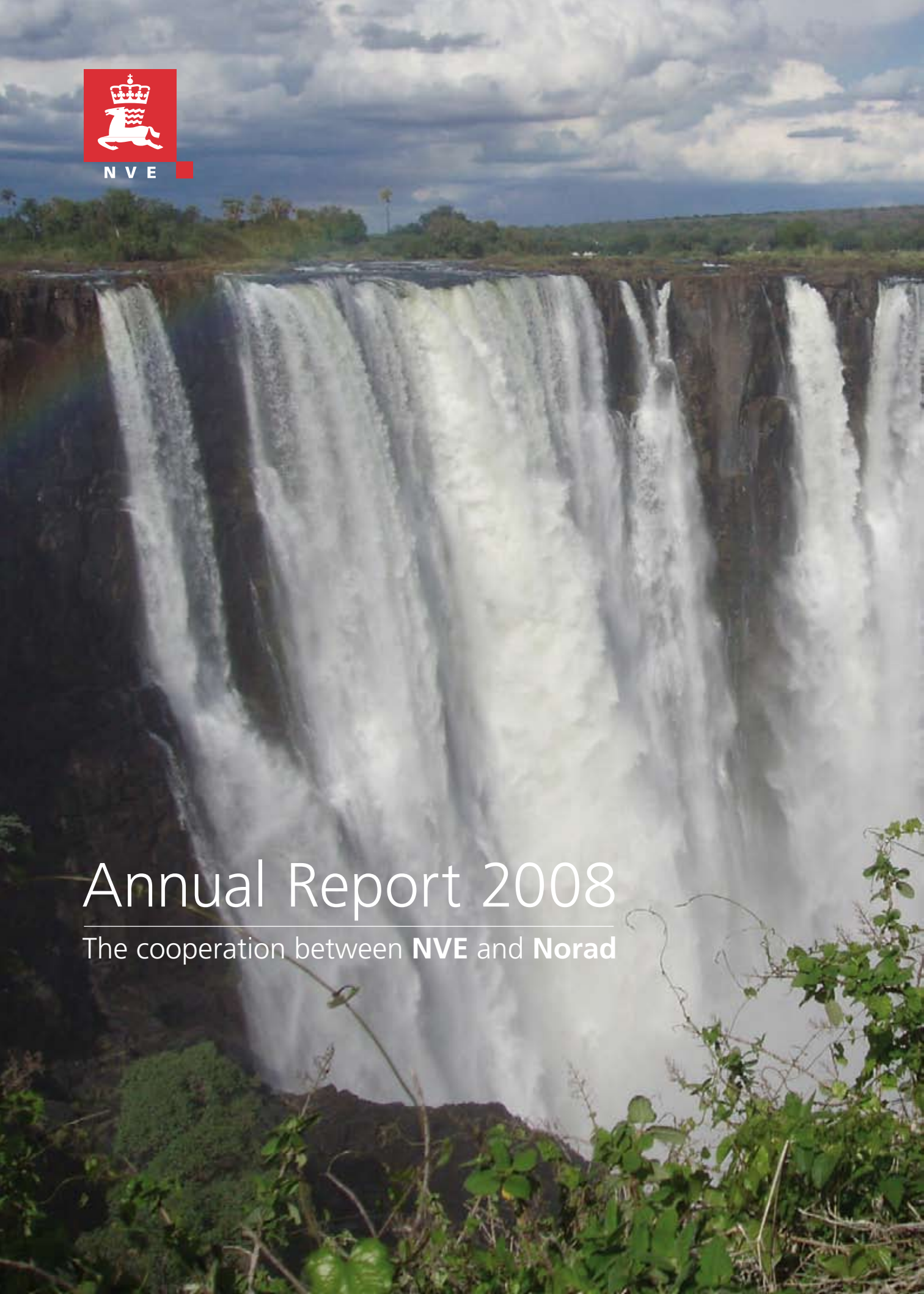

NVE

Annual Report 2008

The cooperation between **NVE** and **Norad**

Content

«Water and energy for a **sustainable** development»

The Report is available at: www.nve.no

Chief Editor: Sverre Sivertsen

Editor: Lisbeth Karijord

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Preface

Energy and water are fundamental factors in the struggle to combat poverty, improve health conditions, and increase prosperity in the developing world. The Norwegian Water Resources and Energy Directorate (NVE) has worked in the field of energy for more than 100 years, and with water for nearly 200 years. During all these years the organisation has acquired a vast amount of experience and knowledge which, combined with the cooperation with the Norwegian Agency for Development Cooperation (Norad) for more than 30 years, has given NVE a great experience in development assistance within the fields of energy and water.

An integrated and environmentally sound management of Norway's water and energy resources has always been high on the agenda, gradually institutionalised through laws, regulations and guidelines. Increased pressure on fossil fuels and energy sources as well as on water necessitates higher emphasis on environmentally friendly energy production and consumption, and on increasing use of renewable energy. Norad has therefore, during recent years, prioritised development assistance within the energy and infrastructure sector, in which NVE with it's vast experience and knowledge is well qualified to assist.

For the assistance to be successful, however, institutional and capacity building, and institutional cooperation with a long-term perspective is a prerequisite. Hopefully NVE, in cooperation with other directorates and organisations, as well as with private consultants, can assist in ensuring its success.

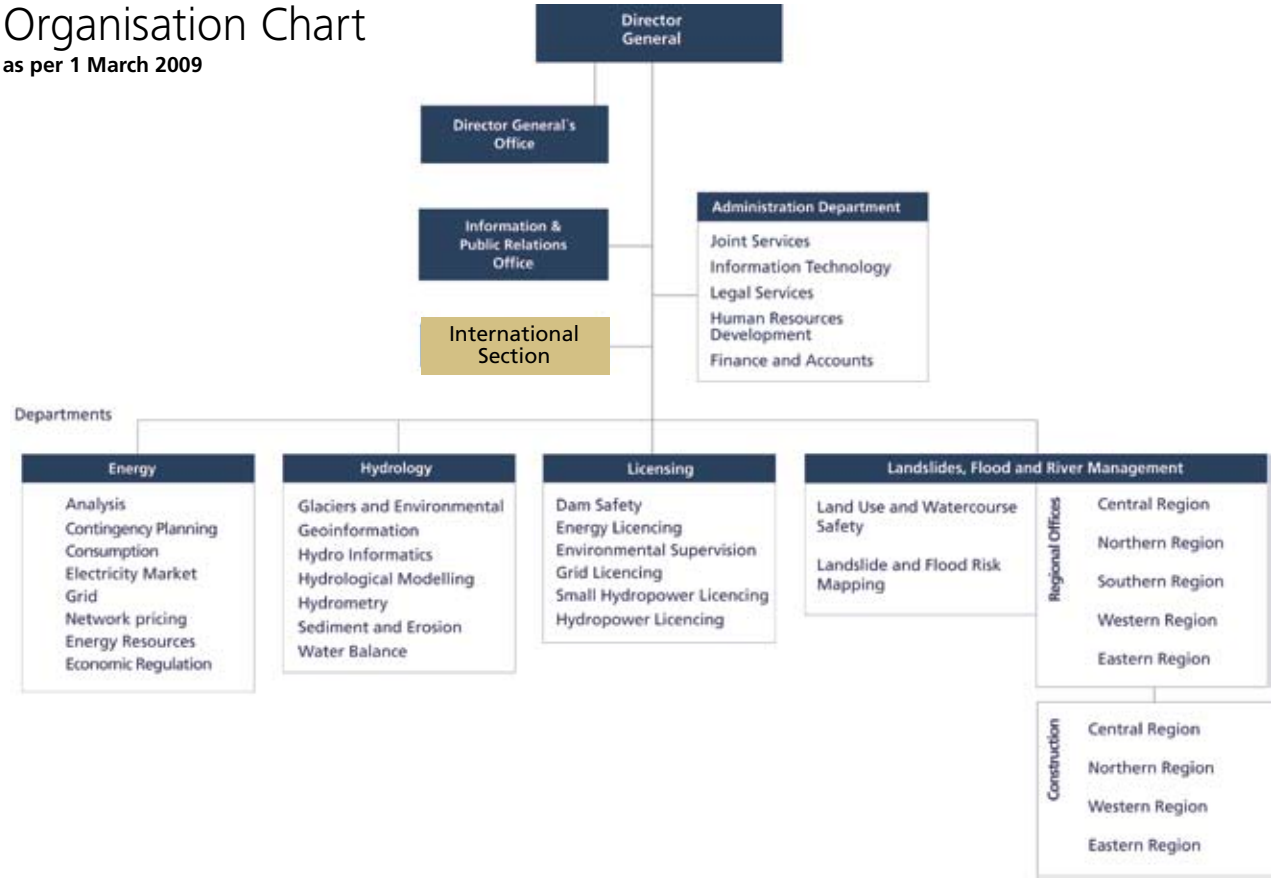
Agnar Aas
Director General

Organisation of NVE as per 1 March 2009

Established in 1921, the Norwegian Water Resources and Energy Directorate is a directorate under the Ministry of Petroleum and Energy and is responsible for the management of Norway's water and energy resources. Our mandate is to ensure an integrated and environmentally sound management of the country's water resources, to promote efficient energy markets and cost-effective energy systems and contribute to the economic utilization of energy. We are Norway's national centre of expertise for hydrology, and play a central role in national flood contingency planning. NVE also has the overall responsibility for maintaining national power supplies. NVE is based in Oslo and has five regional offices in Norway and a total of 469 employees.

Organisation Chart

as per 1 March 2009



CONTACTS in International Section as per 1 March 2009

Switchboard (+47) 22 95 95 95

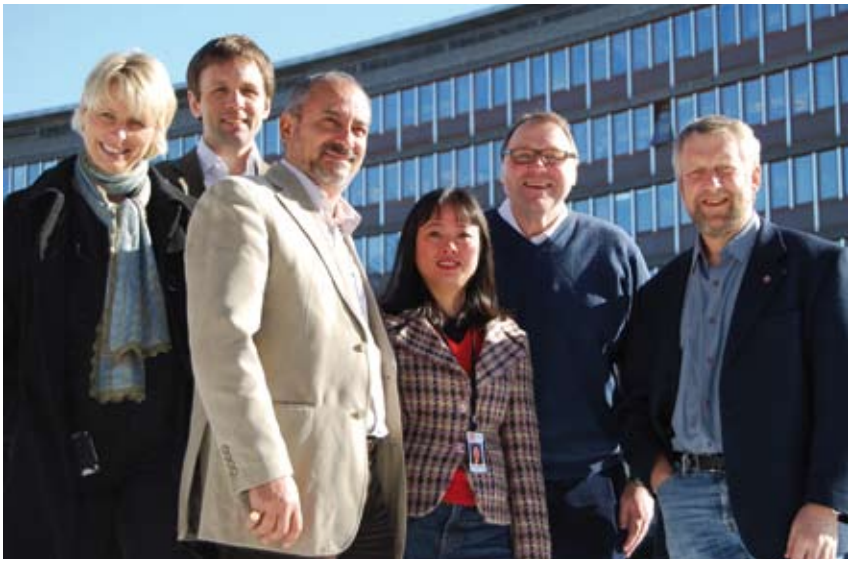
Names	Office	Mobile	E-mail
Morten B. Johnsen	(+47) 22 95 98 64	(+47) 481 44 883	mbj@nve.no
Lisbeth Karijord	(+47) 22 95 91 65	(+47) 952 26 670	lak@nve.no
Kjell Repp (Head Of Section)	(+47) 22 95 92 38	(+47) 911 80 720	kre@nve.no
Kim Chi Tran-Gulbrandsen	(+47) 22 95 98 17	(+47) 473 06 828	kctg@nve.no
David A. Wright	(+47) 22 95 94 28	(+47) 415 17 034	daw@nve.no
Amir Messiha	(+47) 22 95 98 70	(+47) 980 44 707	ame@nve.no

RESIDENT ADVISERS:

Alf V. Adeler	Timor Leste	Until June 2009	ava@nve.no
Hans Terje Ylvisåker	Mozambique	Until January 2010	hans.ylvisaker@gmail.com

International Section

From left to right: Lisbeth Karijord Morten B. Johnsen, Amir Messiha, Kim Chi-Tran Gulbrandsen, David A. Wright, Kjell Repp



Overview of activities / time consumption

NVE's development assistance is organized and coordinated by the International Section which at the start of 2008 had five staff at the main office in Oslo and two stationed abroad in Timor-Leste and in Mozambique.

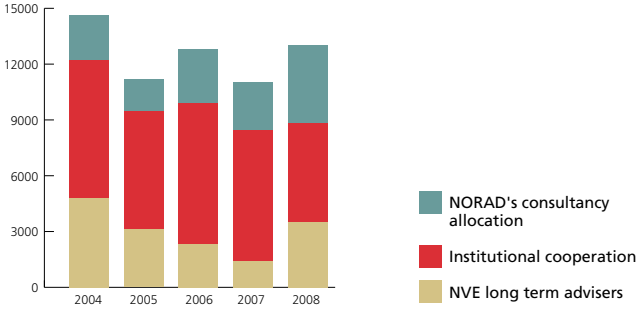
In October the staff was increased to six at the main office due to an increased number of tasks from Norad and the Ministry of Foreign Affairs.

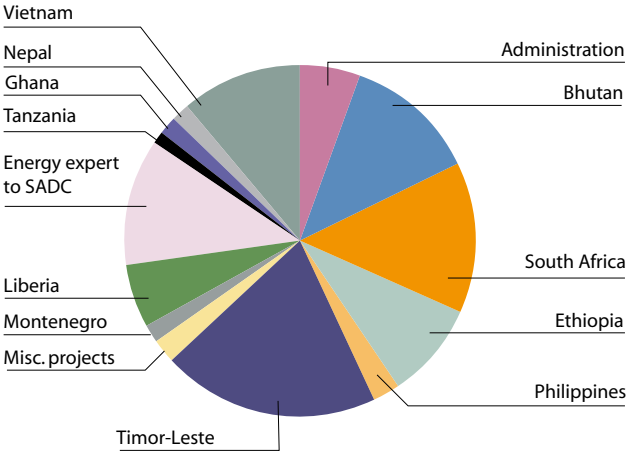
The main tasks of the International Section are project preparation of energy and water resources related projects and cost and quality control of projects and programmes during implementation. The major part of the professional work is carried out by staff from the various technical departments and sections of NVE. During 2008 a total of 62 persons were involved in the assistance, compared to 46 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 2008 was recorded at 9.3 person-years (one person-year being 1400 effective working hours), compared to slightly less than 8 person-years in 2007.

In addition, however, NVE has also been asked to assist in a few other development projects outside of the scope of the NVE–Norad agreement, such as a UNDP-funded project in Azerbaijan (mainly licensing), and 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 and with participation from 16 EU countries. NVE-staff are also widely used as lecturers in courses, including the International Centre for Hydropower's courses. The International Section also normally coordinates visits to NVE by international delegations. Those additional tasks amount to slightly less than one person-year, which brings the total volume of activities in 2008 to 10.1 person-years.

The increase is mainly due to one more resident adviser (Mozambique) and the additional task mentioned above. A further increase is foreseen, mainly because of new activities in Timor-Leste, Nepal and Liberia.





Countries worked in

Assignments for Norad and Ministry of Foreign Affairs

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

In order to assist Norad, NVE and many other organisations assist Norad in its many endeavours within their specialities. Thus NVE, through a framework agreement, has assisted Norad in engagements within the fields of water resources and energy assessment, monitoring and management. The engagements have varied from appraisals of projects and evaluation of reports, to planning and preparatory work for new projects, and monitoring of water resources.

Additionally, NVE has been asked directly by the Ministry of Foreign Affairs to assist and advise on it's support to the Balkan states, specifically on energy efficiency and environmental impact assessment in Montenegro.

Ethiopia

Ministry of Water Resources

NVE was engaged by NORAD to assist the Ministry of Water Resources in Ethiopia with formulation of the study of the feasibility of the Mandaya and Beko Abo Multipurpose projects on the Blue Nile in Ethiopia.

These large strategic projects will be of regional importance and have the potential of providing long-term benefits to the entire region. Both projects include hydropower stations with more than 2000MW installed capacity and large reservoirs which will provide possibilities for increasing water availability for downstream uses such as irrigation as well as reducing the sediment flows and siltation problems downstream.

Due to the regional importance of the projects efforts are being made to involve all regional stakeholders and a regional conference was held to discuss the draft Terms of Reference for the projects in Nazareth in Ethiopia in November 2008. Both NORAD and the Royal Norwegian Embassy in Addis Ababa attended the conference as well as officials and other stakeholders from Ethiopia, Sudan, the World Bank and other institutions, and NVE. The tender process for the feasibility studies for Mandaya and Beko Abo projects is scheduled for mid 2009.

Due to the lack of physical measurements and data of sediment loads in the river, NORAD commissioned NVE to carry out a sediment and hydrological measurement campaign during the 2008 flood season. NVE was able to muster a qualified team of hydrologists and sediment experts at short notice during the Norwegian annual vacations. Measuring equipment was procured and the campaign was carried out together with the Hydrology Department of the Ministry of Water Resources.

Contact: David A. Wright

ETHIOPIA

Capital: Addis Ababa
GDP (10^9 USD): $25.08
Population: 82.5 million
Total installed capacity: 1 000 MW
Main Energy Sector Authorities: Ethiopian Ministry of Water Resources (MOWR)


Water level gauge

ACHIEVEMENTS

- Valuable new sediment and flood data secured, which will contribute to the data base for the study and development of the multipurpose projects (improved reliability and quality of the data base)
- For the Mandaya and Beko Abo Feasibility studies Terms of Reference and other documents for procurement of consulting services has been jointly developed, elaborated and completed during regional stakeholder meeting which will contribute to the regional acceptance and success of the projects

Water Resources Commission

NVE was engaged by NORAD to assist the Water Resources Commission in Ghana with the formulation of a Project Document for the establishment of a national Dam Safety Unit. NVE officials travelled to Ghana early 2008 to get familiar with the Water Resources Sector in Ghana and together with the Water Resources Commission in Ghana identify main areas of the cooperation.

The Project Document finalized in December 2008 and sent to Norad for assessment. The cooperation is proposed to last for a period of three years and is composed of the following five activities:

- Development of a legal framework for dam safety
- Establishment of an institutional setup and organization
- Training and education of dam safety personnel
- Establishment of a national database of dams in Ghana
- Coordination and backstopping by NVE

The Project has an estimated budget of approximately NOK 5 million in the form of a grant from Norway. In addition, the Ghanaian national input budget is estimated to NOK 530 000.

The Water Resources Commission will be the recipient of the assistance from NVE for the cooperation described in the Project Document. NVE's assistance to the Water Resources Commission is foreseen provided under a direct contract between Norad and NVE.

Contact: Amir Messiha

GHANA

Capital: Accra

GDP (10^9 USD): $17.72

Population: 23.4 million

Total installed capacity: 1 490 MW

Water Resources Authorities: Ministry of Water Resources, Works and Housing

ACHIEVEMENTS

- Initial workshop between NVE and Water Resources Commission held in Ghana to get a better understanding of the competence of the involved stakeholder and agree on main areas of the cooperation
- The Programme Document was jointly developed and all stakeholders fell committed to the content of the cooperation

The Akosonbo Dam

Liberia

Ministry of Lands, Mines and Energy

Liberia has been an independent republic since 1847. Fifteen years of civil war has destroyed much of Liberia's physical and human capital and severely damaged it's institutions, however, and the new government established in 2006 under President Ellen Johnson-Sirleaf is facing severe challenges. The new government has endorsed programs aimed at improving governance, building capacity and managing post conflict recovery through establishing policies to stabilize the economy and supporting economic reconstruction.

The supply of electricity has been substantially affected since the start of the war when the country's main hydropower plant (Mount Coffee Hydropower Plant) was damaged and its vital components looted. Over the last decade, looters have stolen most of Monrovia's electricity cables for sale as scrap metal. Since 2006, the Government of Liberia (GOL) has provided emergency power using diesel generators to supply power for essential public services in Monrovia, while the rest of the country is virtually without power supply.

Norway has decided to increase the assistance to Liberia in order to support the peace and stability programme in the country. In April 2007 Norway entered into an agreement with Liberia aiming at increasing the electricity production in Monrovia. Liberia has expressed a wish to extend the cooperation with Norway within the power sector. On this background NVE was requested by Norad to participate in a fact-finding mission in January 2008.

LIBERIA

Capital: Monrovia
GDP (10^9 USD): $ 0.926
Population: 3.3 million
Total installed capacity: 188 MW*
Main Energy Sector Authorities: Ministry of Lands, Mines and Energy (MLMR)
**including private owned*

A report was produced by Norad with the assistance from NVE for the Ministry of Foreign Affairs which, together with a Terms of Reference prepared by Norad, provided the basis for a new NVE mission to Liberia in July 2008. During the mission a number of meetings and discussions were conducted between NVE and the various stakeholders on the energy and water resources sector in Liberia, and NVE became quite familiar

Solar powered street light in Zwedru, Liberia

Liberia

War damage

with the problems to be encountered in the country. Based upon the findings a Draft Project Document was prepared, outlining the various activities to be included in a 5-year institutional cooperation between NVE and the Ministry of Lands, Mines and Energy in Liberia. All activities are aimed, directly or indirectly, at eliminating poverty in the long-term and at increasing the self-sustainability of the country. The overall goal is to contribute to the economic and social development of Liberia through assistance to developing monitoring and management of the water and energy resources.

Contact: Kjell Repp

ACHIEVEMENTS

- Participation in a fact-finding mission to Liberia together with Norad and Ministry of Foreign Affairs in January and contribution to a report prepared by Norad. Norwegian officials gained a thorough insight into the challenges that Liberia is facing within the power sector and Liberian counterparts got a better understanding of Norwegian competence and assistance that may be part of the institutional cooperation
- Mission conducted in July resulting in a proposal for a Draft Project Document describing an institutional cooperation between NVE and the Ministry of Lands, Mines and Energy of Liberia, based upon discussions and proposals by involved stakeholders during a number of meetings

Tanzania

Assistance to Royal Norwegian Embassy

Based on a request by the Royal Norwegian Embassy in Tanzania, NVE participated in a number of meetings with the energy sector in Tanzania in late 2008. The background was consideration of increased support to the energy sector, in particular to the Rural Energy Agency and the Energy and Water Utilities Regulatory Authority of Tanzania.

Further activities included participation in the Regional Electricity Regulators Association's conference in Arusha. NVE was also asked to present Norwegian hydropower expertise at a conference in Morogoro, where NVE presented a paper on the impact of climate change on hydropower and a paper on renewable energy.

Contact: Kjell Repp

ACHIEVEMENT

- Presentation of Norwegian energy expertise and exchange of knowledge and information within the energy and electricity regulation sector

Montenegro

Ministry of Economic Development

Strategic Environmental Impact Assessment (SEIA) study at the Moraca River

The bilateral project assistance program between The Ministry of Economic Development (MoED) of Montenegro and the Royal NorwegianMinistry of Foreign Affairs was initiated in 2004.The Norwegian assistance to the Strategic Environmental Impact Assessment (SEIA) study at the Moraca River in Montenegro is a part of this program, where NVE's role is to assist MoED with procurement of consultants and quality assurance of the process and the report.

The cooperation is in line with the overall objective of the program to support Montenegro's integration into Euro-Atlantic structures by supporting projects contributing to sustainable economic and social development.

The work started in September 2008 and a contract was signed in November 2008 followed up with a start-up meeting in Podgorica between MoED and NVE. An output of the start-up meeting was an agreed Terms of Reference (ToR) for the SEIA in compliance with national and European laws. The SEIA-study was published in the Norwegian national database for public procurement- Doffin in early December with planned award of contract and start-up of work in January 2009.

Contact: Morten B. Johnsen

MONTENEGRO

Capital: Podgorica
GDP (10^9 USD): $4.515
Population: 678,177
Total installed capacity: 238 MW
Main Energy Sector Authorities: Ministry for Economic Development

ACHIEVEMENTS

- Agreement between MoED and NVE signed in November 2008 followed by a start-up meeting in Podgorica and a short field trip to the identified sites along Moraca River
- Agreed progress plan and ToR for the SEIA-study published in Doffin

Reconnaissance of one of the dam sites

Montenegro

Energy Efficiency

In late 2007 the Ministry of Foreign Affairs asked NVE to assist the Republic of Montenegro to assess the needs for support to the Energy Efficiency Unit within the Ministry of Economic Development.

Because of limited capacity Norsk Energi was hired by NVE after open competitive bidding to carry out the study. Norsk Energi completed their report in May 2008, which concluded that there is a substantial need for improved conditions for energy efficiency and renewable energy sources in Montenegro. The report stated further that Norwegian support should be coordinated with other relevant programmes and activities.

As a result of the report and discussions between NVE and the Ministry of Foreign Affairs, a cooperation between Norway and Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) from Germany has been established, where GTZ will be the cooperating partner with the Republic of Montenegro, and with partial funding from Norway.

Contact: Kjell Repp

ACHIEVEMENT

- The basis for long-term cooperation between Montenegro, Germany and Norway has been laid which will help Montenegro towards improved conditions for energy efficiency and renewable energy sources in the country

IHA

International Hydropower Association Sustainability Assessment Protocol

NVE was engaged by NORAD to assist in participation in the Hydropower Sustainability Assessment Forum for development of the Hydropower Sustainability Assessment Protocol of the International Hydropower Association (IHA).

The protocol is a tool to measure and guide sustainability performance of the hydropower sector, based on review and revision of the existing IHA Sustainability Assessment Protocol (2006).

The aspiration is that the hydropower sustainability assessment protocol will reflect a broadly endorsed view of what sustainability means in practice for the hydropower sector and provide a practical measurement tool that can be implemented across a range of contexts.

The composition of the Hydropower Sustainability Assessment Forum (HSAF) includes Non Government Organisations, developing and developed country governments, commercial and development banks and the hydropower sector, and was guided through the common efforts of the World Wildlife Fund, The Nature Conservancy and the International Hydropower Association, as were the initial efforts to obtain the necessary financial support. The Hydropower Sustainability Assessment Forum is funded by the governments of Norway (NORAD), Iceland, Germany, IHA and The Nature Conservancy. The HSAF held its first meeting in March 2008 and aims to produce a final revised protocol by the end of 2009.

The hydropower sustainability assessment protocol has the potential to be used by companies, governments, financial institutions and other stakeholders to improve decisionmaking relating to proposed hydropower developments; identify, manage and mitigate risks; guide development of new projects in a sustainable way, taking environmental impacts into consideration; and assess and improve the performance of existing operations. Pathways forward for the protocol, including the potential for a sector standard, will be explored at the end of 2009.

Contact: David A. Wright

ACHIEVEMENTS

- NVE carried out an assessment of Norwegian experience in the use of the IHA Sustainability Assessment Protocol, and issued a report which was made available to the Forum to help them in their work in updating the Protocol
- NVE represented NORAD as alternate in the Hydropower Sustainability Forum Meetings and workshop in Santa Rosa, California in July 2008 and contributed to the work of the Forum

The Philippines

Department of Science and Technology Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)

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 the impacts of flooding in the valley the Philippine Government established the Cagayan Flood Forecasting and Warning System (FFWS) in 1982. The Cagayan FFWS is equipped with six combined rainfall and water level stations, one field station in Tuguegarao, Cagayan, and one repeater station in Ilagan, Isabela.

The Flood Forecasting and Warning System which was in place in 1982 and upgraded in 1992 with the inclusion of a warning system for operation at Magat Dam (multipurpose dam for irrigation of 102,000 hectares of farmland and power production), has since encountered problems including breakdown of the communication system and some of the monitoring stations. The communication link between PAGASA and the National Irrigation Administration-Magat is no longer operational and data from the automatic stations are no longer available in real time. The ability to warn affected people downstream and to operate the spillways of the Magat Dam satisfactorily in order to decrease the flooding risk is therefore very limited.

In June 2008 Norad asked NVE to assist PAGASA in the preparation of a proposal for rehabilitation and upgrading of the system. A field visit including an assessment of the station network was conducted by NVE officials in November, after which the proposal was prepared in close cooperation with PAGASA on how to structure the potential Norwegian support for rehabilitation and upgrading of the Flood Forecasting and Warning System.

Contact: Kjell Repp

THE PHILIPPINES

Capital: Manila
GDP (10^9 USD): $168.6
Population: 96.1 million
Total installed Capacity:15 610 MW

ACHIEVEMENT

- The groundwork for improvement of livelihoods of affected people has been laid through the successfully completed field trip and data gathering for assessment of necessary content of proposal for rehabilitation and upgrading of the Flood Forecasting and Warning System

SADC

Southern African Development Community (SADC) Energy Coordinator

The Southern African Development Community, SADC, includes 15 countries. Norway has been a strong supporter to the energy sector of the organisation since its establishment as a loose alliance in 1980, providing both institutional and project-related support over more than two decades.

In 2006 a new partnership between SADC and the International Cooperating Partners (ICPs, also referred to as donors) was established. It provides a new structure for effective dialogue between SADC and the ICPs, and guides future cooperation for the achievement of SADC's socio-economic development agenda.

Thematic coordination is a key element in this new partnership and in 2007 SADC launched Norway as the Lead ICP on energy. To undertake this responsibility the Norwegian Embassy in Maputo, Mozambique, entered into a contract with NVE in 2007 to engage a full time regional energy coordinator based in Maputo.

From the launch of an innovative ceramic cooking stove in Maputo, Mozambique. The stove was developed and produced as part of a project supported by Norway and will help African households to cut their bio fuel consumption by almost half

The Southern Africa region is facing a substantial energy challenge. It is rich in primary energy resources, such as hydro, coal, oil, gas, biomass and solar, but consumers still experience frequent power cuts, hampering both industrial and social development. Furthermore about 80 % of the region's population has no access to electricity or other sources of modern energy.

The main task of NVE's regional energy coordinator is to mobilize the various stakeholders in the SADC energy sector so that actions and initiatives to meet these challenges are coordinated. An important forum for coordination is the Energy Thematic Group, where the SADC Secretariat meets the ICPs bi-annually.

During 2008 the NVE coordinator has had a key role in operationalising the group, in addition to enhancing networking and information exchange, as well as giving strategic advice to SADC.

Contact: hans.ylvisaker@gmail.com

ACHIEVEMENTS

- The Energy Thematic Group is successfully established
- Two meetings were arranged in 2008 with broad ICP participation
- A good dialogue with the SADC Secretariat is established
- The communication among the ICPs is improved

Institutional cooperation

Most of NVE's activities connected to development assistance are part of institutional cooperation with partner institutions in the developing country as elaborated in the following pages. Of NVE's recorded hours on development assistance in 2008, 68 % (or 6.3 person-years) was spent on cooperation with 9 institutions in 6 countries. In addition there has been some wrap-up work on the former contracts between NVE and Uganda and Angola, which is not included in this Annual Report. The institutional cooperation is always based on signed contracts, clearly defining objectives, scope and mode of work, time schedule, obligations of the parties, reporting, and total budget.

As in earlier years approximately 20 – 25 % of the project funds have been spent on activities directly linked to institutional cooperation with NVE. Besides the NVE fees and reimbursable expenses, this includes various forms of training. The remaining 75 – 80 % is spent on local expenses or assignments carried out by consulting firms, either in direct contract with the cooperating institution or with NVE.

Department of Energy (DoE)

2008 was a historical year in Bhutan with the introduction of democracy and the country's first national elections. 2008 also saw the start of a new era of cooperation between Norway and Bhutan. NVE's long-standing and successful institutional cooperation with the Department of Energy saw the finalisation of the Phase II project and the start of two new agreements which will help Bhutan on the path to accelerated development of its hydropower resources for the good of its people, its neighbours and the environment.

Strengthening of the Energy Sector (Phases II & III)

The electricity supply in Bhutan is almost entirely based on hydropower. From nature the country is endowed with huge hydropower resources and only a tiny portion of the estimated economically viable potential of 16,000 MW has been developed. Only about 30% of the population is served with electricity. One of the Royal Government of Bhutan's main goals is to supply electricity to the entire population by 2013, and DoE is a central player in this respect.

The Phase II programme of the institutional cooperation between DoE and NVE started in 2004 and was completed in 2008. The total budget was approximately NOK 15.0 million. Phase II culminated in a study tour to Norway for officials from the Department of Energy, the Bhutan Electricity Authority, the Bhutan Power Corporation and Druk Green Power Company during which participants were able to network with Norwegian government officials and commercial companies operating within the energy sector.

BHUTAN

Capital: Thimphu

GDP (10^9 USD): $1.368

Population: 682,321

Total installed capacity: 1 500MW

Main Energy Sector Authorities: Department of Energy, Bhutan Electricity Authority

Due to the success of the programme, DoE applied for and was granted an extension of the cooperation into a third phase which started in July 2008.

Phase III of the cooperation will help Bhutan embrace its accelerated hydropower development programme in the next five

NVE hydrologists at Wangdue Phodrang Flood Warning Station

Bhutan

years. This is aimed at increasing the rate at which Bhutan develops its hydropower resources for export and for domestic consumption which will in turn increase "Gross National Happiness" and economic development for all Bhutanese, as well as contribute to the power shortage and increase the percentage of renewable energy supply in neighbouring India.

Through the development of human resources and capacity building the programme is designed to help ensure the required regulatory capacity to allow the growth of the power sector in Bhutan in an orderly and cost-effective manner, and thereby supporting the accelerated hydropower development strategy of the government's 10th Five Year Plan. This falls within Norad's overall strategy of contributing to poverty reduction through offering Norwegian experience in the sustainable development of natural resources. The ultimate goal for DoE is to become a strong and modern institution, able to manage Bhutan's energy resources in a sustainable manner without the need for further external development assistance.

DoE is responsible for the formulation of policies, plans, programmes and guidelines related to sustainable development, efficient utilization and management of energy and hydro meteorological services in Bhutan.

NVE, with its responsibility for management of Norway's water and energy resources, is a natural partner for the institutional development of the Department. Where necessary, NVE has also brought in external expertise from consultants and advisers. In addition the new programme includes a plan for cooperation with other programmes, in particular with the cooperation between the Department of Geology and Mines and the Norwegian Geotechnical Institute.

The Phase III cooperation between NVE and DoE which has a budget of NOK 15 million over a three-year period contains the following activities, all of which were initiated in 2008:

- Human resources development in DoE, Bhutan Electricity Authority and other related authorities.
- Support for Electricity Regulation to meet the challenges of Accelerated Hydropower Development
- Support to Hydromet Services Division for data provision to Accelerated Hydropower Development
- Coordination and backstopping by NVE

ACHIEVEMENTS

- DoE human resources strengthened through training performed in Bhutan and in Norway and other locations worldwide. This has lead to the possibility of implementing the accelerated hydropower development programme and better use of available natural resources and improved livelihoods for the people of Bhutan bringing forward the target of "electricity for all" from 2020 to 2013
- BEA strengthened in licensing, tariffs and other regulatory issues. The organisation has been empowered to issue its first licences for power production
- Guidelines for safe operation of dams delivered and implemented. Dam operators in Bhutan now have a tool with which to help them monitor and operate their hydraulic structures which in turn leads to increased safety for local residents and greater integrity of the investments
- Energy sector management information system server procured and delivered to BEA in Thimphu
- The hydro meteorological network strengthened through upgrading of stations which has lead to better data catchment and has strengthened the hydrological database for the development of the country's hydropower resources
- Networks enhanced between institutional and corporate experts from the energy sectors in Bhutan and Norway which in turn leads to improved opportunities for investment and utilisation of the natural resources of Bhutan

Bhutan

NVE hydrologists at Wangdue Phodrang Flood Warning Station

Hydropower Development Programme

In addition to the new agreement for Phase III of the institutional cooperation, a new second programme was initiated in 2008 with a budget of NOK 15 million over three years. The programme will give support to the Government of Bhutan's Accelerated Hydropower Development Programme through the following key activities:

- Project Finance and Power Sales Agreements
- Reconnaissance surveys for remaining listed hydropower project sites under the Power System Master Plan
- Prefeasibility Studies of project sites including Environmental Studies
- Detailed Project Report and Environmental Study of one hydropower project site

Much of the available budget is expected to be used to finance the reconnaissance surveys and prefeasibility study of hydropower sites which will be carried out by the Department of Energy with external consultants under the assistance of NVE.

The Detailed Project Report and Environmental Study of one project will be done as part of a planned two year extension of the programme should funds be made available.

Contact: David A. Wright

ACHIEVEMENT

- Consultant procurement arrangements prepared and elaborated in cooperation between Department of Energy and NVE

Nepal

Department of Electricity Development (DoED)

The contract agreement on institutional cooperation between Department of Electricity Development (DoED) and NVE was signed in December 2004. Norway has agreed to provide financial support for the implementation of feasibility studies of small and medium size hydropower projects in Nepal, based upon the precondition that the studies shall be undertaken by Nepalese consultant companies on the basis of competitive bidding. The studies are split into three packages, and will be conducted successively.

NVE participates in the evaluation of the consultants' proposals, and comments on their feasibility studies. The main objective is to encourage investments in hydropower projects in Nepal. Another important objective is to increase the competence of Nepalese consultants and water resources authorities in undertaking projects in order to obtain required quality for licence and financing.

The implementation of each feasibility study includes preparation of an inception report, a field report, an interim/progress report, a draft final report and a final report, in addition to an environmental impact assessment (EIA).

NEPAL

Capital: Kathmandu
GDP (10^9 USD): $12.64
Population: 29.5 million
Total installed capacity: 557 MW
Main Energy Sector Authorities:
Department of Electricity Development
Nepal Electricity Authority

There has been delays in the deliverables for all feasibility studies.

Contact: Kjell Erik Stensby, kest@nve.no

ACHIEVEMENTS

- Three draft feasibility studies (Package 1) were finalized according to international standards, suggesting a total potential of 38.5 MW
- The feasibility studies for three projects (Package 2) have been initiated, and two inception reports have been prepared

Provincial Government of Oriental Mindoro

In 2003 the Provincial Government of Oriental Mindoro in the Philippines asked Norad for assistance to develop a "Flood Control Master Plan for Bucayao and Mag-asawang Tubig Rivers", and Norad requested NVE to assist in the preparation of the Terms of Reference for the project and facilitate the tendering process. As a result of a round of open competitive bidding, the contract for preparation of the Master Plan was awarded to SWECO Grøner AS (later SWECO NORGE), and work was started on the study in late 2007.

The progress during 2008 has been satisfactory, even if some problems were encountered with regard to the Environmental Impact Assessment (EIA) in the upper parts of the catchment. Several indigenous tribes live in the catchment, and a few of them did not allow access for the consultants to their areas. This will not, however, have a significant impact on the quality of the Flood Protection Plan for the flood plain where the majority of the people live. Technical reports have been prepared and training carried out.

The progress was reviewed during the Annual Meeting in June, with participation from all stakeholders, including representatives from the Province, the indigenous tribes, Norad, NVE, and the Consultant. In addition, several meetings have been conducted between NVE, the Consultant and the Provincial Government. The progress has been documented in quarterly progress reports from the Consultant.

THE PHILIPPINES

Capital: Manila
GDP (10^9 USD): $168.6
Population: 96.1 million
Total installed capacity: 15 610 MW

Contact: Kjell Repp

ACHIEVEMENTS

- Main environmental aspects identified in the Draft EIA study report submitted in June
- Surveys and Mapping for Flood Plain and Water Courses report submitted in July
- Construction of Geographical Information System (GIS) Database and Digital Elevation Model report submitted (draft in October and final in December)
- Hydrometric Network and Flood Warning System draft report submitted in December
- Flood Protection Plan draft report submitted in December
- Training on hydraulic modelling and GIS carried out (results yet to be evaluated)

South Africa

International Cooperation in South Africa

In October 2006 NVE entered into a new contract with the Department of Minerals and Energy (DME) based upon a Memorandum of Understanding signed between the South African and Norwegian governments in 1996.

based upon a Memorandum of Understanding signed between the South African and Norwegian governments in 1996.

The new cooperation programme was intended to start up in 2006, partly based on the outcome of the earlier cooperation projects between DME, NVE and the Norwegian Petroleum Directorate. It includes an overall general business plan and five sub-programme business plans on Energy Regulation, Electricity, Hydrocarbons, and Alternative Energy and Upstream Petroleum. NVE is involved as the Norwegian Coordinator for four of the sub-programmes, with NPD working with the Petroleum Agency South Africa (PASA) on the Upstream Petroleum sub-programme.

In order to ensure adequacy of content, the development of the sub-programmes became a lengthier process than expected. The main reason for the delay was a restructuring of the DME. This also resulted in a restructuring and revision of the energy cooperation between Norway and the Republic of South Africa. During the Annual Meeting between the Royal Norwegian Embassy and DME in Pretoria in early June 2007 it was decided to merge the various sub-programmes together into three main themes, or programmes:

- Energy Planning
- Regulatory Environment
- Climate Change

The first two themes mainly belong to DME, even though Energy Planning necessarily has to include all energy sources, which are partly handled by other institutions or departments. The Climate Change theme mainly belongs to the Central Energy Fund (CEF) with its subdivision the Energy Development Corporation (EDC), even though some aspects like the Clean Development Mechanism (CDM) are handled by the DME as well.

Some of the activities under the initial four sub-programme business plans had already commenced prior to the revision of the programme, and have been incorporated into the new revised programme. The revision of the entire programme, which has been

SOUTH AFRICA

Capital: Pretoria
GDP (10^9 USD): $300.4
Population: 48.8 million
Total installed capacity: 41 105 MW
Main Energy Sector Authorities:
Department of Minerals and Energy
National Energy Regulator of South Africa
Electricity Supply Commission (ESCOM)

based partly on restructuring of the DME and partly on visits by DME high level officials to Norway in December 2006 and in May and August 2007, has also lead to reallocation of funds. This has been agreed upon between the Norwegian Embassy and DME. Progress meetings have been held on a somewhat irregular basis. Meetings have been combined with field visits and workshops as far as possible to make the programme most cost-efficient.

Contract signing between NERSA and NVE

South Africa


Hydropower reservoir in Eastern Cape

For clarity the activities carried out during 2008 will be described under the various institutions or departments responsible for the implementation of the activities.

Department of Minerals and Energy (DME)

As a result of a visit undertaken by a DME delegation to Norway in February 2008, during which meetings were held with a number of institutions (e.g. NVE, Norwegian Petroleum Directorate, Statistics Norway, Norwegian University of Science and Technology, Powel and Statoil Hydro), NVE was requested to undertake an assessment of the electricity reticulation networks in the areas where the 2010 Soccer World Cup will be hosted in South Africa. This assignment, largely based on Norway's experience with preparations for the 1994 Winter Olympic Games in Lillehammer, has turned out to be very comprehensive, involving frequent and long visits to the municipal areas involved. As a result of meetings in Norway in February, the Chief Directorate of Energy Planning and NVE started the process of implementing technical support activities in relation to the DME's implementation of integrated energy modelling and planning. The process has been very slow, however, mainly due to recent re-organising and lack of capacity and resources at DME. The process has, however, resulted in a far better understanding of energy modelling and planning at DME, which will hopefully lead to an improved energy situation in South Africa in the long run.

After re-organisation, the Petroleum

ACHIEVEMENTS

- **First draft report submitted to DME on the condition of the electricity reticulation networks in a number of the cities that will host the 2010 World Cup**
- **Close cooperation with DME staff has resulted in valuable capacity building and a better understanding of bottlenecks and deficiencies in the energy distribution system. This also applies to the municipalities and local distributors involved in the assessment**
- **Capacity building through a series of meetings and workshops with counterpart organisations in Norway**
- **Capacity building to implement the integrated energy modelling and planning functions at DME**
- **DME staff attended courses on energy policy management, conflict resolution, market analysis, public law and governance, and economic and financial assessment of the petroleum retail sector. According to a DME Director involved in the process, this has assisted greatly in the task of processing licences for activities in the downstream petroleum sector**

South Africa

Controller is now performing the functions that formerly were part of the Chief Directorate for Hydrocarbons. The Petroleum Controller plays a critical role in administering the licensing system for the downstream petroleum sector in South Africa, and focus has therefore been placed on increasing the Directorate's capacity and competence to perform its functions. Improved administrative effectiveness has been one of the key areas.

Contact: Amir Messiha

Central Energy Fund (CEF)/ Energy Development Corporation (EDC)

A number of activities have been undertaken, focused on renewable energy and Clean Development Mechanism (CDM) capacity building. Some of the activities were implemented directly by EDC after advice from NVE and approval by the DME Programme Management, while other activities were carried out in cooperation with NVE and Norwegian companies. Three workshops have been conducted, one in Norway and two in South Africa. The first workshop in Norway in January focused on renewable energy sources, hydropower, wind and solar energy. The workshop included visits to Nord-Trøndelag Energiverk, amongst others, and was attended mainly by participants from EDC. The second workshop on hydropower was conducted in Port Elizabeth, with cases from the Little Fish water transfer and irrigation system from the Orange River where existing irrigation dams may be utilised for small scale hydropower production in addition to irrigation purposes.

The third workshop in Cape Town focused on wind power, with visits to the two wind parks in the neighbourhood.

The last two workshops, attended by representatives from South Africa, Angola, Mozambique, Lesotho and Namibia, had considerable focus on CDM. As a result a formal cooperation with the Norwegian company Greenstream has been established. All workshops were considered to be quite successful and a number of contacts were established between various stakeholders in the countries.

Contact: Kjell Repp

ACHIEVEMENTS

- Workshop in Norway on renewable energy, January 2008
- Regional workshop on hydropower development in Port Elizabeth, April 2008
- Regional workshop on wind power in Cape Town, April 2008
- Completion of a study to develop a framework for economic development using hybrid-based electricity generation for stand-alone applications and mini-grids (the final Renewable and Hybrid Energy for Productive Use Frame-work to be submitted to EDC in February 2009)
- A Carbon Coordinator, previously with Point Carbon in Norway, appointed in August 2008 on a two year contract to strengthen the CDM capacity within EDC (partly financed by the cooperation programme)
- Several other spinoffs including new cooperation with Nordic partners

National Energy Regulator of South Africa (NERSA)

Limited activities were carried out in 2008, except for coordination meetings between NVE and NERSA. In a meeting in early March the contract between the two organisations was signed and an approved Minutes of Meeting outlined the responsibilities of the various partners with regard to the list of activities. Due to a review of NERSA's funding options in terms of the National Energy Regulator Act, which included whether such options included donor funds, the progress during the following months was negligible, and a workshop planned in Norway at the end of the year was cancelled.

The lack of progress can also be attributed to lack of capacity and resources within NERSA. In a clarification meeting between NERSA, NVE and the Programme Manager at DME in October, the way forward was agreed upon. The RSA 3001 Programme Management team, in conjunction with NVE, has been working with NERSA to revise the regulator's work plan, taking into account the expectation to complete implementation by September 2009.

Contact: Amir Messiha

Ministry of Infrastructure (MIS)

Phase 1 of the institutional cooperation between the then Ministry of Natural Resources, Minerals and Energy Policy and NVE started in early 2003. After reorganisation following the elections in May/June 2007, the contract partner became the Ministry of Infrastructure (MIS). By the end of 2008, Phase 2 of the cooperation is close to completion and plans for a Phase 3 of five years duration are under discussions.

The total grant from Norway for Phase 1 and 2 as of September 2008 was NOK 46.5 mill. The contract provides financial support for feasibility studies of hydropower projects and institutional strengthening including training within the power sector, alternative energy, hydrology and technical training for operation and maintenance staff. Establishment of the hydro meteorological network in the country is also a part of the Terms of Reference for the cooperation.

The main goal is to develop the management of the power sector in Timor-Leste through institutional and capacity building within the Ministry and other relevant institutions. A considerable part of the funds are spent on studies and assessment of hydropower projects, training and purchase of equipment.

Extensive training has been carried out within the power sector, alternative energy, hydrology and technical training for operation and maintenance staff. In 2008 training was mainly carried out locally in Timor-Leste, but also in Thailand and China. The project personnel have participated in several meetings in the South East Asia Disaster Preparedness Committee, dealing with floods, droughts and tsunamis.

TIMOR-LESTE

Capital: Dili
GDP (10^9 USD): $0.489
Population: 1.1 million
Total installed capacity: 26 MW
Main Energy Sector Authorities:
Ministry of Infrastructure,Electricidade de Timor-Leste

Installation of turbine at Gariuai

Timor-Leste

Transport in rough terrain

Installation

In 2008 all reports for the feasibility studies for the 28 MW Iralalaru hydropower project and the transmission line from Dili to Lospalos were completed and approved by the authorities in Timor-Leste. Work on the tender documents for the construction of the Iralalaru plant was started.

The study for Laclo hydropower project was abandoned, and additional studies of three small hydropower projects in the west of the country were initiated. The feasibility study for the Atsabe small hydropower project, approx 11 MW, was completed, and the documents are now with the authorities in Timor-Leste for evaluation and possible approval.

In November 2008 the 326 kW Gariuai Mini Hydropower Plant, including a 4 km transmission line, was inaugurated with a traditional ceremony where people from the different ministries, the Parliament, the local administration, and high level representatives from Norway participated. This is the first hydropower plant ever built in Timor-Leste. The plant is financed with a grant from Norway (NOK 12.5 mill), and was constructed by local people in Gariuai. Abount 1500 local people, both women and men, were trained during the 3-year construction period. Students from the local vocational training institute also participated in the construction of the power plant and transmission line.

Timor-Leste

Opening ceremony Gariuai Mini Hydropower Plant

A Programme Document for a new five-year Phase 3 of the institutional cooperation has been developed and subject to an independent appraisal in 2008. A new Agreement between MIS and NVE is expected to be signed in the first half of 2009. NVE has had a resident adviser based in Timor-Leste since 2003. He was assisted by a second adviser during six months in 2008.

Contact: Morten B. Johnsen

ACHIEVEMENTS

- Completion of the feasibility studies for the 28 MW Iralalaru Hydropower Project and the transmission line from Dili to Lospalos, and the documents are approved by Timor-Leste
- The construction and commissioning of the 326 KW Gariuai Mini Hydropower Project, including a 4 km transmission line, were completed in 2008
- Extensive training carried out within the power sector, alternative energy, hydrology and technical training for operation and maintenance staff. The training this year has mostly been in Timor-Leste, but also in Thailand and China. Training of about 1500 persons was carried out during the 3-year construction period of Gariuai
- The feasibility study for Atsabe small hydropower project completed, and the reports are with the Timor-Leste authorities for approval
- Regular inspection and maintenance of all rainfall and water level stations, and observers trained
- A Programme Document for a new five-year Phase 3 of the institutional cooperation developed and subject to an independent appraisal in 2008

Photo: Basil Rolandsen (www.bouvet.info)

Vietnam

Ministry of Natural Resources and Environment (MONRE)

The Country Agreement between Vietnam and Norway was signed on 19 September 2006, and MONRE and NVE negotiated and signed a contract on 20 October 2006. The project is scheduled to last for at least three years.

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

Hydropower licensing involves several ministries and agencies in Vietnam, and the licensing process in Vietnam is not well coordinated. The first two years of the project has brought the involved authorities together in several workshop activities. Their responsibilities and tasks according to Vietnamese legislation has been presented and discussed in the workshops. The Norwegian licensing system and practice has also been presented as a reference for discussions and ideas. It seems that this contact between ministries has already led to changes towards better coordination in the licensing procedures. The workshops have provided input to the first draft of the hydropower licensing guidelines.

VIETNAM

Capital: Hanoi
GDP (10^9 USD): $90.88
Population: 86.1 million
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)

Vietnam

The workshops also included a training aspect. The number of participants at the workshops counted between 30 and 40, including staff from MONRE, relevant ministries, authorities at provincial level and Electricity of Vietnam. Through presentations from the Vietnamese participants and from NVE, and through group work and discussions, the participants have increased their skills to develop licensing routines and procedures, and to deal with and evaluate license applications.

A study tour to Norway was organised in October 2008. Six participants from MONRE headed by a vice minister attended the study tour. The focus was on hydropower licensing, the roles and responsibilities of the involved authorities, climate change, flood forecasting, erosion and sedimentation in rivers. The program included presentations at NVE,visits to ministries and institutions and hydro-power developments near Oslo.

Six candidates from MONRE, the Electricity Regulator Authority of Vietnam and Electricity of Vietnam attended courses at the International Centre for Hydropower in Trondheim, Norway and found it highly useful.

Contact: Knut Gakkestad, kga@nve.no

ACHIEVEMENTS

- Better coordination between the various authorities as a result of participation in three workshops
- Improved skills in developing licensing routines and procedures due to the above workshops. The participantshave gained better knowledge on how to deal with and evaluate licenseapplications
- First draft hydropower licensing guidelines completed
- Increased knowledge in humanresources development and licensing aspects from participation in study trip to Norway organised by NVE
- Increased basic knowledge on hydropower development and environment for 6 candidates who attended International Centre for Hydropower courses in Trondheim, Norway

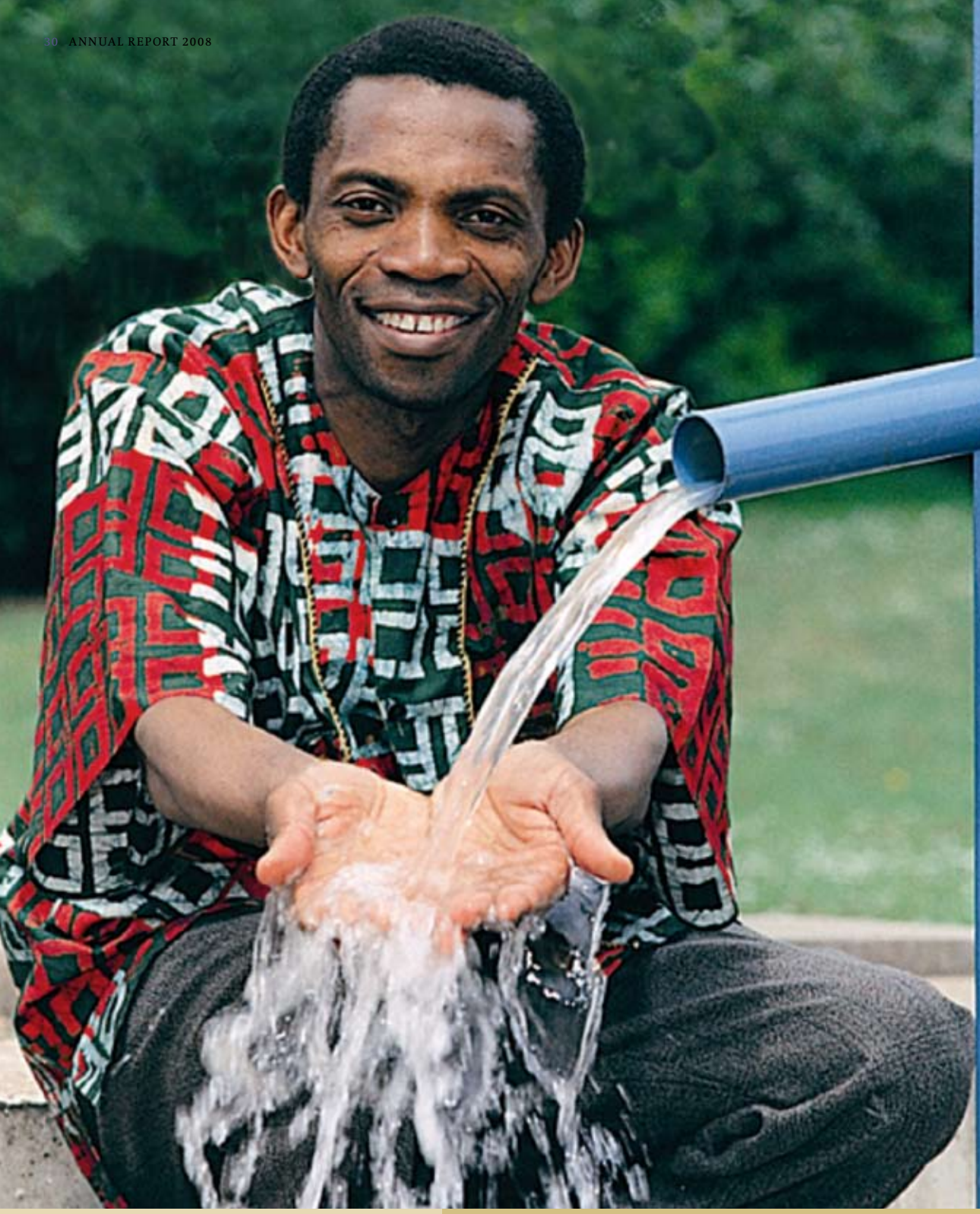


Photo: Design and Printing Services, Loughborough University, U.K. Modified: Rune Stubrud

Other assignments

In addition to work for Norad, 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 most of those assignments, which are funded from various sources.

Azerbaijan

Ministry of Industry and Energy

Promoting development of small hydropower

As part of growing emphasis on the environment and restructuring of the power sector, Azerbaijan has committed itself to developing clean energy through several international agreements. On October 28th 2004, the president of Azerbaijan issued a decree emphasizing the importance of renewable energy sources. The Ministry of Industry and Energy is responsible for implementing activities to follow up targets set in the decree.
The Ministry of Industry and Energy is thus partner of the project "Promoting development of small hydropower in Azerbaijan" together with the Norwegian government, represented by the Ministry of Foreign Affairs that funds the project. The implementing partner is the United Nations Development Program (UNDP) which, through its local representatives, has assumed the overall management of the project and is responsible for the attainment of project objectives.

Of the 16 TWh feasible hydropower potential existing in Azerbaijan, 5 TWh can be produced utilizing Small hydropower Stations.
A corresponding reduction in the energy produced in the conventional thermal power stations would roughly save 4 million tonnes of CO2 per year. Moreover, the grid will be more stable, especially in the regions, thus improving the general situation for the people and generating employment.

The main outcome of the project is to achieve a healthy investment environment in order to exploit the existing hydropower potential in Azerbaijan. This will be achieved by revising the legal system, promoting investments and building one or more pilot projects. Some funds are budgeted to co-finance the pilot projects. To secure the success of the project it is, however, essential to get private investors to share the risks, spend time and energy in realisation of the project, and force barriers together with the project team.

As Norway has much experience from small hydropower stations, both technically, legally and environmentally, the project is organized to transfer this experience to Azerbaijan. On request from The Norwegian Society of Chartered Technical and Scientific Professionals (TEKNA) which is coordinating the Norwegian contribution to the project, NVE has been assigned the legislation and policy assessments elements of the project. This focuses on the Azeri legal framework relevant for managing small hydropower development.

NVE's role is, based on Norwegian know-how concerning the legal framework and design of licensing procedures, to collaborate with Azeri legal experts in the elaboration of a report dealing with the legal framework. The report will give relevant proposals and recommendations on which legal changes Azerbaijan may apply to secure a rational and inviting legal framework and practise for private development of small hydropower in Azerbaijan.

Contact: Kjell Repp

Photo: Sølvi Eide, Gauldal consult

ACHIEVEMENT

- Workshop in Baku focusing on the main challenges found in Azeri legal framework applying to development of small hydropower stations, compared with the Norwegian legal framework and practical licensing process.

Other assignments

China

Norwegian Ministry of Finance

Under agreement with the Ministry of Petroleum and Energy, NVE was asked by the Norwegian Ministry of Finance to make an assessment and audit of the sustainability of the Dahuashui Hydropower Project in southern China.

The Ministry of Finance required this audit using the International Hydropower Association's Sustainability Protocol to assist them in their decision to purchase the Clean Development Mechanism Joint Initiative carbon emissions Quota for the project.

The construction of the plant was delayed when the turbine delivery was on hold because the project owner could not pay for it, following lack of financing and refusal of banks to grant additional loans. This situation was reportedly solved only after an agreement for sale of the Quota for the project was achieved. The hydropower plant is now in operation.

The audit was based on written documentation and verbal evidence received during a field trip to China and the project area, as well as on other documentation provided.
The conclusion of the audit was an aggregate IHA Sustainability Assessment score of 3.681 out of 5. This indicates that the project is "Satisfactory" according to the selected international guidelines for best practice in hydropower development and that it is deemed to have:

- Essentially met the requirements of the Sustainability Guidelines (no major gaps).
- Generally compliant with regulations and commitments (minor exceptions only).
- Some non-critical gaps in planning and management systems.
- Some non-critical gaps in meeting objectives and measurable targets,

Contact: David A. Wright

ACHIEVEMENT

- Audit report as input to the Norwegian Government's decision database in evaluating the merits of the Dahuashui project and possible purchase of carbon credits from the project

Bulgaria

As 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 with funds channelled through Innovation Norway. In this context the Government of Bulgaria has sought cooperation with NVE in several fields, to which NVE has responded positively.

Ministry of Environment and Water (MoEW)

As an important part of its strategy the Ministry of Environment and Water is considering to develop a system for monitoring and protection of water resources, to control sources of waste water and to provide online information to the public on the status of the country's water resources, in line with the EU Water Framework Directive. In 2008 the MoEW, in cooperation with NVE, prepared an application for funds based on clear objectives, proposed activities, and envisaged results, which was subsequently approved by Innovation Norway.

Contact: Kim Chi Tran-Gulbrandsen

ACHIEVEMENT

- A cooperation has been established between NVE and MoEW
- A joint programme for development of a water resources monitoring and assessment system has been prepared and agreed upon

Seminar on Electricity Regulation (ELRI)

ELRI (the Electricity Regulators' Initiative) is a training programme for electricity regulators, primarily from developing countries. It also serves as a meeting place and a discussion forum for regulators from different countries, and in particular those countries with institutional cooperation with NVE.

The seminar was arranged for the first time in 2002 by NVE, with contributions from various actors like Nordpool Consulting, ECON Analysis and Statnett (the Transmission System Operator in Norway). The International Centre for Hydropower has been responsible for the practical arrangements and logistics since 2006, while ECON Analysis was responsible for the professional input in 2006, and NVE in 2008. The seminar in 2008 was attended by participants from Ecuador, Kenya, Nepal, Tanzania, Zambia, and South Africa.

Contact: Kjell Repp

ACHIEVEMENT

- The evaluation of the seminar by the participants indicated high satisfaction with the seminar. The evaluation also serves as a guideline for future seminars and indicates new topics which could be included, whilst others may be deleted

SPLASH

Coordinating European water research for poverty reduction

SPLASH is part of the European Union Water Initiative Research Area Network (EUWI Era-Net). It is a consortium of 16 ministries, funding agencies and national research and technological development authorities from 11 European countries. Established in 2007, the project focus is Africa and the Mekong region. The overall aim of SPLASH is to coordinate European water research for development and make the research results available to all stakeholders, and thus contribute to achieving the Millennium Development Goals. SPLASH focuses on the following objectives:

- To coordinate existing national and regional research programmes to minimise duplication and identify gaps
- To design collaborative research programmes which address identifiedneeds
- To speed up knowledge sharing between researchers and practitioners
- To map good research management to maximise use of resources
- To support the transfer of research into practice

The project activities are grouped into several Work Packages. Within each Work Package there is a series of tasks, each led by a SPLASH participant with responsibility for the delivery of the planned activities. NVE's main responsibility is to establish the "Yellow Pages" of water research for development online resources.

Contact: Kim Chi Tran-Gulbrandsen

ACHIEVEMENT

- Existing nationally funded programmes in water research in developing countries have been mapped. A survey report and a searchable database of these programmes is now available on the SPLASH website which can be searched by donor, recipient country and major research themes (see: www.splash-era.net.outputs/index.php)
- Key lessons to support the design and implementation of more effective research programmes have been researched and synthesised, these will be widely disseminated during 2009
- Joint hosting of a side event during the Stockholm World Water Week in August 2008 with other water related era-net projects
- Hosting of workshops and project meetings in Oslo in June 2008

Appendices

Appendix 1

TOTAL INVOICED 2008 Norad/Ministry of Foreign Affairs

Proj.no	Activity	NVE hours	Fee charged (NOK)	NVE-adviser (NOK)	NVE expenses (NOK)	Consultants (NOK)	TOTAL (NOK)
32001-A	General assistance	739,0	550 555,00		171,00		550 726,00
32001-B	Assistance to the Energy Sector in Tanzania	27,0	20 115,00		10 031,00		30 146,00
32001-C	Tanzania. Assistance to the Embassy	112,0	83 440,00		84 720,17		168 160,17
32001-D	Business delegation to Nepal				30 897,25		30 897,25
32001-E	International Energy Agency, IEA/WEO Workshop				113 500,00		113 500,00
32076	Energy expert to SADC	117,0	87 165,00	1 289 844,40	593 682,90		1 970 692,30
32082	Montengro. Ministry of Economic Development. Energy Efficiency	135,0	100 575,00		0,00		100 575,00
32084	Liberia.Energy and Water	315,0	234 675,00		138 682,23	97 394,00	470 751,23
32085	Uganda. Bugoye power station	53,0	39 485,00		44,00	230 625,00	270 154,00
32086	Nepal. Field trip for Nepal delegation, February 2008	39,0	29 055,00		8 804,00		37 859,00
32087	Ghana Dam Safety	249,0	185 505,00		47 535,87		233 040,87
32088	Liberia. Visit to Norway by the Energy Minister	210,5	156 822,50		164 037,28		320 859,78
32089	IHA Sustainability Protocoll	148,5	110 632,50		27 432,46		138 064,96
32090	Vietnam. Participation in Seminar on Hydro Power Master Plan, Da Nang	42,0	31 290,00		32 047,00		63 337,00
32091	Ethiopia. Feasibility study for Mandaya and Beko-Abo	1 154,5	860 102,50		688 944,51	374 979,96	1 924 026,97
32092	Liberia. Ministry of Lands, Mines and Energy. Preparation of Project Document	211,5	157 567,50		35 723,26	157 002,00	350 292,76
32093	SAPP-meeting in Harare i 2008	52,0	38 740,00		30 869,00		69 609,00
32094	The Philippes. Flood Warning System	202,0	150 490,00		62 114,40		212 604,40
32095	Montenegro. Strategic Environmental Impact Assessment. Study at the Moraca River	92,5	68 912,50		12 369,00		81 281,50
xxxx	Timor Leste. Preparation of Project Document	300,0	223 500,00				223 500,00
	TOTAL	4 199,5	3 128 627,50	1 289 844,40	2 081 605,33	860 000,96	7 360 078,19

Appendix 2

TOTAL INVOICED - INSTITUTIONAL COOPERATION 2008

Proj.no	Cooperating Partner	NVE hours	Fee charged (NOK)	NVE adviser (NOK)	NVE expenses (NOK)	Engaged Consultants (NOK)	TOTAL (NOK)
32538	Timor Leste. Ministry of Infrastructure	205,3	152 911,25	1 400 946,50	144 260,22	14 592,00	1 712 709,97
32541	Bhutan. Department of Power. Phase II	555,5	413 847,50		176 682,68		590 530,18
32542	Southern African Power Pool Coordination Centre (SAPP)	17,0	12 665,00		22 566,47		35 231,47
32543	Nepal. Department of Electricity Development	167,5	124 787,50		64 278,13	9 312,50	198 378,13
32547	South Africa. National Energy Regulator	227,5	169 487,50		122 780,47	13 821,50	306 089,47
32548	South Africa. Department of Mineral and Energy II	988,5	736 432,50		388 899,06	8 142,50	1 133 474,06
32549	Uganda. Ministry of Energy and Mineral Development	16,0	11 920,00		1 858,88	80 790,00	94 568,88
32550	The Philippines. Provincial Government of Oriental Mindoro	145,0	108 025,00		49 076,00	1 635 242,63	1 792 343,63
32551	Vietnam. Ministry of Natural Resources and Environment	1 383,0	1 030 335,00		391 053,39		1 421 388,39
32552	South Africa. Department of Mineral and Energy (CEF) Alternative Energy Cooperation	365,0	271 925,00		145 254,95	398 325,47	815 505,42
32553	South Africa. Department of Mineral and Energy. Hydrocarbons Subprogramme	206,0	153 470,00		9 785,62		163 255,62
32555	Bhutan. Department of Energy. Phase III	932,3	694 526,25		544 010,88		1 238 537,13
32556	Bhutan. Accelerated Hydropower	119,8	89 213,75				89 213,75
	TOTAL	5 328,3	3 969 546,25	1 400 946,50	2 060 506,75	2 160 226,60	9 591 226,10

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

ENERGY

International Energy Agency (IEA)
Wind Energy: Member of Executive Committee for the Implementing Agreement in the research and development of wind turbine systems. Participate in Annex for wind and hydro systems and Annex for wind system integration.

IEA Hydropower technologies
Participate in Annex for small hydro

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

The European Regulators' Group for Electricity and Gas (ERGEG)
ERGEG is an advisory group of independent national regulatory authorities 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 a as 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.

CIRED – International Conference on Electricity Distribution
CIRED 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. CIRED is dedicated to the design, construction and operation of public distribution systems and of large installations using electrical energy in industry, services and transport. CIRED 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.

Climate and Energy: International project. The project comprises several institutions representing Nordic and Baltic countries.

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 Meteorogical 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 Meteorological and Hydrological Service in Serbia and NVE.

The Republic of Armenia:
Hydrology in Armenia, cooperation between Republic of Armenia and NVE

Norwegian
Water Resources
Energy Directora

Norwegian Water Resources and Energy Directorate

Middelthuns gate 29
P.O.Box 5091 Majorstuen
N-0301 Oslo, Norway

Telephone +47 22 95 95 95
Telefax +47 22 95 90 00

www.nve.no