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TERNA Wind Energy Programme

Energy-policy Framework Conditions for Electricity Markets and Renewable Energies

23 Country Analyses
Chapter Philippines

Eschborn, September 2007

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New Edition of the TERNA Country Survey

Since the first edition of the TERNA country survey appeared in 1999, there has been a distinct heightening of public and political awareness of the consequences of climate change and of energy provision as a key factor in sustainable development. In Germany and other industrialised countries, a political tailwind, effective promotion mechanisms and rising energy prices have created the conditions for a dynamic market in which renewable forms of energy are exhibiting high growth rates within the energy mix. In 2006, global new investment in renewables amounted to US$ 70.9 billion – an increase of 43 % over 2005.

Strong economic development in many emerging countries has triggered rapidly rising demand for energy and competition on the international oil market. Against the background of the rising cost of fossil fuels, supply risks and damage to the environment, the significance of renewable energy as a means of generating electricity is growing – also in developing and emerging countries: according to analyses conducted by the Renewable Energy Policy Network for the 21st Century (REN21), 39 countries have set expansion targets for renewable energy sources and introduced promotion mechanisms, nine of which are developing or emerging countries. Of total new investment in renewable energy around the world, US$ 15 billion was invested in developing and emerging countries. Nevertheless, the majority of countries still have a long road ahead of them before they overcome existing barriers to the successful introduction of renewable forms of energy.

The German and European market acts as the driving force for the wind energy industry and provides an indispensable background of experience. However, growth in the industry is also increasingly apparent in developing and emerging countries. It is the successes in countries such as India, China and Brazil which encourage commitment beyond the borders of industrialised nations. In those three countries there is a growing proportion of local content in the systems and equipment they produce – and not only for supply to their own domestic markets.

A number of other countries though, too, are erecting their first wind farms, thereby establishing the basis for gaining experience to be utilised in future markets.

To help interested players gain access to the new markets, this survey provides detailed descriptions of the framework conditions for electricity markets and renewable energy in 23 developing and emerging countries.

Latin America	Africa/Middle East	Asia
Argentina	Egypt	Bangladesh
Brazil	Ethiopia	China
Caribbean States	Jordan	India
Chile	Morocco	Indonesia
Colombia	Namibia	Pakistan
Costa Rica	South Africa	Philippines
Dominican Republic	Tunisia	Viet Nam
Mexico		
Nicaragua		

This latest country survey and the previous editions are available on our homepage: www.gtz.de/wind. For the first time, the publication is also available on CD-ROM. For information on how to obtain this, again, go to the homepage.

Our grateful thanks go to a large number of GTZ staff members and other experts in the field for their help in putting this information together.

Eschborn, September 2007

Legal Information

1. The data used in this study is based on both publicly accessible sources of information (publications, specialist articles, internet sites, conference papers etc.) and non-public papers (for example internal expert reports from promoting institutions), as well as personal interviews with experts (for example officials at energy ministries in the investigated countries and project staff at promoting institutions). Although all information has been checked as far as possible, errors cannot be ruled out. Neither the GTZ nor the authors can therefore provide any guarantee of the accuracy of the data included in this study; no liability can be accepted for any loss or damage resulting from use of the data included in the study.

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The TERNA Wind Energy Programme

There is great potential for generating electricity from renewable energy sources in many developing and emerging countries. Obstacles to the exploitation of such sources include a lack of knowledge of framework conditions in the energy industry and insufficient transparency with regard to the prior experience and interests of national actors.

The purpose of the TERNA (Technical Expertise for Renewable Energy Application) wind energy programme, implemented by GTZ on behalf of the Federal German Ministry for Economic Cooperation and Development (BMZ), is to assist partners in developing and emerging countries in planning and developing wind power projects. Since 1988 the TERNA programme has pursued the twin goals of laying the foundations for sound investment decisions while at the same time enabling partners to assess wind energy potentials, plan wind energy projects and improve energy-policy frameworks for renewable forms of energy.

The TERNA wind energy programme's partners are institutions in developing and emerging countries that are interested in commercial exploitation of wind power. These include, for example, ministries or government institutions which have the mandate to develop BOT/BOO projects, state-owned or private energy supply companies (utilities) and private enterprises (independent power producers).

TERNA offers its partners expertise and experience. In order to initiate wind power projects, favourable sites must be identified and their wind energy potential ascertained. To do this, wind measurements are normally taken over a period of at least twelve months and wind reports are drawn up. If promising wind speeds are found, the next step is to conduct project studies investigating the technical design and economic feasibility. TERNA also provides advice to partners on matters of finance, thus closing the gap between potential investors and offers of funding from national and international donors.

If required, CDM baseline studies can be prepared and advice can be offered to potential operators on setting up an efficient operator structure. In order to ensure as much transfer of know-how as possible, efforts are made to ensure cooperation between international and local experts, for example when preparing the studies.

In successful cases, TERNA initiates investment-ready wind farm projects by this method. TERNA itself is not involved in financing. In addition to the activities that are tied to specific locations, TERNA advises its partners on how to establish suitable framework conditions for the promotion of renewable energy sources.

Up until 2007, TERNA has been active in over ten countries around the world.

Further information on GTZ's TERNA wind energy programme, the application procedure etc. is available at www.gtz.de/wind or directly from:

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22 Philippines

22.1 Electricity Market

Installed capacity

The installed power generating capacity in the Philippines totalled 15,619 MW at the end of 2005. Due to the overcapacities that prevailed over many years, this level is only slightly higher than that of the year before. Expansions in capacity required to cope with the increasing demand for electricity in the country are estimated to be 9 GW by 2016. There are no grid-connected imports of electricity from abroad.

Total capacity [MW]	2003		2004		2005	
	15,124		15,548		15,619	
	MW	%	MW	%	MW	%
Oil	3,604	24	3,669	24	3,663	23
Coal	3,958	26	3,967	25	3,967	25
Hydropower	2,876	19	3,217	21	3,222	21
Geothermal	1,931	13	1,931	12	1,978	13
Natural gas	2,764	18	2,763	18	2,763	18
Solar/wind					26	0.002

Tab. 1: Power station capacities according to energy source in MW and %; Philippines; 2003-2005[1]

Power generation

Power generation in 2005 amounted to roughly 57,000 GWh. The most important domestic primary energy sources used for this were natural gas (30%), geothermal energy (18%) and hydropower (15%), and among the imported energy sources coal (27%) and oil (11%). This means the share accounted for by the various domestic energy sources has grown considerably over the past years and the country has come closer to its goal of achieving greater independence in the energy supply market.

A crucial factor in this shift has above all been the development and expansion of domestic gas reserves[2], through which the country's level of independence in energy supply increased by 5.4% to 50.9% from 2001 to 2002 alone. [3]

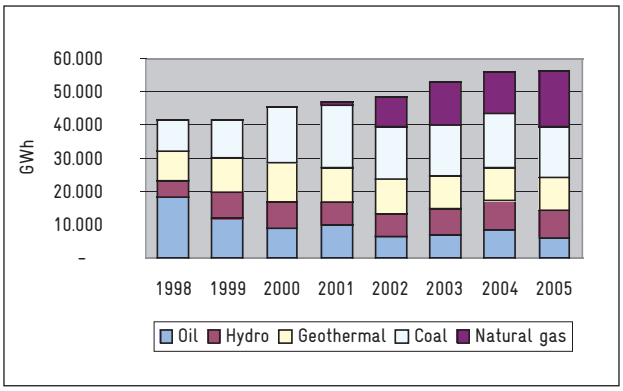

Fig. 1: Power generation in GWh; Philippines; 1998-2005[4]

According to the Philippine Energy Plan 2005-2014, national independence in the field of energy supply is to reach 60% by 2010.

Power transmission and distribution

The geography of the Philippines, which comprises some 7,000 islands, has a decisive influence on the nature of the country's mains-borne power supplies. As well as three large, separate national electricity transmission grids (Luzon[5], Visayas and Mindanao), there are regional supply systems on smaller islands. Under the Transmission Development Plan (TDP) the power grids are to be considerably expanded in the coming years.[6] Two-thirds of the Philippine villages still without power[7] are to be connected to the grid in this way.

1 Source: Department of Energy, 2006.
2 The signal to begin exploitation of domestic gas reserves was given by the discovery and development of the Malampaya offshore gas field in the northwest of Palawan in 2001/2002, which on its own supplies three gas-fired power stations with a total capacity of 2.76 GW.
3 While in 1973 as much as 92% of primary energy consumption was still met by imported oil, this figure has now dropped below 50%. In relation to the share of oil used for power generation purposes, this consumption figure has fallen by 5% to just under 11% within the space of just 12 months (2004 to 2005).
4 Source: Department of Energy, 2006
5 The Luzon power grid – the largest of the three cited – alone carries 72% of the domestically generated electricity.
6 The TDP is part of the Power Development Plan 2004–2013. DOE – Department of Energy: Highlights on the Implementation of Republic Act No. 9136, Electric Power Industry Reform Act of 2001 for the Period May 2003 – October 2003.
7 Almost 6% of Philippines villages are not as yet connected up to the existing supply systems.

The poor reliability of the transmission grids that make up the national power supply system is reflected by regular power failures, which in 2003 accounted for a total of 52 hours downtime without power. The greatest power losses occur at the distribution level, adding up to a total of 6,817 GWh in 2005.

Electricity consumption

Electricity consumption in 2005 amounted to roughly 45,000 GWh. Of this, 35.5 % was attributable to households, 34.8 % to industry and 27.1 % to trades and crafts ("other": 2.6 %). This ratio has barely changed in the past years.

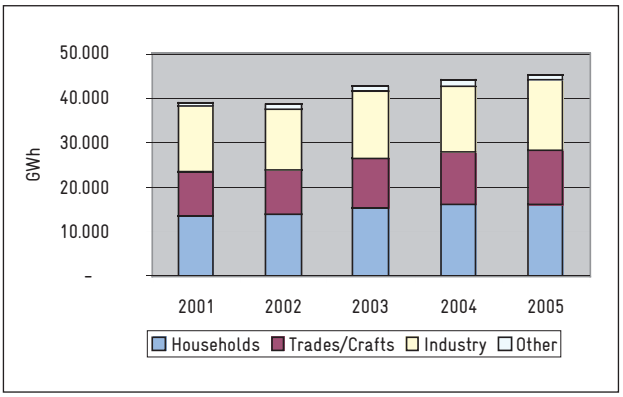

Fig. 2: Electricity consumption according to sector in GWh; Philippines; 2001-2005[8]

Electricity prices

In comparison with certain neighbouring countries, such as Malaysia, Thailand and Indonesia, the Philippines has high electricity tariffs. The reasons for this include the high costs of loan capital for the state-owned power utility National Power Corporation (NPC or NAPOCOR), considerable network losses at the distribution level, and the dispersed location of the many islands – making power supply difficult. A renewed rise in tariffs[9] across all customer groups in 2005 can be put down to the abolition of long-standing cross-subsidies in many supply areas. The highest tariffs are still paid by electricity customers on the main island of Luzon. In terms of customer groups, the highest tariffs are paid by industrial consumers and trade/craft enterprises.

	Households	Trades and crafts	Industry
	€-ct/kWh		
Electricity tariffs	2.54–8.66	2.97–7.97	2.71–8.76

Tab. 2: Average electricity tariffs; Philippines; in euro cents/kWh; 2005[10]

8 Source: Department of Energy, 2006.
9 From an average of 8.9 euro cents/kWh in 2004 to 10.8 euro cents/kWh in 2005.
10 Source: ASEAN Centre for Energy, 2006.

22.2 Market Actors

Since centralised reforms in the electricity sector began in 2001, the structure of the market has been undergoing a process of change in which the importance of private-sector actors is growing compared with public-sector actors.

Power generation and transmission companies

The main actor in the field of power generation is the state-owned National Power Corporation (NPC).[11] This corporation's power plants, the majority of which are operated by private, independent power producers, currently supply 75 % of the electricity generated nationally. In addition to power stations owned by NPC, the private power producers also operate a large number of their own power generating facilities.[12] Power generation in regions not connected to the grid is primarily under the control of the Small Power Utilities Group (SPUG) that belongs to NPC. Since January 2004, the Philippines' Department of Energy (DOE) has been engaged in opening the way for private initiatives to access these off-grid areas, too.[13]

Following the reforms introduced in 2001, ownership and management of the nationwide transmission grids was handed over to the National Transmission Corporation (TRANSCO). So far, TRANSCO has been acting as a wholly owned subsidiary of the Power Sector Assets and Liabilities Management Corporation (PSALM). The long-standing plans to sell the transmission grid to private concessionaires and power distribution companies are now being implemented.[14]

Power distribution companies

By far the largest company in the power distribution segment is the partly state-owned (26 % share) Manila Electric Company (MERALCO), in whose service area a quarter of the population of the Philippines lives. Its share of the total amount of power distributed throughout the nation is actually as much as 70 %, due among other things to the high proportion of urban customers in its service area. Apart from MERALCO, 141 distribution companies control the rest of the power delivery market to the end customers. This group is made up of 18 private providers, 4 municipal utilities and 119 rural cooperatives. The latter have relatively small numbers of customers individually,[15] but together actually serve a total of around 55 % of all customers in the country. Not only MERALCO but the other distribution companies, too, purchase the electricity they distribute either from NPC or the independent power producers.

Privatisation of power stations

Privatisation of NPC's power stations is one of the functions of the state-owned Power Sector Assets and Liabilities Management Corporation (PSALM). Since late 2005, 31 power stations with a total generating capacity of 4,337 MW have been offered for sale. Five small power stations with a total capacity of 8.5 MW have already been sold.[16] By the end of the first quarter of 2007, 70 % of the NPC power plants connected to the Luzon and Visayas transmission grids will be in private hands – and by 2008 a total of 25 state-owned power stations. Besides the privatisation of existing power stations, the construction of additional power stations and expansion of the grids are in future also supposed to be carried out primarily by private actors.

11 NPC was founded back in 1936 and for decades was responsible for all power generation and transmission activities in the country.

12 The large number of independent power producers can be traced back to a period when many new companies were set up at the end of the 1980s after the Philippines had suffered a power supply crisis lasting several years and the government had responded with a vigorous political campaign promoting private-sector involvement in the power generation sector.

13 Seven of a total of 14 regions NPC has identified as "first wave" regions had been opened up for private-sector involvement by the end of 2005.

14 One of the reasons for the long delay (of several years) in the privatisation of TRANSCO is the lack of qualified prospective purchasers. Further information on this topic can be found in the 8th EPIRA (Electric Power Industry Reform Act) Status Report (www.doe.gov.ph).

15 89% of the rural cooperatives have fewer than 100,000 customers.

16 The sale of one of the largest power stations in the Philippines – the 600-MW Masinloc power plant – in 2004 to an Australian consortium had in the end to be cancelled due to the consortium's inability to pay. This was a serious setback for the current privatisation process.

Other Actors in the Electricity Sector

The most important institution determining energy policy is the Department of Energy (DOE), as it is responsible for drawing up plans, laws and programmes. It underwent a reorganisation in August 2002 as part of the power sector reform. Since then, the newly created Electric Power Industry Management Bureau (EPIMB) has been part of the DOE; among other things it has the task of monitoring the reform process, ensuring a reliable and efficient power supply and elaborating strategies and plans for rural electrification.

Regulatory functions are performed by the independent Energy Regulatory Commission (ERC)[17], which was set up under the Electric Power Industry Reform Act (EPIRA) in 2001. The commission is also responsible for drawing up and enforcing implementation guidelines and specifications in line with this Reform Act. Its scope of responsibility also covers:

- Regulation of the 141 power distribution companies
- Maintenance of competition, including controlling and monitoring measures against anti-competitive behaviour
- Supervision of tariffs, including setting up and enforcing methods for wheeling tariffs
- Enforcement of regulations in the distribution and transmission sector and in the wholesale market, as well as monitoring compliance with these regulations.

22.3 Legal Framework

Electric Power Industry Reform Act 2001

The Electric Power Industry Reform Act (EPIRA), which entered into force in June 2001, was a milestone in the restructuring of the electricity sector.[18] The Reform Act creates a new legal and regulatory framework for the electricity sector and has already paved the way for the unbundling of power generation, transmission and distribution. The most important objectives are to reduce the high costs in the electricity sector, to privatise state-owned enterprises, to attract foreign capital and to expand domestic resources. The coming launch of a wholesale market is supposed to guarantee free access to distribution networks and free choice of power supplier by end customers with a monthly average peak demand of 1 MW.[19]

New tariff system

The Reform Act EPIRA also aims to increase the level of transparency in the tariff system: a separate price has to be specified for each service in the electricity supply chain (generation, transmission, distribution, sale). The planned examination and approval of the disaggregated tariff structures by the regulatory body, the ERC, has been widely implemented.[20] The policy of abolishing cross-subsidies is now also well advanced after initial delays.[21]

17 Support for the establishment of the regulatory authority is guaranteed within the framework of technical cooperation, in particular by the Asian Development Bank (ADB). With an overall budget of US$ 1.2 million, it also supports the privatisation of NPC.

18 Republic Act No. 9136. The DOE is obliged to report on the status of the reforms twice yearly. The last report published was entitled "8th Status Report on EPIRA Implementation: 11/2005-4/2006", available on the DOE website: www. doe.gov.ph.

19 This 1-MW threshold is to be reduced after the wholesale market has been up and running for a certain length of time. In the long term, the regulatory authority has the task of opening up the market completely, to the extent that households will also be able to choose their electricity supplier freely.

20 In February 2006, of the 141 applications for disaggregation of tariffs submitted to the regulatory authority a total of 138 had been approved, among them those from NPC and NPC-SPUG.

21 In February 2006, 119 of the 120 electrical cooperatives and 14 of the 18 private utilities had already begun abolishing cross-subsidies. Originally, the total abolition of cross-subsidies was to have been completed within three years of the Electricity Power Industry Reform Act being enacted.

Another element of tariff reform is what is referred to as the "universal charge", a fixed charge to be paid by the final electricity customer that serves the purpose among other things of financing the debts of the former electricity supply company, NPC, and electrification measures. Socially balanced tariffs are to be granted to financially weak sections of the population.

Wholesale market

In order to strengthen competition at the generator level, it was decided as part of the reforms to set up a Wholesale Electricity Spot Market (WESM) whose structure is based on the principles of the electricity markets in Australia and New Zealand. The main emphasis is to trade all electricity flows through a power exchange that is binding for all participants. The computer-based system required is currently being put in place with assistance from the Asian Development Bank. The first major test run of the system, which also served to prepare the 53 participating companies for the WESM, was conducted in Luzon between April and December 2005. The test run in Visayas was begun in March 2006.[22]

As soon as the ERC has approved the pricing and the structure and levels of the market dues for the WESM, its commercial operation is to begin. The Philippine Electricity Market Corporation (PEMC), which was set up by the DOE at the end of 2003 as the agency responsible for the WESM and for developing an efficient, highly competitive, transparent and reliable electricity market, is now ready to begin work, according to the DOE.

One of the critical factors that has contributed to launching of the programme being delayed up to now relates to the high demands efficient running of the WESM makes on all the market actors as regards their financial resources and possibilities. The extent to which the model is actually able to integrate all market actors when it is implemented is still uncertain in this connection.

22.4 Policy Promoting Renewable Energy Sources

The key political motives of the Philippines for supporting renewable forms of energy are the reduction of energy imports and the supply of energy to the rural population.

Executive Order 462

The New & Renewable Energy Programme was initiated by the Department of Energy (DOE) when it adopted Executive Order EO 462 in 1997. The programme is aimed at strengthening the commitment of private actors in the field of renewable energy and in the process also particularises Executive Order 215[23], which already cleared the path for the commercialisation of renewable energy projects. It includes the promotion of large-scale application systems.

According to Executive Order EO 462, private actors are granted the right to launch alternative energy projects.[24] Along the same lines as when exploration rights for fossil energy sources are awarded, in the case of renewable energies, too, a contract must be concluded with the state according to which a share of the net profits is paid to the state ("production sharing contract"). The level of this levy is determined by tender or by direct negotiation. Criticism of the executive order led to a modification in 2000 according to which projects with a capacity of below 1 MW are now exempt from the levy, and the levy is limited to a maximum of 15%. Furthermore, support was promised from the DOE with project development and financing, for example with the development of locations and drawing up feasibility studies.

22 The launch of the WESM is considerably behind schedule. According to the original legal situation, the electricity trading market ought to have begun operation in June 2002.

23 Executive Order 215, which was passed in 1987, formed the initial basis for participation by the private sector in the electricity market by regulating the integration of independent power producers in law, for instance.

24 Executive Order No. 462, "Enabling Private Sector Participation in the Exploration, Development, Utilization and Commercialization of Ocean, Solar and Wind Energy Resources for Power Generation and Other Energy Uses". Important additions were made in Executive Order No. 232, which came into force in 2000.

Regional programmes

In order to support the use and development of technically and economically mature renewable energy systems in the provinces, Area-Based Energy Programmes (ABEPs) are being advanced as part of the New & Renewable Energy Programme. Local energy supply concepts are also being drawn up within the scope of these regional programmes. The ABEPs are implemented by partner institutions (Affiliated Non-Conventional Energy Centers – ANECs) such as universities.

Planned renewable energy law

The central legal code for the electricity sector, EPIRA, adopted in 2001 emphasises expansion of the use of renewable energy sources. The liberalisation of the market associated with this legislation, along with free access to the power grids, opens up opportunities in particular for large application systems such as wind farms, which can produce electricity cost-effectively and sell it to major customers.

To enable smaller systems that use alternative energy technologies to also make inroads into the liberalised market and to strengthen the establishment of renewable energies overall, it is intended to enact a separate law targeted specifically at renewable energy sources.[25] The current bill contains among other things provisions for financial and non-financial incentives, a quota system for renewable energy sources that every power producer must comply with as well as the basis for the establishment of a trust fund. It is also envisaged that electricity generated from renewables should be identified as such ("green pricing") and that existing and possibly also new investment incentives should be locked in.

Investment incentives

Renewable energy was included in the government's Investment Priorities Plan. As a result, investors can apply for certain concessions from the responsible authority, the Board of Investments (BOI). Such concessions include:

- Deferring payment of income tax for 4-6 years
- Exemption from tax and customs for imported plant components
- Tax concessions on purchase of local goods
- Employment of foreign personnel
- Simplification of customs clearance

Clean Development Mechanism

The Philippines ratified the Kyoto Protocol in October 2003. Responsibility as the Designated National Authority (DNA) has been assumed by the Philippine Department of Environment and Natural Resources (DENR). As such, it acts among other things as the final approving authority in a 4-stage process that has been set up at the national level to assess and approve CDM projects.

By the end of 2006, the DENR had submitted 31 CDM projects to the international Executive Board (EB), the majority of them being renewable energy projects. Among the most recent projects submitted are a biomass project on energy recovery from rice husks with an annual CO_2 savings potential of 44,680 tonnes and a 40-MW geothermal project with an annual CO_2 savings potential of 174,900 tonnes. The greatest potential for CDM projects is considered to be in the field of renewable energy sources – in particular, in the use of hydropower, wind power and biomass.

Several institutions are supporting the DENR within the framework of the national CDM activities. These include for example three CDM Technical Evaluation Committees (TECs), which – as expert committees for the environment (including waste), forestry and energy – examine to what extent the CDM projects submitted actually satisfy the nationally defined criteria for CDM projects. The DOE performs this task for the energy sector. The DNER receives assistance in implementing national CDM projects from among other things a CDM help desk.[26]

25 In February 2006, a draft bill was proposed to the government, which had in fact reached the Senate by the end of January 2007 but had not yet been passed.

26 Further information on the national CDM activities is available at www.cdmdna.emb.gov.ph or in the CDM Country Guide for the Philippines (published by the Japanese Institute for Global Environmental Strategies) at www.iges.or.jp/en/news/topic/0512cdm.html

22.5 Status of Renewable Energy Sources

In 2005, renewable sources of energy accounted for a share of 42 % of primary energy consumption. The most significant part of this was the traditional thermal utilisation of firewood and agricultural wastes in households and trades or crafts.

One particular feature of the portfolio of renewable energies used to generate electricity in the Philippines is the intensive use of geothermal energy and hydropower. Power stations that operate using these two energy sources generated one-third of the total power generated in 2005, while the use of wind power, biomass and solar energy for power generation accounted for an exceedingly small share of just 0.03 %.

	Potential	Installed capacity 2005 [MW]	Installed capacity 2013 [MW]
Geothermal	4,790 MW	1,978	3,131
Hydropower	No data	3,222	5,468 (by 2014)
Wind power	70,000 MW	25	417
Solar	5.1 kWh/m²	1	130–250
Biomass	250–350 mill. barrels oil equivalent/ year	No data	
Marine energy	170,000 MW	0	
Total		5,226	9,147

Tab. 3: Potentials, installed capacity and planned expansion of renewable energy sources; Philippines; 2005, 2013; MW[27]

Ambitious expansion targets

The DOE has defined ambitious expansion targets for the next 10 years. The Philippines aims to become the world number one in the exploitation of geothermal energy and the number one in Southeast Asia in the use of wind energy, and the country also aims to almost double its hydropower capacity by 2013. The exploitation of marine energy is supposed to contribute to power supplies in the long term.

Hydropower

Hydropower is the second most important domestic energy source for electricity generation. Measured against the total installed capacity of 3,222 MW at the end of 2005, the share accounted for by small-scale hydropower up to 10 MW is relatively small. At the present time, 53 small (mini) plants (100 kW-10 MW) with a total capacity of 89 MW and more than 100 micro systems (< 100 kW) are in operation.[28] The increase in installed capacity of more than 700 MW between 2002 and 2005 can primarily be traced back to the construction of additional large hydropower stations.[29] Apart from that, a 12-kW plant that supplies 150 households with electricity was installed in Saloy in May 2004 by a rural cooperative.

27 Source: Department of Energy, 2006

28 Classification of hydropower plants in the Philippines: pico hydro: < 1kW; micro hydro: 1 to 100 kW; mini hydro: 101 kW to 10 MW; small hydro: 10 to 50 MW; large hydro: > 50 MW.

29 Among these are two large hydropower plants that were put into service in 2004: the 345-MW San Roque station in Pangasinan and a 350-MW station in Laguna.

The political goal of increasing installed capacities by 780 MW to 5,468 MW by 2013 is primarily to be achieved through the development of small and mini hydropower plants.[30] Several organisations from the Philippines and elsewhere have conducted site analyses and investigated the unexploited potential for small-scale hydropower installations:[31] it is estimated that 1,850 MW of capacity in mini hydropower plants and 28 MW in micro hydropower systems could make an additional contribution to power supplies. According to forecasts by the Department of Energy, the growth in capacity of small-scale plants will amount to 160 MW by the end of 2009 and to 457 MW by 2025.

Five government-funded mini hydropower projects with capacities of between 350 kW and 2.5 MW are currently in the process of being implemented. With the support of the Development Bank of the Philippines (DBP), the construction of a 400-kW plant for supplying electricity to 1,000 households in Kaling province is to begin in the spring of 2007. Start-up is planned for spring 2008.

The DOE is planning to utilise wave and tidal energy in future; the potential has been estimated at 170 GW. Developments in this regard, however, are still in the initial phase.

Mini Hydroelectric Power Incentive Act and other promotion

The Philippine government spelled out its objective of promoting the involvement of the private sector in mini hydropower projects in a law that came into force in 1991.[32] Project developers can take advantage of various reduced tax rates as well as tax and customs exemptions. Because of complex approval procedures, however, only a small number of projects have been implemented in recent years.

Technical and/or financial cooperation for small-scale hydropower projects is also offered by the Development Bank of the Philippines (loans) and the Renewable Energy Project Support Office (REPSO-Philippines) in the form of feasibility studies and schemes for participation in equity capital.

Wind energy

The utilisation of wind power for generating power is still a very fresh concept in the Philippines. That said, few now doubt the potential of wind energy as a new energy source for the country. The wind power potential, calculated to be at least 70,000 MW,[33] and the dispersed geography of thousands of islands make wind power seem not only a cost-effective alternative to diesel generators in isolated systems but also an economic option for feeding power into the grid. Location-specific information on the respective wind potentials has been published by the Department of Science & Technology in the form of a wind atlas.[34]

The most commonly seen use of wind power is for water pumps, driven by windmills. According to information from the DOE, 368 such systems were in place at the end of 2001. In addition to a few small wind power generators in the form of isolated systems, there are now also a number of larger installations. The first privately operated wind-diesel system went into service in August 2004 as a hybrid project. This was followed in June 2005 by the first 25-MW wind farm, comprising 15 wind turbines, which was constructed on the coast of Ilocos Norte in Bangui by the Northwind Power Development Corporation, a joint venture between Denmark (40 %) and the Philippines (60 %). This wind farm is connected to the island's main transmission grid by means of a 60 km-long transmission route and guarantees 40 % of the regional electricity supply, that is power for more than 500,000 people.

30 Environmental concerns and the high cost of large dams led to this decision.

31 These include the National Electrification Administration (NEA) and the National Power Corporation (NPC), which has identified over 1,000 locations, and the US National Renewable Energy Laboratory (NREL).

32 Republic Act No. 7156, "An Act Granting Incentives to Mini-Hydro-Electric Power Developers and for Other Purposes". Assistance can only be claimed by enterprises or organisations that are 60 %-owned by Philippine citizens. Installations with a capacity of between 101 kW and 10 MW are promoted.

33 A study conducted by the National Renewable Energy Laboratory (NREL) in the USA identified wind power potential with a total capacity of 76,000 MW. According to this study, the best wind resources, including suitable locations for wind farm projects with total outputs of between 40 and 60 MW, are to be found in the north and northeast of the country.

34 Within the Department of Science and Technology (DOST), the Council for Industry and Energy Research and Development (PCIERD) is responsible for the wind atlas: www. pcierd.dost.gov.ph. The wind atlas can also be downloaded from the Internet from NREL: www.nrel.gov/wind/pdfs/26129.pdf.

No other such projects have been implemented to date. The slow development of the wind power sector in the Philippines can essentially be put down to the lack of a legal framework targeted specifically at promoting commercial development of wind power on a large scale. High hopes are currently being placed in the enactment of the planned law on renewable energy.

Expansion plans

The Energy Development Corporation of the Philippine National Oil Company (PNOC-EDC), which is primarily active in the field of geothermal energy, intends to concentrate more on advancing the construction of grid-connected wind farms. For some years, the company has been planning the construction of a 120-MW wind farm on the northern coast of Luzon, with construction to be conducted in three separate phases. In the first phase a 30-MW wind farm is to be built with the financial backing of JBIC (Japan Bank for International Cooperation).[35] In addition, Smith Bell Rosco plans to build a 30-MW farm in San Carlos City on Negros.

To attract private companies to the business, the government identified 16 sites with a total potential of 345 MW and put them out to tender in June 2004. Three local companies from the Philippines were awarded contracts to develop a number of these sites – six in all, with a total capacity of 140 MW. A further 16 sites were approved for development at the beginning of 2006.

Biomass

Despite biomass accounting for a share of 30.8 % of the national energy supply in 2005, hardly any use has been made of biomass for generating electricity in the Philippines so far. It is predominantly limited to its traditional uses, namely, cooking and heating. Thanks to the enactment of a new law in July 2006,[36] the production of biofuels has received new impetus for growth.

The main forms of biomass that lend themselves to power generation are bagasse, rice husks and coconut residues. Power stations with a capacity of at least 540 MW could be run with the bagasse obtained from the processing of sugar cane. The use of rice husks could make a contribution of 360 MW to power generation. Coconut residues would allow the operation of combined heat and power (CHP) stations with an output of 20 MW.

Current activities

Various examples of planned activities for utilising these potentials can be found, amongst other places, on the island of Negros. This includes a 30-MW bagasse-fuelled combined heat and power plant operated by First Farmers Holding Corporation (FFHC), which is supplied with residues from the corporation's own sugar mill and from other mills in the region. Apart from supplying its own needs for electricity and steam, the project aims at feeding surplus electricity into the Luzon-Visayas grid. At the centre of the planned San Carlos Renewable Energy Project is an 8-MW power plant for generating electricity from bagasse.[37]

At present, 653 biogas systems based on animal dung are in use. Plans are being drawn up for a biogas project on the Paramount Pig Farm close to Luzon, whose power has until now been provided by a diesel generator. Two 75-kW generators will convert the generated biogas into electricity and cover the farm's entire needs for power. The project was registered with the international CDM Executive Board at the end of January 2007.

35 The original goal set by PNOC EDC to put the first 40-MW wind farm into service as early as 2004 could not be met due to a significant increase in the costs originally estimated for the project at the beginning of the planning phase.

36 The Biofuels Act (Republic Act 9367) passed in 2006 is targeted at reducing the nation's dependence on oil and its CO_2 emissions. The act contains development incentives, such as an exemption from value added tax on local and imported equipment, systems and raw materials. Furthermore, it stipulates the admixture of 5% bioethanol to petroleum sold between 2006 and 2008 and 10% up to 2010.

37 The two projects are also intended to earn emission rights within the framework of the Kyoto Protocol.

In addition to the growing commitment of the Philippine National Oil Company, with its bioenergy spin-offs, the Energy Development Corporation (PNOC-EDC) and Alternative Fuels Corporation (PNOC-AFC), a small group of suppliers of corresponding technologies has formed.

Solar energy

According to investigations by the US National Renewable Energy Laboratory (NREL), which has prepared a solar atlas for the Philippines, the average daily solar irradiation is 5.1 kWh/m^2.

The dispersed geography of the numerous islands presents good opportunities for the use of PV systems. Until now the applications that have found use are mostly decentralised, such as for telecommunications facilities, water pumps, lighting and battery chargers, for example.[38]

Bilateral cooperation

A large proportion of the projects for rural electrification on the basis of isolated PV systems are based on bilateral development cooperation. In the past, GTZ has, for instance, supported rural solar projects in the Philippines installing solar home systems (SHSs) and solar-powered water pumps. The Netherlands is also promoting the use of solar energy as part of the PNOC solar home system project, in which 15,100 households are to be supplied with power. By the end of the first quarter of 2006, 9,191 SHSs had been installed. The Solar Power Technology Support (SPOTS) project, which is supported by among others the Spanish Mix Credit Facility, aims to provide power to 40 rural communities in Mindanao. By mid-2005, 5,435 PV systems had already been installed, the majority of them in households. Almost 500 systems were also installed in schools and health centres and for providing water supplies.[39]

Grid-coupled solar power plant

The largest grid-coupled solar power system in any developing country has begun operation in the north of Mindanao. It has an installed capacity of 950 kW. The scheme was supported by the World Bank/GEF. The pilot installation is supplying electricity in hybrid operation in conjunction with a 7-MW hydropower plant.

Production location for solar technology

According to the government's intentions, the Philippines is to become a significant location for PV technologies. The first manufacturer to open a production plant for solar cells was Cypress Sunpower in 2004. While the company began with an annual production capacity of 25 MW (8 million solar cells), it is already counting on an increased production figure of 150 MW for 2007.

Geothermal energy

Geothermal heat is the most important domestic resource used for generating electricity and has been used since 1977. The installed capacity of 1,978 MW is to be boosted to 3,131 MW by 2013. The potential as yet undeveloped is estimated to be just under 3,000 MW.

The development of geothermal potential has so far been the reserve of primarily two companies: the Energy Development Corporation of the Philippine National Oil Company (PNOC-EDC) and Philippine Geothermal Incorporated (PGI), a subsidiary of the American company Union Oil of California (UNOCAL). These two companies have secured the development rights for many attractive locations. The state-owned utility (PNOC-EDC) alone plans to build installations with a total capacity of 330 MW by 2010.

38 According to information from the DOE, approximately 8,944 solar home systems (SHSs) had been installed by the end of 2005. The provisional goal of 15,100 SHSs is supposed to be achieved in 2007. (DOE PEP 06 3) The commercial potential is estimated to be for 500,000 systems. 119 systems with a capacity of 94 kW_p have been installed for supplying power to telecommunications facilities, and some 130 systems (180 kW_p) for water pumps and irrigation. Other applications, such as for battery chargers, together account for a capacity of roughly 50 kW_p.

39 Other bilateral solar power projects: the Alliance for Mindanao Off-Grid Renewable Energy programme (AMORE) with US support, and the Philippine Rural Electrification Service project (PRES), through which the French government is supporting the provision of electricity to 18,000 households in Masbate.

Act on Exploration of Geothermal Resources

Presidential Decree No. 1442 governs the involvement of private actors in the geothermal energy sector.[40] Investors are granted exploration rights for geothermal fields by being issued with a service contract. Apart from that, they benefit from incentives such as exemption from all taxes (with the exception of income tax) or the possibility to write off capital goods over a period of 10 years. In return, the investors must pay duties amounting to 40 % of their net proceeds to the state.[41] The willingness of private investors to invest in the geothermal sector is on the increase.

Current activities

In the course of the national privatisation process, the Philippine government plans to sell the 685-MW Tiwi-Makban power station. Currently under construction are two power stations whose operation will be subject to the rules of the new Electricity Act and which therefore will be run as "merchant plants": whereas previously all independent power producers were forced to sell their electricity to the state-owned NPC, the operators of the two new geothermal power stations are free to choose their own customers.[42]

22.6 Rural Electrification

Thanks to the great efforts that have been made in recent years to develop rural electrification, the number of non-electrified villages has fallen from 4,600 to 2,500 of the total of 42,000 villages (barangays[43]) between mid-2003 and mid-2006. According to the government's current plans, 90 % of all Philippine households are to be electrified by the end of 2007[44] and all villages electrified by the end of 2008 – for the most part by means of expansion of the supraregional grids. For the majority of these households and a large number of the villages, however, isolated solutions are the only solutions that come into question due to their peripheral location. 484 villages have been electrified by employing systems based on renewable energy sources, such as photovoltaics and mini hydroelectric power.

Electrification programmes

A new version of the Rural Electrification Programme has been running since April 2003.[45] It aims to achieve full electrification of villages already categorised as electrified, but in which there are still various households without access to electricity. In addition, several bilateral and international assistance programmes are contributing to the provision of rural electricity supplies in the Philippines.[46]

The updated Missionary Electrification Development Plan (MEDP) for 2006-20010 serves as the future strategy paper for the electrification of regions that can mainly be supplied only by localised energy systems. The MDEP is a sub-programme of the national Power Development Plan (PDP), which is targeted at developing the entire national power supply system. The MDEP is updated every year by the DOE.

40 Presidential Decree No. 1442 "An Act to Promote the Exploration and Development of Geothermal Resources".

41 As such, the previously highly restrictive provisions of the decree, by which at least 60 % of the net proceeds accruing from the enterprise has to be paid to the state have been revoked.

42 One power station (40 MW, commissioning planned for spring 2007, Philippine National Economic Development Authority (NEDA) 06) is situated on Mount Kanlaon in the province of Negros Occidental, the second power station (20 MW, commissioning planned for 2008, German Office for Foreign Trade (bfai) 2006) in the city of Palinpinon. The orders for building the power stations were awarded to a Japanese company by PNOC-EDC. Japan Bank for International Cooperation (JBIC) is supporting the construction of the Kanlaon power station with a loan of US$ 82 million.

43 Barangays are the smallest administrative bodies at the local level and generally comprise 100 to 500 households.

44 The deadline has been brought forward in the past years from 2017 to 2007.

45 The forerunner of this programme was the O'llaw Programme ('gift of light' programme) that ran from January 2000 to March 2003.

46 The World Bank and the Asian Development Bank (ADB) in particular are supporting the Philippines in rural electrification.

The Rural Power Project of the World Bank is supporting the electrification of 10,000 households with solar and isolated systems over a five-year period by granting a loan amounting to US$ 10 million. 1,000 systems were installed by mid-2005.

The Development Bank of the Philippines (DBP) implemented a Regional Power Plan (RPP) in order to enable rural consumers to gain access to the main electricity supply. In January 2005 the bank made a budget totalling US$ 1 billion available for the promotion of specific projects.

Three Philippine NGOs[47] launched a 100 Villages Campaign in 2006. During the course of the next 5 years, this campaign is intended to give 100,000 inhabitants of villages in the Philippines among other things access to electricity by means of micro hydropower stations and solar energy systems.

Institutions

The National Electrification Administration (NEA) is a key organisation in execution of the electrification programme. Its primary task is to provide financial, technical and institutional support to the Rural Electric Cooperatives (RECs), which are the bodies chiefly responsible for electricity supplies in rural areas. According to the Reform Act EPIRA, the Small Power Utilities Group (SPUG) of the NPC assumes a major role in the provision of electricity in areas where there is no grid connection.

According to national plans, the supply of electricity to previously non-electrified communities is to be facilitated by private actors to a greater extent than before. The starting signal for measures of this kind was given in 2005 with the opening-up of the first "first wave" regions of NPC-SUPG for private sector activities. Within the framework of a promotion programme (2003-2011) aimed at strengthening the Philippines' private sector, GTZ is providing support in particular to poorer sections of the population of the Visayas group of islands to help them develop their entrepreneurial potential, among other things by simplifying access to medium- and long-term loans.

Model region Negros Occidental

The island province of Negros Occidental is intended to become a model region for the use of renewable forms of energy and thus serve as an example for other regions. In addition to the construction of a 30-MW wind farm, there are plans for a 40-MW geothermal power station, micro hydropower installations, battery charging stations and a combined heat and power plant fuelled by bagasse.

Exchange rate (6.2.07):
1 Philippine dollar (PHD) = 0.01593 euro (EUR)

47 The three NGOs Yamog, SIBAT and AIDFI want to use this campaign to replicate their previous successes with regional renewable energy projects at national level.

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There is great potential for generating electricity from renewable energy sources in many developing and emerging countries. Obstacles to the exploitation of such sources and to the involvement of foreign investors include a lack of knowledge of framework conditions in the energy industry and insufficient transparency with regard to the prior experience and interests of national actors. This fourth, updated and expanded edition is aimed at overcoming barriers such as these.

The electricity markets and their respective actors are investigated for 23 countries in various regions: Latin America, Africa – Middle East and Asia. The country studies analyse the energy-policy framework conditions and closely examine the status of and promotion policy for electricity generation on the basis of hydropower, wind power, solar power, biomass and geothermal energy. The chapters on each country are rounded off by information about rural electrification.

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