



# Annual Report 2010

The cooperation between the Norwegian Agency for Development Cooperation (Norad), the Ministry of Foreign Affairs (MFA) and the Norwegian Water Resources and Energy Directorate (NVE)





**NVE's  
vision:**

«Water and energy for sustainable development»



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# Preface

The overall goal in NVE's institutional cooperation programs is to contribute to economic and social development in the partner countries within the working areas and mandate of NVE.

Most of NVE's institutional partners are in countries defined by the UN as Least Developed Countries (LDCs). A country is classified as LDC if it meets the three criteria of low income, human resource weakness, and economic vulnerability. NVE takes all of these aspects into account when we provide capacity building and technical assistance to our partner institutions. There are no quick fix solutions to any of these criteria, and one has to go step by step. In most partner countries NVE has been involved for many years, which illustrates NVE's long term commitment. It takes time to build trust among organisations both at a personal and institutional level. Trust is essential in order for a capacity building program to be a success.

With rising oil prices, increased demand for energy, and the global challenge of climate change, the energy sector is a political arena at both national and international level. National priorities in the energy sector may shift from one day to another, which also affect work carried out under institutional programmes. Flexibility and change management are therefore essential in our institutional programmes, in order for NVE to adapt our assistance to the needs of the recipient institution. Regardless of shifting political priorities, the aim is to develop the capability and capacity of local institutions. Such capacity development is needed in both the public and private sectors, and should leverage and build on the national expertise and knowledge base.

The basis for NVE's fulfilment of the agreement of cooperation with Norad and the Ministry of Foreign Affairs, is NVE's own staff and experience. NVE has a qualified and competent staff, as well as nearly 200 years of experience from the water resources and energy sector. However, NVE depends to a large degree on external competence and qualifications from international consultants for carrying out the various studies and assignments.



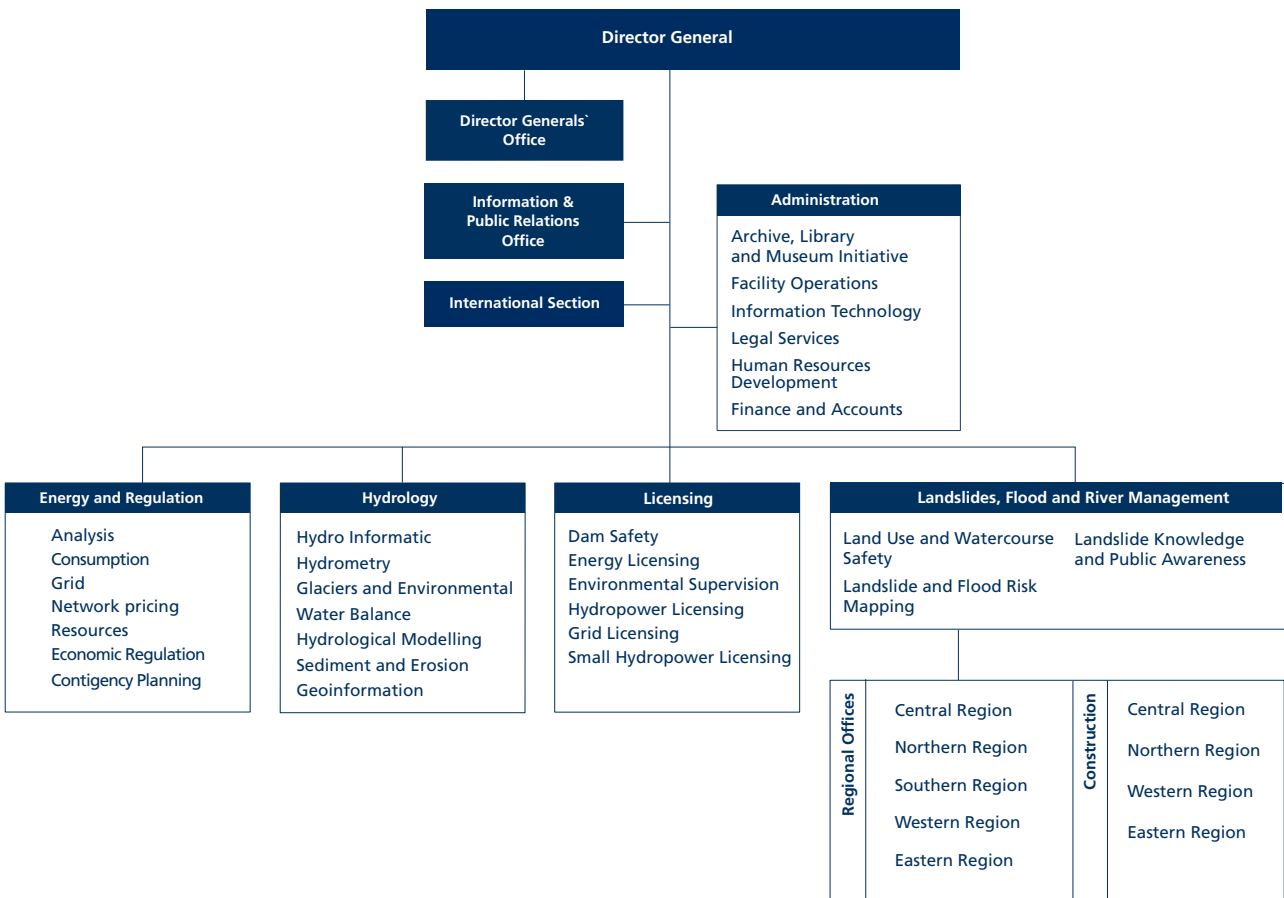
A handwritten signature in blue ink, which reads "Anne Britt Leivseth".

Anne Britt Leivseth  
Acting 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, 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, has five regional offices in Norway and a total of 550 employees. NVE's role and competence in a historical context is further described in the chapter "NVE's role, competence and experiences".

## Organisation Chart



# Contacts in International Section

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## Resident Advisers

Svein Ingar Semb	Timor Leste	From August 2009	Until August 2011
Astrid Semb	Timor Leste	From February 2010	Until May 2011
Kim Chi Tran-Gulbrandsen	Liberia	From May 2011	Until March 2013
Thor Henning Gulbrandsen	Liberia	From March 2011	Until March 2013
Jan Grzegorz Perzyna	Liberia	From February 2011	Until February 2013

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Photo: L-R: David A. Wright, Kjell Repp, Morten B. Johnsen, Lisbeth Karijord, Kim Chi Tran-Gulbrandsen, Terje Lysfjord, Amir Messiha



## Overview of Activities and Time Consumption

NVE's development assistance is organised and coordinated by the International Section which at the start of 2010 had seven staff members at the main office in Oslo and two stationed abroad, in Timor-Leste and in Mozambique. By the end of the year one staff member had retired and a new one had been recruited.

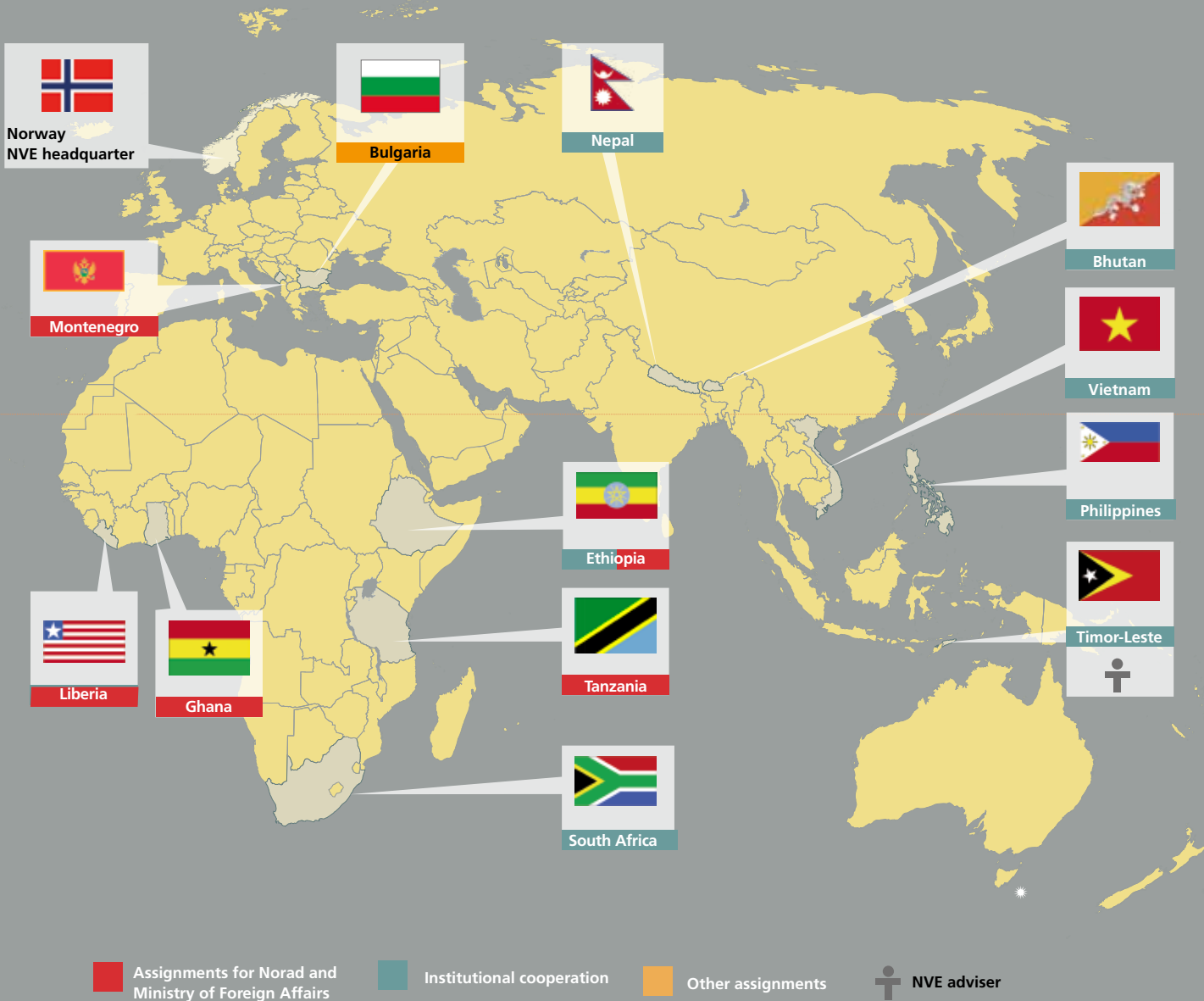
The main tasks of the International Section are the preparation of energy and water resources related projects and the cost and quality control of projects and programmes during implementation. The major part of the professional work is carried out by staff from the various technical departments and sections of NVE. During 2010 a total of 56 different officers were involved in the international cooperation activities, compared to 63 in the previous year. In addition, 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.

The volume of activities in 2010 was recorded at 13 person-years (one person-year being 1400 effective working hours), compared to 11 person-years in 2009.

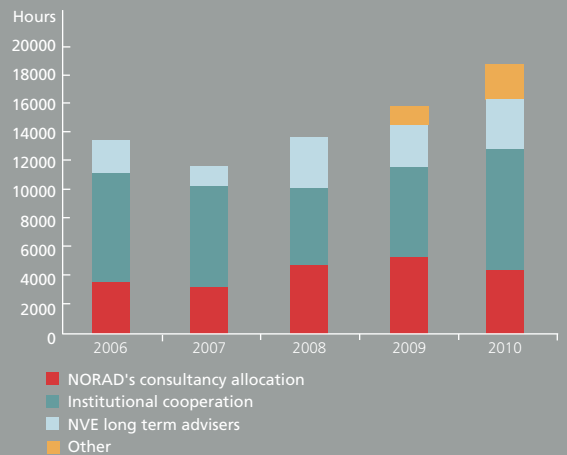
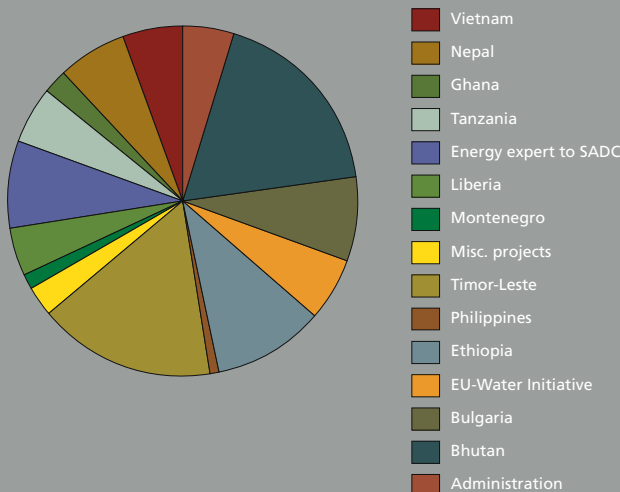
Included in the 13 person-years is also assistance to a few other development projects outside of the scope of the Norad-NVE agreement, such as two projects in Bulgaria, funded by Innovation Norway (one on water and one on electricity regulation). NVE is also participating in one EU-funded water research project entitled SPLASH, coordinated by the Department for International Development in the United Kingdom, with participation from 16 EU countries. Following a request from the Ministry of Foreign Affairs, NVE made some preparatory work during 2010 for assistance under the European Economic Area/Norway Grants in the coming years. This work is still limited and has not yet been covered separately in this Annual Report.

NVE staff members are also widely used as lecturers in courses, including the International Centre for Hydropower's courses. The International Section also normally coordinates the visits to NVE by international delegations. An increase in activities is still foreseen, in particular in Liberia and Nepal, but also in other countries like Tanzania and Angola.

# Countries worked in



# Time consumption





## Assignments for Norad and Ministry of Foreign Affairs

The Norwegian Agency for Development Cooperation (Norad) is Norway's principal government agency for international development cooperation. Being organised as a directorate under the Ministry of Foreign Affairs (MFA), its main tasks are to provide advisory services to the Ministry, to embassies in developing countries and to multilateral development organisations. Norad is also often carrying responsibility, delegated by MFA, for organising the implementation of projects and programmes. This is carried out through agreements with foreign governments and in some cases combined with contractual services by institutions like NVE. According to its strategy, Norad aims at maximising the effectiveness of its work by placing a focus on quality and results.

NVE has, through a framework agreement, assisted Norad's engagements in the fields of water resources management and energy development. The specific tasks have varied from project identification, appraisals of projects and evaluation of reports, to planning and preparatory work for new projects, and to monitoring or comprehensive management of water resources.

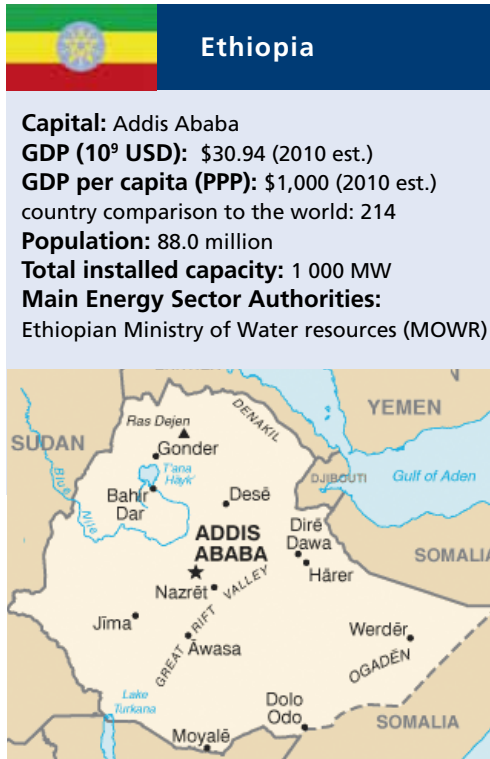
Additionally, NVE was in 2011 asked by the MFA to prepare for and provide assistance to the Ministry's European Economic Area/Norway Grants funding programme.



Norway has long supported the development of hydropower resources in Ethiopia which is crucial to underpin Ethiopia's overall economic development and industrialization efforts and make the development sustainable. Ethiopia has a hydropower potential of around 30,000 MW compared to Norway's potential of 50,000 MW which is substantially developed, and Norwegian support can help Ethiopia do the same through sharing experience from this development.

To this end, Norway has entered into a bilateral agreement with Ethiopia giving support to the feasibility studies of the Mandaya and Beko-Abo Multipurpose projects on the Abay River (also known as the Blue Nile within Ethiopia). The bilateral agreement has allowed for a complementary study of flows and sediment transports, to be measured during the 2008, 2009 and 2010 flood seasons. It is the intention that this data should be made available to the feasibility studies of the projects.

The Ministry of Water and Energy is entrusted with the position of Executing Agency for the Norwegian sponsored feasibility studies. A programme of institutional cooperation between the Norwegian Water Resources and Energy Directorate and the Ministry of Water and Energy (MoWE) is being sponsored by Norway, designed to help the Ministry meet its obligations for the two projects. Prior to



the signing of the institutional agreement between NVE and MoWE, however, the project work was already started, and hence the project is reported under Institutional Cooperation as well as under Assignments for Norad and Ministry of Foreign Affairs.

## Feasibility Studies: Mandaya and Beko-Abo Multipurpose Projects, Abay River

### Background:

Ethiopia has requested assistance from Norway to carry out studies of two multipurpose projects on the Abay River (the Blue Nile within Ethiopia, the largest tributary to the Nile River), namely the Mandaya and Beko-Abo Multipurpose projects. These are large strategic projects of regional importance. Both projects include hydropower stations with more than 2,000 MW installed capacity. The large reservoirs may provide additional water to downstream users, e.g. for irrigation. Norad engaged NVE to assist MoWE managing the formulation and execution of the two feasibility studies.

Being the responsible authority for study of hydropower in Ethiopia, MoWE is Executing Agency for the feasibility studies. Implemen-

tation and construction of hydropower plants is however the responsibility of the Ethiopian Electric Power Corporation (EEPCO). Due to the projects' regional importance and impact, efforts are being made to involve all regional stakeholders with the assistance of ENTRO.

### Activities and Outputs:

In the short time since the project became fully active, the efforts have mostly entailed different preparatory tasks. The tender process for the feasibility studies for the Mandaya and Beko Abo projects was initiated in autumn 2009. The current status is:

- Project preparation and procurement of services were substantially completed during 2010 and has encompassed, i.a.: Soliciting Proposals for Technical Consultants for the

Feasibility Studies of the Mandaya and Beko-Abo Multipurpose Projects, Pre-proposal Conference, Evaluation of Proposals with the elaboration of a Proposal Evaluation Report and participation in MoWE negotiations with consultants, both technical consultants for the feasibility studies and environmental consultants for the Environmental and social impact analyses for the two projects.

■ Other specific assistance to MoWE has dealt with the preparation of: Terms of Reference for and procurement of panels of experts for dam safety and environmental/social issues, and the Project Document for the institutional cooperation between MoWE and NVE.

### Issues and Challenges:

Human resources capacity within MoWE needs strengthening through engagement of new experienced staff. The Ministry is primarily a custodian of Ethiopia's water resources, and it is in some areas short of capacity to manage complex multi-purpose project studies. Institutional changes during the second half of 2010 when the Energy section of the Ministry of Energy and Mines was merged with the Ministry of Water Resources to form the Ministry of Water and Energy, have placed additional emphasis on the projects in that the Ministry is now not only responsible for studies of projects but also implementation.

This may result in a new focus with respects to the projects and the capacity building needs.

**Contact:** David A. Wright



## Overall Project Data

**Client:** Ministry of Water and Energy (MoWE); – formerly Ministry of Water Resources.

**NVE Mandate:** Advisory services to executing agency MoWE on: i) Implementation of two feasibility studies, and; ii) Preparation of project document for Capacity Building in collaboration with MoWE.

**Contract Value/ Duration:** MNOK 4.500 from Norad; started (formally) November 2009 and lasting until 2010/11

**Type of Activities:** Workshops, seminars, site visits, preparation of documents, procurement, advisory services, sub-consultant to Eastern Nile Technical Regional Office (ENTRO).

**Work Completed 2010:** Procurement of technical consultants; procurement of environmental consultants; Preparation of project document and contract for institutional cooperation between MoWE and NVE.

**Work in Progress 2010:** Assistance to MoWE in procurement of panels of experts for dam safety and environment and social aspects for the feasibility studies.



Sediment measuring at Kessie bridge, Abay River

## Results/Outcome:

Several positive results/outcomes have materialized during 2010. The most important ones are:

- Procurement of technical consultants' services and environmental/social studies consultants' services is completed and both groups of consultants are actively working with the studies.
- The procurement of Panels of Experts for Dam Safety and Environmental/Social aspects has advanced and is expected to be completed in early 2011.

# Strategic Environmental Impact Assessment for Detailed Spatial Plan for Hydro Power Projects (HPPs) on the Morača River

## Background:

The Government of Montenegro requested Norway’s assistance with the preparation of the SEIA for the Morača River HPPs. The Norwegian Ministry of Foreign Affairs asked NVE to assist with procurement of consultants’ services and quality assurance of the process, and with completion of the report. The assistance for the SEIA is part of the bilateral cooperation between Norway and Montenegro. This is in pursuance of the program to support Montenegro’s integration into the Euro-Atlantic structures, including Montenegro’s adaptation to EU guidelines and standards.

The project activities focused on the Morača River upstream of Podgorica where the potential for hydropower development have been investigated several times since the 1950’s. The Detailed Spatial Plan proposes four dams with three HPPs; - the largest upstream dam is a regulating reservoir at Andrijevo, feeding the downstream run-of-river generating stations of Raslovići, Milunovići and Zlatica. The scheme’s overall installed capacity will be 238.4 MW with estimated generation of 700 GWh/year. The estimated construction cost is € 500- 550 million.

## Issues and Challenges:

The process for finalizing the Draft Report has been challenging for all involved parties due to different experiences and practices with such studies and with the process requirements. Several clarification meetings have been held both in Norway and Montenegro to resolve the challenging issues. This has caused the progress of the project to be slower than anticipated.

	<b>Montenegro</b>
<p><b>Capital:</b> Podgorica  <b>*GDP (10<sup>9</sup> USD):</b> \$3.884 billion (2010 est.)  <b>GDP per capita (PPP):</b> \$9,900 (2010 est.)          country comparison to the world: 110  <b>Population:</b> 666,730 (July 2010 est.)  <b>Total installed capacity:</b> 238 MW  <b>Main Energy Sector Authorities:</b> Ministry for Economic Development</p>	
	

## Activities and Outputs:

A series of project activities has been undertaken during 2010:

- Clarification meeting in Oslo in January
- Submission of Draft Final SEIA in February
- Public Hearings in Montenegro during one week in March
- Clarification meeting in Montenegro in November
- Submission of Final SEIA in December

All project activities and contract obligations had been completed by the end of December, 2010.

**Contact:** Morten B. Johnsen

## Overall Project Data

**Client:** Ministry of Economy (ME) and Ministry of Spatial Planning and Environment (MSPE).

**NVE Mandate:** Assisting the ME with key aspects of the Strategic Environmental Impact Assessment (SEIA).

**NVE Contract Value:** MNOK 0.5, covering period September 2008 – April 2010 (including delay).

**Type of Activities:** Advice/ supervision and quality control on implementation of environmental studies for HPPs, with a subsequent hearing processes.

**Work Completed 2010:** Key outputs completed during project's last year, 2010:

- Draft Final SEIA in February
- Public Consultation in March
- Final SEIA in December

## Results/Outcome:

A full hearing process for the Draft SEIA Report has been carried out in Montenegro with consultation meetings both at local, regional and national levels. This is the first time that such an extensive hearing process has been carried out in Montenegro for this type of report. The hearing process revealed the need for additional studies which will be conducted outside the scope of this contract.

The project is considered to be successful as the process has lead to improved understanding and enhanced competence of EU guidelines and practise for involved parties. This was achieved in part due to the process-oriented approach to services as adopted by NVE.

# Southern African Development Community (SADC) - Energy Coordinator

## Background:

SADC is the post-apartheid continuation of the regional cooperation originally established to strengthen the member countries' independence of South Africa's strong economy and political interference. The new organization has shifted its objectives as the Republic of South Africa (RSA) is now a strong positive force in regional economic development.

Despite being rich in primary energy resources, the SADC region experiences a power shortage. Furthermore about 80 % of the region's population use various forms of biomass very inefficiently. Against this background there is a substantial involvement from various ICPs in energy related projects. In 2006 a new partnership between SADC and the ICPs was established, and Norway was appointed lead ICP on energy. To pursue this task the SADC Energy Thematic Group (ETG) was established. This Group is the main instrument for meeting the objectives of the energy coordination project.

The objectives of the Coordinator's work have been formulated in three key activity areas:

- Assist SADC in facilitating the coordination of ICPs involved or interested in activities within the energy sector.



- Strategically advise the SADC Secretariat and other SADC structures on the various ICPs' comparative advantages and individual ICP priorities of support to the sector.

- Maintain a continuous dialogue and flow of information between SADC and ICPs on regional energy issues.

## Activities and Outputs:

Over the three-year period a main task has

## Overall Project Data

**Client:** Answerable to Norwegian Embassy, Maputo, acting as the lead International Cooperating Partner (ICP) on energy in the SADC region.

**NVE Mandate:** Responsible for facilitating energy sector coordination, communication and collaborative efforts between member countries and interested donors.

**Contract Value/ Duration:** MNOK 2.5 annually for resident Coordinator and NVE's backstopping expenses. The project period has been from 2008 – 2010.

**Type of Activities:** Consultations with donors and responsible energy authorities, formulating initiatives, preparing documentation, providing advice and organizing events.

### Work Completed 2010:

Disseminated information to partner organizations and facilitated high level energy sector meetings. Execution of general mandate continued, notably trying to broker investments and to assist with development of the carbon trade initiative. The project came to its end and was terminated in 2010.



been to liaise with the SADC Secretariat in planning meetings in the ETG. A total of seven meetings have been held, focussing on:

- Information exchange among the ICPs.
- Identification of areas for coordinated ICP initiatives.
- ICP cooperation to fund new initiatives to develop renewable energy and energy efficiency programmes.
- Dialogue and strategic support to the SADC Secretariat.

Parallel to this, the Coordinator has interacted closely with SADC and associated institutions, to support and facilitate various initiatives supporting and developing SADC's energy strategy.

**Electricity supply Iha de Mocambique.  
Photo: Hans Terje Ylvisåker**

**Contact:** Kjell Repp

## Results/Outcome:

SADC's overall energy sector goal is to ensure the availability of sufficient, reliable and least cost energy supplies. The three years 2008 – 2010 is a too brief period to evaluate long-term outcomes. However, it is generally acknowledged that by institutionalizing the ETG, a vital contribution has been made towards active and "productive" donor cooperation. This will eventually support achievement of the SADC goals.

Furthermore, the project has strengthened Norway's position within energy in the region. The role as lead ICP has provided access to decision-making forums, hence offering an opportunity to enhance beneficial energy solutions in the region.

The Norwegian Embassy in Maputo will maintain Norway's role as lead ICP based on the platform established through the project.

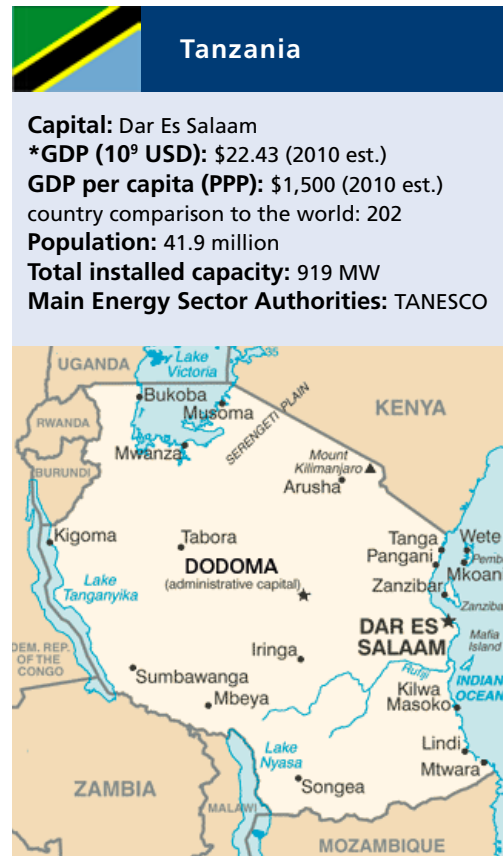
# Capacity Building in Operation and Maintenance of Hydropower Plants

## Background:

NVE has had a long cooperation with Tanzania within hydrology, hydropower and electrification, through the Rural Energy Agency, the Energy and Water Utilities Regulatory Authority, the Regional Electricity Regulators Association and TANESCO. The Royal Norwegian Embassy requested in mid 2009 NVE to carry out a Feasibility Study on selected areas of human resource capacity building for improved O&M of existing hydro power plants and on hydropower technology generally in Tanzania. The background for the request was the increased demand for electricity and the slowly deteriorating condition of existing hydropower plants in the country.

## Activities and Outputs:

The work specifically related to the planned O&M project can be summarized in three points: i) Workshop on feasibility report, conducted in Bagamoyo, June 2010. ii) Project document (PD) prepared in cooperation with TANESCO and finally submitted to the Norwegian Embassy, Dar es Salaam in December, 2010. iii) Draft TOR elaborated in cooperation with TANESCO.



## Overall Project Data

**Client:** Tanzania Electricity Supply Company Ltd – TANESCO.

**NVE Mandate:** Assisting TANESCO in the preparation of Programme Document (PD) for Operation and Maintenance (O&M) of Hydropower Plants in Tanzania.

**Contract Value/ Duration:** MNOK 1.4 for preparation of Programme Document (PD), including Terms of Reference (TOR). The project started in late 2009.

**Type of Activities:** Presentation at a workshop. Assisting TANESCO on PD preparation, including TOR for the “Capacity Building Implementer” (CBI). Assisting TANESCO during procurement of the CBI.

**Work Completed 2010:** Preparatory studies and project design for the O&M project with related components; PD and TOR.





**Hydropower plant workshop**

An NVE team of three senior advisors visited Tanzania in June 2010 in order to present the feasibility report and to organise the workshop in Bagamoyo in cooperation with TANESCO. Site visits to three power plants and a training site were included. TANESCO contributed with inputs and comments to the report and arranged the fieldtrip.

An NVE team of two senior advisors participated in the African Hydro Symposium, at Arusha, September 2010. Several meetings were held with TANESCO officials and the Norwegian Embassy, and site visits to the remaining three power plants were completed on the way to Arusha. The team presented and discussed the PD with TANESCO and the final PD was finalized in November 2010.

### Issues and Challenges:

A critical situation with regards to sustainable management of the electricity supply is about to develop in Tanzania, mainly due to financial constraints and lack of capacity. There is serious lack of personnel to operate and maintain the hydropower plants. Hence, human resource capacity building within TANESCO is urgently needed. Unless proper action is taken soon, several of the hydropower plants might be exposed to rapid deterioration and acute breakdowns in the near future. As indicated below, one has to look at fresh options for effective arrangements to contain the situation.

**Contact:** Amir Messiha



**Turbine with generator at Hale Hydropower Plant**

### Results/Outcome:

The PD was developed as a joint effort on consensus basis with TANESCO and delivered to the Norwegian Embassy for further consideration. The TOR have similarly been prepared in order to develop options for a ROT (Rehabilitate-Operate-Transfer) or Twinning Partnership with TANESCO. Such options need to be studied in sufficient detail to enable a decision on how to proceed in a time- and cost-effective way as dictated by the state of the infrastructure.



## Institutional cooperation

A large part of NVE's activities connected to development assistance is part of institutional cooperation with partner institutions in the developing countries. This is elaborated on the following pages. Approximately 59 % (or 6,2 person-years) out of NVE's recorded hours on development assistance in 2010 was spent on cooperation with 11 institutions in 9 countries. This is an increase of approximately 10% since 2009.

The institutional cooperation is always based on signed contracts providing clearly defined objectives, scope and mode of work, time schedule, obligations of the parties, reporting requirements, and total budget.

The low population and modest degree of energy intensive development of Bhutan, imply a limited domestic demand and slow growth in the industrial/commercial electricity demand. With its relatively large hydropower potential, much of the generated electricity can be exported to neighbouring India in the foreseeable future. This has two distinct advantages: i) Bhutan will be able to make revenue from its natural resources; ii) India will be helped to reduce its dependence on fossil fuels.

Norway is now supporting the institutional development and capacity strengthening of the electrical sector in Bhutan, as well as the country's "Advanced Hydropower Development Program" which is part of Bhutan's current 5-year plan of economic development for the country. This support is provided by Norad under two separate Bilateral Agreements from May 2008. These are the latest in a series of agreements through which Norway has enabled Bhutan to first map and thereafter be in a position to develop its hydropower resources for the economic benefit of the nation.

Norway's assistance to the energy sector of Bhutan over the last 20 more years has highly contributed to the country's position today,

Bhutan

**Capital:** Thimphu  
**GDP (10<sup>9</sup> USD):** \$1.397 (2010 est.)  
**GDP per capita (PPP):** \$5,000 (2010 est.), country comparison to the world: 144  
**Population:** 699,847  
**Total installed capacity:** 1 500 MW  
**Main Energy Sector Authorities:** Department of Energy Bhutan Electricity Authority

where export of electricity to India is lifting more and more of its population out of poverty.

## Support to Projects of the Accelerated Hydropower Development Programme

### Background:

The main purpose of this component of the Programme is, on the national scale, to support the accelerated development of the hydropower resources of the country, - within Bhutan's overall development plan. The immediate objective is to facilitate accelerated hydropower development in the form of Programme finance (including specific projects) and power sales agreements, reconnaissance surveys for the remaining listed sites under the Power System Master Plan, pre-feasibility studies of project sites and a Detailed Project Report of one site, including environmental studies.

The bilateral agreement between Norway and Bhutan for "Support to Accelerated Hydropower Development Programme of Bhutan" was signed between the two countries on 21 May 2008, in parallel with the Phase III Energy Sector support agreement. A contract was entered into between DoE and NVE for

implementation of the project during the period July 2008 - June 2011, with a provision for 2 years extension, subject to a positive outcome of Norad's planned project review and results assessment.

Planned activities within project finance and power sales agreements have been cancelled; these issues became less relevant as India offered to plan and construct all of the first 10,000 MW of projects forming the first part of the Accelerated Hydropower Development Program. Consequently, the Norad support has been refocused to cover projects within some of the remaining 20,000 MW of hydropower potential in the country. This revised content is now guiding the project activities.

### Activities and Outputs:

2010 saw much activity in the study of the hydropower projects and by the end of the year the consultant was well on the way to

completion of the studies. The Final Report is expected in January 2011.

The contracted work includes:

- Reconnaissance Surveys for unvisited sites under the Power System Master Plan of Bhutan (15 sites)
- Pre-feasibility Studies of project sites incl. Environmental Studies (2 sites).

One of the recommendations of the consultant was to enhance the sediment sample testing facilities in the country by refurbishing an existing sediment laboratory at the Kurichhu power plant in eastern Bhutan. This would require institutional collaboration between the Department of Energy's Hydromet Services Division and Druk Green Power Corporation who own the Kurichhu power plant. It was decided to implement this arrangement, procuring equipment for refurbishment of the old sediment laboratory under this hydropower development programme. Training of trainers to work with staffing of the sediment laboratory would however be carried out at NVE, in Norway, under the institutional cooperation agreement.

### Issues and Challenges:

The decision by India to become a major investor in Bhutan's hydropower sector caused the need for some re-planning and reallocations. This was however amicably resolved between Norad, NVE and the Bhutan authorities. No major challenges or issues have other-



Staff gauge inspection during hydrological field visit

## Overall Project Data

**Client:** Department of Energy (DoE), Bhutan.

**NVE Mandate:** Project formulation and procurement through international competitive bidding, with joint management and supervision of Consultants by NVE and DoE.

**Contract Value/ Duration:** MNOK 14.982 (100% Norad financed). Project period: July 2008 – June 2011.

**Type of Activities:** Consulting services for study and planning of hydropower projects selected from the Accelerated Hydropower Development Programme of Bhutan; procurement of services and supervision of consultants.

**Work Completed 2010:** Issue and review of consultant's reports and progress reports. Planning for: i) Establishing laboratory for sediment sample testing in Eastern Bhutan, and; ii) Training of trainers for this laboratory.

**Work in Progress 2010:** Reconnaissance Surveys of hitherto unstudied hydropower sites; Pre-feasibility Studies of selected projects; NVE coordination and structured cooperation with DoE; Establishment of sediment sample testing laboratory in Eastern Bhutan.



wise been apparent in 2010, and progress on the studies appears to be well within schedule and budget. The power sales agreements between Bhutan and India are up for regular review in 2011; - one of the challenges will be to help the Bhutanese negotiators' preparations for this. This will be addressed in early 2011.

Some of the savings from these activities were made available for the refurbishment of the sediment laboratory in Eastern Bhutan.

**Contact:** David A. Wright



## Results/Outcome:

The major outputs of the studies (Final Report for Reconnaissance Study of 15 hydropower sites and Prefsability Study Report of 2 hydropower sites) are nearly completed, being expected in January 2011. This will enable Bhutan to take next steps towards more detailed planning/ design and subsequent implementation of actual projects. Training of trainers for the Kurichhu sediment laboratory in Eastern Bhutan was successfully carried out under the DoE/NVE institutional cooperation programme.

# Strengthening of the Energy Sector (Phase III)

## Background:

The Goal of Bhutan's Advanced Hydropower Programme is to accelerate development of the hydro based energy resources by improving both knowledge and managerial capacity, and thereby attracting investors for implementation of hydropower projects. Moreover, the Government of Bhutan has realized that improved regulatory capacity is a prerequisite for an orderly and cost-effective growth of the energy sector. In this way, the sector programme will better support the accelerated hydropower development strategy set out in the 10th Five Year Plan for Bhutan.

The specific purpose of the Norwegian supported Programme component is to ensure the availability of local expertise for planning the development of hydropower resources and strengthening of regulator capacity in the energy sector. Phase III of the energy sector cooperation between Norway and Bhutan is

covered by the bilateral agreement signed in May 2008. Immediately afterwards, a contract was entered into between DoE and NVE, in July 2008, for continued institutional cooperation. This contract covers the period July 2008 - June 2011 with a provision for 2 years extension, subject to a positive outcome of Norad's planned project review and results assessment.

## Activities and Outputs:

A Training Needs Assessment (TNA), the basis for the staff training programmes, was concluded by DoE during 2010. This ensures that training activities are linked to the relevant institutional and organizational development issues, including defined skills requirements. Activities during 2010 included:

- Training and human resources development (various higher level education (MSc) and short term courses).

## Overall Project Data

**Client:** Department of Energy (DoE), Bhutan

**NVE Mandate:** Institutional cooperation under the Contract between DoE and NVE, synchronized with Bhutan's 5-year plan for economic development of the country.

**Contract Value/ Duration:** MNOK 9.653 (NVE portion) and MNOK 5.170 (DoE portion), both portions fully Norad financed. The current project covers the 3 year period May 2008 – June 2011.

**Type of Activities:** Institutional strengthening and human resources development within the electricity sector, particularly for regulation and hydro meteorological services; studies of effect of climate change on hydropower flows.

**Work Completed 2010:** Formal high level education (MSc) as well as skills training of staff through short-term interventions; strengthening of Bhutan Electricity Authority (BEA) and DoE's Hydromet Services Division including implementation of Low-Flow Seminar in Thimphu in collaboration with UNICEF and regional partners in November.

**Work in Progress 2010:** Formal training (MSc) of Bhutanese civil servants is ongoing at several institutions worldwide as well as a series of initiatives aimed at institutional strengthening for development of energy sector; preparation for modelling of effects of climate change; management development in key areas; enhancing the DoE – NVE cooperation and coordination including hydrological data collection and analysis and the regulator BEA.



- Supporting improved regulatory capacity of BEA to meet challenges related to accelerated hydropower development, this was particularly important now that BEA has been delinked from the Department/Ministry. Support including training and project meetings both -in Bhutan and in Norway.

- Supporting DoE's Hydromet Services Division on data provision for accelerated hydropower development, including holding of a seminar on Low-Flows in Thimphu in collaboration with UNICEF and regional partner institutions and procurement of vital equipment for hydrological measurement and sediment sampling and analysis. Training in hydrological analysis of Hydromet services Division (HMSD) employees at NVE headquarters in Norway. Training of HMSD and Druk Green Power Corporation (DGPC) employees in sediment sampling and analysis at NVE sediment laboratory in Norway. In addition, modelling of the effects of climate change on hydropower flows.

- NVE coordination and backstopping, including co-management of project in collaboration with DoE project management.

- Annual reports and consultation meetings.

### Issues and Challenges:

It was agreed to intensify efforts to provide formal training (MSc, etc.) at institutions in Norway. An updated overview of relevant courses at Norwegian Institutions has been prepared for the 2011 intake for consideration by Bhutanese partners.

**Contact:** David A. Wright

### Results/Outcome:

Several DoE professionals have completed MSc courses at foreign training universities and have returned to their duties in Bhutan with greatly increased competence. BEA has strengthened its capacity and, most importantly, became an autonomous authority on 1 January, 2010. This is a strong indicator of improved institutional framework achieved as part of the project; - the project's human resources development component has helped filling voids occurring as a result of the new organisation. The Hydromet Services Division has increased its know-how and capacity with regard to all aspects of data management. The Division is now in a better position to provide inputs to the planning, design and operations of hydropower schemes.

# Institutional Cooperation for Feasibility Studies of Mandaya & Beko-Abo Multipurpose Projects

## Background:

Norway has provided assistance to Ethiopia for studies of two multipurpose projects on the Abay River (the Blue Nile within Ethiopia, the largest tributary to the Nile River), namely the Mandaya and Beko-Abo Multipurpose projects. These are large strategic projects of regional importance. See the feasibility study project for additional details.

Being the responsible authority for study of hydropower in Ethiopia, MoWE is Executing Agency for the feasibility studies. The Ministry is in need of capacity strengthening to help it fulfil its obligations under the projects, and Ethiopia requested therefore additional assistance from Norway towards institutional strengthening and capacity building with the dual purpose of being able to manage the feasibility studies and enhancing the institutional capacity to manage similar tasks in the future.

## Activities and Outputs:

The current status is:

- Technical consultants for the feasibility studies were engaged by the Ministry in April 2010. Environmental consultants for the Environmental and Social Impact Analyses



**Capital:** Addis Ababa  
**GDP (10<sup>9</sup> USD):** \$30.94 (2010 est.)  
**GDP per capita (PPP):** \$1,000 (2010 est.)  
 country comparison to the world: 214  
**Population:** 88.0 million  
**Total installed capacity:** 1 000 MW  
**Main Energy Sector Authorities:**  
 Ethiopian Ministry of Water resources (MOWR)



## Overall Project Data

**Client:** Ministry of Water and Energy (MoWE); – formerly Ministry of Water Resources.

**NVE Mandate:** Advisory services and capacity building of executing agency MoWE in: i) Implementation of two feasibility and EIA/SIA studies, and; ii) Capacity Building of MoWE in project management and procurement and hydrological services.

**Contract Value/ Duration:** MNOK 17.463 from Norad, with duration from June 2010 until end 2012.

**Type of Activities:** Workshops, seminars, training, site visits, hydrological systems and measurement, preparation of documents, procurement, advisory services within project management and hydrology services.

**Work Completed 2010:** Technical and environmental consultants fielded; Kick-off Workshop for institutional cooperation between MoWE and NVE held.

**Work in Progress 2010:** Review of technical and environmental consultants' reports; design of institutional cooperation programmes within project management and hydrological services; training needs assessment; establishment of procurement routines; project procurement officer.





**The Tisissat falls, immediately below Lake Tana – the source of the Blue Nile (Abay)**

were engaged by the Ministry in June 2010. Both consultancies were well under way by the end of the year.

- The donors require that Panels of Experts in Dam Safety and Environmental and Social Issues be maintained by the Ministry to oversee, comment and guide the work of the consultants for the feasibility and EIA/SIA studies. By the end of 2010 the procurement of the individual experts for these two panels was almost completed.

- A Kick-off Workshop was held in Addis Ababa in October 2010 in which the baseline for the capacity building and the plans for the institutional cooperation between the MoWE and NVE were elaborated.

Initially the two projects – Institutional Cooperation and the Feasibility Studies – have been in a transitional state before activities are strictly divided according to the respective projects' purposes.

### Issues and Challenges:

Human resources capacity within MoWE needs strengthening through engagement of new experienced staff. The Ministry is primarily a custodian of Ethiopia's water resources, and it is in some areas short of capacity to manage complex multi-purpose project studies.

During the Semi-Annual Meeting between MoWE and the Royal Norwegian Embassy and Norad in October 2010 it was agreed to include a local (Ethiopian) long-term adviser and a local (Ethiopian) project procurement officer under the institutional cooperation with NVE. This is intended to complement the stretched project management and procurement capacity of the Ministry. The persons will be employed by MoWE and funded from Activity 0 of the project.

Institutional changes during the second half of 2010 when the Energy section of the Ministry of Energy and Mines was merged with the Ministry of Water Resources to form the Ministry of Water and Energy have placed additional emphasis on the projects in that the Ministry is now not only responsible for studies of projects but also implementation. It was hoped that this would result in a new focus with respects to the projects and the capacity building needs.

**Contact:** David A. Wright

### Results/Outcome:

Several positive results/outcomes have materialized during 2010. The most important ones are:

- Commissioning and active work of technical consultants and Environmental/Social consultants commenced.
- Kick-off workshop for Institutional Cooperation held; - baseline information and planning of activities identified.

# Establishment of National Dam Safety Unit (NDSU)

## Background:

Dams impose a serious threat as dam breakage can cause irreparable damage to property, environment and loss of lives. In Ghana there is no single authority responsible for the safety of dams. The need for a centralised body set up to ensure that dam safety procedures are in place for all dams is therefore apparent. The 3 major owners of major dams (i.e. of significant heights and/or reservoir volumes) in Ghana - the Volta River Authority (VRA), the Ghana Water Company Ltd (GWCL), and the Ghana Irrigation Development Authority (GIDA) - administer some 30 dams. An additional 1,500 smaller dams built for local water supply or irrigation purposes are owned by local authorities.

NVE was engaged by NORAD (2008) to assist the WRC formulate a Project Document for the establishment of an authority responsible for dam safety. By the end of the Project - after 3 years - it is expected that an independent NDSU has been established in Ghana. NVE's inputs have been covered by special funding from NORAD.



**Capital:** Accra  
**\*GDP (10<sup>9</sup> USD):** \$18.06 (2010 est.)  
**GDP per capita (PPP):** \$1,600 (2010 est.)  
 country comparison to the world: 201  
**Population:** 24.3 million  
**Total installed capacity:** 1 490MW  
**Main Energy Sector Authorities:** Ministry of Water Resources, Works and Housing



## Overall Project Data

**Client:** Water Resources Commission of Ghana (WRC).

**NVE Mandate:** Assisting the WRC developing key steps and inputs towards the planned National Dam Safety Unit (NDSU).

**Contract Value/ Duration:** MNOK 6.7 grant for the project from Norad, with equivalent of MNOK 0.53 as a national input from Ghana. Norad's final approval still pending; - the project started in late 2009 with planned duration of 3 years.

**Type of Activities:** Preparation of legal provisions and regulations, technical guidelines and modus operandi, data management, capacity building, and long term financing strategy, all as required for the functioning of NDSU.

**Work Completed 2010:** Workshop with relevant Technical Committee on Dams, Legal and Finance actors on various activities and capacity building initiatives.

**Work in Progress 2010:** With the Dam Safety Working Group (DSWG) as a basis, continuing activities towards implementation of the fully operational NDSU



Akusombo Hydropower Plant, Volta River

### Activities and Outputs:

The institutional Agreement between NVE and WRC was signed in December 2010 and the Programme was officially established. Some activities started in Ghana early in 2010 with special approval from Norad while awaiting the final Project Document approval. A workshop in Accra, for the three Technical Committees took place in February 2010 as a follow-up to the 1st workshop in Swedru in December 2009.

### Issues and Challenges:

Some constraints due to lack of signed agreement, effects on motivation and commitment of the technical committee members have affected the project negatively. It is expected that this influence will be reduced soon after the project has become fully formalized.

**Contact:** Amir Messiha

### Results/Outcome:

Some results were achieved in spite of the disturbing start delays:

- Second meeting of the DSWG and the technical Committees held, February 2010, Accra.
- Steering Committee Meeting held, December 2010, Accra.

These meetings have been termed results as important issues relevant to project's objective were tabled and discussed.

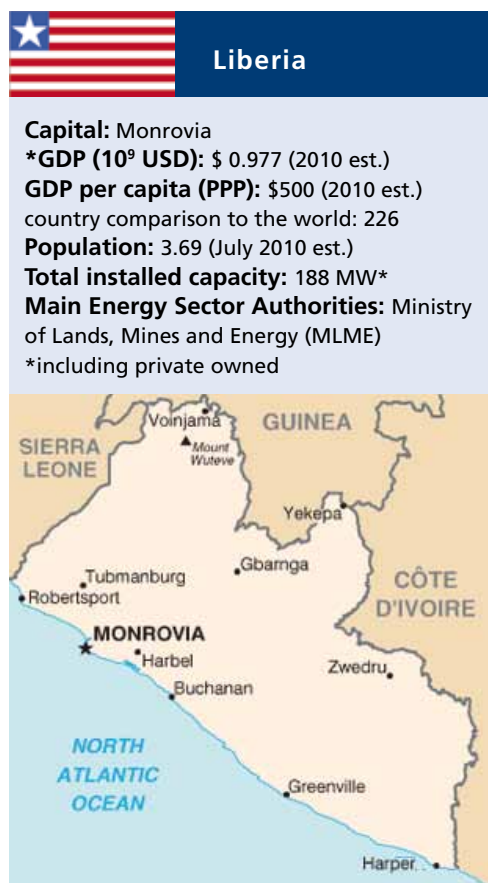
# Strengthening of the Water Resources and Power Sectors

## Background:

Fifteen years of civil war has destroyed much of the country's physical and human capital, severely damaging its institutions. The new Government of Liberia (GOL) established in 2006 is facing serious challenges which have been taken on in a systematic fashion. The GOL has prepared and endorsed programs in support of the recovery process. These are aimed, directly or indirectly, at eliminating poverty in the long-term and at ensuring self-sustainability of the country. Hence, the overall goal is to achieve economic and social development in Liberia's important sectors.

The electricity supply has been adversely affected since the start of the war; - the country's main generating plant (Mount Coffee Hydro-power Plant) was damaged. Since 2006, the GOL has provided diesel generators to supply emergency power for essential public services in Monrovia. The rest of the country is virtually without electricity supply.

In April 2007 Norway entered into an agreement with Liberia aiming at increased electricity production in Monrovia. NVE has conducted a number of missions to Liberia since January 2008 funded by Norad. The contacts between NVE and the various energy and water resource sector authorities have



## Overall Project Data

**Client:** Ministry of Lands, Mines and Energy (MLME).

**NVE Mandate:** Assistance to MLME with development of a monitoring and management system for water and electricity resources in Liberia, with associated institutional support.

**Contract Value/ Duration:** MMNOK 51, covering period mid-2010 – 2015. Direct services provided by NVE are estimated at MNOK 34 (including 2 long-term advisers).

**Type of Activities:** Institution and capacity building, incl. amongst others legal framework within the water and energy sectors, hydrology, and rural and renewable energy. Gender aspects and women's empowerment are important parts of the cooperation programme.

**Work Completed 2010:** Institutional Agreement between NVE and MLME signed in December 2010.



Emergency power supply to Monrovia

enabled NVE to become familiar with Liberia's development agenda and with the sector specific issues in particular. Liberia has expressed a wish to extend the cooperation with Norway within the power sector. Norway has decided to increase her assistance to Liberia in order to support the peace and stability program.

### Activities and Outputs:

A Project Document was finalized in 2010 on the request of MLME, outlining the various activities to be included in a 5-year institutional cooperation between NVE and the Ministry (representing Liberia's water and energy/ electricity sector stakeholders). Thereafter an Institutional Agreement between MLME and NVE was signed later during 2010. The focus is on assistance to development of monitoring and management of the water and energy resources, with special attention to institutional strengthening.

The 2010 activities in Liberia comprised:

- Recruitment of Norconsult to assist the MLME in ensuring that sufficient, low cost and timely generation is made available.
- Recruitment of the South-African consulting company NetGroup to assist the Board of the Liberian Electricity Company (LEC).
- Completion of the Project Document and

the Institutional Agreement between NVE and MLME.

- Provision of 2 long term advisors. The process of recruiting a long term advisor for Liberia's Hydrological Service was accomplished in December 2010; - the advisor will take up position in Monrovia in February 2011. For the Energy advisor, the process was still ongoing and will be completed in January 2011.

### Issues and Challenges:

The general situation in Liberia following the 15 years of civil war constitutes a serious challenge for all kinds of infrastructure and institutional development work. As the GOL has adopted a systematic approach with well defined policies and strategies, NVE is committed to adapt all proposed initiatives regarding water and energy resources to this framework. A major challenge is human resources. As a result of the civil war the country lost almost one generation of well-educated people, and short- as well as long-term training and capacity building, considered in the context of cross-cutting issues, will therefore receive particular attention in the programme. The capacity at MLME is also very limited, due to financial constraints caused by the civil war

**Contact person:** Kjell Repp

### Results/Outcome:

At this early stage of the cooperation, with mostly short term ad hoc activities, few results can be reported. However, the overall recovery and development framework provided by GOL, combined with the NVE assisted analysis of water/ energy sector issues, has enhanced the Liberian authorities' understanding of measures to be taken. The quality of and commitment towards outline sector plans have been notably improved since the first contacts in early 2008.

# Feasibility Studies of Small and Medium Size Hydropower Projects

## Background:

DoED is responsible for executing the MoEN’s mandate, within overall government policies, as it relates to the power/electricity sector. The major role of DoED is to ensure transparency of the regulatory framework, and to accommodate, promote and facilitate the private sector’s participation in the power sector. This is achieved by providing a “One Window” service and licensing for power projects. The purpose of the feasibility study projects, related to DoED’s role, is to encourage investors to engage in implementation of small and medium sized hydropower projects.

In the Agreement between the Governments of Norway and Nepal in 2004, Norway agreed to provide a grant of MNOK 10 to conduct Feasibility Studies and Environmental Impact Assessments (EIAs) of small and medium sized hydropower projects in Nepal. Moreover, a contract covering institutional cooperation between DoED and NVE was signed in December 2004. It is a precondition that the studies shall be undertaken by Nepalese consulting companies based on competitive bidding with DoED as the Client.

The programme of 8 projects was split into



**Capital:** Kathmandu  
**\*GDP (10<sup>9</sup> USD):** \$15.11 (2010 est.)  
**GDP per capita (PPP):** \$1,200 (2010 est.)  
 country comparison to the world: 208  
**Population:** 29.0 million (July 2010 est.)  
**Total installed capacity:** 557 MW  
**Main Energy Sector Authorities:**  
 Department of Electricity Development  
 Nepal Electricity Authority



three lots, termed Package 1 – 3 with 3, 3 and 2 projects respectively. Completion of all projects was made subject to available budget resources as costs of each package became known. It was for this reason that Package 3

## Overall Project Data

**Client:** Department of Electricity Development (DoED), under Ministry of Energy (MoEN).

**NVE Mandate:** Technical Assistance on Feasibility Studies.

**Contract Value/ Duration:** MNOK 3.17 (included in DoED’s total budget for the studies), 2004 – 2011.

**Type of Activities:** Feasibility Studies, originally divided in 3 lots (Package 1 – 3); Terms of Reference ; Procurement of services (entire process); transfer of NVE competence in the respective fields.

**Work Completed 2010:** Prepared proposal for reallocation of remaining funds; Submitted and consequently approved by responsible Nepalese authorities and by the Norwegian Embassy. Programme Document (PD) for agreement on further institutional cooperation (2011-2015), jointly developed by NVE and DoED, -submitted to Embassy for appraisal.

**Work in Progress 2010:** Studies in Package 2 being conducted by consultants.



was cancelled and it was decided to reallocate the voted funds.

A procurement procedure was worked out, covering preparation of Letter of Invitation and Tender Documents, evaluation of tenders, and reports with recommendations on the bids. When requested and required, NVE had to prepare comments to DoED on emerging procurement and study implementation issues.

### Activities and Outputs:

The status as of end 2010 is as follows:

- Consultants working on Package 2 projects, with most of the required reports already presented and approved (before entire study documentation can be compiled).
- For the three projects in Package 1, which were completed and approved in 2009, necessary activities for further preparation towards investment have been defined in order for work to start in 2011.
- Following a national tendering process, the evaluation committee concluded that the financial bids received for the 2 projects under Package 3 were too high, and hence the Package-3 was cancelled.

DoED requested that the budget allocated for Package 3 be re-allocated for a programme containing short-term assistance (to be terminated by mid of 2011) on activities within DoED's line of work. These activities include Panel of Experts for Large Storage (Dam) Projects, as well as cooperation and general training activities for DoED officials. The re-allocated funds also cover preparation of the Programme Document (PD) for further institutional cooperation between DoED and

### Results/Outcome:

- Procedures for procurement of consulting services refined and followed in an orderly fashion.
- Projects with completed Feasibility Studies and EIAs seem to move rapidly to implementation.
- EIAs have been given due attention and DoED has benefited from Norwegian experience and practises through the joint evaluations of the proposals as well as the reports..
- The Feasibility Study requirements have been linked to reforms in the framework for licensing and financing.
- The Programme Document for new institutional cooperation will include a number of new working areas which are reflecting upon the close relationship and mutual confidence between DoED and NVE, provided the request is accepted by the Norwegian Embassy.

NVE (2011-2015). Funds to cover implementation of activities during the new programme period have, however, to be voted in conjunction with the next bilateral agreement between Nepal and Norway.

### Issues and Challenges:

Although delays have occurred during implementation of the Feasibility Studies, the accumulated costs are within approved budgets. Implementation of the activities covered by the proposed re-allocated funds from Package 3 projects in 2010, has been delayed due to a time consuming approval process by Nepalese authorities. Approval was however given in late December, 2010.

**Contact:** Kjell Erik Stensby

# Flood Control Master Plan for Bucayao and Mag-asawang Tubig Rivers

## Background:

Parts of the Philippines have repeatedly been exposed to severe flood damages. On this background a dialogue between PGMO and Norad on these issues commenced. In 2003 the PGOM asked Norad for assistance to develop a “Flood Control Master Plan for Bucayao and Mag-asawang Tubig Rivers”. Norad requested NVE to assist in the preparation of the Terms of Reference for the project and to facilitate the tendering process. As a result of open competitive bidding, the contract for preparation of the Master Plan was awarded to SWECO Grøner AS (later SWECO NORGE) with its partners in the Philippines, and work started on the study in late 2007.

## Activities and Outputs:

- The Flood Protection Plan has been completed and was presented to the new Provincial Government during a workshop in November, 2010.
- Recommendations for future work have been drafted, based upon consultations with stakeholders and local communities during the above workshop.



## Overall Project Data

- Client:** Provincial Government of Oriental Mindoro (PGOM).
- NVE Mandate:** Coordination and responsibility for overall execution of the Norwegian supported project.
- Contract value/Duration:** MNOK 4.291, started in 2007 and will be completed in 2011.
- Type of Activities:** Baseline studies and data collection/ management for real time hydrometric network and a flood warning system.
- Work Completed 2010:** Presentation of “Flood Control Master Plan for Bucayao and Mag-asawang Tubig Rivers” by NVE to the new Provincial Government, and preparation by NVE and stakeholders of recommendations for implementation of flood protection measures.
- Work in Progress 2010:** Preparation of final report on Environmental Baseline Study and preparation of flood forecasting software.





### Issues and Challenges:

The project has been considerably delayed, mainly because of the pending final Environmental Baseline Study Report (EBSR). The EBSR is of minor importance for defining and prioritizing the various proposals for mitigation measures, however, and it was therefore decided during the workshop in November 2010 to finalize the project without this report.

The remaining funds will be allocated for preparation of the final recommendations and proposals in prioritized order, for implementation of flood mitigation measures, observation of flood mitigation measures, observing outcomes of the consultations with stakeholders.

**Contact:** Kjell Repp

### Results/Outcome:

If the various proposals are implemented, the Provincial Government will be in possession of new tools for reducing the flood damage, and might be able to warn people of coming floods. If not implemented, the outcome of the project will be minor, except for the training and capacity building carried out by the consultant.

Even if implemented, however, it is important to notice that without information and public awareness campaigns, and without evacuation plans, the flood forecasting system will have a severely reduced effect once disaster strikes. It should also be noted that although the gender perspective has not been considered important in a project of this nature, women from the local communities and provincial government authorities were encouraged and participated actively during the final workshop in November, 2010, when the draft recommendations were prepared.

# Improvement of the Flood Forecasting and Warning System for Magat Dam and Downstream Communities

## Background:

The Cagayan river basin is the largest in the Philippines, encompassing the provinces of Nueva Viscaya, Isabela and Cagayan. The basin is affected by recurring floods due to tropical cyclones and the northeast monsoon. To mitigate adverse effects of flooding in the basin, the Philippine Government established the Cagayan Flood Forecasting and Warning System (FFWS) in 1982. The FFWS was upgraded in 1992 with the inclusion of a warning system for operation of the Magat Dam; -multipurpose dam for irrigation of 102,000 hectares of farmland and power production. The system has since encountered problems, including breakdown of the telemetry system and some of the monitoring stations. The ability to warn people downstream and to operate the spillways of the Magat Dam satisfactorily in order to decrease the flooding risk has therefore been reduced.

In June 2008 Norad asked NVE to assist PAGASA preparing a proposal for the rehabilitation and upgrading of the system. A field visit including an assessment of the station network was conducted by NVE officials in November 2008. As an agreed follow-up, NVE prepared a proposal in close cooperation with PAGASA on how to structure potential Norwegian support for this rehabilitation and upgrading

of the FFWS. Upon submission, the proposal was later approved by Norad and by the Norwegian Embassy in Manila; - the agreement between the Embassy and the Department of Science and Technology of the Philippines was signed in late December 2009.

## Activities and Outputs:

The following have been accomplished during 2010:

- Revision and refinement of budget and activity plans carried out.
- Signing of Institutional Agreement between PAGASA and NVE made in November, 2010.

## Issues and Challenges:

Change of staff and contact person within PAGASA hampered progress for some time in the course of the year. Large floods during second half of 2010 also caused a considerable delay in the institutional cooperation. On the other hand, these large floods proved the importance of the project, which now seems to be back on track with a strong commitment towards its implementation.

**Contact:** Kjell Repp

## Overall Project Data

**Client:** Department of Science and Technology, Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA).

**NVE Mandate:** To assist and advice PAGASA with implementation of the flood forecast and warning system project.

**Contract value/Duration:** MNOK 10.685; - started in November 2010 and will end in late 2012 or early 2013.

**Type of Activities:** Rehabilitation of hydrometric network, development of procedures for use of data for flood forecast/ warning systems, and associated training.

**Work completed in 2010:** Updating of project plans; Signing of Institutional Agreement between PAGASA and NVE.

# Policy Research and Capacity Development Programme for the Energy Sector

## Background to Cooperation and Programme:

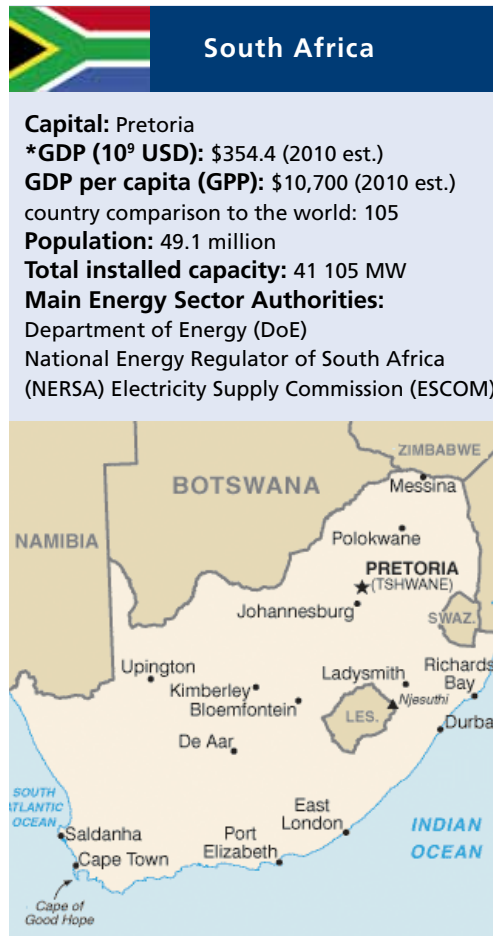
Norway has a long tradition of supporting South Africa, first during the struggle for majority rule and thereafter with the democratically elected RSA Government. The “new” RSA embarked on updating of the sector policies and strategies, in conformity with the changed political situation. Norway offered her cooperation to RSA’s relatively sophisticated institutions in areas where Norway had a comparative advantage; - the power and energy sector received early attention in discussions between the two countries.

In October 2006 NVE entered into a contract for a new phase of cooperation with the Department of Minerals and Energy (DME), based upon a Memorandum of Understanding signed between the South African and Norwegian governments already in 1996. This cooperation programme was intended to commence in 2006, partly based on outcomes of earlier assistance, and now including also the Norwegian Petroleum Directorate (NPD) as a participant in some components. NVE was called upon to serve as the Norwegian Coordinator of four Norwegian supported sub-programmes. Since the programme has now come to an end, it is rather comprehensively described, with some references to earlier years.

## Activities and Outputs:

The Programme’s Final Report was presented in May 2010 and included a review of the “RSA3001” Programme since inception in 2006. Based on NORAD’s reporting requirements, the review focused on the following aspects of each sub-programme:

- Effectiveness, - assessing the extent to which objectives had been achieved.
- Efficiency, - comparing the value of outputs to the costs thereof.
- Impact, - assessing both positive and negative effects on target groups and/or stakeholders.
- Sustainability, - assessing the extent to which positive effects will continue beyond Programme expiry.



The Final Programme Report built on the work undertaken by consulting company Econ Pöyry AS for the Mid-term Review of the Programme in May - June 2009. Where applicable, the review was presented in terms of the three themes that were approved at the 2007 Annual Meeting (AM), namely: Regulation; Climate Change; Energy Planning.

It should be noted however that the implementation had taken place on the basis of individual business plans for five different sub-programmes, namely:

**i) Electricity;** with The Department of Energy (DoE), Chief Directorate Electricity and Chief Directorate Energy Planning respectively, as the RSA partners.



Irrigation canal in Western Cape

**ii) Hydrocarbons**, with The Department of Energy (DoE), Chief Directorate of Hydrocarbons as the RSA partners.

**iii) Energy Regulation**; with The Department of Energy (DoE), Chief Directorate Electricity and the National Energy Regulator (NERSA) as the RSA partners.

**iv) Upstream Petroleum**, with Petroleum Agency SA (PASA) as the RSA partner, and

**v) Alternative Energy**, with Central Energy Fund (DEF) / Energy Development Corporation (EDC) as the RSA partners.

These business plans included technical support agreements between South African and Norwegian counterpart institutions. In terms of these agreements, NVE supported the Electricity, Energy Regulation, and Alternative Energy sub-programmes, and to a smaller extent, the Hydrocarbons sub-programme. NPD primarily provided support to the Upstream Petroleum sub-programme under Hydrocarbon.

For internal administration purposes, the Energy Planning activities, involving NVE and the Energy Planning Chief Directorate, were conducted on the basis of the Electricity Sub-Programme agreement. This agreement was also used to facilitate NVE's modelling of the electricity reticulation networks of the cities that had been selected to host matches of the FIFA 2010 World Cup in South Africa.

■ **Regulation Theme:** Activities addressing this theme were the ones most delayed; - those under Electricity (Independent Power Producer (IPP) Framework Development), Hydrocarbons (Petroleum Pricing Review) and the entire sub-programme under National

Energy Regulator of South Africa (NERSA). They commenced only during financial year 2009/10. This was despite work-plan approvals that were granted in January 2008 (Petroleum Pricing Framework and NERSA) and October 2008 (IPP Framework Development).

Draft versions of the IPP Framework Report and Regulatory Model (for petroleum service stations), were eventually submitted. NERSA also completed a staff training workshop and the roll-out of a licensing information system. The process of developing the IPP Framework provided inputs towards the establishment of an Independent System and Market Operator (ISMO) by means of new legislation (e.g. the ISMO Bill) and amendment to the existing Energy Regulation Act, 2006. The Regulatory Model has provided an indication of a typical 'bench-mark service station', including how it may be financially valued for regulated pricing purposes. Furthermore, this may help redefining the vertical relationships between integrated oil companies and fuel retailers, primarily in accordance with the provisions of the Petroleum Products Amendment Act, 2003.

Whereas Petroleum Agency of South-Africa (PASA) cancelled a number of approved activities, pending the outcome of a Training Needs Analysis exercise in 2008, the remaining ones were completed within agreed timelines. The exception was the 'Data Search' activity, which PASA decided to fund from internal resources following delayed procurement of the required specialist.

It must be noted that a number of activities were carried forward from the previous Programme – "RSA0027". These included the Strategic Stocks Policy and Security of Supply

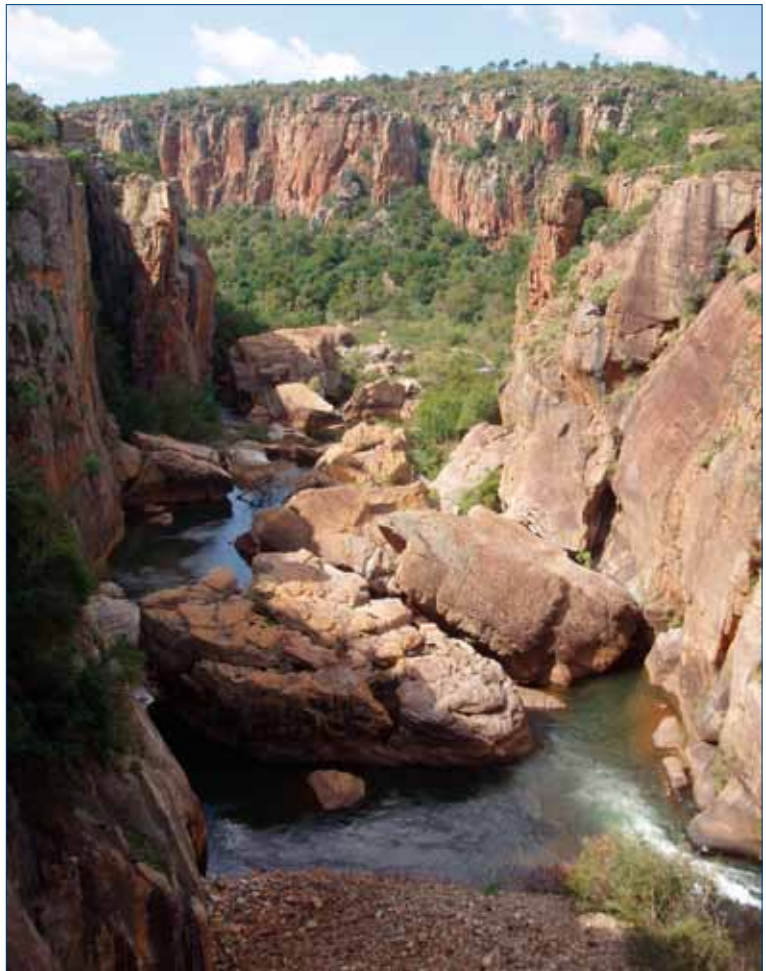
Strategy projects, as well as implementation of the computerised petroleum licensing system, which were completed successively during 2006-2007. The licensing system was in due course used to process over 10 000 licenses for the downstream petroleum sector (i.e. refining, wholesales and retailing). The report on strategic stocks formed the basis for a Strategic Stocks Policy (which had not yet been published at the time of compiling this report). The delayed activities were the primary reason why expenditures of approx. MZAR 6.2 million had to be carried over to the current programme as a “reimbursement” to Norway.

■ **Climate Change Theme:** The Energy Development Corporation (EDC) completed a number of approved activities focused on the roll-out of bio fuels assessment, pre-feasibility studies for small scale hydropower projects, and development of a framework for the productive use of renewable energy. However, following a review of the plans and budgets during the 2009 Annual Meeting, funding for a number of activities was withdrawn due to the risks of exceeding Programme timelines.

Despite a belated introduction to the Programme, the Designated National Authority (DNA) completed its approved activity - the 1st Annual Clean Development Mechanism (CDM) Tracking Report – by September 2009.

■ **Energy Planning Theme:** The Programme was instrumental in the development and early implementation of the Cabinet-approved Energy Security Master Plan – Liquid Fuels; - some of its outputs were used to strengthen energy modelling capabilities, as well as for preparing plans to ensure adequate liquid fuel supplies during the FIFA 2010 World Cup in South Africa. The National Treasury supported the National Multi-Products Pipeline, targeted to eliminate transport capacity constraints between Durban and the inland liquid fuels market. This bore testimony to the importance of this pipeline, which was one of the listed ESMP projects. The funding was raised in the form of a ZAR 0.075 /litre levy, recovered from the sales of national road transportation fuels, from 1 April 2010 onwards.

As a basis for building improved energy modelling capacity, two workshops were held with NVE. At the same time the development of user specifications for a conceptual, integrated energy modelling system and the definition of supporting processes/ institutional arrangements were also completed. These provided the basis for preparation and early implementation of the National Energy



Canyon in South Africa

Act, 2008, addressing the energy modelling and planning requirements.

With respect to Electricity, NVE completed a model of the reticulation systems of the cities which were critical to successful hosting of the FIFA 2010 World Cup tournament, focusing on capacity constraints that could jeopardise security of electricity supplies on match-days. This was based on a process that was followed during similar planning for the 1994 Olympic Games in Lillehammer, Norway. The outputs were shared with the DoE and the affected municipalities. In some cases (e.g. Polokwane) the municipalities decided to undertake precautionary measures as a result.

Regarding the petroleum side, Norwegian assistance primarily contributed towards capacity building for management of the offshore and on-shore gas and petroleum resources. This, which was mainly handled by the Norwegian Petroleum Directorate and PETRAD, took into account the changing age - and experience profiles among the agency’s staff, notably the ratio (and combination) of highly experienced staff members approaching retirement to the young fresh recruits with



limited experience but need of enhanced skills.

**Key results:**

**i) Electricity:** Eskom’s use of the Electricity Pricing Policy (EPP) resulted in a substantial increase in the proposed regulatory asset-based and the associated depreciated charges.

**ii) Electricity:** The reticulation of WC 2010 modelling exercise, highlighted potential areas of failure that could negatively impact electricity supplies to key facilities.

**iii) Hydrocarbons:** The computerised Petroleum Licensing System has made it possible for the DoE to give effect to the key requirements of the Petroleum Product Act.

**iv) Regulation:** The Licensing Information System will contribute to closing the information asymmetry that makes it difficult for a regulator to effectively exercise its mandate.

**v) PASA:** The capacity-building interventions have improved PASA’s ability to regulate the upstream sector.

**vi) EDC:** Regulatory certainty will be realised now that the policy guidelines for the implementation of hydro are being operationalised.

**vii) DNA:** The capacity built through the database provides a central repository for the DoE to monitor CDM development using

internal human resources.

**viii) Energy Planning:** Effect of Energy Security Master Plan process was to highlight bottlenecks in the supply of liquid fuels and especially during periods of peak demand such as the 2010 World Cup.

**Contact:** Amir Messiha

**Results/Outcome:**

The Programme was completed in 2010. A final report was delivered by the Programme Manager and the final Annual Meeting took place in June 2010 in Pretoria.

# Institutional Strengthening of the Water Resources and Power Sectors

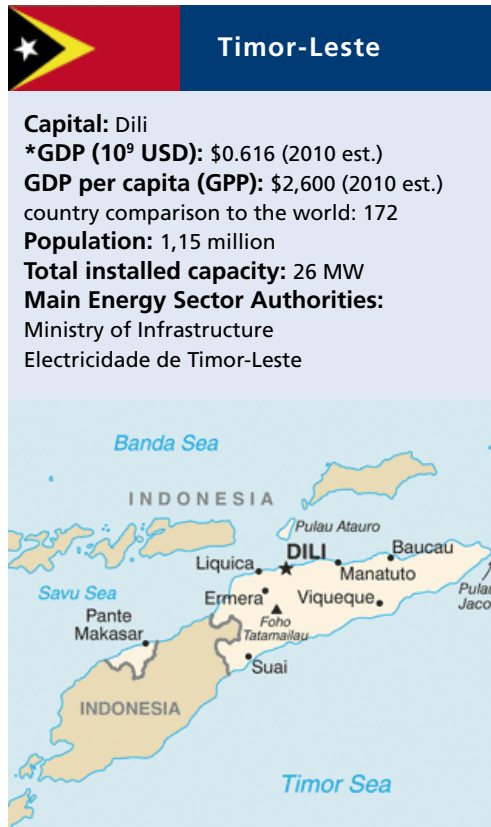
## Background:

The cooperation with Timor-Leste started with a request from the then President Alkatiri in December 2001 for Norwegian assistance within the energy sector. The request was considered favourably by Norad, and Phase 1 of the institutional cooperation between ministries in Timor-Leste and NVE started early 2003. The bilateral cooperation has moved successfully into Phase 3 based on a consolidated mutual trust and adequate response to the tasks. For additional information on the history of the comprehensive cooperation, reference is made to International Section's earlier annual reports.

## Activities and Outputs:

During 2010 the following were achieved:

- **Hydrology and water resources monitoring:** Enhanced capacity for hydrology management; Several new rainfall gauging stations installed; Potential sites for new hydrological gauging stations identified; Hydrological database, HYDATA, in operation under consolidated management; Personnel trained for operation of database; Entering of hydrological data into database continued.
- **Legal Assistance:** Lier Consulting was selected, after tendering in accordance with Norwegian procedures, to render services to NDWRM for development of a draft Water Resource Law for Timor-Leste; Contract also encompassing assistance on the Transboundary River Dialogue with Indonesia. The Consultancy commenced in December, 2010.
- **Studies and physical works regarding hydropower development:** After international tendering consulting company NORPLAN was selected to prepare the Hydropower Master Plan for Timor-Leste and to carry out Feasibility Studies for the Atsabe and Maliana HPPs. Draft Feasibility Report for Atsabe with subsequent consultations was finalized during December, 2010. Tender documents for Iralalaru Hydropower Plant was finalized in February and presented in Dili. Repair works for the Gariuai mini hydropower plant continued.



- **Capacity building and training:** English courses held for staff from cooperating institutions; 3 Timorese officials participated in the ICH course Hydropower and the Environment, Trondheim in Norway; Other training activities continued (on-the-job, courses/seminars, external studies); Two NDWRM officials attending Master studies abroad with programme support; Workshop arranged by NVE on hydrological data collection, held in November 2010 for 20 rainfall readers.
- **Various coordination and management tasks:** Resident Adviser and Education & Training Coordinator continued their work throughout 2010. A new accounting system was established and in-house personnel trained. Regular consultation meetings between NVE and MIS/ NDWRM; Cooperation with the Norwegian Petroleum Sector actors in Timor-Leste established to coordinate capacity building activities.



## Overall Project Data

**Client:** Ministry of Infrastructure (MIS), also on behalf of the respective Secretaries of State for Electricity, Water and Urbanization, for Energy Policy, and for the Environment.

**NVE Mandate:** Assistance to Government of Timor-Leste towards institutional strengthening of the Water Resources and Power Sectors, as well as facilitating physical development and improved operation of selected hydropower projects.

**Contract Value/ Duration:** MNOK 50 for Phase 3 of the cooperation, covering the period September 2009 – September 2014.

**Type of Activities:** Advisory services, incl. coordination and supervision of consultants; Institutional development and capacity building, incl. staff training and education programmes, for sector institutions; Support towards enhanced physical water/ electricity infrastructure.

**Work Completed 2010:** Key outputs during 2010:

- HYDATA established as the hydrological database with regular input of data
- New hydrological stations established.
- Tender documents for the Iralalaru HPP finalized and presented.
- Staff training: English courses held for staff members; Establishment of Human Resource Working Group to coordinate scholarships.
- 30 trained rainfall readers officially employed by the National Directorate for Water Resource Management (NDWRM).

**Work in Progress 2010:** Ongoing activities, to be continued during 2011:

- Repair works/ rehabilitation on Gariuai micro-HPP.
- Consultancy work for the Hydropower Master Plan for Timor-Leste, and Feasibility Studies for the Maliana and Atsabe HPPs.
- Scholarship programme: Selection of candidates to be enrolled in courses prioritized under the cooperation.
- Consultancy work to establish a Water Resource Law for Timor-Leste and assistance to the Transboundary River Dialogue with Indonesia.
- Continued work related to hydrology/ water resources monitoring.
- Workshops/seminars, field work, training and education programmes, preparation of documentation, procurement services, advisory services, supervision of consultants and coordination/management.





**Raingauge demonstration during training**

### Issues and Challenges:

The biggest challenge is the capacity situation at NDWRM. The Directorate is under-staffed and lacking some key expertise, given the many areas of responsibility and the need for coordination with other agencies and with donors. In the short run this situation is not likely to improve because more staff will go abroad for education through the scholarship programme. However, upon their return the situation will improve significantly with the well qualified staff members holding international experience.

The capacity situation might also be the reason why many viable hydropower projects have been identified and developed to feasibility level, but not been prioritized for implementation finance. No new investments in hydropower have been made since the beginning of the institutional cooperation back in 2003.

**Contact person:** Morten B. Johnsen

### Results/Outcome:

The long-term cooperation on energy and water resources has had a profound positive impact on Timor-Leste's ability to manage and develop its resources in these fields. To-day NDWRM is the main agency in Timor-Leste responsible for hydrological measurements and data-collection. NDWRM's strengthened position as a resource institution within the water resource and energy sector is demonstrated through their daily involvement with other authorities/ institutions, as well as with donors, requesting data, professional advice and cooperation in these areas.

Reporting of activities, outputs and results based upon defined indicators has been significantly improved during the last year.

The State Secretary for Energy Policy and NDWRM are actively involved in the development of the Hydropower Master Plan for Timor-Leste. This document is expected to become an important tool for continued and sustainable development of the hydropower resources in Timor-Leste.

Moreover, the request for NVE's involvement in the preparation of a new Water Resource Law is a further proof of mutual trust and respect built during 8 years of close cooperation.

# Hydropower Licensing Project – with MONRE/DWRM

## Background:

The project has been conceived within the overall objectives of water resources management in Vietnam: Have sustainable - technically, environmentally and socially sound - management of the water resources, particularly as regards development of hydropower projects in the country. The main specific goal is to establish licensing routines for hydropower projects which will involve all relevant authorities and stakeholders. Training of involved staff in licensing and related skills is also an important activity within the project. The Country Agreement between Vietnam and Norway was signed on 19 September 2006. MONRE and NVE signed a contract for specific services on 20 October 2006.

## Activities and Outputs:

The two workshops planned for 2010 were compressed into one with same overall contents due to limited time and funding. The workshop dealt with comments on the second draft of the hydropower licensing guidelines and with preparation of and issuing of licence documents according to the law on water resources. The number of participants at the workshop counted around 30.

A study tour to Norway was organised in September 2010. Six high-level officials from MONRE attended the study tour which focussed on hydropower licensing and development. The programme included presentations at NVE, a visit to Norad, and a field trip from Oslo to the Western part of Norway; - several hydropower developments were visited. The delegation from Vietnam found the study visit highly interesting and useful. During 2010 NVE was also involved in four actual licensing cases in Vietnam as advisers. NVE gave comments on the quality and content of applications including EIAs, and commented on the implementation process, license conditions and need for environmental flows.

## Issues and Challenges:

Hydropower licensing involves several ministries and agencies, and this process is not well coordinated in Vietnam. The order and timing of licences is not fully logical as



Vietnam

**Capital:** Hanoi

**\*GDP (10<sup>9</sup> USD):** \$102 billion (2010 est.)

**GDP per capita (PPP):** \$3,100 (2010 est.)

country comparison to the world: 167

**Population:** 89.6 million (July 2010 est.)

**Total installed capacity:** 12 400 MW

**Main Energy Sector Authorities:** Electricity of Vietnam Ministry of Natural Resources and Environment (MoNRE) Ministry of Industry and Commerce (Moi) Electricity Regulator Authority of Vietnam (ERAV)

Ministry of Agriculture and Rural Development (MARD) Ministry of Planning and Investment (MPI)



most construction work is already finished when the water licence is applied for. Tasks and responsibilities according to Vietnamese legislation have been presented and discussed in the workshops. The Norwegian licensing system and practice has also been presented as a reference for discussions and ideas.

**Contact:** Knut Gakkestad

## Overall Project Data

**Client:** Department of Water Resources Management (DWRM), Vietnam, under the Ministry of Natural Resources and Environment (MONRE).

**NVE Mandate:** Assist in formulation of the processes and capacity building package on licensing for water resources exploitation and utilization for hydropower.

**Contract Value/ Duration:** MNOK 6.157, started in 2006 and will be completed in 2011.

**Type of Activities:** Regulatory mechanisms: Hydropower licensing guidelines, standard licence documents and hydropower licence database. Work-shops, training courses, study visits, advice on actual licensing cases.

**Work Completed 2010:** One workshop, one study tour and staff training, particularly on hydropower licensing. Assisted on four cases of hydropower licensing (also for demonstration/ learning).

**Work in Progress 2010:** Elaboration of hydropower licensing guidelines (final version). Development of database for hydropower licences.

## Results/Outcome:

The workshop and study tour have helped providing inputs to the final version of the hydropower licensing guidelines which NVE is committed to in the form of a handbook. Through presentations by the Vietnamese participants and from NVE's side, through group work and discussions, and field visit observations all participants have gained new skills and insights. They have substantially improved their knowledge on how to deal with and evaluate licence applications under Vietnamese water law.

Through field visits, discussions and training they have also enhanced their qualifications for stipulation of all licence conditions and environmental flows related to hydropower development. The study tours and courses in Norway contributed duly to this outcome; - the awareness of how different aspects play together, including the important role of associated environmental and social issues, has been strengthened. The project has initiated contact and cooperation between ministries that will last beyond this project, and presumably become an institutionalized part of licensing in Vietnam. The project activities have provided valuable input to the on-going revision of the Law on Water Resources. The above assessment of results is based on feedback from individual Vietnamese participants and from their respective institutions.



Representatives from MONRE on field trip to Western part of Norway



## Other assignments


In addition to work for Norad and the Ministry of Foreign Affairs, NVE has carried out a few assignments within the water and energy sector as a result of bilateral contacts. Institution and capacity building within the government sector is a common feature for all those assignments, which are funded from various sources.

# Euro Electricity Market Design and Implementation

## Background:

The purpose of the project is to contribute to the improvement of legislation and implementation of an efficient and competitive electricity market in compliance with EU legislation and Regional Initiatives in Bulgaria. The project is funded from the Norwegian EEA Grants as part of the Norwegian Cooperation programmes with Romania and Bulgaria. NVE had established the contacts with Bulgarian authorities in early 2008, and this programme component was based on the partnership agreement between the MEET and NVE. Some activities were allowed to commence already in September 2009, about a month before signing of the Grant Offer Letter between Innovation Norway and the MEET.

Initially the project had been given high priority but was later put on a wait-list, awaiting priorities and screening. Innovation Norway had, as a first step, only provided a lump sum covering about 10% of the estimated full project costs. The partners then agreed to scale down the first phase of the project, covering preparation of a “road map” towards the Bulgarian Day-Ahead Market (DAM). If more Norwegian EEA Grant funds become available for the project later (i.e. phase II), new requests will probably be prepared in order to implement fully the power exchange mechanisms, as well as the DAM.

	<b>Bulgaria</b>
<p><b>Capital:</b> Sofia  <b>*GDP (10<sup>9</sup> USD):</b> \$44.84 (2010 est.)  <b>GDP per capita (PPP):</b> \$12,800 (2010 est.)            Country comparison to the world: 89  <b>Population:</b> 7.1 million (July 2010 est.)  <b>Total installed capacity:</b> 11.169 MW  <b>Main Energy Sector Authorities:</b> Ministry of Economy, Energy and Tourism</p>	
	

## Overall Project Data

**Client:** Ministry of Economy, Energy and Tourism (MEET).

**NVE Mandate:** Assistance to MEET on improvement of legislation and implementation of an efficient and competitive electricity market.

**Contract Value/ Duration:** € 383,000 (of which € 57,000 for in-kind expenses) from Innovation Norway within the Norwegian Cooperation Programme with Bulgaria. Project started officially 13 November 2009, lasting up to 14 December 2010.

**Type of Activities:** Preparation of guidelines and procedures for commercialized electricity market management.

**Work Completed 2010:** Final report from the project is completed. It has according to the plan also been held four work sessions.



### Activities and Outputs:

Project work started after a kick-off meeting in Bulgaria, September 2009. The Nordic power market has served as a benchmark for development of national and regional power markets world-wide for more than a decade. The project contains work on the preparation of draft guidelines, rules and procedures for important electricity market actors, working sessions and workshops/conferences as arenas for developing consensus, adopting recommendations and formulating plans for completion as per the original project concept.

Statnett SF and Nord Pool Consulting AS have assisted NVE during implementation of the Activity Plan. The first report presented some main features of the Nordic power market, in particular the roles of the Norwegian Regulator (NVE), the Transmission System Operator (Statnett) and the Market Operator (Nord Pool Spot) – and relating these to the Bulgarian situation. After outlining some main features of the Nordic power market, the main focus of the report has been to explain the market monitoring/surveillance functions of each of these three actors.

The last two chapters of the report deals with conclusions and recommendations on the way forward; - how the electricity market in Bulgaria can be developed further. There have been four working sessions, in accordance with the current plan, where key market management issues have been presented and discussed.

### Issues and Challenges:

The delay and curtailing of funds caused some initial frustrations but with the first phase well underway, motivation was fast returning. The lack of familiarity with and understanding of the commercial approach to power market management (policy, regulation, distribution of roles and marketing-/pricing- mechanisms) has constituted a challenge. This aspect was duly addressed in the Activity Plan, and it is now up to the Bulgarian partners to disseminate and promote the relevant knowledge among politicians, bureaucrats and other actors in the electricity sector.

**Contact:** Bjørn Aulie

# Information System for Water Permits and Monitoring Management

## Background:

Being a new European Union (EU) member country, Bulgaria is facing a number of challenges in adapting to EU rules and regulations. The Norwegian Ministry of Foreign Affairs is supporting and facilitating this process in some sectors with funds channelled through Innovation Norway.

As an important part of Bulgaria's water management policy and in order to fulfill the EU Water Framework Directive, the MoEW needs to develop a system for registration, monitoring and control of water bodies, especially to control discharge points and to provide information to the public online on the status of the permits. MoEW has developed a project for Information System (IS) with this scope, based on its structures, existing systems, collected data, and within the existing resources. The resources are not sufficient for the activities envisaged by the MoEW for realization of the integrated water information system. In its planned form it is expected to include services and data collection, monitoring of ground water, registration of discharge

points, quality control of the water, as well as support to public awareness. In 2008 the MoEW, in cooperation with NVE, prepared an application for funds based on clear objectives, proposed activities, and envisaged results. Approval was subsequently received from Innovation Norway in early 2009. The project officially started in December 2009 and will now end by April 2012, following the 1 year extension.

## Activities and Outputs:

In 2010, two major sets of activities were completed:

- A study tour in Norway for 13 Bulgarian participants from the Water Directorate and the 4 Basin Directorates.
- Procurement for the software component. This included the preparation of Terms of Reference, Request for Proposals, evaluation of proposals and preparation of Evaluation Report. Contract with the winning software consulting consortium was signed in August 2010.

## Overall Project Data

**Client:** Ministry of Environment and Water (MoEW)

**NVE Mandate:** Assistance to MoEW in setting up a database system for registration, monitoring and control of water uses and licensing.

**Contract Value/ Duration:** € 1.386.080 (grant of € 1.177.535 from Innovation Norway within the Norwegian Cooperation Programme with Bulgaria, and € 208.545 co-financed by MoEW). Project started officially 1 December, 2009, and with planned ending by 30 April 2011. However, due to delays, the project has been granted an extension until April 2012.

**Type of Activities:** Study visits, preparation of documents, procurement activities, technical assistance, advisory services, advising on database system set ups (both software and hardware), and training workshops.

**Work completed in 2010:** Study visit of 13 Bulgarians from MoEW in Norway, preparation of the technical specifications, procurement, tender evaluation and contract signing with the winning consortium for the software component.

**Work in Progress 2010:** Implementation of the software project.



**Study visit of experts from Bulgarian Ministry of Environment and Energy.**

The Software consulting consortium is in the process of executing their tasks. During the inception phase the Consultant clarified the requirements of the tender documentation and the proposed technical solution. This phase was immediately followed by the in-depth business analysis and functional specification of the system.

A working group consisting of staff from the four River Basin Directorates and the MOEW was formed to liaise closely with the Consultant. The Bulgarian project coordinator, employed by NVE, also participated in the group's meetings together with its members and the Consultant. The development process started immediately after the Consultant presenting of the functional specifications. The pilot project was started and proposed changes observed while implementing the system. The development and implementation of the software component are expected to finish at the end of February 2011.

### **Issues and Challenges:**

The procurement process was long and complicated due to fear of complaints from non-successful bidders and the heavy bureaucracy therefore surrounding the entire process. The roles of partners were not clearly defined and understood by MoEW. This caused misunderstandings and conflicts between partners. However, the issue was clarified and the cooperation has been greatly improved lately.

The River Basin Directorates - with preference for maintaining separate, local databases - have opposed the centrally located database system, thus creating challenges for project

execution. In order to resolve these challenges, an awareness workshop was organised to demonstrate the advantages of the centralized system using examples from NVE.

The project is now commencing the next two main activities: i) entry of non-structured data, and; ii) delivery of required software licenses and hardware equipment.

The second activity has been delayed due to disagreement on the architecture (structure/ design/ lay-out/ agency roles/ roll-out) of the system. As the project has been extended until April 2012, it should be feasible to have this activity completed within the project time. The management actions prompted to deal with the risks caused by this delay is to use temporary software licenses for the system and to make use of existing hardware, reallocated on temporary basis for the project purposes.

**Contact:** Kim Chi Tran-Gulbrandsen



# Regional Cooperation in Europe

## SPLASH - Coordinating European Water Research for Poverty Reduction

### Background:

Established in 2007, SPLASH is part of the European Union Water Initiative Research Area Network (EUWI Era-Net), working towards strengthening research in Europe. The Concept Note 14, entitled “Water and Energy: Sustainable development of hydropower involving the private sector in research collaboration in the Lower Mekong Region” (SPLASH-Mekong), was developed by NVE jointly with other SPLASH members.

The private sector has been involved significantly in hydropower development in the Lower Mekong region. As the regulatory framework is weak, serious negative impacts on environment and society have been observed. The Concept Note called for a better cooperation among various stakeholders, namely academics, decision makers, regulators, NGOs and private developers in order to

achieve sustainable development of hydropower in the region. The Note was presented to the SPLASH Scientific Advisory Committee and SPLASH funders, and was accepted for funding by the Ministry for Foreign Affairs of Finland.

The “SPLASH-Mekong” sub-project was developed. The overall goal of the project was to increase cooperation between research and private sector in hydro energy development in the Lower Mekong region.

### Activities and Outputs:

i) In coordination with the Belgian Ministry of Foreign Affairs, SPLASH hosted the “Good Practice Workshop – Sharing our Learning and Planning our Future” in Brussels from 27-29 October. The workshop served the dual purposes of sharing findings and good practice between SPLASH and research and develop-

### Overall Project Data

**Client:** EU-FP6 and the Finnish Ministry of Foreign Affairs.

**NVE Mandate:** i) Implement the SPLASH project. ii) Develop, execute and manage the sub-project “Water and Energy: Sustainable development of hydropower involving the private sector in research collaboration in the Lower Mekong region” (short name: SPLASH-Mekong project).

#### Contract Value/ Duration:

€ 109.649 for NVE from EU-PF6 (above task i)), and € 150.000 from the Finnish Ministry of Foreign Affairs (above task ii)). The two tasks have start - end years as follows: Task i) 2007 – 2010, with 1 year extension to Dec 2011; Task ii) 2009 – 2010 .

**Type of Activities:** Data collection, project development, preparation of project documents, workshops, seminars, reviews, technical advisory and supervision, project management.

**Work Completed 2010:** The SPLASH-Mekong project was completed in 2010.

**Work in Progress 2010:** Provide support to and reporting on the SPLASH project implementation. Participate in preparation for the extension of SPLASH into Phase 2.



**Floating village on Tonle Sap, Cambodia**

ment partners; and engaging these relevant stakeholders to discuss and refine the future plans for SPLASH beyond December 2010.

ii) The SPLASH-Mekong project activities consisted of assessing the research, knowledge transfer and capacity building at the academic level and in the private sector on various topics related to hydropower development, organizing an interactive workshop with participation of academics, decision-makers, private sector and NGOs in order to get their recommendation on how to improve the cooperation among various stake holders, to achieve sound private sector involvement in sustainable hydropower development, and to facilitate the application of scientific research findings/ results at practical and policy levels. Specifically, the project activities and outputs are as follows:

- National and regional consultants were contracted.
- Four academic reviews on the status of research, knowledge transfer and capacity building were done for the 4 Lower Mekong Basin (LMB) countries, namely Cambodia, Laos, Thailand and Vietnam, and published in the project final report.
- The regional review entitled “Mekong hydropower development: a review of governance and sustainability challenges” was completed and published in the project final report.
- Internet questionnaire and interviews related to multi-criteria decision analysis were completed and published in the project final report.

- The regional workshop entitled “Regional Workshop for Coordination of Research on Hydropower Development in the Lower Mekong Basin” took place on 14-15 September 2010 in Vientiane, Laos with 63 participants, who mainly came from Cambodia, Laos, Thailand and Vietnam. The workshop report can be downloaded at [http://www.splash-era.net/news\\_events3.php](http://www.splash-era.net/news_events3.php)

- The project’s final report was ready at the end of December 2010 and available for download at [http://www.splash-era.net/news\\_events3.php](http://www.splash-era.net/news_events3.php) . Besides the reviews, the findings from internet questionnaires, and interviews related to Multi-Criteria Decision Analysis (MCDA), the report is also presenting outlines of themes for North-South-South collaborative activities.

- The proposed themes’ focus is on research projects and capacity building programmes related to sustainable hydropower and funding opportunities. The outlines aims at facilitating cooperation among the Southern researchers and NGOs by providing information on research topics of relevance to sustainable hydropower development in the LMB and potential funding opportunities.

- Fact-sheet and policy brief (in the form of Learning Note) related to hydropower development in the LMB were produced and widely distributed as hard copies as well as internet download.

### **Issues and Challenges:**

The identification of Lao consultants was difficult, mainly due to communication



problems, such as bad internet and telephone connections. The Lao consultant was contracted much later than from other LMB countries.

It was difficult to get the private sector, especially Chinese companies, to participate in the project. Generally there was a lack of interest and, particularly in the case of the Chinese, political reasons played a role. Only 5 participants from the private sector actually

**Water sale, Mombasa, Kenya: Retail price 10-100 times "official" water rates**

attended the workshop. This fact makes it opportune to consider the possible lack of incentives for private sector actors to participate; - were the short/ medium term business opportunities "disguised" or too weak?

**Contact:** Kim Chi Tran-Gulbrandsen

## Results/Outcome:

The SPLASH-Mekong workshop set up a forum for discussions and networking among academics, NGOs, decision-makers and private sector. It hopefully sets a basis for future North-South-South cooperation in research and capacity building related to sustainable hydropower development in the LMB.

Based on the results and recommendations of the SPLASH-Mekong project, a Concept Note entitled "Launching of a Joint Call for a Collaborative Research Programme on Sustainable Hydropower Development in the Lower Mekong Basin" was made by NVE in collaboration with Danish Water Forum and presented at the SPLASH workshop in Brussels in October 2010.

The proposed actions are currently pending, awaiting a decision on the SPLASH project's extension into the second phase. It is intended during the SPLASH second phase that financial supports will be solicited from various funding agencies in order to carry out research as set out in the Concept Note.



## NVE's Role, Competence and Experiences

This year's Annual Report introduces a separate chapter addressing the competence and experience issues; - as background to readers unfamiliar with NVE and with Norwegian water/ energy management practices, and as a "window" for review of lessons learned from the international activities.

A brief history is given of NVE's evolving role from early water laws and from its predecessor institutions up to present time's tasks and responsibilities. Light is then shed on how this current mandate requires NVE to stay on the cutting regarding knowledge management for the water/energy sector. Dealing with this challenge has an enabling effect on NVE also for the international assignments.

Finally, some of the recent experiences are summarized.



Electric energy from remote rivers via high tension power lines to the demand centers.  
Photo: Sissel Riibe/NVE

## Water Resources and Energy Management in Norway

Inland waters – lakes and rivers – have since time immemorial been important for the location of settlements and their developments. The first simple “laws” and common rules on water rights date back about 1000 years. Gradually governance of water became legally linked to the economically important forestry, agriculture and transportation sectors – clearly evidenced already from the 17th century. The first Water Course Act dates from 1887, - in anticipation of extensive hydropower development. The revised Act, with provisions for Concessions (i.e. comprehensive Licenses) for hydropower, came into force in 1917. After several amendments, new acts and subsidiary regulations, the current Water Resources Act was adopted in 2003 as the modern legal instrument for governance of water in Norway.

The institutional framework has always reflected the primary “priorities of the time”, - starting from transportation (incl. floating of large quantities of timber) via grinding-/saw-mills to hydropower and increasing focus on the environmental concerns. The present day’s NVE, which is now under the Ministry of Petroleum and Energy (MPE) has evolved from the first formal institutions in charge of “water matters”, initially the Directorate of Canals and Harbours formed in 1804. The Norwegian Water Resources and Electricity Administration was established in 1927. This became the first “NVE” with a similar, although both wider and a less focused mandate than at present.

During the most intensive period of hydropower development in Norway (1950s –1970s), NVE was largely a huge “all-in-one” institution with internal directorates responsible for regulation/licensing, development, and opera-

tion/distribution in relation to electric power. The next major shift came as the Government decided to separate regulatory functions more clearly from the executive (and commercial type) functions in 1986; - the present NVE retained the key regulatory role, along with resource monitoring and inspectorate functions as shown in the organizational chart of NVE. There is now strong focus on independent, knowledge based decision support. The hydropower production and transmission functions were separated and transferred to new state owned enterprises with commercial objectives; - an important aspect of this new regime is extensive outsourcing and exposure to competition (or production targets passed by NVE/MPE).

Over the years, a set of complementary laws have been passed to cater for all aspects related to governance, development and management/operation of water resources in Norway. To ensure checks and balances, responsibility for the various acts fall under different Ministries such as the Ministry of the Environment (e.g. pollution control and general spatial planning issues), the Ministry of Health (e.g. water quality) and the Ministry of Fisheries (e.g. inland aquaculture and fish farming), in addition to the portfolio of MPE. In addition, all of these water and energy governance issues entail important roles for local actors, notably the Local Authorities.

## NVE in the “Knowledge Business” for Water and Energy

The evolving governance structure for water and energy in Norway provides good lessons for continued refinement and high quality of water resources management within NVE’s mandate. These lessons are equally relevant for countries where the water resources/energy sector management is only now gaining momentum, or where highly centralized



government structures without separation of the regulatory and executive functions hinder efficiency, transparency and accountability.

In order to execute its mandate in Norway, NVE has to conduct continuous research and development, – both alone, in collaboration with other sector relevant authorities, and by engaging research institutions. NVE is committed to be at the cutting edge on matters pertaining to water resources/catchments (basins), electric energy, concessions/licensing for the sector, landslides where there are water related risk factors, electric power markets, as well as safety and security (energy supply, damage safeguards, environment).



The NVE mandate requires two different and equally important approaches with a view to conduct a legitimate and competent role in decision-making and promotion of reforms (e.g. the new laws/regulations):

■ **Manage all relevant water resources and energy data;**

- collection, analyses, reporting and dissemination of findings; - setting agenda for continued and expanded routine work and/or research.

■ **Ensure transparent ways of doing the water/energy business;**

- interface with partners, competing actors, central/local level authorities, and society/community; organize adequate and transparent hearing processes.



**Top left - bottom: Measuring head to value energy potential; “Monumental” electricity pylons; Water stored as snow is essential part of hydrology in Norway; The Vemork power station, commissioned in 1911 by electro-chemical industrial company. Opposite page: Earth-/rock-fill dams often used in mountain areas of Norway**

The readers are referred to NVE’s web pages for more information. Go to home page: [www.nve.no](http://www.nve.no) and click on “English” for access to English languages content. The page contains a lot of relevant and illustrative information, reflecting on the professional and scientific duties of NVE. Some links, e.g. “real time hydrological data”, will take you to detailed information with text in Norwegian but there are simple vocabularies to help foreign readers. Annual Reports of the International Section are available from

2003 onwards on: [www.nve.no/en/About-NVE/International-work](http://www.nve.no/en/About-NVE/International-work).

It is by drawing on the historical, as well as present day’s tasks and challenges, that NVE’s advice and management of activities in foreign countries can be made relevant and legitimate. In our organization high competence levels and analytical skills are at a pre-



mium, and we believe this to be our competitive advantage in our overseas endeavors.

## Learning from Experiences Abroad

The foreign activities of NVE are always linked with the corresponding competencies required and used in Norway. While respecting each country's right to make their own policy/strategy decisions – and indeed having a genuine ownership to them – the experiences and “best practices” gained by NVE can no doubt be brought to bear also in the different situations abroad. It is more than 50 years since the first systematic collaboration with developing countries' water resources authorities began.

In order to systematize the lessons learned – and being able to disseminate and share them with other partners – NVE will from now onwards request its project staff to report on lessons learned. These can be in terms of positive and negative “anecdotes”, as well as sophisticated statistics, new draft legislation or practical guidelines.

Some lessons learned from recent years institutional cooperation with NVE partner countries include:

### ■ Successful dialogues leading to reform and improved sector management:

Such achievements do take time; - to understand, to accept, to promote. What made it work: The Bhutan experience demonstrates how important it is to take issue with changing circumstances immediately; - India moved

in as a major investor and NVE's support was redirected from feasibility study type pre-investment work towards capacity building to strengthen Bhutan's capacity to pursue a coherent sector strategy in line with overall poverty eradication and other development goals.

■ **Observing the “tension” and “stress” making foreign/Norwegian lessons and “best practices” hard to adopt:** Any country will start out with a set of “givens”, - both facilitating and constraining factors. The Timor-Leste experience shows the importance of patience, responsiveness and mutual trust; - through a long term presence NVE has built good rapport with the institutions, helped developing them and, in addition, adopting a training-by-doing approach. As a result, NVE is now assisting the sector authorities with hefty legal issues such as the drafting of new water resources legislation and the negotiations concerning transboundary river issues.

■ **Resolving project implementation issues:** Some projects struggle with cumbersome procedures, rules, and resistance towards making decisions. The reasons might be incompatible procurement and accounting rules or over-cautious officials afraid of being accused of corruption or favoritism; - one option is to put in place a semi-autonomous implementation unit operating under tailor-made rules acceptable to both parties. Similar concerns have been raised with reference to collaboration in several countries. Needless to say: Such “one-off” units do have advantages from efficiency point of view but the sustainability of implementation capacity thus utilized might be questionable.

■ **Enabling the next steps in sector development:** Sustainable and cost-effective sector development may often require that successfully reformed and equipped institutions are put in place before the development pace is increased. Such approaches are challenging for donors and responsible governments alike; - results need to be tangible and measurable but many of the preparatory activities – the capacities to be in place – are often time consuming and their outputs are difficult to measure. This is a concern both at the overall sector level (good policy before accelerated construction of trunk infrastructure) and also at the “local” institutional level (testing laboratory needing analytical capacity and confident/competent staff as well as up-to-date equipment and transportation facilities). This dilemma is reflected in nearly all project activity descriptions, and they are addressed differently both for good and for not so good reasons.



Photo: Rune Asgaard

# Appendices



# Appendix I

## TOTAL INVOICED 2010 Norad/Ministry of Foreign Affairs

Proj.no	Activity	NVE Hours	Fee charged (NOK)	NVE-adviser (NOK)	NVE expenses (NOK)	Consultants (NOK)	Total (NOK)
32001	General assistance Delegation to Nepal Angola. Slutføring av vann og energiprojekter	889,75 71,00	765 185,00 61 060,00		39 513,09 283 688,41 17 548,65		804 698,09 283 688,41 78 608,65
32076	Energy Expert to SADC. Royal Norwegian Embassy, Mozambique	62,00	53 320,00	1 385 836,37	683 165,82		2 122 322,19
32091	Feasibility Studies of the Mandaya and Bek-Abo Multipurpose Hydropower Projects	707,75	608 665,00	396 971,04	202 416,34		1 208 052,38
32092	Liberia. Ministry of Land, Mines and Energy. Preparation of Project Document	253,00	217 580,00		783,00	124 082,00	342 445,00
32094	The Philippines. Flood warning system	30,00	25 800,00				25 800,00
32095	Montenegro.Strategic Environmental Impact Assessment. Study at the Morača River	254,75	219 085,00		43 241,69	1 036 286,00	1 298 612,69
32098	Nepal. Verification Mission 2009	68,00	58 480,00		21 036,07	867 808,50	947 324,57
32104	Tanzania. Routines for operation and maintenance	884,25	760 455,00		183 898,11	239 709,31	1 184 062,42
32105	Nepal. Energi Seminar	150,75	129 645,00		48 467,75	84 705,50	262 818,25
32108	Nepal Energy Minister. Visit to Norway	96,50	82 990,00				82 990,00
32109	Tanzania. Monitoring Twinning Agreement Tanesco-Statnett	32,00	27 520,00				27 520,00
32110	Nicaragua. Fact Finding Mission	161,50	138 890,00		100 818,71		239 708,71
32112	Nepal. Energy Strategy	87,50	75 250,00		27 725,10		102 975,10
32113	Bolivia. Erfaringsutveksling	8,50	7 310,00				7 310,00
32114	Mozambique. Norconsultstudier	10,50	9 030,00				9 030,00
<b>TOTAL</b>		<b>3 767,75</b>	<b>3 240 265,00</b>	<b>1 385 836,37</b>	<b>1 846 857,44</b>	<b>2 555 007,65</b>	<b>9 027 966,46</b>

# Appendix II

## TOTAL INVOICED - INSTITUTIONAL COOPERATION 2010

Proj.no	Activity	NVE Hours	Fee Charged (NOK)	NVE-adviser (NOK)	NVE expenses (NOK)	Consultants (NOK)	Total
32543	Nepal. Department of Electricity Development	261,00	224 460,00		91 073,48		315 533,48
32106	Nepal. Department of Electricity Development. Prep. for new inst. agreement	500,75	430 645,00		157 744,55		588 389,55
32550	The Philippines. The Provincial Government of Oriental Mindoro	123,00	105 780,00		1 831,98	36 173,81	143 785,79
32551	Vietnam. Ministry of Natural Resources and Environment	988,50	850 110,00		378 643,45		1 228 753,45
32553	South Africa. Department of Minerals and Energy. Hydrocarbons sub- programme	23	197 800,00		120 835,88		318 635,88
32555	Bhutan. Department of Energy	2 974,68	2 558 224,80		1 067 069,37		3 625 294,17
32556	Bhutan. Department of Energy. Accelerated Hydropower Development Programme	303,20	260 752,00		92 490,39	4 817 217,50	5 170 459,89
32557	Ghana. Water Resources Commission	407,50	350 450,00		196 672,92		547 122,92
32558	Timor Leste. Ministry of Infrastructure. Phase III	1 142,75	982 765,00	1 437 684,88	632 393,76	541 184,46	3 594 028,10
32559	Liberia. Ministry of Lands, Mines and Energy	596,00	512 560,00		265 151,20	1 677 313,82	2 455 025,02
32560	Ethiopia. Ministry of Water Resources	1 183,50	1 017 810,00		769 387,11		1 787 197,11
<b>TOTAL</b>		<b>8 710,88</b>	<b>7 491 356,80</b>	<b>1 437 684,88</b>	<b>3 773 294,09</b>	<b>7 071 889,59</b>	<b>19 774 225,36</b>

## Appendix III

## NVE's Participation in International Research and Cooperation with International Institutions

### Energy:

#### International Energy Agency (IEA)

Wind Energy: Member of the Executive Committee for the Implementing Agreement for Cooperation in the Research, Development and Deployment of Wind Energy Systems. Participate in Annex for Integration of wind and hydropower systems and Annex for wind system integration.

#### IEA Hydropower Implementing Agreement

Participates in the Executive Committee, the Small Scale Hydropower annex and in the preparation of an annex on valuation methodology for hydropower's systems balancing and ancillary services.

#### 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 electricity and gas in Europe.

#### The European Regulators' Group for Electricity and Gas (ERGEG)

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

#### International Council on Large Electric Systems (CIGRÉ)

CIGRE (International Council on Large Electric Systems) is one of the leading worldwide Organizations on Electric Power Systems, covering their technical, economic, environmental, organisational and regulatory aspects. NVE participates, inter alia, as a member of the Board in the Norwegian national committee and as a member of the study committee on System Environmental Performance.

#### European Committee for Electrotechnical Standardization (CENELEC)

CENELEC's mission is to prepare voluntary electrotechnical standards that help develop the Single European Market/European Economic Area for electrical and electronic goods and services removing barriers to trade, creating new markets and cutting compliance costs.

#### The Union of the Electricity Industry (EURELECTRIC)

Its mission is to contribute to the development and competitiveness of the electricity industry and to promote the role of electricity in the advancement of society.

#### CIREN – International Conference on Electricity Distribution

CIREN works for the purpose of increasing the business relevant competencies, skills and knowledge of those who see themselves as a part of the electricity distribution community. CIREN is dedicated to the design, construction and operation of public distribution systems and of large installations using electrical energy in industry, services and transport. CIREN covers the whole field of Electricity Distribution Systems and associated services, including dispersed and embedded generation issues, the technical aspects of Electricity Supply and related aspects such as cost reduction, environment, regulation, organisation and related IT systems.

#### 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, and Greenland.

## **NATO; Industrial Planning Committee (IPC)**

Ad Hoc Working Group on the Protection of Energy-Related Critical Infrastructure (AHWG), subgroup electricity. The aim of the working group is to examine the electricity infrastructure and resulting vulnerabilities and 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 CENELEC Joint Expert Group Critical Infrastructure - Energy Supply has identified needs and possibilities for standardisation activities for security and emergency preparedness within energy supply.

## **NordVind**

Wind power working group appointed by the Government Officials Committee for Energy under the Nordic Council of Ministers. Collecting and communicating national experiences from practice and procedures as well as

results from R&D projects to create a Nordic “best practice” for wind power development

## **International Commission on Large Dams (ICOLD)**

NVE has the secretary function for the national dam 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.

## **European Governments Dam Safety Network**

Forum for sharing experience on issues relevant to dam safety between national authorities.

## **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 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).

## **Cooperation with EU/EEA:**

Stakeholders Forum related to a European Flood Action Programme. Norway has one representative; from NVE. In 2007 the forum was replaced by a Working Group F (WG F),

dealing with the theme Flood risk management as part of the working structure for the Common Implementation Strategy (CIS) for the Water Framework Directive (WFD).

The objectives of WG F are:

- support the implementation of the EU Floods Directive (adopted in 2007)
- ensure a platform for coordination with the WFD.
- ensure links with other CIS activities
- provide a platform for information exchange. As part of this Norway organised a workshop together with the Netherlands in Oslo Jan 31 - Feb 1, 2007 on the relation between flood risk management and land use planning.

#### **China:**

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

(2) Workshop, Beijing 21. - 22. March 2007 "Climate Change and Possible Effects on Water Resources in Mountain Areas"

(3) Cooperation between NVE and Haihe Water Conservancy Commission concerning groundwater monitoring and water management practices

**EU:** Participation and Vice Chair in COST 731. Long term research cooperation dealing with uncertainty in meteorological- and hydrological forecasting. NVE contributes to the EU WATCH project together with partners from other Nordic and Baltic hydrological services (climate and energy related research).

**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.

**WMO:** National representation in international forums under WMO on operational hydrology (Hydrology Department)

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

#### **UK – Centre of Ecology and Hydrology:**

Long-term cooperation with CEH in hydrology.

#### **Republic of Croatia**

Regional Workshop on Hydrological Forecast and Real Time Data management in Croatia, May 2009, Dubrovnic. Cooperation between Meteorological and Hydrological Service in Croatia and NVE.

#### **Montenegro Hydrometeorological Institute, Podgorica:**

Preparation of masterplan for hydrological network and data acquisition in Montenegro. Cooperation between Meteorological and Hydrological Service in Montenegro and NVE

#### **The Republic of Serbia:**

Hydrological Flood Forecasting System for Small and Medium Sized Catchments in Serbia. Cooperation between Republic Hydro-meteorological Service of Serbia (RHMS) and NVE.

#### **The Republic of Armenia:**

Hydrology in Armenia, cooperation between Armenian State Hydrometeorological and Monitoring Service (ArmStatHydroMet) and NVE.



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