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MAIN TOPIC

Solar energy in the Philippines

Solar energy presents a quick solution for providing basic energy services to remote villages. However, there are several problematic issues connected with its use, which still have to be overcome.

People in Pangan-an Island, Cebu, Philippines, enjoy 24-hour electricity service from a centralised solar photovoltaic (PV) system donated by the Kingdom of Belgium. This power plant consists of 504 PV panels, a battery bank with 118 storage batteries, a charge controller, and 2 inverters made in Germany. The solar power plant has been operating since December 1998, supplying 230 Volt (V) Alternating Current (AC) electricity to around 200 households. The Pangan-an residents use electricity for lighting, radio and TV sets. The sustainability of this power system is questionable, however. The batteries need to be replaced in the next two years, which will cost the community \$ 100,000. So far, they have only saved around \$ 13,700 over the last 7 years. At the rate of savings from their monthly collection, they would not be able to raise the amount needed to replace the batteries. This illustrates that components for PV systems are still very expensive, particularly for people living in rural areas.

Limited capacities

Misunderstanding is rampant among solar energy users. For instance, in a solar home system, many people think that the most critical component is the PV module. In reality, the heart of the system is the battery, which

stores energy. Being unaware of this fact, they tend to over-use the battery, which reduces its operating life.

Another problem is that people often think that solar electricity is the same as electricity from electric utilities, where you can use all types of home appliances. They imagine that a 100-Watt PV can supply 100 Watt of power at anytime. The truth is that solar power is limited by the capacity of the PV panels, available sunshine hours per day and battery storage capacity. Since solar PV depends on sunlight (irradiance), PV panels will generate less power to recharge the battery in rainy or cloudy weather.

Subsidies required

In Pangan-an, people are willing and able to pay only around \$ 2 a month for electricity, which is roughly the same cost if people buy kerosene to fuel one or two lamps. Residents are primarily dependent on fishing and generally have low incomes. Thus, the money collected would not be enough for maintenance and replacement of critical components, such as the battery. Consequently, for this type of project, subsidies from the Government or from other sources are still required in order to sustain operation.

Important load management

As experienced in Pangan-an Island, maintaining a solar PV system is not easy. High-level technical knowledge is required to maintain such a system properly. The battery, for instance, needs to be topped up or recharged regularly. However, recovering its charge, once discharged, depends on the weather. Load management is thus extremely important. A solar power plant, which has a limited PV installed capacity, can only generate a specific amount of power per day, depending on solar irradiation or intensity of sunlight. On a rainy or cloudy day, PV panels generate less power, thus less charging current goes to the storage battery. Conversely, on a hot summer's day, the irradiation could be high, causing the PV to deliver more current to the battery. When it is cloudy or raining, people should be advised to conserve energy stored in the battery by limiting their use of appliances.

Rare spare parts

Spare parts, especially for large centralised systems, are quite difficult to find. When an inverter card is damaged, for example, it needs to be sent back to Europe for repair. There is practically no way to find a local supplier for critical components. ➤



Photo: Magdaleno M. Baclay, Jr.

Photovoltaic battery charging station in Antique, Panay Island, Philippines.

➤ Some users of solar home systems complain when they encounter faulty components such as the charge controller. When they call the supplier for repairs, they often

receive promises only, but no actual visits to the village. Clearly, the support system for the maintenance of PV systems remains weak and often non-existent.

Overcoming gap of sustainability

These are just some of the issues on sustainability of solar energy in the Philippines that came out of the experience in monitoring installations of PV systems.

Addressing these issues will require a major effort and large investments. Suppliers thus have the responsibility to help fill these gaps against sustainability. Industrialised

countries, being world leaders in the field of renewable energy, should approach these concerns and continue to focus on transfer of expertise, technical training and follow-up activities through their development agencies.

By Magdaleno M. Baclay, Jr. ■



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Philippines: Development and renewables

The article reviews how the world has fared thus far in tapping and utilising renewable energy (RE), with special attention to developments in the ASEAN region and the Philippines.

■ National development highly depends on the availability of adequate energy supply. The fact remains, however, that the supply of conventional fuels is limited and insufficient to sustain rapid rates of development. Therefore RE sources are being tapped to provide for a portion of the escalating fuel requirements worldwide.

Growing renewable energy sector

RE posted strong growth world wide in 2005, reflecting its increasing impact relative to conventional energy. Renewable power capacity totalled 160 gigawatts (GW) (worldwide excluding large hydropower), contributing about 4% of the global power sector's capacity. Developing countries accounted for 70 GW of this capacity.

For millions of people in rural areas of developing countries, RE has provided electricity, heat and power for water pumps and

continues to serve the needs of agriculture, small industry, homes, schools and other communities.

RE has also become big business. Large commercial enterprises are "mainstreaming" RE investments in their business portfolios. Annually, some \$ 300 million go to developing countries as development aid for RE projects, training, and market support.

Key role for commercial fuels

Since the beginning of this decade, the majority of countries in Southeast Asia or the ASEAN have registered remarkable economic growth. This growth spurt has placed considerable strain on the energy supply systems, which have only recently started to regain some degree of stability and sustainability.

Over the last two decades, the fuel supply mix of most countries in Southeast Asia also

has changed noticeably. Fuel supply systems in most ASEAN nations have moved from a base predominantly supported by traditional fuels to a system where commercial fuels play a key role.

At the same time, Southeast Asia has a diversified base of RE sources ranging from biomass to geothermal energy. The role of renewables will emerge in other contexts, given the varied socio-economic development state of countries in the region.

Environmental issues with significant regional consequences (e.g. acid rain) are far from being adequately addressed. Furthermore, the rural-urban divide in the region is much greater today than in recent past. Balancing the future energy systems between RE sources, which have assumed a larger role in the rural context and fossil fuels for urban industrialisation, is a major challenge for energy policy makers in ASEAN. ➤



Energy mix in the Philippines

The Philippine economy is dominated by services, followed by industry and agriculture. Approximately 70% of the population lives in rural areas and 40% subsist below the poverty line.



Photo: Magdaleno M. Baday, Jr.

Solar PV centralized power plant on Pangasinan Island.

In 2003, about 53 billion kilowatt-hours (kWh) of electricity were produced and 46 billion kWh were consumed. Coal-fired plants are the chief sources of energy followed by geothermal, gas and hydropower.

Hydropower

The abundance of water resources makes hydropower an important part of the energy generation sector. However, given the large initial investments, long construction periods and related environmental concerns, the government has turned to small hydropower projects. Such projects correspond with the directives under the Renewable Energy Power Program (REPP) of the Philippine Depart-

ment of Energy (DOE), which has allocated \$ 30 million as a financial facility for private sector participation in new RE projects.

Geothermal energy

The Philippines is the world's second largest user of geothermal energy for power generation after Indonesia. In 2003, geothermal energy accounted for 19% of the country's total electricity requirements. There are only two major players in geothermal energy generation, and the passage of Executive Order 215 and Republic Act 7718 allows private sector participation in power generation.

Biomass

With extensive agricultural, forestry and livestock industries, the Philippines have extensive bio-energy fuel sources at its disposal. Over 653 biogas systems for generating electricity from animal wastes are installed in the Philippines; applying technology is in use since the 1970s.

In 2000, the Payatas dump site collapsed and municipal solid waste disposal has become a primary concern. In response, the Presidential Task Force on Solid Waste Management has considered landfill gas generation and incineration as possible options.

Other resources

There is minimal use of wind energy in the Philippines, but the potential is strong. A wind mapping survey estimated that the Philippines could generate 70,000 megawatts (MW) of wind power. The survey identified 47 provinces with the potential to generate at least 1,000 MW.

In 2000, the Philippines had an installed solar photovoltaic capacity of 567 kilowatt (kW). While the technical potential exists, prohibitive costs and the grid extension of conventional electricity hinder the commercial potential of solar home systems, which the DOE places at 500,000.

Supporting laws

The Philippines has a number of laws in place that promote the commercialization of grid-

connected renewable energy power projects. The Electric Power Industry Reform Act (EPIRA) led to the privatization of transmission assets via concession. Introduced in 2004, the Energy Independence Package has a five-point plan for the energy sector that includes the aggressive development of RE potentials from biomass, solar, wind and ocean resources. Executive Order 215 paved the way for the entry of independent power producers (IPPs) as well as the commercialization of independent RE power projects.

The Mini-Hydro Law was enacted to cover hydro projects up to 10 MW in capacity, while the REPP was designed to provide up to \$ 14.5 million in financing for IPP projects using solar, wind, biomass and small hydropower resources.

Aid assistance for renewable energy in the Philippines

Over the past twenty years, the Philippine government has been the recipient of aid from all the major donor organisations for funding for RE projects. Currently, a number of energy projects are being undertaken under various official development assistance programmes. The Rural Power Project (RPP) of the World Bank assists in making affordable, reliable and adequate electricity available through new business models for public/private partnerships. The United Nations Development Programme's Capacity Building to Remove Barriers to RE in the Philippines aims to eliminate key market, policy, technical and financial stumbling blocks in promoting widespread electrification using RE. The Renewable Energy and Livelihood Development Project for the Poor is being implemented till 2008 to pilot test the production and use of RE in rural areas without access to the grid. The Renewable Energy Project Support Office of Winrock International acts as a clearinghouse for matching the global interests of the RE industry with the specific needs of the rural populations living without electrical service in the developing world. ➤

Tax privileges for renewables

The majority of the country's future pursuits in RE development are embedded in the Philippine Energy Plan (PEP) for the period 2004-2013. Its provisions on RE reiterate the mandate of the DOE to promote the development and use of RE resources including solar, biomass and wind energy.

The RE Bill proposed to the Philippine Congress seeks to facilitate the use of RE for

rural power and off-grid electrification and to give priority to RE projects in receiving special tax privileges as well as the endorsement of RE projects for bilateral and multilateral funding.

The Development Bank of the Philippines (DBP) is the country's leading development banking institution. DBP is implementing the regional power plan (RPP), which aims to provide a mechanism for rural energy consumers unlikely to gain access to grid electricity services. In January 2005, DBP

committed to set aside approx. \$ 1 billion to help finance RE projects in the country.

By Tony M. Maghirang



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China's wind power industry

Due to China's rapid economic development, the country is facing increasing pressure from energy crises and pollution. For this reason, politicians are starting to focus more on renewable energy sources, including wind power.

“Development in the area of wind power is being blocked by a lack of technical know-how and specialists.” Professor Liao Mingfu from Northwestern Polytechnical University (NWPU) in Xi'an explains the status of the Chinese wind power industry today and the training of wind power engineers.

“With around one billion kilowatts (kW) of accessible wind power, China has a wealth of wind energy resources. According to statistics, around a quarter of this is available to the north, northeast and northwest areas of the country. The remainder benefits the coastal regions,” Professor Liao Mingfu says.

Most small wind power plants worldwide

In the 1980s and 1990s, China primarily produced and installed small wind power plants to supply individual households in remote areas with energy. As a result, the country has the most small wind power plants in the world.

At the end of the 1990s, China focused on

connecting wind generators to the energy network. By the end of 2005, there were 61 wind farms throughout the country producing 1.27 gigawatts of energy. There are 592 generators in China, with the greatest individual energy capacity totalling 1,500 kW.

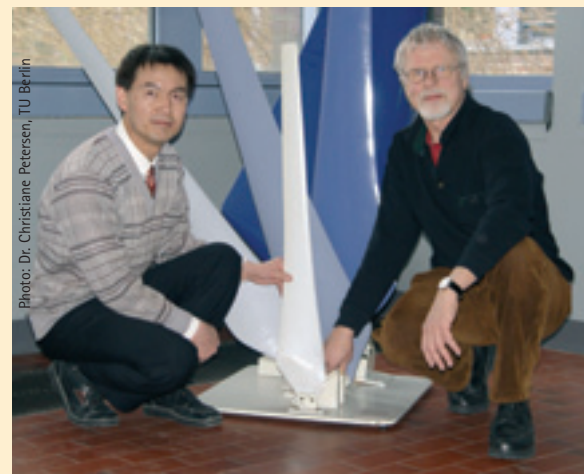
Bottleneck of development

At present, wind power plants do not even generate 1% of the entire power production capacity of the country. Until now, only 0.14% of the country's wind power resources have been utilised.

Professor Liao Mingfu thinks that the lack of awareness about environmental protection and the potential for developing renewable energies is responsible for the slow rise of wind power usage. “As compared to Germany, China is about 10 years behind when it comes to the standards in technical research and training.”

Professor Liao cited Germany as an excellent example, with its many years of technical and professional preparations and 55,000

employees working in this industry. In comparison, there were barely 5,000 wind power engineers and employees at the end of 2005 in China. The subject of wind power was taught at Chinese universities in Xinjiang and Hebei for the first time in 2005 and 2006 respectively. According to Professor Liao, China will need at least three to five years to catch up with the rest of the world in this area.



Prof. Liao Mingfu (left) and Prof. Robert Gasch.

Future investment

The Chinese government plans to increase the total capacity of wind power plants to 30 million kW by 2020. This means that an average of 1,500 wind power plants with a capacity of 1,500 kW is needed each year. This step will mean more than just the creation of many new jobs. It should also help to promote wind power as a source of energy as well as the restructuring of the Chinese power industry while reducing the pressure caused by the energy crisis.

The Chinese government enacted a new renewable energy law at the beginning of 2006. According to the legislation, power system providers are required to integrate the energy produced by wind power plants into the system without any barriers. The law also specifies a so-called "feed-in" power price, which is guaranteed for 12 years. The profit accumulated over this period of time is to be used to benefit the wind power plants.

Renewable energies represent a sustainable development of the energy sector. As a result, major state-owned concerns as well as private companies are interested in investing in wind power. Professor Liao believes that there will be little difficulty in generating the required capital for this alternative energy source.

Joint education of engineers

At present, the Chinese wind power industry is not capable of building its own megawatt (MW) plants. Instead, it buys production licenses from countries such as Germany or conducts joint research and development projects with other countries active in wind power. The cooperation focuses on the areas of capacity building or the training of specialists.

InWEnt has been involved in a joint education project in this area with NWPU since 2001. The aim of the project is to train engineers and support them in their work to establish an environmentally friendly and socially acceptable power supply system for China. Joint preparations with regard to instructors and curricula were made before the project officially started in 2003.

Wind power engineers from throughout the country and students at NWPU had the chance to participate in a 5-month wind power course. The 2-month basic course was taught at the NWPU. This was followed by a 3-month intensive course, which included 6 weeks of practical training at a company in Germany and information about the company's production and operations. Over 80 people have completed this educational programme so far and have turned their experiences into their careers.



China is increasing the total capacity of wind power plants.

According to Professor Liao, NWPU will offer the subject of wind power plants in the future, which should lead to further cooperation between InWEnt and German universities. In September, Professor Gasch from the Technical University of Berlin and Professor Twele from the University of Applied Sciences in Berlin will travel to Xi'an for a seminar on wind power usage at the NWPU.

Chinese and German specialists have an active cooperation in this area.

By Ms Shu Xin



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Renewable energy in Vietnam – untapped sources

Over the past decade, Vietnam has made remarkable progress in alleviating poverty and promoting economic development. The country has placed its priorities on rural poverty reduction and improving the economic well-being of its rural citizens.

As one of the decisive keys to economic growth, energy is seen as an indispensable factor in the poverty reduction programme. The government set its target to increase

access to electricity to 90% by 2010 for Vietnamese households in rural areas.

Geographically rural households are often scattered, which makes it difficult and not

economically feasible to connect the national grid to those areas. By 2004, about 82% of rural households in Vietnam had access to electricity. This enviable figure has been >

➤ reached because of concrete efforts by the government. However, about 18% of rural households still have an electricity shortage. Denied access to electricity, these households will continue to live in poor conditions. Is the national electricity grid the only solution for rural areas? Alternatively, are there any other solutions for these households to obtain electricity to develop their economic activities to overcome poverty? Could at least renewable energy (RE) be an alternative solution?



Solar energy systems could provide light and power to the rural people in Vietnam.

Solar, small hydropower, biogas and wind – untapped resources

Vietnam is well endowed with RE resources. According to a 1999 workshop's report on "Option for RE in Vietnam", hydropower potential for small-scale generation (under 10 megawatt (MW)/site) is estimated at about 2,000 MW. Solar radiation levels are good in the southern and central regions. Over 50 million tonnes of biomass are created each year, with only 30-40% currently used for energy production. Wind speeds are ade-

quate in the coastal areas and on offshore islands.

Despite this potential and regardless of the fact that RE is a clean source, only a small proportion of RE resources are effectively used to serve rural communities. Mini and micro hydropower plants use only about 66 MW of the small hydro potential. Of these, only 40% are reported to be operational. By the end of 2004, about 2,800 solar photovoltaic systems and a few wind farms were in use in Vietnam.

Policy for energy development

Rapid economic development, population migration to major cities combined with elevated living standards have all contributed to a growing demand for electricity, which is straining current generation capacities. According to 'RE in Asia – The Vietnam Report', demand for electricity in Vietnam is expected to grow 15-16% per year until 2010. Vietnam currently purchases power from China to prevent shortages in the north and plans to begin purchasing power from Laos in 2008. The expected strong growth of energy demand in Vietnam raises questions concerning the availability of resources, environmental degradation, efficiency of energy use and the need for diversification in energy sources.

Dealing with the rise of energy, the Ministry of Industry has formulated the National Energy Policy for Vietnam that highlights the following points: (1) develop energy with consideration of environmental protection and sustainable development; (2) use energy economically and efficiently; (3) develop new and RE resources such as small hydropower, wind power and solar energy, geothermal power, etc.; (4) ensure an adequate energy supply to socio-economic sustainable development in rural and mountainous areas; (5) enhance international cooperation in energy; and (6) improve the legal framework and implementation of market-oriented power reform.

Following the National Energy Policy, the government launched in 1999 a 'Renewable Energy Action Plan' (REAP) to contribute to a

system approach to develop RE in Vietnam. The plan set out a 10-year framework of international assistance to scale up the development and use of RE for rural electrification and grid supply.

Obstacles to overcome

Traditionally, Vietnamese people, especially those who live in the countryside, often use RE, such as solar energy or wind energy, to serve for their daily activities. They use solar energy for heating or drying things, wind energy for cooling or water energy for grinding rice (water wheel), etc. However, using RE for electricity is still unfamiliar for many of them. This may partly answer the question why RE is available in Vietnam but not notably utilised to compensate for the shortage of electricity in rural households, but the whole answer depends on many other factors.

Barriers that have an effect on the development of RE in Vietnam could be:

- an inadequate policy and regulatory framework to encourage the use of RE and to provide the necessary drivers to accelerate the development of the Vietnamese RE industry;
- insufficient awareness of the available technologies, their costs and performances;
- lack of commercial businesses and infrastructure to provide renewable electricity equipment and services;
- lack of awareness except in the area of hydro systems;
- lack of sources to compare (dis)advantages of available different rural electrification options;
- limited access to finance for consumers, businesses and project developers.

As more than 70% of the population in Vietnam still lives in rural areas, of which many cannot be connected to the national grid, the application of RE systems could provide light and power to the rural people. This would bring important socio-political changes on the way to overcome poverty, e.g. ➤

► improving people's educations, creating healthier ways of life and eliminating social differences.

Capacity building and policy improvement

Accelerating RE development in Vietnam should receive more attention with a focus on the following issues:

- Strengthen the capacity to plan and develop RE investments in government, NGOs and the emerging private sector;

- Improve policy to increase access to credit;
- Strengthen the supply sector to provide RE goods and services;
- Raise awareness to reach prospective users, suppliers, financiers, donors;
- Provide market information, etc.

Success also depends on the means of effectively addressing issues related to education, training, public appreciation and understanding. If decentralized RE strategies make it possible to deliver electricity on a sustainable basis, then communities must

learn how to finance, build and operate these power systems over the long term.

By Ms Vu Thu Ha



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InWEnt alumni activities in Laos

On 28 October 2005 the InWEnt Regional Office Hanoi, represented by Ms Le Thi Bich Ngoc, joined InWEnt Alumni coordinators from Laos, Ms Pamouane Phetthany and Mrs Somchay Keomek, to organize an 'Alumni Capacity Training Assessment' in Vientiane/Laos. Around 80 alumni as well as representatives from German Embassy and DAAD attended the meeting, which resulted in the decision to conduct 4 more training courses for Laotian Alumni in Vientiane until September 2006.

The first course "The Art of Building Facilitation Capacities" was held in December 2005. "Office Management" was the focus of the second training programme, held in May 2005. Two months later, in July, alumni learned about "Performance Improvement Programme for Existing Entrepreneurs (PIP)". The last of the 4 training programmes took place in September 2006 on the topic "Human Resources Management".



Photo: Pamouane Phetthany

Participants performing an exercise during the training 'Office Management'.

All Laotian alumni so far are happy to have these kinds of challenges, which enable them to meet up while improving their skills and capacities at the same time.

Some statements made by the participants

reflected their feelings and benefits gained during the different courses:

1. Ms. Phanida Maniphousay, Deputy Head Administration Electricite Du Laos (EDL) who participated in ►

➤ 'Office Management Training': "Since the training, I can manage my temper better than before. I learned to improve my management skills and I also got a job promotion."

2. Ms. Souphayvanh Thiengchanhxay, Assistant to Managing Director, Burapha Agro-Forestry Co., Ltd who took part in the 'PIP Training': "I feel more self-confident to follow up on company debts

from debtors. I enhanced my marketing skills and means of product advertisement."

3. Mr. Dathsadachanh XAYAPHET, Senior Officer, Ministry of Foreign Affairs who attended the Training on 'The Art of Building Facilitation Capacities': "The training helped me to know what facilitation is. How can I be a good facilitator? In general, all training activities help

alumni to improve their capacities and to share experiences with others."

By Ms Pamouane Phetthany



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InWEnt's new team member in Beijing

News from the Regional Office: Min Zhou joins Niels Albers and his team.

My name is Min Zhou. I was born in Xinjiang Uygur, an Autonomous Region of the People's Republic of China. I am an alumna of InWEnt, so naturally I feel closely linked to the organisation. For me, it is a great honour to work for InWEnt in China.

In 2001, I had my first contact with InWEnt. As a trainee for 1 year, sent by Ministry of Communications, I was engaged in advanced studies of Logistics & Transportation at Carl Duisberg Gesellschaft (CDG) in Germany. Learning the German language helped me to know the world better! It was just then that I began to get in touch with Germany, to learn about its agreeable environment, sound law system and its friendly people. I changed a lot within that year: I acquired new knowledge, and also broadened my horizon. I keep improving since.

Germany features its outstanding management science, which has always attracted me. I went to Germany for the second time as a Master of Business Administration (MBA) student of the University of International Business and Economics: Bearing a sense of special intimacy, I chose University of Cologne.

This wonderful choice gave me the chance to get to know InWEnt better. Fortunately, I



Min Zhou

now have a new job with InWEnt. My responsibilities in the new position:

1. Ensure a well-established alumni Network and cooperation with other alumni associations to provide the alumni with more and better chances and means to communicate with each other;
2. Execute and administrate workshops and other activities;
3. Adapt the alumni network platform to Chinese needs;
4. Offer any alumni help and support.

I am delighted with this brand-new position! This is not only a chance to work, but also a chance to learn! InWEnt is a learning

organisation with several excellent employees, giving me many opportunities for personal development within this big family! I can enjoy the satisfaction of helping others in this wonderful job while enjoying the freedom to create new things.

I cherish the expectations in my new job. I want to promise two points:

1. Serving as a bridge, meaning I will ensure everybody keeps in close touch with each other so that alumni can develop themselves and shoulder social responsibilities as well;
2. Together with the alumni-team, I will offer the alumni more and sustained learning opportunities.

It is my sincere wish that I will be able to help more and more InWEnt alumni to make their lives more colourful and shoulder more social responsibilities.

By Ms Min Zhou



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