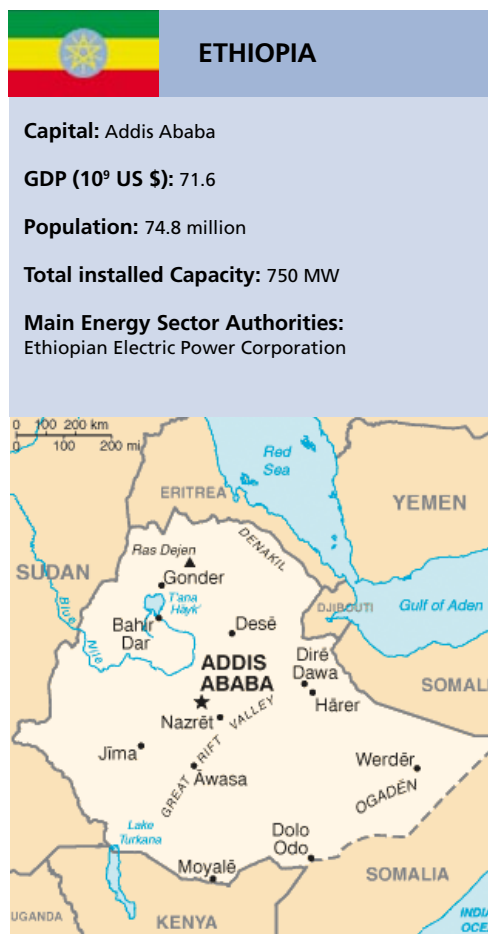
Ethiopia

Ministry of Water Resources [MoWR]

The Baro and the Karadobi multipurpose projects are part of the Eastern Nile Subsidiary Action Programme within the Nile Basin Initiative. Norway financed a feasibility study of the Baro project and a pre-feasibility study of the Karadobi project under an agreement between the governments of Ethiopia and Norway signed in June 2003. Both projects are large and, in addition to hydropower, shall be designed to accommodate other needs - in particular irrigation and flood control. The cost frame of the agreement is NOK 40 million including external consultants' contracts. The Baro project is situated on a tributary to the White Nile, whereas the Karadobi project is located on the Blue Nile.

Under a separate agreement between the countries, NVE has assisted the MoWR who is Client for the two studies. Bidding documents were prepared in 2003 and a contract for the services was signed in May 2004 between the MoWR and a Joint Venture of the consulting firms Norplan, Norconsult and Lahmeyer International. In spite of sometimes difficult weather conditions most of the studies were completed on time. It proved difficult, however, to obtain data from Sudan and Egypt which was needed to assess the anticipated positive effects related to water availability for irrigation and reduced flooding and siltation problems, as well as various other impacts in these countries. The draft final reports were submitted in June and commented by NVE in early July. Following this, a workshop was held on 10-12 July where the reports were discussed and commented upon by involved stakeholders. The final reports, which were revised according to the comments received, were submitted by the Consultant in September.

The Baro project was found to be economically viable, but it was decided not to proceed further with the project at this time since it would inundate 4600 hectares of rainforest. The Karadobi project was found to be highly economical, with a calculated economic internal rate of return for the base case of 18.2%. The project would include a 250 m high dam with a reservoir area of 405 km² and a live storage capacity equalling 85% of the mean annual runoff. The installed capacity would be 1600 MW which would produce 9700 GWh annual energy - of which 9300 GWh would be firm energy. Other benefits from the project would be increased irrigation capacity in Sudan and Egypt and



reduced flood damage and siltation problems. With the preliminary nature of pre-feasibility study level, environmental impacts have not been fully studied, but are indicated to be acceptable. The study conclusions gave a firm recommendation to proceed with a full feasibility study.

Defined goals were reached for both studies. For the Baro study the objective was to provide the required documentation for formal approval (or disapproval) of the project, and for the Karadobi study the objective was to provide the required documentation to decide on which further action to be taken on the project.

Contact: David A. Wright

ACHIEVEMENTS

- Consultants issued draft study reports
- Workshops held to discuss draft reports
- Consultants issued final reports
- Final reports reviewed and approved
- Studies completed and plans for further study of Karadobi project initiated

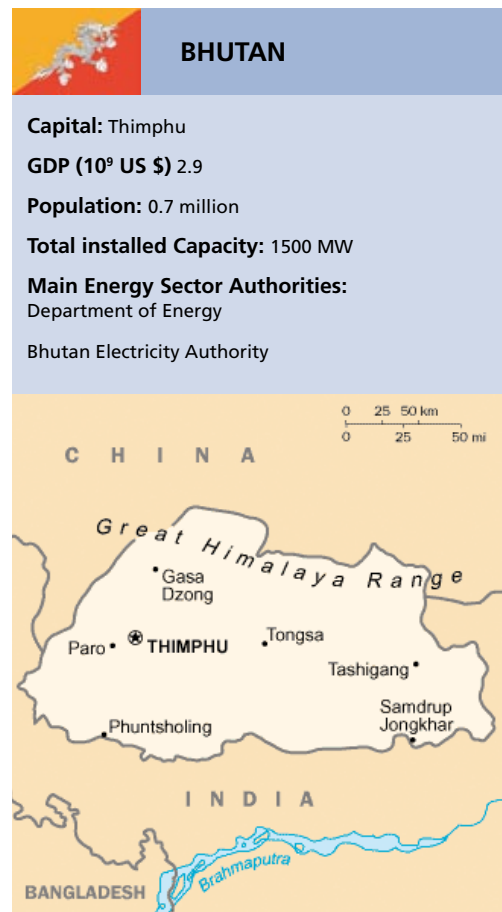
Bhutan

Department of Energy (DoE) Phase II

The electricity supply in Bhutan is almost entirely based on hydropower. From nature the country is endowed with huge hydropower resources and only a tiny portion of the estimated economically viable potential of 16,000 MW has been developed. Only about 30% of the population is served with electricity. One of the Royal Government of Bhutan's main goals is to supply electricity to the entire population by 2020 and the DoE is a central player in this respect.

The phase II programme of the institutional cooperation between DoE and NVE started in 2004 and will last through 2007. It carries a total budget of NOK 15.0 million. Due to the success of the programme, DoE is planning to extend the cooperation into a third phase starting in 2007/2008 which will help it embrace Bhutan's accelerated hydropower development programme in the next five years. This is aimed at increasing the rate at which Bhutan develops its hydropower resources for export and for domestic consumption which will in turn increase "Gross National Happiness" for all Bhutanese. The overall goal of the programme is the development of human resources and capacity building of the energy sector, thereby bringing about efficiency in the sector and providing both the DoE and the Bhutan Electricity Authority (BEA) with the necessary tools for effective and transparent monitoring of the sector. This falls within Norad's overall strategy of contributing to poverty reduction through offering Norwegian experience in the sustainable development of natural resources. With the contributions of the institutional cooperation programme DoE is getting on track to becoming a strong and modern institution, able to manage Bhutan's energy resources in a sustainable manner without the need for further external development assistance.

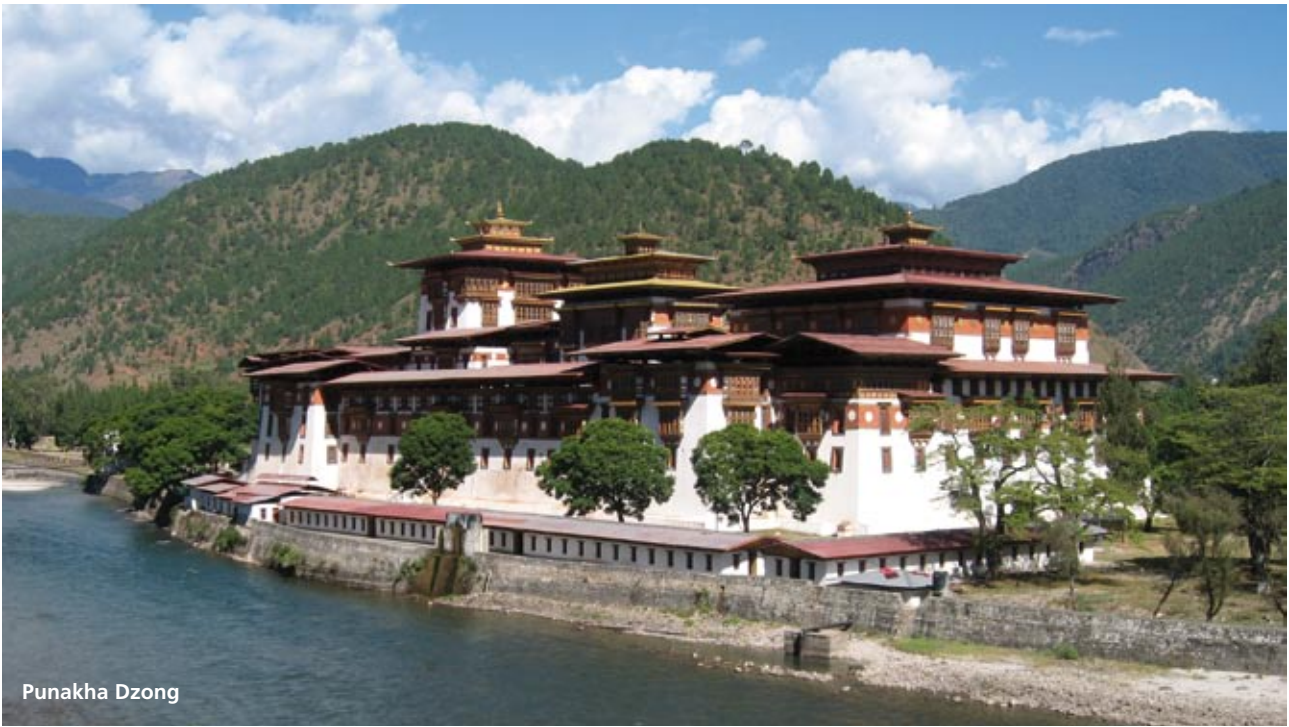
DoE is responsible for the formulation of policies, plans, programmes and guidelines related to sustainable development, efficient utilization and management of energy and hydrometeorological services in Bhutan. NVE, with its responsibility for management of Norway's water and energy resources, is a natural partner for the institutional development of the Department. Where necessary, NVE has also brought in external expertise from consultants and advisers.



The programme has covered the following activities in 2006:

- Human resources development in DoE
- Development of Bhutan Electricity Authority
- Guidelines for water structure safety
- Development of Geographical Information System for the energy sector
- Development of management information system for the energy sector
- Strengthening of the hydrometeorological network

Contact: David A. Wright



Punakha Dzong



Signing of "Agreed Minutes" after Annual Meeting between the governments of Bhutan and Norway, April 2006

ACHIEVEMENTS

- DoE human resources strengthened through training performed in Bhutan and abroad
- BEA strengthened in licensing, tariffs etc.
- Guidelines for safe operation of dams prepared
- Energy sector Management Information System prepared
- DoE's Geographical Information System strengthened
- The hydro meteorological network strengthened

Nepal



Solar collector in use

Department of Electricity Development [DoED]

The contract on institutional cooperation between DoED and NVE was signed in December 2004. NVE shall provide technical assistance to DoED on implementing feasibility studies of 5 to 10 small and medium sized hydropower projects. The studies will be subject to competitive bidding by national Nepalese consulting firms.

The objectives of the project are to encourage investors to invest in small and medium size hydropower projects in Nepal and to increase the competence of Nepalese consultants to conduct the necessary studies.

The output of the project is preparation of up to 10 feasibility studies by Nepalese consultants. The studies shall be of a quality required for investment in small and medium sized hydropower plants.

NEPAL

Capital: Kathmandu
GDP (10⁹ US \$): 41.9
Population: 28.3 million
Total installed Capacity: 600 MW
Main Energy Sector Authorities:
 Department of Electricity Development
 Nepal Electricity Authority

A financial evaluation of the proposals and contract agreement for the first package were completed in Kathmandu in January 2006. Inception reports for the first three small hydropower projects and scoping reports for two of them were completed and comments were given to the consultants. The preparation of terms of reference for the second package of three small hydropower projects was finalised by the end of 2006.

Contact: Aud K. Skaugen



ACHIEVEMENTS

- A Nepalese consulting firm has contracted three groups of experts to conduct feasibility studies and environmental impact assessments
- Three inception reports and two scoping reports have been prepared and commented on by NVE

Mozambique

Ministry of Energy [ME]

Phase 2 of the ME/NVE cooperation started in 2002 with a budget of NOK 20 million and was planned to be completed by the end of 2005. In early 2005, Mozambique decided to establish a separate Ministry of Energy with a new structure of Directorates and Departments. Thus, as DNE ceased to exist, NVE continued to cooperate within the new structure of ME. As a consequence of the new structure it became necessary to revise the work plans for the remaining period of Phase 2 based on input from all new directorates. It was also decided to extend the implementation period through 2006. Most agreed activities have been completed in 2006, and the ME/NVE institutional cooperation will be terminated in early 2007. The NVE resident adviser ended his contract on 31 August 2006.

The main development goal of the ME/NVE cooperation remained unchanged after the establishment of the new ministry. The goal is an improved management of the energy sector to promote positive social and economic development in Mozambique. The long-term objective is to make ME capable of performing as a competent and credible power sector authority.

The establishment of the new Ministry of Energy caused a considerable delay in most activities. Some previously agreed activities were cancelled and planning of some new activities to be implemented during the first half of 2006 started. A major constraint turned out to be the lack of manpower in the new Ministry. A recruitment plan, however, been agreed on and the situation has gradually improved during 2006.

Activities on training and education are central in institutional cooperation and an integrated training plan covering all main activities was made. Training has been organised as courses and workshops in Mozambique and Swaziland, and as parts of study tours to other countries.

The cooperation involves short-term visits to ME by NVE advisers. Emphasis is given to management and organizational aspects, training, development on small hydropower, development and maintenance of the local area computer network and energy efficiency. Some inputs have also been given on the restructuring of the energy sector and the development of a new strategy plan for the Ministry.



In March 2006 a workshop on the development of small hydropower was held in Maputo with the participation of experts from ME and NVE. Funds are not available to study the small hydropower potential in all provinces in Mozambique. It was therefore decided to carry out a pilot study in the Niassa and Zambezi provinces. Two weeks of field work was carried out in these two provinces by a joint ME/NVE team in March 2006. A draft report has been prepared. NVE has developed a method using Geographical Information System (GIS) technology to estimate the potential of small hydropower up to 10 MW. It seems clear, however, that the existing geographical and hydrological data is not of the required quality to make full use of the GIS-method.

A team of Norwegian experts headed by NVE made a full revision of the terms of reference for development of a power generation

master plan for Mozambique. The development of such a plan is planned to be part of the future Norwegian assistance to ME. Under energy efficiency there has been close cooperation with the University of Eduardo Mondlane, and practical work has continued in one hotel and two hospitals in Maputo. The programme was expanded in 2006 to the Sofala Province with active participation of local industries.

General regulations on natural gas have recently been approved by the Cabinet. Contracts were entered into with two local consulting firms to assist ME to develop guidelines on specific issues such as safety, concession procedures, standard contracts, authorization of companies, etc.

A workshop on regional power trading was held in Maputo for ME-employees in November 2006. Experts from NVE, the South African Power Pool, and NordPool Consulting made presentations at the workshop.

Contact: Egil Skofteland



NVE's computer expert visiting Mozambique



Improvisation

ACHIEVEMENTS

- Further development and maintenance of the Local Area Computer Network in ME were achieved
- A workshop and field work (pilot study) to estimate the small hydropower potential in the Niassa and Zambezi Provinces was completed and a draft report prepared
- A terms of reference for the development of a power generation master plan for Mozambique is prepared.
- Training of officials has been organised as courses and workshops in Mozambique and Swaziland and as parts of study tours to other countries
- Draft guidelines on specific issues connected to regulations on natural gas have been prepared
- A workshop for ME employees on regional power trading was organised in Maputo
- Energy audits are carried out for two hospitals and one hotel in Maputo, and the energy efficiency programme was expanded to the Sofala Province

Provincial Government of **Oriental Mindoro**

In 2003 the Provincial Government of Oriental Mindoro in the Philippines asked Norad for assistance to develop a “Flood Control Master Plan for Bucayao and Mag-asawang Tubig Rivers”, and Norad requested NVE to assist in the preparation of the TOR for the project. The overall goal of the project is to prepare a Flood Control Master Plan which will serve as a framework for flood mitigation measures in the province.

Project development has been a long process and the Memorandum of Understanding between Norad and the Provincial Government of Oriental Mindoro was only signed on 26 January 2006. NVE visited Oriental Mindoro in June 2006 in order to clarify a number of outstanding matters and agree on the contract between the Provincial Government and NVE. The contract was finally signed on 24 October 2006. At the same time NVE subcontracted a local consultant to act on NVE’s behalf in Oriental Mindoro. The Terms of Reference for the consultancy work to be carried out was prepared during November/December, and after receiving the Provincial Governor’s approval a consultant will be contracted to carry out the work.

Contact: Kjell Repp



ACHIEVEMENTS

- Memorandum of Understanding signed in January 2006
- Contract between the Provincial Governments signed on 24th October 2006
- Terms of Reference for the local consultant completed and submitted for approval from the Provincial Governor



South Africa

Department of Minerals and Energy [DME]

NVE entered into a contract with DME in February 2002, based upon a Memorandum of Understanding signed between the South African and Norwegian governments in 1996. The overall goal of the project was to develop and restructure the Electricity Supply Industry to enhance efficiency in the sector. Institutional and capacity building enabling DME to meet the challenges of the restructuring process in the country was an important part of the agreement.

The project was substantially completed by the end of 2005. The final report of the project, however, was prepared during the first half of 2006, and completed on 25 June 2006. The report concludes that the project has achieved its goals in line with the objectives outlined in the 1999 Declaration of Intent, namely, assistance to South Africa's transformation and poverty reduction policies; the regional dimension in the aid programme; and cooperation between South African and Norwegian institutions and organisations. The report also concludes that the project has enabled the Chief Directorate of DME to strengthen its directorate in the fields of electricity policy analysis and regulation legislation drafting. Courses have been conducted locally with NVE participation.

During 2006 NVE was involved in the development of a new cooperation programme which was intended to start up in 2006. The programme is partly based on the outcomes of the earlier cooperation projects between DME, NVE and the Norwegian Petroleum Directorate. It includes an overall general business plan and four sub programme business plans on Energy Regulation, Electricity, Hydrocarbons, and Alternative Energy. NVE is involved as the Norwegian Coordinator for all of the sub programmes. In order to ensure adequacy of content the development of the sub programmes became a more lengthy process than expected and the main activities will now start in 2007. A comprehensive workshop/study tour was conducted in late 2006 when a high level team from DME visited Norway to familiarize themselves with the Norwegian expertise in the fields of electricity, oil and gas (mainly downstream). Besides NVE, the Norwegian Petroleum Directorate, the Norwegian Petroleum Safety Authority, and the International Programme for Petroleum Management



SOUTH AFRICA

Capital: Pretoria
GDP (10⁹ US \$): 576.4
Population: 44.3 million
Total installed Capacity (MW): 40 500 MW
Main Energy Sector Authorities:
Department of Minerals and Energy
National Energy Regulator of South Africa
Electricity Supply Commission (ESCOM)



and Administration were visited, in addition to other organisations.

Each of the new programmes will be briefly described below, except for the one on energy regulation, for which the contract has not yet been signed.

Contact: Kjell Repp

ACHIEVEMENTS

- Development of a new cooperation programme, consisting of four sub programme business plans
- 10 participants attended the ELRI seminar, all of whom described it as a valuable tool for increasing knowledge on regulation issues

Chief Directorate of Electricity

The Sub programme Business Plan for Electricity Cooperation was signed by the Chief Directorate of Electricity, DME and NVE on 31 July and 18 October 2006, while the contract between DME and NVE was signed on 12 September and 18 October 2006. The goal of the project is to assist DME in the transformation of the electricity industry in South Africa. This will be achieved by



Visit to "Norsk Gassenter", Karmøy, Norway

assisting in the development of policy, promoting the availability of capacity (both human and data) to manage the restructuring of the electricity sector in support of a transparent, competitive and sustainable electricity industry. The purpose of the project is to contribute to the implementation of concrete interventions towards the capacity building for effective governance and regulation, equitable market liberalisation and sustainable growth and poverty alleviation.

Two major activities were planned for the financial year 2006/07: drafting "Regulations concerning quality of supply emanating from the Electricity Regulation Act", and "Pricing Policy". A start-up workshop was held at NVE in May 2006, after which there has been continuous communication between NVE and DME experts. Two DME experts visited NVE in November 2006 in connection with the ELRI-seminar and another brief meeting was conducted. The two activities will continue through 2007 when another workshop and a stakeholders' meeting have been planned. With regard to the "Pricing Policy", DME decided to do the work in-house, with assistance from NVE and possible short-term consultants.

ACHIEVEMENT

- Drafting of the "Regulations concerning quality of supply emanating from the Electricity Regulation Act" has started, and a good working relationship between the cooperating partners has been established

Central Energy Fund [CEF]

The Sub programme Business Plan for Alternative Energy Cooperation was signed by the Central Energy Fund and NVE on 22 August and 11 September, while the contract was signed respectively on 28 August and 11 September 2006. The implementing agency on the South African side is the Energy Development Corporation (EDC).

The goal of the project is to assist CEF/EDC with capacity and policy development to promote and make operational low carbon energy options in a manner that encourages local economic growth and poverty alleviation. The purpose is to contribute to the implementation of concrete interventions towards the development of the policy framework and capacity for development of alternative low carbon options.



National Electricity Regulator [NER], changed to National Energy Regulator of South Africa [NERSA] in October 2005

The cooperation between NER and NVE started in February 1999, based upon an agreement signed in June 1997, concerning the Promotion of the Reconstruction and Development Programme of the Republic of South Africa. NER and NVE entered into a second phase of the cooperation in June 2001. The main goal was to develop a regulatory framework for the Electricity Supply Industry which will enable the NER to comply with its designated role as the national electricity regulation authority. In order to reach this goal the objective of the cooperation was to provide technical assistance to NER and to build competence and capacity through exchange of experience. The cooperation was completed in March 2006.

A new agreement known as the “South African Energy Sector Policy Research and Capacity Development Programme” has been signed between South Africa and Norway. The programme includes a sub programme with NERSA, which is yet to be signed. Before completion of the programme a number of activities were carried out in early 2006. NVE staff visited NERSA in January, mainly for familiarization with the organisation and discussion of priorities, and for planning of two workshops in Norway. The workshops on Technical Performance Improvement in Distribution and on Compliance Monitoring of Licensed Utilities were arranged in Norway in February, with the participation of seven NERSA staff members. In addition to NVE, Statnett and Sintef Energy contributed to the workshops. A media training seminar was carried out by NVE for selected staff at NERSA in January.

Contact: Kjell Repp

The sub programme started with a small workshop in Norway in September 2006, when two senior staff members and the General Manager of EDC visited Norway. The main goal of the meeting was to discuss and agree on which topics NVE and other Norwegian expertise could contribute. It was agreed that NVE should assist within the fields of solar and wind energy and small scale hydropower development.

As the cooperation started late in the year, no achievements are listed. A good working relationship has, however, been established between NVE and EDC which is necessary for successful completion of the project.

Chief Directorate of Hydrocarbons

The sub programme Business Plan on Hydrocarbons Cooperation and the contract were signed in November 2006. NVE is the coordinator of the programme with heavy input from the Norwegian Petroleum Directorate. The contract has therefore been signed by all three parties, while the sub programme Business Plan is signed by NVE and DME only. All parties have, however, agreed on the plan. The first workshop/ meetings took place in Oslo and Stavanger in early December 2006.

As the sub programme started at the end of the year, no results are reported for 2006 except that NVE has contributed in discussions and commented on a proposed terms of reference for a consultancy on how to develop and increase natural gas contribution to primary energy supply in South Africa.

ACHIEVEMENT

- Training of NERSA staff in Technical Performance Improvement in Distribution and on Compliance Monitoring of Licensed Utilities, and on how to handle media. All participants have expressed great satisfaction with the high quality of the training/workshops carried out

Timor-Leste



Discharge measurement

Ministry of Natural Resources, Minerals and Energy Policy

NVE entered into a Contract with the Ministry of Transport, Communication and Public Works in February 2003 concerning institutional strengthening of the power sector in Timor-Leste. The Contract was transferred to the Ministry of Natural Resources, Minerals and Energy Policy in July 2005. The amount provided from Norway for funding the cooperation is NOK 26.8 mill for a five-year period.

The contract shall provide financial support for feasibility studies of hydropower projects (NOK 14 million), and institutional strengthening, including training within the power sector. The establishment of a limited hydro meteorological network is a part of the terms of reference for the cooperation.



NVE entered into a contract with the Joint Venture Norconsult AS/NORPLAN AS in June 2003 regarding consultancy services related to the Iralalaru and Lacló hydropower projects and the Baucau/Gariuai mini hydropower project.

NVE has had a resident adviser working in Timor-Leste since 2003. On behalf of the Ministry, the NVE resident adviser has established a close and efficient cooperation with the Consultant.

The main goal of the project is to develop the management of the power sector in Timor-Leste through institutional and capacity building within the Ministry and other relevant institutions. A considerable part of

the funds are spent on studies and assessment of hydropower projects and on training and purchase of equipment.

The Joint Venture Consultant has completed the first version of the Technical Feasibility Report for the Iralalaru hydropower project (28 MW). Some additional studies are, however, still ongoing. In 2006 a new core drilling project was completed to obtain more detailed information about the quality of the

	TIMOR-LESTE
Capital: Dili	
GDP (10⁹ US \$): 0.4	
Population: 1.0 million	
Total installed Capacity (MW): 20 MW	
Main Energy Sector Authorities: Ministry of Natural Resources, Minerals and Energy Policy Electricidade de Timor Lorosae	
	

rock (mainly karst). The geologist's findings point to very poor rock conditions meaning that the water tunnel will most probably have to be fully lined with reinforced concrete. This may increase the cost estimate considerably. New tracer tests have been carried out to locate the underground water flow and the results of the final laboratory analyses of these are expected to give a more input to the cost estimates.

The Environmental Impact Assessment of the Iralalaru Hydropower Project and the transmission line to Dili is expected to be completed in March 2007 after some delays due to the civil unrest in Timor-Leste in April/May 2006, as well as due to the introduction of more detailed regulations from the environmental authorities which had to be taken into account.

The Consultant has provided valuable training within hydrology, geology, land surveying and transmission line planning for the local staff.

The studies for the 326 kW (Baucau)/Gariuai Mini Hydropower Project were completed in 2004 and construction work is now going on, including the 4 km long transmission line. The aim has been to have the power plant in operation by the end of August 2007, but bad weather conditions during critical periods of construction may cause a delay of some months. Extensive training of the local workforce is taking place, including management/monitoring, procurement, environmental studies and practical tasks connected to core drilling and construction.

Studies of the Laclo mini hydropower project have been temporarily terminated and the Consultant has been instructed to investigate the possibilities for developing small hydropower on the western part of the country. Some promising sites have been located and the intention is to make a full feasibility study of two projects.

Several study tours and other training activities for employees both in the Ministry and Electricidade de Timor-Leste have taken place in 2006, both locally and abroad. Visits have been made to Indonesia, Laos, Thailand, and China.

Contact: Egil Skofteland



Computer calculations in the field

ACHIEVEMENTS

- Extensive training has been performed, both locally and abroad, improving the understanding of the connection between hydropower development, integrated water resources management, the environment, sociology and economy
- The Consultant has completed the field investigations for the Iralalaru Hydropower Project and the transmission line to Dili. The final report is expected in early 2007
- Construction work on the Gariuai Mini Hydropower Project including the 4 km long transmission line has progressed well. The plant is planned to be in operation by late 2007 or early 2008
- The Consultant has located several promising sites for small hydropower projects in the western part of the country and is in progress with studies for two of these

Ministry of Energy and Mineral Development [MEMD]


On 5 December 2005 Norway and Uganda signed an agreement on "Strengthening the State Administration of the Upstream Petroleum Sector" including a component related to the planning of a capacity programme for the State administration of the electricity sector.

During 2006 a preparatory phase for the electricity sector has been initiated in order to elaborate a capacity building programme for MEMD. The component covers the preparation of a full scale project document complying with generally acceptable standards.

A contract has been entered into between MEMD as the implementing Ugandan institution and NVE as the Norwegian Partner institution. The contract covers the implementation, coordination and quality assurance of inputs from externally contracted consultants. In addition, NVE is undertaking a "Functional Analysis" with the aim of detecting potential gaps and/or overlaps in the distribution of tasks, powers and responsibilities amongst the institutions involved in the state administration of the electricity sector in Uganda.

The capacity building programme will be completed during the first quarter of 2007.

Contact: Egil Skofteland/Kristian Løkke,
kloe@nve.no

	UGANDA
Capital: Kampala	
GDP (10⁹ US \$): 51.9	
Population: 28.2 million	
Total installed Capacity (MW): 380 MW	
Main Energy Sector Authorities: Electricity Regulatory Authority Uganda Electricity Generation Company Ltd.	



ACHIEVEMENTS

- Functional Analysis under preparation
- Project Documents under preparation



Uganda

Vietnam

Ministry of Natural Resources and Environment [MoNRE]

NVE has assisted MoNRE in the preparation of a Project Document regarding licensing of hydropower projects in accordance with the new law on water resources. The project is a natural follow up of the National Hydropower Plan study, financed by Norad and Sida, which is expected to be completed in 2007.

The Country Agreement between Vietnam and Norway was signed on 19 September 2006, and MoNRE and NVE negotiated and signed a contract on 20 October 2006. The project is scheduled to last for three years until the end of 2009.

The main goal of the project is to establish licensing routines for hydropower projects which involve various authorities and stakeholders. The legal framework already exists but will be amended during the project. Training of involved staff in licensing and related skills is also an important activity within the project. A handbook for hydro-power licensing will be developed and a standard framework for license conditions and rules of operation is also included in the scope of work.

Contact: Knut Gakkestad, kga@nve.no

ACHIEVEMENTS

- Contract between MoNRE and NVE signed
- Preparation of Inception Report in process



VIETNAM

Capital: Hanoi

GDP (10⁹ US \$): 258.6

Population: 83.5 million

Total installed Capacity: 8700 MW

Main Energy Sector Authorities:
Electricity of Vietnam

Ministry of Natural Resources and Environment



Distribution network maintenance in Hanoi

Electricity of Vietnam [EVN]

Norway and Sweden have provided financial support to Vietnam for the development of the National Hydropower Plan (NHP) Study since 1999. Stage 1, which was completed in 2001, comprised five priority river basins. The second stage, which deals with the remaining four major river basins and an integration of the stage 1 projects into a national plan, has a cost frame of NOK 19.0 million and SEK 12.7 million. The main Consultant is a Joint Venture of Sweco and NORPLAN.

The main objective of the two studies is to prepare preliminary plans for development of the water resources of the country, with respect not only to hydropower but also other needs - in particular flood control and irrigation. The identified projects are then prioritised and made subject to national ranking. Factors such as technical, economic, environmental and social conditions and impacts related to the projects are taken into account. Finally, the hydropower projects are considered against other forms of energy in a national energy development plan.

In late 2005, the Consultant presented the NHP Draft Final Report. The thirteen volumes included all studies previously reported, in addition to the Stage 2. NVE commented on the Report in early 2006. While agreeing that sedimentation in reservoirs is a very problematic issue, NVE recommended, among other things, and that additional gauging stations were established upstream of the reservoirs to provide more reliable data for further planning. The Consultant's final report on the NHP will be presented in March 2007.

As part of the assessment of the Srepok River in the NHP-Study, SWECO Grøner in association with the Norwegian Institute for Water Research, ENVIRO-DEV, and ENS Consult was contracted to evaluate the potential impacts of hydropower development in Vietnam on the downstream Cambodian part of the river. The Srepok is a tributary to the Mekong River. The study comprised both hydraulic modelling and a rapid assessment of the expected social and environmental impacts. NVE commented on the Consultant's draft in March 2006, and the final report was presented in November 2006. A stakeholders' meeting to discuss the report will be held in Phnom Penh in January 2007.

Contact: Egil Skofteland



Street life in Hanoi

ACHIEVEMENTS

- Comments provided on the NHP Stage 2 Draft Final Report
- Comments provided on the Draft Report on Environmental Impact Assessment on the Cambodian part of Srepok River due to Hydropower Development in Vietnam

Regional Cooperation in Africa

Support to the Southern African Power Pool [Sapp]

12 of the national power utilities in the SADC-region have established a regional power pool, SAPP. The objectives of SAPP are to provide a forum for developing a robust, safe, efficient, reliable and stable interconnected electrical system in the region, harmonise inter-utility relationships, co-ordinate the development and enforcement of common regional standards, measure and monitor systems performance and to facilitate the development of regional expertise through training programmes and research.

A cost based Short Term Energy Market for the region was established in April 2001 and in 2004 SAPP embarked on the development of the then cooperative pool into a competitive real time electricity market, trading both physical and financial contracts. The process is financially supported by Norway, and NVE is engaged by SAPP to provide advisory services related for this process. NordPool Consulting is providing consultancy services whilst NordPool itself will deliver the trading platform and appropriate supply services.

The work is progressing according to plan, and most of the scheduled training activities are initiated and acceptance tests for the trading platform market trials are successfully completed. The official opening is planned to take place April 2007.

The SAPP Environmental Sub-committee visited Norway during November 2006 in order to gain insight in the Norwegian Licensing Procedures for hydropower development projects and transmission lines, including appropriate EIA procedures. The Group met with NVE, the Ministry of Environment, the System Operator and several distribution utilities.

The Group afterwards visited Denmark to get similar presentations related to the thermal power generation system in this country.

Contact: Kristian Løkke, klo@nve.no



ACHIEVEMENTS

- Training activities nearly completed
- Acceptance tests for trading platform successfully completed
- Market trials initiated
- Study tour by the SAPP environmental sub-committee to Norway and Denmark completed

Regional Electricity Regulators Association [RERA]

RERA is an association of regulators in the SADC region. Currently there are eight members; South Africa, Namibia, Zambia, Malawi, Lesotho, Angola (from 2006), Tanzania (from 2006), and Zimbabwe (from 2006). The objective of RERA is to develop the Electricity Supply Industry in the region through enhanced regional integration and trade, and to harmonise and develop a regulatory framework. The RERA - NVE contract was signed in February 2004.

The main goal of the project is to develop a self-sustainable organisation which, through good and professional coordination, can assist its members in the development of a harmonised regulatory and legal framework.

The RERA secretariat is now fully operational in Windhoek, Namibia, assisting three sub-committees on: Capacity Building & Information Sharing; Legal, Economic/Financial Regulation; and Technical Regulation. NVE provides the secretariat for two of the sub-committees, the Legal, and the Economic/Financial Regulation, besides assisting and playing an advisory role to the secretariat in Windhoek. NVE participated in the Annual Meeting between RERA and the Norwegian Embassy in Livingstone, Zambia in May 2006. The Annual Meeting

between RERA and NVE was conducted back-to-back with this meeting. NVE also participated in the Annual General Meeting of the RERA Executive Committee in Lesotho in November 2006.

Two meetings/workshops were held in the sub-committees during the year, while the NVE-Coordinator participated in one of the workshops and in one meeting of the Executive Committee of RERA.

Contact: Kjell Repp



Annual Meeting between RERA and the Royal Norwegian Embassy, Livingstone, Zambia

ACHIEVEMENTS

- Various reports and position papers have been produced by the sub-committees, mainly for use by the members. The reports also provide valuable information for the entire electricity supply industry and will hopefully contribute to eventual harmonisation of the regulatory framework in the SADC region
- Fruitful information sharing and exchange of knowledge during the various meetings/workshops (capacity building)
- Strategic Plan for RERA for the next five years developed and distributed for approval by the members

Appendices



Appendix 1

Total invoiced Norad 2007

Proj.no	Activity	NVE hours	Fee charged	NVE exp.	Consultants	TOTAL
32001-A	General assistance	859,50	593 055,00	9 590,00		602 645,00
32001-B	Visit from Nepal	31,00	21 390,00	75 340,00		96 730,00
32009	Nile Basin initiative	114,00	78 660,00	45 772,50		124 432,50
32020	Coordination Norwegian water expertise	8,00	5 520,00			5 520,00
32032	ELRI. Preparation for seminar 2006	27,00	18 630,00			18 630,00
32046	Visits to NVE	6,00	4 140,00			4 140,00
32057	Vietnam. Project document for licensing	225,50	155 595,00	51 860,30		207 455,30
32058	Evaluation of Norwegian competence re. Renewables	39,00	26 910,00			26 910,00
32061	Participation in international conferences	202,00	139 380,00	131 544,30		270 924,30
32064	World Water Forum	110,00	75 900,00			75 900,00
32067	Bhutan. Rural Energy/Project Document	58,50	40 365,00			40 365,00
32068	Course in integrated water management for development	99,00	68 310,00	1 255,00		69 565,00
32069	Rusumo Falls, Hydrology	718,00	495 420,00	108 180,76	218 003,03	821 603,79
32070	Rusumo Falls, Terms of Reference	118,00	81 420,00	47 230,60		128 650,60
32071	Nepal. Appraisal of proposed development project of Hydro Lab	137,00	94 530,00	40 955,00		135 485,00
32072	Assistance to the Embassy in Tanzania (power sector)	153,00	105 570,00	50 126,50		155 696,50
32075	Zanzibar. Sea cable	5,50	3 795,00			3 795,00
	TOTAL (NOK)	2 911,00	2 008 590,00	561 854,96	218 003,03	2 788 447,99

Total **invoiced Institutional Cooperation** 2007

Proj.no	Activity	NVE hours	Fee charged	NVE adviser	NVE expenses	Consultants	TOTAL
32501	Angola. National Directorate of Energy	202,5	139 725,00		60 837,54		200 562,54
32513	Mozambique. Ministry of Energy	1082,5	746 925,00	673 289,48	514 420,95	362 490,00	2 297 125,43
32518	Vietnam. Electricity of Vietnam	107,5	74 175,00		27 668,49		101 843,49
32519	South-Africa. National Electricity Regulator	843,0	581 670,00		211 020,90	240 565,81	1 033 256,71
32534	South-Africa. Department of Mineral and Energy. Completed	14,0	9 660,00		759,05		10 419,05
32536	Angola. National Directorate of Water	144,0	99 360,00		81 645,24	181 005,24	
32537	Regional Cooperation. Regional Electricity Regulators Association (RERA)	337,0	232 530,00		89 994,42	206 525,00	529 049,42
32538	Timor-Leste. Ministry of Natural Resources, Minerals and Energy Policy	971,0	669 990,00	892 769,25	351 090,30	29 019,60	1 942 869,15
32540	Ethiopia. Ministry of Water Resources	416,0	287 040,00		40 510,81		327 550,81
32541	Bhutan. Directorate of Energy	1019,0	703 110,00		844 946,37		2 345 322,17
32542	Regional Cooperation. Southern African Power Pool (SAPP)	372,0	256 680,00		495 310,65		751 990,65
32543	Nepal. Dep. of Electricity Development	257,0	177 330,00		101 361,01	118 336,00	397 027,01
32547	South Africa. National Electricity Regulator	60,0	*				
32548	South Africa. Department of Mineral and Energy. Electricity Sub-programme	460,5	317 745,00		231 020,45		548 765,45
32549	Uganda. Ministry of Energy and Mineral Development	801,0	552 690,00		130 373,75	191 653,00	874 716,75
32550	Philippines. Provincial Government of Oriental Mindoro	103,0	71 070,00		50 906,48		121 976,48
32551	Vietnam. Ministry of Natural Resources and Environment	97,0	66 930,00				66 930,00
32552	South Africa. Department of Mineral and Energy (CEF) Alternative Energy Sub-programme	78,0	53 820,00		9 801,97		63 621,97
32553	South Africa. Department of Mineral and Energy. Hydrocarbons Sub-programme	104,0	71 760,00		8 812,00		80 572,00
32554	Ethiopia. Ministry of Water Resources	58,0	*				
TOTAL (NOK)		7527,0	5 112 210,00	1 566 058,73	3 250 480,38	1 945 855,21	11 874 604,32

* Not invoiced, contract not signed

NVE's participation in international research and cooperation with other international institutions

ENERGY

International Energy Agency (IEA)

Wind Energy: Member of Executive Committee for the implementing Agreement in the research and development of wind turbine systems. Participate in Annex for wind and hydro systems og Annex for wind system integration.

IEA Hydropower technologies:

Participate in Annex for small hydro

The Council of European Energy regulators (CEER)

The overall aim of the Council of European Energy Regulators (CEER) is to facilitate the creation of a single competitive, efficient and sustainable internal market for gas and electricity in Europe.

The European Regulators' Group for Electricity and Gas (EREG)

EREG is an advisory group of independent national regulatory authorities to assist the European Commission in consolidating the Internal Market for electricity and gas.

The Nordic Energy Regulators (NordREG)

NordREG is a cooperative organization for Nordic regulatory authorities in the energy field. Their mission is to actively promote legal and institutional framework and conditions necessary for developing the Nordic and European electricity markets.

Nordic Project on distributed energy for remote areas: The objective of the project is to identify renewable technologies and new energy technologies suitable for remote areas in Finland, Sweden, Denmark, Norway, Iceland, Greenland.

Climate and Energy was completed and reported, **National Energy Authority, Iceland**. Cooperation in the international project. The project comprises several institutions representing Nordic and Baltic countries.

The International Council on Large Electric Systems (CIGRÉ):

Exchanges experiences on transmission and generation of electric power. NVE participates in the study committee on environmental questions within CIGRÉ.

NATO; Industrial Planning Committee (IPC):

Ad Hoc Working Group on the Protection of Energy-Related Critical Infrastructure (AHWG), subgroup electricity. The aim of the work group

is to examine the electricity infrastructure and resulting vulnerabilities, and to discuss potential preventive and/or consequence management measures, and develop a catalogue of best practices for the protection of electricity-related critical infrastructure.

Nordisk beredskapsforum (NordBER):

The objective of the forum is to conduct a dialogue between the involved parties concerning contingency planning and crisis management in the power sector. NordBER deals with issues which are not managed by TSO cooperation through Nordel. The forum consists of the Nordic energy authorities, TSOs and other relevant parties from the Nordic countries.

EU; The European Committee for Standardization (CEN):

Has created a working group on "Protection and Security of the Citizen" as a monitoring and coordination platform for stakeholders. Nine expert groups have identified needs, one of them is the expert group "Critical Infrastructure – Energy Supply". The scope of the CENELEC Joint Expert group Critical Infrastructure - Energy Supply have identified needs and possibilities for standardisation activities for security and emergency preparedness within energy supply.

International Commission on Large Dams (ICOLD).

NVE has the secretary function for the national committee (NNCOLD). NVE also has representatives in the following ICOLD technical committees: Committee of Governance of Dam Projects; Committee on Dam Safety; European Working Group on Legislation.

NVE is a member of the European Dam Safety - Authority Network

Sweden: Control of water exchange for hydropower production between Norway and Sweden; **Sjomen river catchment. Vattenfall and SMHI, State Power Board** (Norway)

WATER RESOURCES

Harmonizing water related databases along the Swedish-Norwegian border
Swedish Meteorological and Hydrological Institute, SMHI and NVE

Reference Information Specifications for Europe (RISE),

funded by the 6th Framework Programme
Participants: SMHI, Swedish Mapping Authorities, Norwegian mapping Authorities, NVE. Developing guidelines for the creation of geospatial data implementation specifications, with a focus on hydrography, elevation models and land-use data themes.

CHIN GIS workgroup

Participants: The Danish National Environmental Research Institute (DMU), SMHI, Finnish Environment Institute (SYKE), Icelandic National Energy Authority (OS) and NVE
Workshop in Silkeborg, DK focused on basic geographical information systems related to surface waters (rivers, lakes and catchments areas).

Interreg project:

1. FLOWS (finalised June 2006).
2. The aim has been to improve the sustainability of development in areas at risk of flooding. Support communities to adapt to living with flood risk in a changing climate by providing examples that complement and build on existing initiatives in spatial planning and flood risk management.

Cooperation with EU/ EEA:

1. Stakeholders Forum related to a European Flood Action Programme. Norway has one representative; from NVE.
2. Three distinct but closely linked components:
 - improving information exchange, sharing of experiences and the coordinated development and promotion of best practices, as well as increasing the awareness of flood risks through wider stakeholder participation and more effective communication.
 - a targeted approach to the best use of EU funding tools for the different aspects of flood risk management,
 - the development of a proposal for a legal instrument on flood risk management;

China: Bilateral cooperation in hydrology between Bureau of Hydrology (main office in Beijing), MWR (Ministry of Water Resources) and Hydrology Department, NVE.

EU: Participation and vice chair in COST

731. Long term research cooperation within uncertainty in meteorological- and hydrological forecasting.

UNESCO/IHP: Represent NE-FRIEND cooperation (Comprising institutions from NL, UK, Poland, Czech Republic, Slovakia, Austria, France and more), long term professional cooperation in hydrology.

IAHS/ICSW: International cooperation in hydrology, 2007-2010

UK – Centre of Ecology and Hydrology:

the cooperation with CEH in hydrology has lasted for several years

Climate and Energy was completed and reported by **National Energy Authority, Iceland.** The project comprises several institutions representing Nordic and Baltic countries.

Sweden: Flood forecasting and emergency preparedness in the river Klaraälven and Byälven; participating in meetings with local authorities (Länsstyrelsen for Värmland, SMHI m.fl)

Montenegro Hydrometeorological Institute, Podgorica

Masterplan; Hydrological network and data acquisition for Montenegro.

The Republic Hydrometeorological network in Serbia, Beograd

Design and optimisation of the national hydrological network in Serbia



Norwegian
Water Resources and
Energy Directorate

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