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ENERGY FOR SUSTAINABLE DEVELOPMENT

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PREFACE

According to the UN, the world's population will reach almost 10 billion people by 2050. As result of economic growth and a growing population, we expect global energy demand to increase by 35 percent over the next twenty years.

Access to sustainable, affordable and reliable energy services is essential for both economic and social development. While many countries focus on domestic energy security and decarbonising their energy mix, many are also struggling to secure sufficient energy to meet basic human needs. At present more than 1.2 billion people lack access to electricity at home and 2.8 billion have to rely on wood or other biomass to cook and heat their homes.¹

In developing countries access to affordable and reliable energy services is important to reduce poverty. It is necessary to stimulate economic activity like operating businesses and creating employment. Likewise, access to energy is necessary to provide social services like modern health clinics with refrigeration of medicines and schools with sufficient lighting. In addition, energy for the individual households is important, with lighting allowing children to study at night and improved cookstoves which can contribute to significant health improvements. This is why increased access to modern energy services is one of the prioritised areas of Norwegian development funding.

The world's energy use is mainly based on fossil fuels. In order to mitigate the effects of climate change the world's dependence on fossil energy must be reduced. The poorest countries with low energy production and consumption are not major contributors to climate change, but will suffer disproportionately from its impacts at the local level. Support to increased renewable energy production has therefore been high on the Norwegian development agenda.

Since the launch of the United Nations (UN) Secretary General's Sustainable Energy for All (SE4All) initiative, the importance of sustainable energy access for development has received a surge of international attention. The Government of Norway has been an active supporter of the initiative and in 2014 UN launched the decade for SE4All.

Available public funds are insufficient to meet the large investment needs of developing country's energy sectors. Mobilising private capital is therefore a key priority. Norway's main instrument to mobilise commercial investments in developing countries is Norfund. The renewable energy portfolio constitutes about half of Norfund's total investments.

1 Banerjee, Sudeshna Ghosh et. al. *Global tracking framework*. Vol. 3 of *Global tracking framework*. Sustainable energy for all. Washington D.C. ; The World Bank. <http://documents.worldbank.org/curated/en/2013/05/17765643/global-tracking-framework-vol-3-3-main-report>



The Government of Norway has launched two energy initiatives for sustainable development. Clean Energy for Development and the International Energy and Climate Initiative, Energy+. The Clean Energy for Development initiative was launched in 2007 to increase access to affordable clean energy through efficient long-term management of natural resources and energy use. Energy+ is an international partnership launched in 2011. It aims to mobilise action to increase access to sustainable energy services and avoid greenhouse gas emissions, using a results-based approach. Norway has in both initiatives a clear focus on developing business models to leverage private investments in the energy sector.

In 2013, Norway spent NOK 1.55 billion² on clean energy programmes. Most of the funding was managed by Norwegian Embassies, the Ministry of Foreign Affairs, Norfund and Norad (See annex 1 for more information about the key Norwegian actors and partners).

This report presents selected results managed by different key actors and partners with the purpose of providing the reader an understanding of the magnitude and breadth of Norwegian efforts within energy for development. It, however, does not provide a complete list of all results.

While results from Energy+ are presented separately, the other examples are divided into three thematic chapters; *Production and access*, *Long-term institutional cooperation* and *Vulnerable and post-conflict states*. The intention of each chapter is to provide some insight into the results achieved and challenges faced in different contexts and types of work.

In the examples provided for energy production and access, results are quantified where possible. However, the reader is cautioned that statistical variations can be high, and there are substantial differences in the type of interventions and types of costs included. Direct comparison of figures may therefore lead to inaccurate conclusions. For human capacity building, organisational and institutional development results are more difficult to quantify.

² This includes all disbursements in 2013 over chapter post 166.74 (renewable energy) and all disbursements DAC-coded 230 (energy access and production).

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KEY ACHIEVEMENTS



ENERGY PRODUCTION AND ACCESS



INTRODUCTION

Increased access to modern energy services and power generation from renewable energy is a key tool in the fight against poverty and an important goal for Norwegian development assistance.

Increasing access to modern energy services requires new production as well as new distribution and transmission systems. In many parts of the world, small-scale and off-grid solutions are the only feasible alternative in the medium term, especially at the household and community level in remote areas.

'Access' is often measured by the number of households connected to the power grid or that have solar panels installed. While this is important, access to energy is equally important with regards to providing social services such as health and education services. Access can also provide businesses with opportunities to grow, by for example, using a computer or electrical appliances that improve production rates. Such businesses, as well as the distribution and operations of the energy systems themselves, can in turn create employment opportunities.

Access to electricity improves peoples' everyday lives in a number of ways, including:

- Increased use of electrical appliances.
- Improved quality of lighting which provides the possibility to do homework and other activities at night.
- Reduced use of kerosene for lighting, leading to improved indoor climate and health gains.
- Improved security in public places, with street lighting at night.
- Ability to provide medical assistance at night time, and refrigeration for medicines.

Access to clean energy provides new opportunities for job creation, increased productivity and economic growth. Still, experiences show that

business creation does not come automatically with electrification. It must be combined with awareness building and training regarding the opportunities that electricity provides.

Renewable energy investments in low-income countries also contribute to climate change mitigation by reducing the need for increasing fossil fuels. The Government of Norway's policy is to use public financing to encourage increased private investments in new generation capacity. It has however proved to be challenging to attract private-sector investment for clean energy projects in a number of developing countries as it requires long-term investment with a high risk.

Hence, in some cases public financing will still be required to increase generation capacity. Given their nature and the context, transmission and distribution projects are usually taken forward as public investments.

This chapter provides examples of how the Government of Norway has contributed to production, transmission, distribution and access to renewable energy through bilateral cooperation, multilateral initiatives and organisations.



Photo: TERI

Solar micro grids, funded by the Government of Norway, give light in the market place in Aroha Bhawani in Uttar Pradesh in India.

UGANDA: GET FIT – LEVERAGING PRIVATE INVESTMENT IN RENEWABLE ENERGY

Key results:

Support approved for 85 MW of renewable generation capacity from eight privately owned projects.

Norwegian support:

Up to 140 million Norwegian kroner (NOK) over 5 years.

The Government of Uganda has ambitious electrification targets and the Global Energy Transfer Feed-in Tariffs (GET FiT) programme³ has been developed to increase private investments in renewable energy development. Its main purpose is to fast-track a portfolio up to 15 small-scale renewable energy generation projects (below 20 MW), providing a total of about 170 MW of new generation capacity over the next three to five years.

GET FiT was initiated by Deutsche Bank and the German development bank (KfW) and is developed in cooperation with the Government of Uganda.

Norway has been an active partner in this process and was the first donor to commit funds. If the pilot program in Uganda is successful, it may also be implemented in other countries with similar challenges in their energy sectors. A total support of NOK 730 million has been committed from Norway, UK and Germany.

More broadly, GET FiT aims to help improve the overall enabling environment for private investment in renewable energy through improvements in the

Feed-In-Tariff system and its application. The main barrier to investment in renewable energy in Uganda is the low feed in tariff and the risk related to the single buyer. By paying the incremental tariff, or top-up, development support is leveraging private investment whilst the private developer takes the implementation and operational risk.

The goal is to stabilise the Ugandan power sector finances by adding least-cost generation capacity, help diversify Uganda's energy mix and enhance security of supply.

The first round of 'Request for Proposals' was successfully launched in April 2013. The interest from the private sector has exceeded all expectations, revealing a strong private sector interest in the Ugandan energy sector. Eight projects were accepted for GET FIT support in 2013. The supported projects will give a total installed capacity of 85 MW, which correspond to 10 percent of the installed capacity in Uganda today.

The successful implementation of GET FiT would not have been possible without a well-functioning legal, regulatory and institutional framework in Uganda. You can read more about the longstanding Norwegian institutional cooperation in Uganda in the chapter about Long-term institutional cooperation.

“The interest from the private sector has exceeded all expectations, revealing a strong private sector interest in the Ugandan energy sector.”

³ Read more at: <http://www.getfit-uganda.org/>





Photo: Per Kristian Edvardson

The Norwegian developer Jacobsen Elektro at site visit at Nengo Bridge with KfW. Nengo Bridge is one of the first signed financing agreements under the GET FiT Programme.

Jacobsen Elektro AS is developing Hydro Power projects in Uganda under the GET FiT program.

The Norwegian company Jacobsen Elektro was one of the first investors to sign a GET FiT contract.

On 22 November 2013, the Government of Uganda, represented by KfW signed three developer financing agreements under the GET FiT programme. These projects will add clean and sustainable energy to the Ugandan grid by 2015. One of them, Nengo Bridge SHP (6.7 MW) on the border between Kanungu and Rukungiri District is to be undertaken by Jacobsen Elektro AS.

Terje Gresslien, Director Project Development of Jacobsen Elektro AS, is very satisfied with the program. *“Without support from the GET FiT program through topping-up of the existing tariff for small hydropower projects, it would have been financially impossible to develop the Nengo Bridge project”,* he says.



Photo: Ryan Anderson, Norplan

Site visit at possible GET FiT site.

MOZAMBIQUE: STRONG CONNECTION NUMBERS WITH TIME

Key result:

25,000 new household connections in Niassa province.

Norwegian support:

Approximately NOK 60 million from 2002 to 2006.

In 2005, only seven percent of the population in Mozambique had access to electricity, and only 55 of the country's districts were connected to the grid. From this low level, a rapid development has taken place through an extensive rural electrification programme. Today the population with access to the power grid has reached about 26 percent with 120 of 129 districts being connected.

The Government of Norway has cooperated with Mozambique since the time of the civil war and throughout the subsequent 20 years of peace and stability. Norway has financed several rural electrification projects. These are mainly located in the northern and central provinces of the country, which also are the poorest, most rural, and least developed.

The results of electrification programmes take a long time to fully materialise. The number of connections achieved multiplies over the years as more and more people connect to the new grid. An example of this is the Norwegian and Swedish financed electrification of the Northern Province Niassa. The province was first connected to the grid in 2006. Between 5,000 and 6,000 connections were then provided as a direct part of the electrification project.

A recent Impact Assessment⁴ found that by 2013 the number of connections had risen to 25,000, most of which were poor households. Norwegian supported electrification projects in Mozambique have directly provided around 20 000 new household connections to the electricity grid. Using the Niassa electrification as a measure, the total number of connections in the project areas may reach more than 80 000 households.

“Rural electrification has high costs, but results materialise and create valuable impact in the long term.”

Electrification improves peoples' lives through better lighting and use of electrical appliances. On a community level, installation of streetlights as part of the Project has increased security, and connection of a considerable number of schools, clinics and hospitals has also increased the value of these services to the public. Energy is also a basic ingredient for creating opportunities for job creation, increased productivity and economic growth in rural areas. However in Niassa, such effects have not yet fully materialised. This confirms findings from previous research which show that electrification must be combined with building awareness of the opportunities that electricity provides, assistance to access finance, local knowledge building, and market access, in order to reap the full potential development effect of electrification.

Given the low electricity tariffs and prices, projects for extensions and connections in very rural areas are not profitable for the power company EdM (Electricidade de Mocambique). This is a challenge as it decreases EdM's credit worthiness and makes it less able to attract private investments.

⁴ An Impact Assessment Report is available at: <http://www.norad.no/no/resultater/publikasjoner/publikasjon?key=412827>





Photo: Ingar Flatlandsmo, Norplan

Electrification of Niassa has brought a number of benefits, including increased security through street lights.



Photo: Ingar Flatlandsmo Norplan

With electricity supplied from the Norwegian financed electrification project, Mrs. Balbina Fimiosse Massingue employs over 25 workers at her saw-mill and lumber concession in Mucubela town, Zambezia Province.

NICARAGUA: BIG RESULTS FROM SMALL POWER PLANTS

Key results: Over 56 GWh of renewable energy from 10 constructed and two planned small power plants.

Norwegian support: NOK 60 million from 2009 to 2015.

Despite a large potential for alternative energy production, Nicaragua remains heavily dependent on energy import and fossil fuels. The government's goal is for clean energy to make up 90 percent of the energy mix by 2020.

The Government of Norway has since 2009 supported a programme to build 12 small-scale hydroelectric plants in off-grid areas in the Northern Atlantic Autonomous Region and the Central Region; home to some of the poorest rural communities in the country. The programme is driven by the Nicaraguan government together with the United Nations Development Programme. Phase II of the Program, which is set to end in 2015 is co-financed by the Governments of Norway and Switzerland. The total budget amounts to approximately NOK 260 million.

“New employment opportunities and income generating activities have been created”

By the end of 2013, 10 power plants have been completed. So far in phase II the average annual energy production amounts to 45.9 GWh. Once the two remaining plants, with an additional average 10.5 GWh per year come into operation, the power plants will provide electricity to more than 8,000 families.

An evaluation of the programme⁵ pinpoints several positive effects:

- Living conditions in the rural communities have improved.
- New employment opportunities and income generating activities have been created.
- The electricity bills that are tariffed according to income are generally paid.

The programme is strengthening the capacity of local communities to manage the watersheds to ensure sustainability of the water flow and investments, and to run local electricity companies to set up and manage the hydroelectric plants. The programme has also contributed to strengthening the capacities of the Ministry of Energy and Mines in order for it to undertake similar initiatives in other locations.



Construction of a small hydroelectric station in Wiwili, Nicaragua.

⁵ An evaluation of the program is available at: <http://www.norad.no/no/resultater/publikasjoner/publikasjon?key=412825>

SOMALIA: STREETLIGHTS BRING A SENSE OF NORMALITY TO MOGADISHU

Key results:

315 solar powered streetlights installed.

Norwegian support:

NOK 7 million in 2013.

The Governments of Norway and the United Kingdom have funded 315 solar powered streetlights on Mogadishu's main roads, lighting up a total of 14 kilometres. The project has improved stability in the targeted areas through improved community safety and security and increased economic opportunities and quality of life. New and existing businesses have extended their opening hours and a series of organised and unorganised gatherings and celebrations now take place along the street.

The project has also worked to build the capacity of the regional administration to plan, manage and sustain delivery of public services, while undertaking extensive public engagement to improve community visibility and ownership for the project.

"Last night I went for a stroll in Mogadishu. For twenty-odd years the dusty streets of this infamously dangerous city have emptied in a furious hurry at sunset. ...The shift is illustrated dramatically by the scenes I witnessed at 8pm. It wasn't just a few kids hanging out near a bonfire. Or a family sitting on the steps of their home. There were crowds - big, happy, chaotic crowds of boys, girls, men and women. I must have seen a dozen football matches on the streets. One section had been cordoned off with some stones and was being used for driving lessons. At the roadside dozens of shops were open - their doorways flickering with multi-coloured lights. And the reason for the change? Streetlights. Solar-powered, Chinese-manufactured, astonishingly bright streetlights have been erected along two main roads through the city. In all, 14 kilometres have been illuminated courtesy of a project funded by the Norwegian and British governments."

Sited: BBCs Africa Correspondent Andrew Harding,
11 May 2013



Photo: NIS Foundation

Street lights have given increased security in Mogadishu.

NEPAL: ACCESS TO CLEAN ENERGY OFF GRID

Key result:

Access to clean energy for more than one million households since 2000.

Norwegian support:

Approximately NOK 245 million since 2000.

The Government of Norway and other development partners⁶ have since 2000 contributed to giving more than one million households in Nepal access to electricity.

In 2013 the cooperation contributed to giving 16,000 households access to electricity from mini-hydro, while 98,000 households received access to electricity from solar panels. In addition, the Government of Norway contributed to installation of 87,000 improved cooking stoves and 24,000 bio gas plants.

Today the Norwegian assistance is in a single programme under one National Rural Renewable Energy Programme, continuing the good results from the previous phase. The single programme modality is reducing transaction costs and ensures national ownership. The Programme aims at scaling up private sector participation and credit financing. The Nepalese Government's decision to establish the Central Rural Renewable Energy Fund in 2013 with a credit window is an important milestone as it may reduce donor dependency and increase sustainability.



Photo: Bhupendra, Renewable Nepal

Testing of charring in retorts in Nepal.

⁶ Government of Denmark, the German development bank KfW and the Government of the United Kingdom.

UGANDA: CLEAN LIGHTING AND COOKING IN KASESE

Key result: Complete value chains, for provision and sale of clean cook stoves and solar home systems through local organisations, have been developed.

Norwegian support:

NOK 22.8 million over five years.

WWF is implementing a five year Clean Energy Programme⁷ in Uganda, cooperating with the district government, businesses and civil society organisations through the Champion District Initiative in the Kasese District. In this rural area people live out of reach from the electric grid. They light their homes using kerosene and cook their food burning wood and charcoal over open fires within their homes.

For more people in rural areas to have access to new equipment, it is important not only to install it in some homes, but to create complete and sustainable value chains for a continued purchasing, distribution and sale of cook stoves and solar home systems.

WWF has established and provided seed capital to local Community Based Organisations that allow them to buy the first batch of clean cook stoves for selling. The value chains and competence necessary for selling and installing these products have also been put in place. The Community Based Organisations offer families not only the product itself, but also a way to afford it, through microcredit and a tailored payback plan. 10,000 Kasese families now cook dinner using a fuel efficient cook stove, and 2,000 families have purchased solar home systems as a result of the programme.



Photo: Global Alliance for Clean Cookstoves

Woman cooking over a traditional three stone fire.

⁷ Read more at: http://www.wwf.no/dette_jobber_med/klima/energi/the_champion_district/

INDIA: SCALING UP SOLAR MULTI UTILITIES

Key results:

6 solar multi utilities and 34 solar mini grids installed.

Norwegian support:

9 million Norwegian kroner (NOK) over 5 years.⁸

The Government of Norway has a framework agreement with The Energy and Resources Institute in India (TERI), to address global and national concerns of energy security and climate change.

One of several projects under the framework agreement includes the setting up of solar multi utilities in three states; Odisha, Madhya Pradesh and Assam, and solar mini-grids in one state, Uttar Pradesh. The solar multi utilities are used for training and capacity building purposes as well as for institutional building purposes.

Activities under the project have contributed to i) developing a model of livelihood generation led strategy for use of solar energy, ii) increased productivity through technological interventions and iii) long term capacity building.

12 self-help groups, 2 farmer's associations and 1 producer company have made use of solar multi utilities in six different villages. The multi utilities facilitate different livelihood activities like leaf plate making, plant nursery, tailoring, turmeric grinding, chili and other spice grinding and packaging. In total 800-1000 households are affected economically and socially.

In the Uttar Pradesh region around 1000-1200 households in 34 sites in four clusters have installed solar mini grids giving possibility for household lighting, mobile phone charging and lighting for example to poultry, pottery and handicraft.



Photo: TERI

A solar multi utility in Laximiposi Village in Odisha, India.



Photo: TERI

Training and capacity building activities in Odisha, India.

⁸ The electrification project is one out of many projects included in the framework agreement between The Energy and Resources Institute (TERI) in India and the Norwegian Embassy in New Delhi. 60 million NOK was spent on the whole agreement over a five-year period.

MULTILATERAL PARTNERSHIP: REDUCING ENERGY POVERTY BY WORKING TOGETHER

Several multilateral partnerships are initiated to reduce energy poverty, mitigate climate change and increase economic growth, through introducing sustainable, clean energy solutions in poor countries.

The following is a short description of three multilateral partnerships which receives funding from the Government of Norway.

ENERGIZING DEVELOPMENT (ENDEV)

Key result:

Access to basic electricity or clean cooking for over 11 million people.

Norwegian support:

NOK 184 million from 2011 to 2016.

The Energising Development programme (EnDev)⁹ is a multilateral energy partnership, supported by Germany, The Netherlands, The United Kingdom, Austria, Switzerland and Norway.

The goal of the partnership is increased access to energy for poor families for an average cost of NOK 160 per person. According to EnDev this seems to be within reach. The low costs are mostly due to the establishment of self-sustaining markets for the production and sale of efficient and non-expensive cook stoves. Cook stoves stands for about 70 percent of the results, while the remaining 30 percent comes from new electricity production.

Examples of other EnDev supported projects are; extending and intensifying power grids, installing bio gas systems, installing small hydropower plants and distributing solar home systems.

From 2005 to 2013, more than 12 million people have received access to basic electricity and/or clean cooking through the programme. The beneficiaries are mainly in Africa, but also in some countries in Latin-America and Asia. In addition 15,700 schools and health care centres and 28,300 businesses have been reached.

The Government of Norway's total support to EnDev will, if the ambitious goal of an average cost of NOK 160 per person is reached, provide basic energy access or as a minimum better cooking facilities to more than 1.1 million poor people in developing countries.



Photo: Ken Opprann

More than 12 million people have received access to basic electricity and/or clean cooking through EnDev.

⁹ Read more at: <http://endev.info/>

SCALING-UP RENEWABLE ENERGY IN LOW INCOME COUNTRIES (SREP)

Key result: Renewable energy investment plans for the 8 first pilot countries have been developed.

Norwegian support:

NOK 160 million in 2013.

SREP¹⁰ aims to pilot and demonstrate the economic, social, and environmental viability of development pathways that do not exacerbate global warming.

The program is one of the sub-funds under the Climate Investment Funds. It's eleven donors have pledged a total of NOK 3.3 billion through grants and loans, handled by The World Bank. The Steering committee, in which the Government of Norway has a seat, has equal representation from the donors and recipient countries. The committee makes allocations to the different SREP countries for implementation of their renewable energy investment plans. The development banks assist the countries in implementation.

The fund supports investments in renewable energy sources like sun, wind, geothermal, biofuel and hydropower (up to 10 MW), on the basis of SREP investment plans. In addition to these investments, efforts are made to stimulate more private sector investments through a private sector set aside.

Investment plans have been endorsed in Kenya, Ethiopia, Mali, Tanzania, Liberia, Nepal, The Maldives and Honduras. A number of projects under their investment plans have been further developed, ready for implementation. One expects the first projects to start implementation in 2014 resulting in grid extensions and new energy production.

Many developing countries have wanted to be among the pilots. Four more countries are in the pipeline, and work has started to select twelve new pilot countries to start developing their investment plan.



Photo: Ryan Anderson

SREP steering committee in Nairobi, Kenya 2012.

¹⁰ Read more on <https://www.climateinvestmentfunds.org/cif/node/67>

THE ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAM (ESMAP)

Key result: Seven million people in Sub-Saharan Africa reached with clean and improved lighting products through the Lighting Africa-programme. Launch of the SE4ALL Technical Assistance Programme and the Renewable Energy Resource Mapping initiative.

Norwegian support:

NOK 40 million in 2013.

ESMAP¹¹ is a global technical assistance program aimed at promoting environmentally sustainable energy solutions. Fourteen bilateral donors and the World Bank provide grant funding, and the program's total annual budget is about NOK 168 million. The programme's focus is on building capacity, finding institutional and technical solutions, and mobilising resources.

Some of ESMAP results from 2013:

- Launch of the Global Geothermal Development Plan.
- Launch of the Renewable Energy Resource Mapping initiative, which will identify potential locations for solar, wind, biomass and small hydropower. Nine country projects are approved in the initial stage.
- Launch of the SE4ALL Technical Assistance Programme to help high-potential developing countries achieve universal access to electricity and/or modern cooking fuels by 2030. Country-specific technical assistance is underway in Burundi, Guinea, Liberia, Mozambique, and Senegal; with the program expected to expand to Asia and Central America in FY2014.
- Continued support to the Lighting Africa program, which has reached nearly seven million people in Sub-Saharan Africa with clean and improved lighting products.
- Co-authoring of the Global Tracking Framework report, together with the World Bank's Sustainable Energy Department and the International Energy Agency (IEA).

11 Read more on <https://www.esmap.org/>

NORFUND: INVESTING TO REDUCE ENERGY POVERTY

Key result: Produced 6,781 GWh renewable electricity in 2013.

Norwegian support: Capital of NOK 1,198 million was supplied from the Government of Norway to Norfund in 2013. Investment agreements for renewable energy projects for a total of NOK 878 million were signed.

Norfund is an investment fund for the development of sustainable commercial activities in developing countries. The fund contributes equity and other risk capital, extends loans and provides guarantees to establish viable, profitable enterprises that would otherwise struggle to obtain financing due to their high risk.

Norfund is a hybrid state-owned company. It receives funding from the Norwegian development assistance budget, and is the most important instrument in Norwegian development policy to combat poverty through private sector development.

“Produced electricity in Norfund’s portfolio 2013 was 6,781 GWh, equivalent to nine million people’s electricity use in their respective countries.”

The renewable energy portfolio currently constitutes about half of Norfund’s total investments. Hydropower has dominated the portfolio to date, however substantial investments have been made in wind and solar energy in recent years. The largest company in the portfolio is SN Power, with 39 hydro power plants in development, construction or operation.

Norfund’s renewable energy portfolio brings substantial development benefits. Production of clean renewable electricity in 2013 was 6,781 GWh. This is equivalent to the electricity consumption of nine million people in their respective countries. 1.1 million tonnes of CO₂ emissions were avoided, compared to production with fossil fuels such as coal and diesel, which is often heavily relied on in these countries. In comparison, total CO₂-emissions from domestic flights in Norway in 2012 was 1.3 million tonnes.¹²

In 2013, Norfund invested in four new renewable energy projects:

Kinangop Wind Park in Kenya:

Kinangop Wind Park is a 60 MW wind farm in central Kenya. It will be one of the largest wind park investments in East Africa to date, and the first commercial project in the region. The total investment in the park is approximately NOK 886 million, and Norfund has invested about NOK 85 million. It is expected that Kinangop Wind Park will be constructed in 2015, and will deliver electricity to 150,000 Kenyan households. The project is expected to be the first of a number of wind power projects in the region.

Bio2Watt, biogas project in South Africa:

Bio2Watt is the first commercially viable biogas from organic waste project in South Africa. In the biogas plant the degradation of organic waste is accelerated and the methane produced in the process captured and used to generate electricity in gas engines. The generation capacity of the biogas plant is 4.2 MW, providing an estimated 35 GWh of energy per year. Norfund has invested NOK 9 million of a total investment of NOK 85 million.

¹² Norfund’s annual report is available at: <http://www.norfund.no/publications/category321.html>



Linde and Dreunberg solar plants in Africa:

Norfund and The Norwegian life insurance company KLP have invested NOK 35 million each in two new solar plants in South Africa. The solar plants will be built by Scatec Solar in Linde in Northern Cape and Dreunberg in Eastern Cape, regions that have some of the best conditions for solar power in the world. Scatec Solar has become a leading player in the development of solar energy in South Africa. The company has so far been awarded three projects through the South African Department of Energy.

The Linde and Dreunberg plants will together produce more than 225 GWh annually, enough to meet the electricity needs of 53,000 South African households. They will increase the share of renewable energy production in South Africa and improve the balance between supply and demand in the power system.

The Linde and Dreunberg projects represent a breakthrough in Norfund's important work to mobilise more private investors to invest in developing countries. The investment is the first in an agreement between KLP and Norfund of co-investing NOK 1 billion over a period of five years in projects in developing countries to promote sustainable development.

In addition to these four new investments, several follow up investments in existing investments were made in 2013, and an agreement to restructure SN Power was signed. The restructuring is aimed at increasing activities in low income countries in Sub-Saharan Africa, Central America, and Southeast Asia.



Photo: Ivan Hobbs, Scatec Solar

Norfund has invested in Scatec Solar's solar plant in Linde in South-Africa.

LONG TERM INSTITUTIONAL COOPERATION



INTRODUCTION

As seen in the previous chapter, the Government of Norway supports a broad portfolio of projects aimed at increasing renewable energy production, and expanding access to clean energy. However, to secure sustainable operations and long-term development, human capacity and organisational aspects are equally important. Many developing countries face challenges in terms of capacity, regulatory frameworks and institutional structures that are a prerequisite for the sustainability of their power sectors.

The Government of Norway contributes to building capacity in a variety of ways, for example through institutional twinning arrangements, university cooperation, support to short-term courses (especially in hydropower related issues via the International Centre for Hydropower) and joint efforts with multilateral institutions.

The institutional cooperation in the power sector has a long-term perspective. Strategic decisions are made, and human resources and competence must be developed over time. The results of capacity building may therefore only be evident after several years, and results such as empowerment and more efficient decision-making processes are difficult to quantify.

This chapter provides examples of how the Government of Norway has worked closely with partner countries to enable long term institutional cooperation between actors in the Norwegian power sector and their sister organisations in partner countries. Through such processes capacity is built and the regulatory and institutional structures are strengthened.

The chapter intends to give a flavour of the complexity involved both in measuring the impact of

these efforts, the long-term perspective and the different external factors that influences the results in which our support is just one factor/element.

The examples from Uganda, Nepal and Bhutan are included to visualise the long-term perspective needed in these efforts and how impacts and results can be judged differently over time. The African regulators example presents the regional aspects, while the ICH example is provided as an example of more direct training activities.



Photo: Ørnulf Strøm

The Government of Norway has worked closely together with the Government in some partner countries, and enabled institutional cooperation over a longer period.



Photo: ICH

International Centre for Hydropower (ICH) holds training courses in water resource management in Myanmar.

UGANDA: LONG TERM CAPACITY BUILDING – LONG TERM EFFECTS

To gain an understanding of capacity building, it is of special interest to look back on Norway's important contribution within the energy sector in Uganda.

In the recently established Global Energy Transfer Feed-in Tariffs (GET-FIT) programme, the numbers of applications from private renewable energy developers have exceeded all expectations. But the implementation of a programme like GET-FIT would not have been possible without the development of a legal, regulatory and institutional framework through long term capacity building.

20 years ago, the investments in the energy sector in Uganda were poor or non-existent. In the early 90s, the entire Ugandan power sector consisted of one parastatal: the Uganda Electricity Board. The performance, revenues, and investment levels in the sector were poor with load shedding rampant due to the insufficient generating capacity.

The Government of Uganda saw the problems in the energy sector, and initiated reforms in the mid-1990s, aimed at increasing the electrification rate through increased capacity and unbundling of the energy sector.

“At present, most relevant indicators show that the legal, regulatory, and institutional framework functions well”

Over 20 years, a better functioning legal, regulatory and institutional framework, has gradually been built in Uganda, through a living cooperation between the Ugandan government and different development partners and in particular Norway.



Photo: Morten Svelle

Uganda has a large potential for small hydro power plants, but the legal regulatory and institutional framework has not been in place.

Institutional cooperation between Norway and Uganda

The Government of Norway initiated a comprehensive capacity building project with the Government of Uganda in 1997. The project was organised as an institutional cooperation between the Ugandan Ministry of Energy and Mineral Development and the Norwegian Water Resources and Energy Directorate (NVE). The cooperation had three key objectives:

- Development of the Electricity Act, enacted by Parliament in 1999.
- Advising the political leaders on subsequent sector reform actions to be taken within the legal framework provided by the Electricity Act.
- Enhanced enforcement of the legal and regulatory framework.

As a direct result of the Electricity Act, an autonomous Electricity Regulatory Authority (ERA) was formed in 2000, and this soon entered into a new four year institutional cooperation with NVE.

Key components of the cooperation included training of ERA staff, implementation of a tariff structure, implementation of a set of regulations detailing the Electricity Act, and development of

licensing procedures and processes. The bulk of the supporting regulations currently in force were developed in 2003 under this co-operation. Progressively, sector flaws have been rectified, and generation capacity increased.

“Co-operation with Norway has been instrumental in setting our regulatory framework on a sure foundation,” explains Benon M Mutambi, Chief Executive Officer, Electricity Regulatory Authority (ERA) Uganda



CEO Benon M Mutambi, Electricity Regulator Authority (ERA) Uganda appreciate the institutional cooperation with the Government of Norway.

Another institutional cooperation between Statnett, the Norwegian system operator, and the Uganda Electricity Transmission Company has also strengthened the Ugandan Transmission System Operator, in areas like utility management, transmission system operation, technical solutions, implementation as well as governance principles and financial management.

Drawbacks and critics

However, there have been impediments curtailing the sector reform achievements in the short and

medium term. Among others, a decline in the investment climate occurred in the country in the early 2000s, in part precipitated by the global meltdown of energy markets, after the collapse of the US energy company Enron. This led to time-consuming replacement of developers and the need for the Government of Uganda to contract interim costly thermal power generation capacity.

In this period the Norway-Uganda co-operation facilitated the installation of a 50 MW heavy fuel oil thermal plant, a strategic intervention aimed at re-balancing the energy mix that had until then been 99 percent hydro based.

Critics claimed that the unbundling of the electricity sector and the establishment of an independent regulator in Uganda was too ambitious at that time, given that Uganda only had 200 MW capacity installed in the 90's. However the installed generation capacity has increased significantly in recent years, with the commissioning of the 250 MW Bujagali hydropower plant in 2012. Also, the 600 MW Karuma hydropower plant is under development, and the GET FiT Programme aims to provide a total of about 170 MW new generation capacity over the next three to five years.

A long term perspective

At present, most relevant indicators show that the legal, regulatory, and institutional framework functions well, and that the available human resources are adequate.

An important lesson from this experience is that this kind of restructuring and capacity building has a long term perspective and the paybacks are mostly evident after several years. In the case of Uganda, this has taken more than 10 years, but thus far it has been a fruitful investment. The entire

process has also brought to the fore the general understanding among most key stakeholders and actors that the power sector requires strategic decisions to be taken and all involved to remain on course for the long haul.

A well-functioning institutional framework has been important for a programme such as GET-FIT to succeed. The evaluation of proposals and the

follow-up of GET FIT projects is strongly linked with ERA's handling of applications for generation licences, which is done in accordance with the Electricity Act of 1999. Furthermore, Uganda Electricity Transmission Company Limited is responsible for negotiating and entering into power purchase agreements with the successful developers.



Photo: Kristin Wæringsaasen]

The planned GET-FIT project in the Kagara river would not have been possible without a well-functioning institutional framework to have come in place.

NEPAL: REAPING THE BENEFITS OF A BROAD COOPERATION

Nepal has an enormous potential for hydro power, but have lacked the necessary competence and regulations to explore it. The Government of Norway has supported the power sector in Nepal on several fronts for over 50 years. The support has in total been NOK 420 million from 2000-2013.

An institutional cooperation between NVE and the Ministry of Water Resources (today called Ministry of Energy) has been important in developing Nepal's hydropower sector. With assistance from NVE the Government of Nepal prepared an Electricity Act, which opened up for commercial hydropower investors. The law was passed by Parliament in 1992.

Training of technicians

In terms of capacity building, the Norwegian University of Science and Technology (NTNU) has trained Nepali hydropower engineers for decades through its long and still ongoing cooperation with Kathmandu University.

“When looking forward it is important to keep in mind that the groundwork for achievements was laid decades ago.”

Norad has financed training of technicians and on-the-job training implemented by the Norwegian NGO HimalPartner (Tibetmisjonen) as part of the construction of hydro power projects, such as the 0,5 MW Tinau, the 4,5 MW Andhi Khola and the 12 MW Jhimruk. This training also contributed to establishing domestic construction and electro-mechanical companies.

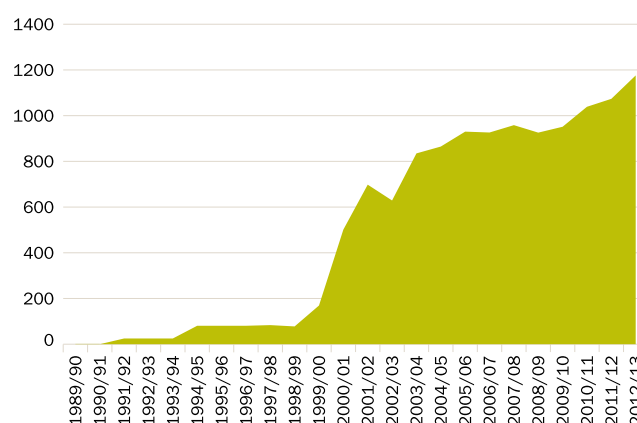
Norad also financed an on-the-job training package to build local capacity as part of the 60 MW Khimti hydropower project, that provided a substantial boost to the Nepalese hydropower sector.

Giving results

After more than a decade of political unrest foreign hydro power investors are again looking to Nepal. Still several challenges remain, but the successful construction and operation of the first commercial hydro power projects have made Nepali investors and banks see commercial opportunities. So far commercial hydro power producers have constructed hydropower in the order of 200 MW, amounting to an annual clean energy generation of more than 1000 GWh. This is expected to grow significantly in the years to come.

In a few years the 456 MW Upper Tamakoshi Project (a national Public Private Partnership), will be commissioned. This will reduce the present load shedding significantly. When looking forward it is important to keep in mind that the groundwork for achievements was laid decades ago.

Figure 1.: Annual hydro power production from commercial producers in Nepal. (numbers from 1997/98 onwards are from NEA's annual reports. Data before that are estimates).



INTERNATIONAL CENTER FOR HYDROPOWER: TEACHING GOOD MANAGEMENT

The International Centre for Hydropower (ICH)¹³ based in Trondheim, is a non-profit organisation based on institutional membership for organisations and companies in the hydropower sector. The purpose of ICH is to raise the standards of competence of personnel in the hydropower industry and to promote the sustainable development of hydropower resources. In 2011, the Government of Norway entered into a new five year cooperation agreement with ICH providing support for its courses aimed at industry stakeholders in developing countries.

In 2013 ICH held 22 courses in 13 countries with a total of 644 participants from 48 countries. A few examples of courses held:

- Dam Safety Inspection in South East Asia
- Regional Power Trade in Central-America
- Hydropower Development and Management
- Hydropower Financing and Risk Management
- The Processes of Social Impact Assessment

“The practical session was very useful and excellent because whatever we have been taught in the class room, we had the opportunity to experience it ourselves. I really want to commend the Norwegian government and ICH for putting together such an excellent program and hope that future activities will be like this course.”

Sited: Participant in the Revenue Protection Management and Vandalism course held 15th–24th July 2013 in Zambia.



Photo: ICH

The International Centre for Hydropower have held training courses in Myanmar, among other countries.

13 Read more at: www.ich.no

BHUTAN: MAKING EXPORT OF ENERGY POSSIBLE

The Kingdom of Bhutan has a hydropower potential estimated at 30,000 MW, out of which 23,000 MW is said to be technically feasible. Still, only about five percent of these resources are currently exploited. Private investment is needed in order to increase production, but investors have until now been reluctant due to different factors, including the lack of regulation of the energy sector.

NVE has assisted Bhutan's Department of Hydropower and Power Systems (DHPS) since their first cooperation agreement was signed in 2001. Back then the aim was to operationalise the Energy act that was introduced that same year.

Key achievements over the last years include:

- Updating of the Power System Master Plan for Bhutan.
- Capacity building through three long-term trainings and 30 short-term trainings of personnel in 2012 and 2013.
- Drafting and implementation of guidelines on fines, penalties and licensing, with advice from NVE tariff, legal and licence experts.

A 2012 review of the programme concluded that the institutional programme has contributed positively to the restructuring of the power sector. Tashi Pem, the project manager of phase 4 of the project says the project is a huge success.

"All our hydropower development projects are based on the Power System Master Plan, which was developed under the Norad assistance in 2003," Tashi Pem explains.



Photo: Terje Fjeldsgård Andersen, Norad

Tashi Pem, Project Manager of Phase 4 in "Strengthening of Energy sector in Bhutan" says the project has been a great success.

Currently there are about 3,000 MW projects under construction in Bhutan, and several projects totalling more than 7,000 MW are under review. The aim of the Government of Bhutan is to add at least 10,000 MW of hydropower to the grid by 2020.

Geology - a great challenge

One of the greatest challenges for the project has been, and remains, geology. The Himalayan mountains are "young" with unstable landmass. Hydropower demands a lot of subsurface exploration which is not only expensive, but at times unpredictable.

"Given that hydropower resources are the most important resource we have, it is important that we have a good database on it. Currently, one of the challenges that we face in hydropower development is the lack of data," Tashi Pem explains.

A key objective of the current phase 4 of the project is therefore to strengthen the network system of hydro-meteorology in the area. The project has also supported to two prefeasibility studies and one feasibility study of medium/large hydropower projects in 2013.

"Having a good prefeasibility and feasibility report is very important in order to attract private investors. The plan is to bid out these projects to the private investors in the coming years," Tashi Pem says.

"Key achievements include updating of the Power System Master Plan for Bhutan"

A safe and efficient electricity sector

The project has come a long way. In June 2013, the national electricity coverage was more than 90 percent. Putting up electricity grids in this mountainous country is a challenge, but the goal is 100 percent coverage by the end of 2014. The revenue from the export of electricity is stimulating the economy, and is one of the main sectors contributing to the country's revenue.

Still, Bhutan needs to further enhance the institutional capacity of the energy sector. The Bhutan Department of Hydropower and Power Systems is still dependent of outside consultants.

"We need to strengthen the capacity of our electricity regulator so that the electricity sector functions in the safest and most efficient manner," Tashi Pem points out.



Photo: Halvør Aarrestad, NORPLAN

The cooperation between the Bhutan's Department of Hydropower and Power Systems and NVE, strengthens the network system of hydro-meteorology.

AFRICAN REGULATORS: KNOWLEDGE THROUGH NETWORKING

Regulation of the energy sector is a relatively new phenomenon in most Sub-Saharan African countries, and there are few professionals with appropriate professional background and experience. As a result, many of the institutions charged with regulatory tasks and responsibilities are weak, lack independency and transparency, and decision-making can be inconsistent and unpredictable.

The Norway financed African Electricity Regulators Peer Review and Learning Network helps the regulators to address these shortcomings. The Network has been supported in two phases from 2008-2013, and a total of 11 countries have participated: Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Zimbabwe, Uganda, Tanzania and Zambia.

In the programme, each of the participating countries host one 'peer review', where the senior executive of that regulator is assisted through a process of interviews, studies and operational reviews. The participants together propose potential improvements that will promote the capacity, competence and credibility of the host regulator. The regulators now actively use information and knowledge gathered in the reviews in their strategic planning and strives for improvement, and in their roles as drivers for change. Tariff reviews are regularly undertaken in several countries, improving tariff setting and gradually moving towards cost-reflectiveness.

"The regulators actively use the information and knowledge gathered in the reviews in their strategic planning and strives for improvement and fairer and cost-effective tariffs."

For example, electricity tariffs were increased by 79 percent in 2013 in Ghana. In Malawi a 29 percent tariff increase in May 2013 was followed by an announcement by the regulator in April 2014 that tariffs would rise by 38 percent over the next four years. Such significant tariff increases are in general unpopular, but required in order to secure the sustainability and continued expansion of energy access through public and private investment. The presence of independent regulatory agencies makes the process of setting fair and cost-reflective tariffs a smoother process than what would otherwise be the case. In addition, over the last few years regulatory agencies in the region have commissioned cost of service studies e.g. in Swaziland and Zimbabwe, that provide a firm basis for understanding the cost drivers in the respective electricity supply industries and determining a migration path to cost reflectivity. While reaching cost reflectivity remains a significant challenge, the regulators are increasingly more adept at facilitating much needed investments in the power sector, and contribute to the recent increase of private investments seen in the region.

The lessons learned from the first phase of the programme are made publicly available, in the book "Power-sector reform and regulation in Africa" (Kapika and Eberhard, 2013). The book presents an analysis of the learnings and shared experiences.



Photo: Ken Opprann

Electricity tariffs must strike the fine balance between a sustainable energy sector and objectives of development in rural areas.

VULNERABLE AND POST CONFLICT STATES



INTRODUCTION

While all developing countries face risks and challenges in their efforts to increase energy access and increase renewable energy production, the task is truly daunting in countries that are in or coming out of conflict situations.

The near total lack of infrastructure, working institutions and technical skills in these environments is augmented by often difficult political and security situations. Obviously, the risks and costs related to development assistance in these countries are tremendous and official development assistance is often the only source of capital available. On the other hand, the potential long-term benefits of economic development on security, political development and stability are vital for the country and its inhabitants, but also for the

world at large. The result of non-engagement and lack of tangible development can bring countries into new conflicts and instability, which can have devastating consequences.

Norway has had a long-term commitment to support vulnerable and post conflict states, and some of this support has gone to the energy sector. This chapter presents three different stories on how Norwegian supported efforts to rebuild the energy sector have fared in countries with troubled pasts and a challenging situation today.

The three examples included in this chapter are chosen to present the large individual differences in this group of states, the challenges they face and how these factors in addition to external drivers impact the results and achievements of each programme.



Photo: Anders Mathias Tørklep, NORPLAN

The Mt. Coffee power station in Liberia was destroyed during the civil war and is now rehabilitated.

LIBERIA: A PROGRAM PORTFOLIO TO FUEL PROGRESS AFTER 14 YEARS OF CIVIL WAR

Ten years after the end of the 14 year long civil war, Liberia is still fragile and suffers from its effect. The war destroyed the existing institutions and infrastructure, and devastated the country's human capital and public institutions. There are challenges with governance in the government as well as in state-owned entities such as the power utility and the agency for rural electrification.

Liberia became a partner of the Government of Norway's Clean Energy Initiative in 2006. Since then Norway has been involved in an emergency electrification project in Monrovia, through analyses of the grid and in the deliverance of an 8 MW diesel generator. In 2013 Norway also entered into an Energy+ agreement with Liberia.

Today Liberia is one of the main partner countries in the Clean Energy Initiative and some of the important projects are described below:

Electrification of Monrovia

The lack of access to electricity in the capital Monrovia is a key constraint on the development of Liberia. In 2010 The Government of Norway started supporting the Liberia Electricity Corporation (LEC). Since then the number of connection has increased from 1,217 to closer to 18,000 by the end of 2013. Through the Norwegian funded project in downtown Monrovia:

- 160 Steel poles have been erected
- 300 Foundations have been constructed
- 3,200 meters of electric cables have been installed



Photo: The Norwegian Embassy in Ghana

Helen Flomoh is working for the local company Sawyers S&A and she is receiving mechanical training from Eltel.

One of the challenges in the programme has been lack of local competence for grid installations. Since 2013 this has therefore been a focus.

The Swedish company, Eltel was contracted by LEC to assist in the electrification of Monrovia. They have also hired and trained local workers to implement the transmission and distribution projects. Eltel held workshops and trainings in 2013 for the local LEC staff to build capacity about material and equipment for distribution.



Photo: The Norwegian Embassy in Ghana

The mechanical technician course held by Eltel that was successfully completed in 2013, and six people were sent to Accra for further training at Cummins, Ghana. Here five of them.

Capacity building in the Liberia Electricity Company

In addition to the on-the-job-training conducted by Eltel, the Government of Norway committed approximately NOK 14 million to a more comprehensive training programme at LEC that was launched in January 2013. The program was co-financed with the World Bank. During 2013 several courses and modules have been completed, including safety training, electrical technology and maintenance training, distribution training, generator maintenance and testing training, electrical metering and record keeping.

Reconstruction of Mt. Coffee

Grid electricity in Liberia is currently provided by diesel generators, and the country has one of the highest electricity tariffs in the Sub-Saharan Africa at 50 US Dollar cents per kWh. In order to provide more environmentally friendly and sustainable electricity, the Government of Norway has committed NOK 400 million to the rehabilitation of the 80 MW Mt. Coffee Hydropower Plant. The first turbine is planned to be commissioned in December 2015. To ensure professional implementation of the project Norway also supports LEC with NOK 50 million to contract a Project Implementation Unit (PIU). Other development partners that support the works are the Government of Liberia, The European Investment bank and the German Development Bank KfW.

Capacity building in water resource management

As part of the effort to rebuild and reform these institutions as well as building capacity, the Government of Norway funds an Institutional Cooperation Agreement between the Liberian Ministry of Lands, Mines and Energy and the Norwegian Water Resources and Energy Directorate (NVE). Through the agreement Liberians have received on-the-job-training in Norway and Kenya,

resulting in increased technical knowledge in the fields of hydrometrics, stream discharge measurement, training of hydrometric station trainers and rainfall station observation.

Among the programme's achievements are the establishment of an energy law working-group, development of a new scholarship program policy, establishment of a hydro meteorological network and establishment of a well-functioning national hydro meteorological database and data collection system. Three stationary automatic weather stations are about to be delivered and a consolidated report on mini hydropower site identification is performed.



Photo: Anders Mathias Tørklep, NORPLAN

The Spillway of the Mt Coffee Power station.

The worst effect of the war was the damage to the nation's human resources and institutions.

“People often think of the impacts of war in terms of the damage caused to physical infrastructure, perhaps because it the most visible and, therefore, appreciable and measurable impact. No doubt, damage to physical infrastructure is one of the worst impacts of war.

However, the Government of Liberia has come face to face with this reality: it has been proven repeatedly, that even when we do have financial resources to undertake reconstruction projects, the shortage of human resources and the institutional mechanisms and arrangements to execute the projects has been our biggest constraint. This is clear evidence to us that the worst effect of the war was the damage to the nation's human resource and institutions.

Therefore, the priority is to rebuild human resource capacity and institutions. The Government of Norway is one of our principle partners in our reconstruction process. Over the years, we have developed a multi-faceted and very successful partnership. One of the key features of Norway's support is the emphasis it places on building institutions and capacity. With Norway's support, through the Norwegian Water Resources and Energy Directorate (NVE), we are implementing the Institutional Capacity Building and Strengthening of the Energy and Water Resource Sectors in Liberia 2010 – 2015, which has contributed immensely to our program to rebuild the Ministry of Lands, Mines and Energy and equip it to undertake the task of rebuilding the nation's energy sector.

I believe that the Norway model, which combines support for critical infrastructure projects and support for human resource and institution building, is the most appropriate and effective for countries emerging from conflict such as Liberia. We appreciate the partnership of Norway and look forward to building on the remarkable progress we have made in just a few years.”

Patrick Sendolo, Minister, Ministry of Lands, Mines and Energy, Republic of Liberia



Photo: The Ministry of Land, Mines and Energy, Liberia

Patrick Sendolo, Minister of Lands, Mines and Energy, Republic of Liberia]

PALESTINE: PHASING OUT AFTER ACHIEVING UNIVERSAL CONNECTION

The Government of Norway has supported the Palestinian Energy Authority since it was established after the Oslo Accords. The main achievement in the past 20 years has been an almost universal connection to the grid, as today 99.5 percent of Palestinians are connected. This caps a significant achievement and has certainly affected the living conditions of the Palestinian people positively¹⁴.

As a result of the high level of technical development in the Palestinian electricity sector, the Government of Norway has signalled to the Palestinian authorities that it will be phasing out its direct support to the energy sector over the next two years. The parties can look back upon a solid 20-year long cooperation in which the main achievement has been the electrification of Palestine.

“This caps a significant achievement and has certainly affected the living conditions of the Palestinian people positively.”

Other goals of the cooperation have proved more problematic to achieve. A main goal of the most recent phase of the cooperation was to improve collection rate from end users and thereby reduce the fiscal burden on the Palestinian national budget. In this area, only little progress has been achieved. Although some measures, particularly the installation of pre-paid meters, has increased the collection rate in some areas, strong progress overall has been hampered by the difficult political situation.



Photo: Andrew Yager, Norplan

Al-Karakoun substation in Nablus Palestine is partly financed by the Government of Norway.



Photo: Andrew Yager, Norplan

Loading pre-paid electric meters at the Tul Karm warehouse for delivery to SELCO Palestine.

¹⁴ A review of the last stage of the program is available at: <http://www.norad.no/no/resultater/publikasjoner/publikasjon?key=412899>

SOUTH SUDAN: NEW RENEWABLE ENERGY ON HOLD IN A YOUNG STATE

South Sudan became an independent state on July 9th 2011, after many years of Civil War. Since independence the country has struggled with internal conflicts that have hampered state building efforts and economic development. Since December 2013 there has been armed conflict between the Government and fractions within the ruling party SPLM. As a result of the conflict the humanitarian situation is critical in large parts of the country. Norway supports the negotiating efforts of IGAD (Intergovernmental Authority for Development), the regional economic and political body.

Currently only one percent of the population has access to electricity. The electricity generation and the distribution of electricity are at a basic level, and technical equipment is in very poor condition. The energy system has to be built up from scratch. New electricity generation must be constructed, along with transmission lines, distribution grids and preparation of a legal framework for production and sale of electricity.

The Government of Norway has provided support to the energy sector in South Sudan since 2010, through two different programs, development of a new 42 MW hydropower plant and institutional cooperation.

Development of the Fula Rapids Hydropower Plant

The 42 MW Fula Rapids Hydropower project is organised as a Public Private Company involving Norfund, the Government of South Sudan and the private investor and operator Aldwych. The Government of Norway is supporting the project with NOK 300 mill, aiming to reduce the tariff for the consumers. The plant will supply Juba with clean electricity instead of electricity from diesel generators. Construction of a transmission line to Juba, distribution network within Juba and building a competent power utility are essential for the success of the project. All arrangements were ready to start construction in May 2014. However, due to the ongoing civil unrest, the project is now on hold.

Institutional cooperation

There is an institutional cooperation between the Ministry of Electricity, Dams, Irrigation and Water Resources and the Norwegian Water Resources and Energy Directorate.

The main focus areas of the cooperation have so far been i) Legal and regulatory framework, ii) Distribution system studies and iii) Legal Transaction Adviser Assistance for the Fula Rapids Hydro Power Project. Priority has been given to activities crucial to the realisation of Fula Rapids.



Key achievements include:

- Drafting an electricity bill.
- Drafting of technical regulations to achieve a suitable legal framework for the sector.
- Preparation of a market study and distribution system expansion and development plan.
- Provisioning of legal and technical advisers to the ministry in the drafting, reviewing and negotiation of the financial and legal agreements for the Fula Rapids Project.

Going forward there are plans to strengthen the Ministry, professionalise the South Sudan Electricity Cooperation and establish a well-functioning distribution system operator(s) both at a national and regional levels. However, these plans must be continuously reviewed in light of the overall security situation and stability of South Sudan.



Photo: Andrew Yager, NORPLAN

Diesel gensets at Juba Power Station in South Sudan

ENERGY+: INCREASING ACCESS TO SUSTAINABLE ENERGY AND REDUCING GREENHOUSE GAS EMISSIONS

The International Energy and Climate initiative Energy+¹⁵ was launched the 10th October 2011, by the United Nations Secretary-General and the Norwegian Prime Minister. The initiative supports efforts to achieve universal access to sustainable energy and reduce greenhouse gas emissions in developing partner countries.

Energy+ is open to all and comprises countries and organisations that agree with and aim to work towards the Energy+ Guiding Principles. Currently 55 countries and organisations have joined.

In 2013 Energy+ has expanded and deepened its activities both through country level and multilateral partnerships. Key results and initiatives are presented below.

Energy+ Country-level Partnerships

Ethiopia: Building capacity and developing investment plans

Energy+ supports readiness activities in rural areas to support improved cook stoves, biofuel, replacement of diesel pumps in rural water schemes, and solar PV. United Nations Development Programme (UNDP) and SNV have joined the Energy+ partnership with Ethiopia. Some preliminary results:

- Sold cook stoves increased from 1.3 million in 2012 to 2.5 million in 2013, with reductions of about two million ton CO₂ emissions. Partly, this can be attributed to Energy+.
- Solar home systems: Installed 23,000 units in 2013.
- Rural diesel powered pump stations - 12,000 stations targeted. Pilot: 40 solar powered and 30 wind powered (of which 27 mechanical and 3 electric) stations to replace diesel generators.
- Biogas: Target 20,000 digesters in cooperation with SNV.

Liberia: Supporting an investment plan for scaling up of Renewables

Initially, Energy+ supports the implementation of an investment plan defined in the Scaling up of Renewable Energy Programme. The programme focuses on mini-grids and stand-alone systems based on small hydro power plants, small solar power plants, and solar home systems in rural areas, and will benefit 360,000 people.

Kenya: Program for lighting, cooking and mini-grids

Energy+ intends to support implementation of programs for replacing kerosene lamps with solar lanterns, distribution of improved cook stoves and implementing of mini-grids based on renewable energy. Energy+ intends to cooperate with Lighting Africa, Global Alliance for Clean Cook stoves, the Department for International Development in the United Kingdom and the German Society for International Cooperation.

Bhutan: Development of a master energy and energy efficiency plan

A partnership is made between Norway, Bhutan and The Asian Development Bank providing support to increase output from renewable energy resources through capacity building, institution and reform of legislation; support in development of renewable energy master plan; and support to energy efficiency programs.

Implementing Energy+ at the sectorial level

The practical implementation of an Energy+ Payment By Results mechanism for the electrification sector can be described in five steps, starting from the overall objectives of the initiative, moving through definition of electricity service levels and leading to a practical methodology for evaluating results achieved and amounts to be paid for through the Energy+ framework, and finally to track results. This is opposed to linking payment

¹⁵ Read more at: http://www.regjeringen.no/en/dep/ud/campaigns/energy_plus.html?id=672635



levels only to the costs of the different activities and programs, or to the different solutions that are offered. By applying the proposed value-based approach, funds will automatically go where the value in an Energy+ perspective is the highest relative to the financial support required to stimulate the desired actions on the ground.

Consultations with private sector and development of business models and instruments to enhance investments

Through the Energy+ Technical Working Group, the Energy+ Partnership convened a private sector consultation in Beijing in December 2013 in cooperation with SE4ALL. The consultation convened 55 high-level participants from Chinese private sector companies interested in African renewable energy markets, the Chinese government, Chinese industry associations, the African and Norwegian embassies in China, and international organisations.

During 2013, Energy+ has work extensively with partners to develop business models and instruments to leverage commercial investments. Examples include:

- *Policy Instruments to Achieve Sustainable Energy for All.* Energy+ commissioned a study to develop an overview of best practice for decision makers. The guide aims to enhance the understanding of the key characteristics of the most attractive policy measures as well as evaluating their suitability for the relevant purpose and countries.
- *Energy+ Technical Working Group* has assessed possible models for interventions to increase energy access in Sub-Saharan Africa.

Energy+ has furthermore collaborated with several organisations on developing approaches and tools to leverage commercial investments:

- *UNDP:* UNDP has developed a report and financial tool, “*Derisking Renewable Energy Investment*”.
- *World Economic Forum:* WEF has been developing a cross-industry framework that can help the energy access “ecosystem” to flourish through off-grid solutions.
- *OECD:* The OECD has prepared “*Policy Guidance for Investment in Clean Energy Infrastructure*”, a tool to help governments identify ways of mobilising private investment in clean energy infrastructure.

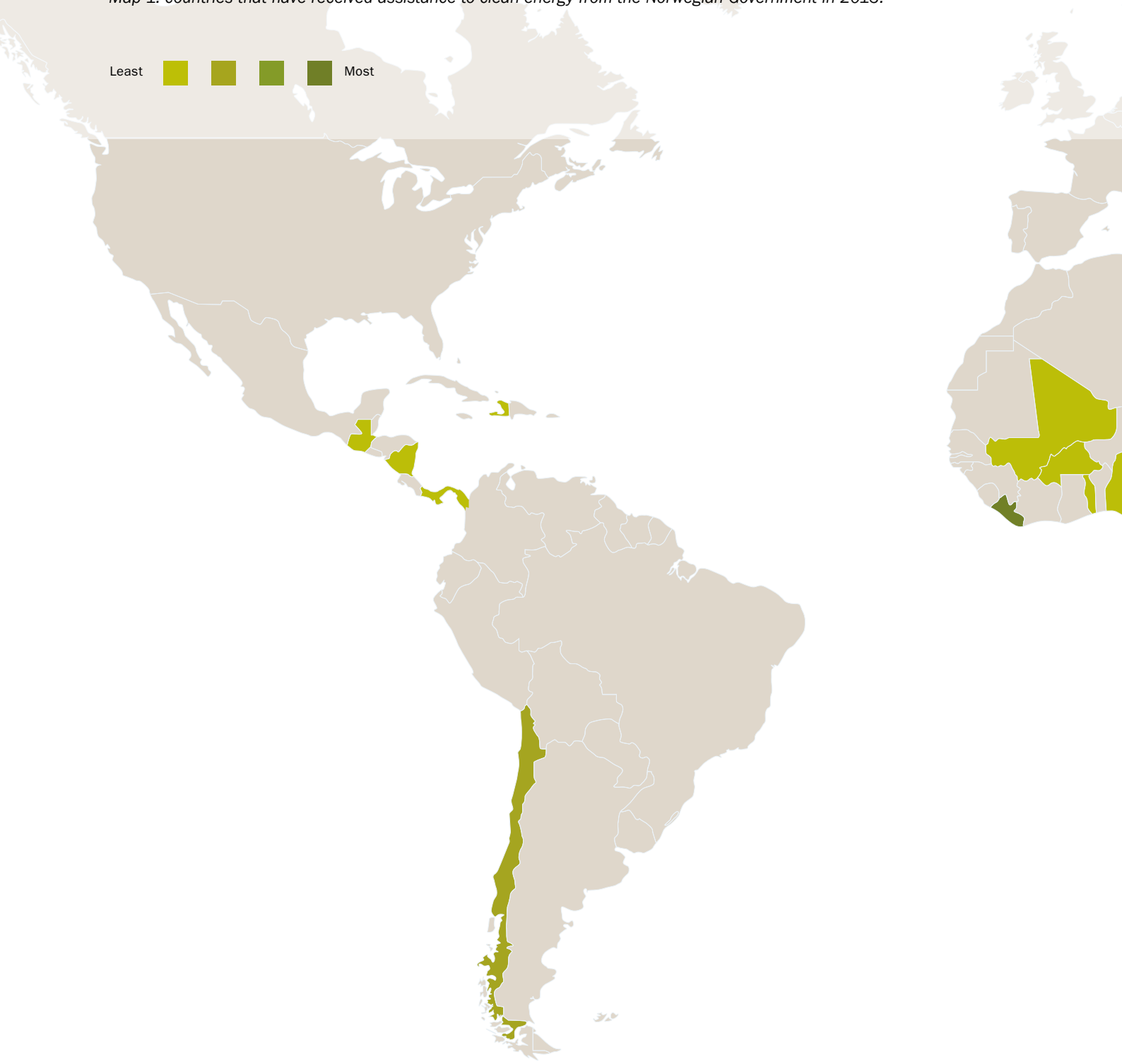
Energy+ «Multilateral» Partnerships

Energy+ has partnerships with:	Projects
Clinton Climate Initiative	NOK 23 million partnership on «Replacing Diesel Power with Clean Energy in Island Nations and Rural Regions». MoUs have been entered into with 24 small islands states. In aggregate, these projects will yield 181.5 MW of clean energy capacity and annually avoid 0.8 million ton CO2 emissions.
The Asian Development bank	NOK 20 million partnership on a “Project Development Facility” with 38 active projects in the pipeline at different stages of development. Three deals have been closed.
The European Investment Bank/ The United Nations Development Programme	Partnership with the European Investment Bank/UNEP joint initiative on “Renewable Energy Performance Platform”. The initiative seeks to mobilise private sector investments in renewable energy by improving access to existing risk mitigation instruments, long-term lending and, when needed, results-based financial support. Objective is to facilitate 150 MW or renewable energy capacity with up to 6 million tons of CO2 emissions abated and electricity generated for 7.4 million households.

FINANCIAL OVERVIEW

Map 1: countries that have received assistance to clean energy from the Norwegian Government in 2013.

Least  Most



There has been a steady increase in funds allocated to clean energy activities during recent years, both within multilateral and bilateral assistance. Total development assistance to clean energy in 2013 through all channels, including Norfund, was approximately NOK 1.55 billion.

Figure 2: Assistance to clean energy in NOK million from 2009 to 2013

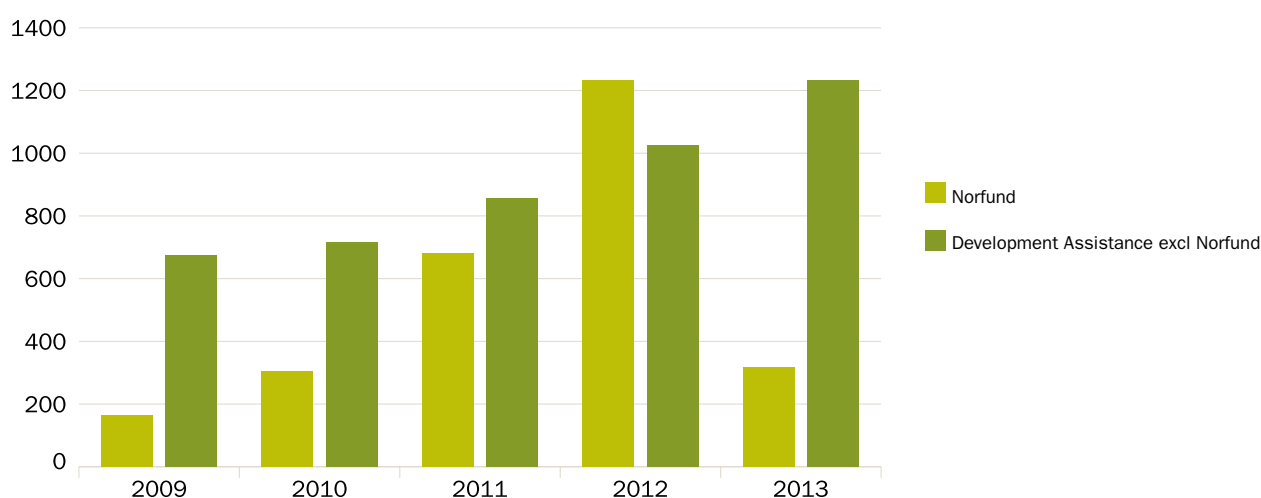


Figure 2 illustrates the assistance to clean energy over the period from 2009 to 2013. The Norwegian Embassies, The Ministry of Foreign Affairs, Norad and Fredskorpset disbursed over NOK 1.23 billion in assistance to clean energy in 2013. In addition, Norfund disbursed over NOK 300 million to clean energy projects.¹⁶ Norfund's reduction in ODA disbursements to clean energy in 2013 is mainly caused by a lower level of disbursements from SN Power Invest compared to previous years. For an investment fund like Norfund, ODA disbursements can vary considerably from year to year due to the nature of its business, and must be assessed over a time period of several years to provide a correct picture.

During the five year period from 2009 to 2013 approximately NOK 7.2 billion was allocated to development assistance for clean energy.

¹⁶ The table reflects Norfund's disbursements to clean energy projects in 2012, in accordance with what is reported to OECD DAC.

Figure 3: Bilateral vs. multilateral assistance to clean energy in mill NOK from 2009 to 2013 (excluding investments through Norfund)

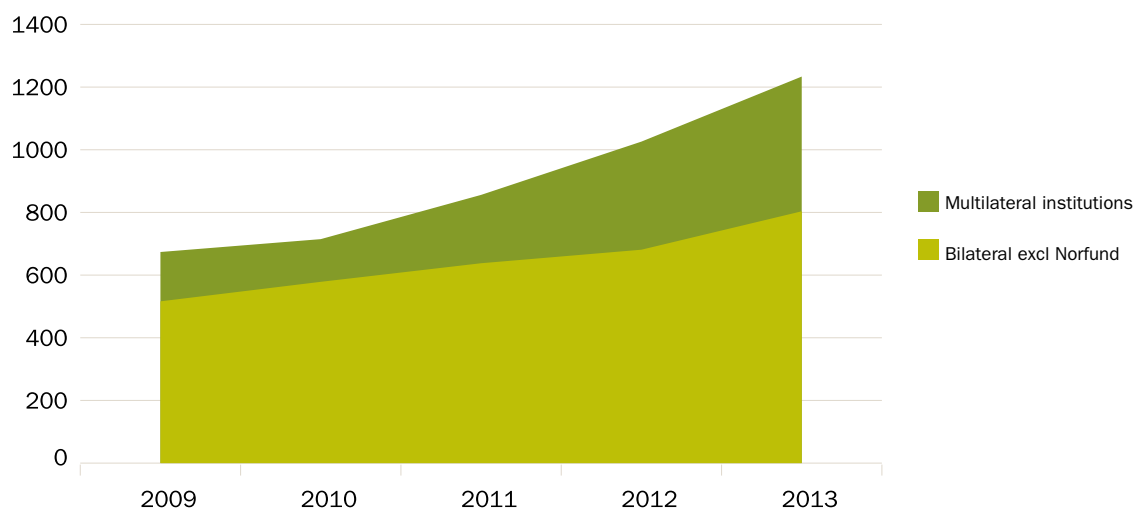


Figure 3 illustrates funds allocated through bilateral and multilateral channels. Norway provides significant funds through various multilateral channels. In 2013 this amounted to approximately NOK 430 million. However, overall Norwegian support through multilateral channels is often given as core support, not earmarked for a specific sector. Also Norwegian funds might be reported as environmental support, although a significant share might be channelled to energy related activities (energy being a sub category).

Figure 4: Assistance to clean energy in 2013 by type of assistance (excluding investments through Norfund)

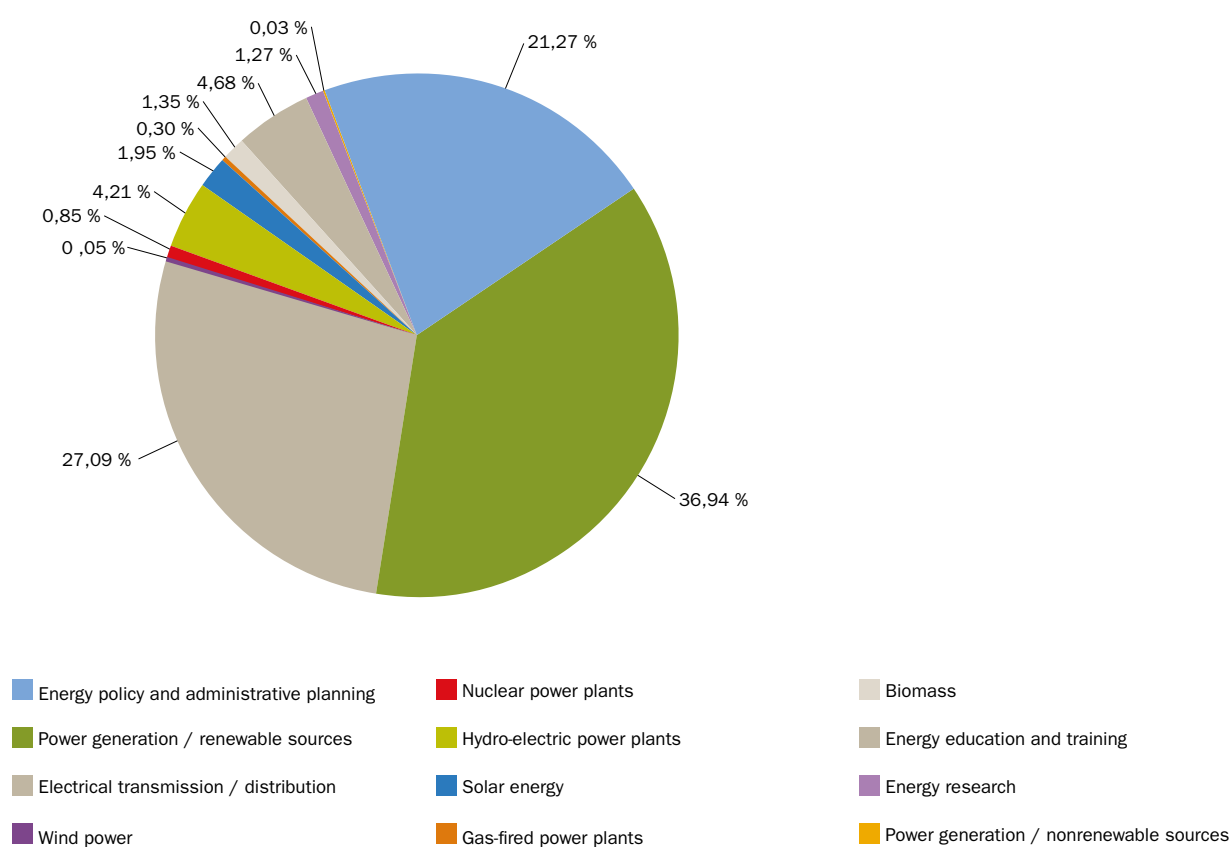


Figure 4 shows development assistance to clean energy by type of assistance.¹⁷ The core of Norwegian funding is directed towards energy policy and administrative planning, power generation from renewable sources and electricity transmission and distribution. Other smaller sub-sectors include for example assistance to International Atomic Energy Agency (Nuclear energy: 0,85 %) and different feasibility studies on upgrading Thaton gas fired power plant in Myanmar to become more energy efficient (Gas fired power plants: 0,30 %).

¹⁷ In accordance to OEC DAC reporting.

Figur 5: Largest recipients of assistance to clean energy in 2013 in NOK million (excluding investments through Norfund)

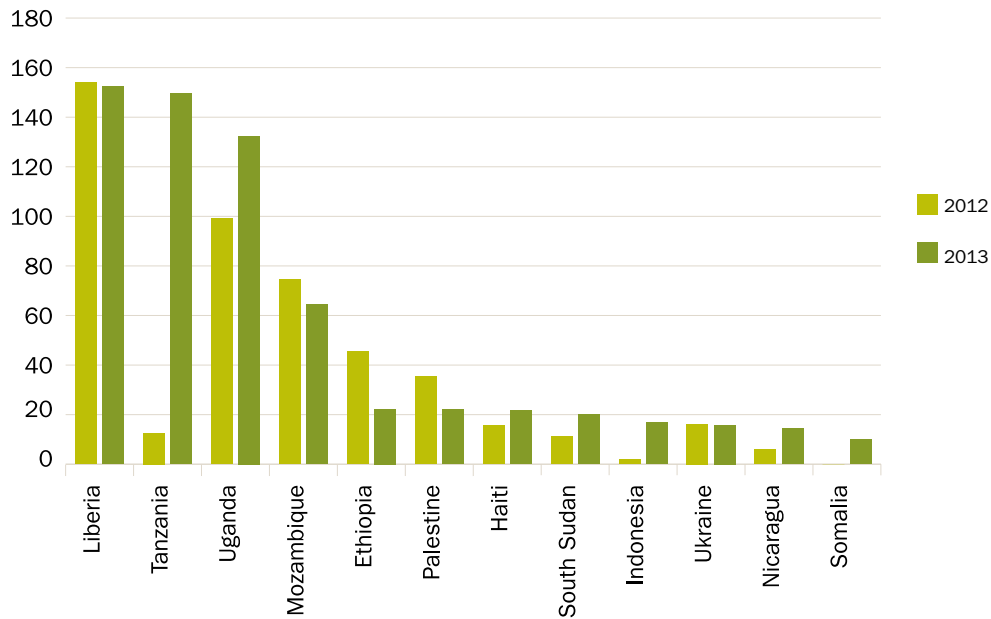


Figure 5 illustrates the division of funds allocated to the seven largest recipients of assistance to clean energy in 2013. The amount disbursed to these countries annually is highly dependent on progress of various projects and can vary significantly from year to year. For example in 2013 Tanzania caught up on performance delays on several project leading to an increase in disbursements over existing agreements. In addition, Norway entered a new agreement on NOK 700 million over 5-7 years on rural electrification in Tanzania and made the first transfer to the rural electrification fund. These two factors made Tanzania the second largest recipient of assistance to clean energy in 2013.

ANNEX 1: KEY NORWEGIAN ACTORS AND PARTNERS

Institution	Description	Webpage
Ministry of Foreign Affairs (MFA)	The MFA has overall responsibility for Norwegian development assistance, including both Energy+ and Clean Energy for Development Initiative. Part of the assistance is managed through the Ministry, for example the overall support to Norfund and support to different multilateral organisations. In addition, the Ministry allocates funds to bilateral development programs through various Embassies and Norad.	mfa.no
Norwegian Embassies	Several Norwegian Embassies allocate funds to bilateral programmes under the Clean Energy initiative in their respective countries. The Policy Platform for the Clean Energy for Development Initiative identifies seven main cooperation countries; Ethiopia, Liberia, Mozambique, Nepal, Tanzania, South Sudan and Uganda. The Embassies in these countries have a particularly important role in following up and promoting activities within clean energy.	norway.info
Norwegian Agency for Development Cooperation (Norad)	Norad provides technical advisory services for the MFA and the Embassies on Clean Energy for Development, through its Department for Climate, Energy and Environment (Section for Renewable Energy). Various other Norad departments works to stimulate private sector development in the energy sector, administer Norwegian support channelled through Norwegian and International Non-Governmental Organisations (NGOs) and provide quality assurance, evaluations, and other technical advice.	norad.no
Norfund	Norfund is a hybrid state-owned company. It receives funding from the Norwegian development assistance budget, to contribute equity and other risk capital, extend loans and guarantees for the development of sustainable commercial activities in developing countries. The renewable energy portfolio currently constitutes about half of Norfund's total investments.	norfund.no
Norwegian Water Resources and Energy Directorate (NVE)	NVE is responsible for ensuring an integrated and environmentally sound management of Norway's water and energy resources. In addition to its domestic responsibilities, NVE has more than 30 years of experience in cooperating with government agencies and institutions in developing countries, both through the United Nations but also directly as part of Norway's bilateral development cooperation within the field of clean energy.	nve.no
Statnett	As the Norwegian Transmission System Operator, Statnett is responsible for coordinating electricity generation and consumption, offering access to the power transmission grid on equal terms to all market participants, and developing and maintaining the Norwegian main transmission grid. Building on their knowledge and expertise in this field, Statnett participates in a number of institutional cooperation's with peer in developing countries to build capacity and sound institutional frameworks.	statnett.no
International Centre for Hydropower (ICH)	The International Centre for Hydropower (ICH) is a non-profit membership organisation of companies and organisations that are active within hydropower generation and supply. Their purpose is to raise the standards of competence of industry personnel and promote a sustainable development. Since 1997 Norad has supported ICH courses on hydropower development and management for energy sector stakeholders in developing countries.	ich.no/
Non-governmental organizations (NGOs)	Norad supports both national and international organisations and networks working with civil society in developing countries. Recipients of support under the Clean Energy Initiative in 2013 were: Naturvernforbundet, WWF Norway, ARC-Aid, Digni, Norwegian Church Aid, and The Royal Norwegian Society for Development.	



ANNEX 2: ABBREVIATIONS

DHPS	Bhutan's Department of Hydropower and Power Systems
EnDev	The Energizing Development programme
ERA	Electricity Regulatory Authority of Uganda
ESMAP	The Energy Sector Management Assistance Program
GET FIT	Global Energy Transfer Feed-in Tariffs
GWh	Gigawatthour, describing produced or used energy per year, for comparison an average Norwegian household use about 0.02 GWh per year and the total Norwegian annual power production is about 150,000 GWh.
ICH	The International Centre for Hydropower
IEA	The International Energy Agency
IGAD	Inter-Governmental Authority on Development
LEC	Liberia Electricity Corporation
MW	Megawatt, describing installed capacity in power plants, for comparison installed capacity in Norwegian hydro power is about 30,000 MW
MFA	Ministry of Foreign Affairs
NGO	Non-governmental organization
NOK	Norwegian Krone
Norad	Norwegian Agency for Development Cooperation
NTNU	Norwegian University of Science and Technology
OECD	The Organisation for Economic Co-operation and Development
SREP	Scaling-up renewable energy in low income countries
SPLM	Sudan People Liberation Movement
TERI	The Energy and Resources Institute in India
NVE	Norwegian Water Resources and Energy Directorate
UN	United Nations
UNDP	United Nations Development Programme



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