GrIPP-Net News

A Quarterly Newsletter of the ASEM Green Independent Power Producers Network

ISSN 1685 4705 Volume 2, Number 2 (March 2003)

Editorial

Biomass energy, including fuelwood, accounted for 11% of the world's total primary energy supply in 2000. It is the fourth most important fuel after oil, coal, and gas. However, in electricity production, biomass energy is the least used, sharing only 1% of the world's total fuel consumption for power.

In the European Union, biomass accounted for 3-4% of the total primary energy consumption in 2001. The figure is even much smaller for power generation. Nevertheless, the EU has targets for increased contribution of renewable energy, particularly biomass. The article prepared by Risoe and ECN discusses the current development and important issues regarding the use of biomass for power generation in the European Union.

A different picture is presented in Southeast Asia, where biomass is an important source of energy since fuelwood is still the dominant source of energy in almost 50% of the region. The share of biomass in the total primary energy supply of the ten ASEAN member countries in 1998 was about 40%. Biomass energy is largely used in the household sector and in small-scale industries. Recently, its use in combined heat and power generation is increasing. ACE discusses the role of biomass in Southeast Asia as well as the limitations and opportunities in the use of biomass for electricity generation.

Meanwhile, we are pleased to announce our **Second Regional Workshop** with the theme of "Renewable energy development in Southeast Asia—European Experiences and Perspectives". Interested individuals and companies involved renewable energy development particularly for power generation in Europe or Southeast Asia in may contact us for further details. Through this workshop, we aim to present the various issues and opportunities of biomass for power generation particularly in light of many global changes in the energy markets. We hope you can meet with us in the Risoe National Laboratory, Denmark, during March 27-28, 2003 and join us in active discussions. Who knows, you might see an opportunity to do business in Southeast Asia's Green energy market.

The *GrIPP Net Newsletter*, the official publication of the Green IPP Network, is published quarterly to communicate network activites and to support the dissemination of relevant information and network results. It is provided free to network members and interested stakeholders, and can be downloaded from this site: www.ASEM-GreenIPPnetwork.net.
This *Newsletter* has been produced with the financial assistance of the European Community. The views expressed herein are those of the authors and can therefore in no way be taken to reflect the official opinion of the European Commission.

Upcoming Event

ASEM Green IPP Network Second Regional Workshop

"Renewable Energy Development in Southeast Asia— European Experiences and Perspectives"

27-28 March 2003; Roskilde, Denmark

The second workshop of the ASEM Green IPP Network is to be held 26-27 March 2003 in Denmark. It is aiming to present experiences of European players in SEA in different fields linked to the Green IPP issue and to present business opportunities and market conditions in South East Asia. Notably, it is envisaged to discuss opportunities and barriers under the changed market conditions in the energy sector.

Issues such as Emission Trading, Joint Implementation and Clean Development Mechanisms are key features of the new market conditions that Green IPPs are operating within. Hence, they make up an important part of the framework - and the business opportunities - for Green IPP activities and Session 1 presents this context in the form of the European approaches and experiences. The market conditions (macroeconomics, power system and markets, prices, investment climates, policies, regulatory instruments etc.) and opportunities in the Southeast Asian market are then presented both by Southeast Asian parties and by European players currently working with Green IPPs in Southeast Asia. Finally, the perspectives linked to European developments in renewable energy are outlined. What potentials do these developments offer in Europe and in SEA? Which difficulties do the European Green IPPs meet (e.g. with power system integration) and what experiences have been gained trying to surmount these difficulties? To what extent are these experiences transferable to SEA? The last session concentrates on wind energy and on the second day of the workshop there is a site visit to wind power plants near Copenhagen.

Workshop (Tentative agenda)

DAY 1 27 March 2003 (9:30-17:45)

9:30-9:45 Opening Session

- Welcome and Opening remarks

Session 1: Green IPP opportunities in Europe - IET, JI & CDM

09:45-10:00 "Emission Trading - introduction to the issue", Dominik Möst, Researcher, University of Karlsruhe, Germany

10:00-10.30 "Joint Implementation and projects within the context of CDM", Catrinus J. Jepma, Professor, University of Amsterdam & Groningen, The Netherlands.

10:30-11.00 Discussion

11:00-11:15 Coffee break

... Continued in page 8

Inside

Biomass for Power Generation in Europe

by Kaj Jorgensen (Risoe National Laboratory, Denmark) and
Annemarije van Djik (Energy Research Centre of the Netherlands, ECN)

Biomass resources and potential in Europe

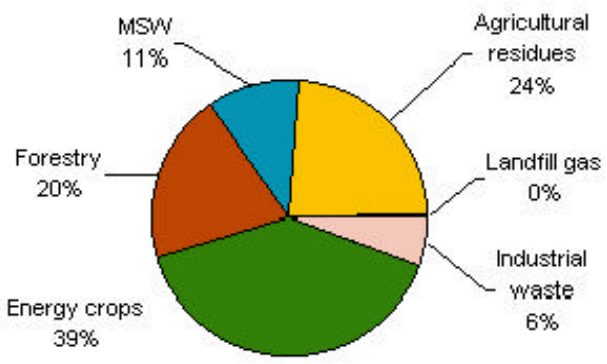
Biomass is the largest source of energy from renewable sources. In 2001, biomass accounted for 3-4% of the total primary energy consumption within the European Union. Four of the 15 EU member states have bioenergy shares of more than 10%; Finland (16%), Sweden (14%), Portugal (13%), and Austria (11%). Much of this energy consists of heat production from wood, both for households and industrial processes. The contribution of biomass to electricity production is much smaller. Total electricity production from biomass fired power stations in the EU in 2000 was 37 TWh, or 1.5 % of total electricity production [EUROSTAT].

Biomass resources for electricity production are currently mainly agricultural residues (agricultural and forestry residues, manure and energy crops) and waste streams (municipal solid waste, industrial waste, sewage sludge and landfill gas).

Much of the existing resource is currently not used- partly because of barriers from technology and policy issues, and partly because it is not realistic to use the potential that is technically available. For example in agriculture it is not realistic to collect all biomass waste as much of this will have competing uses (as natural fertiliser) or cannot be collected easily from the many small resources. When looking at the potential of biomass, it is therefore important to take into account such practical limitations by defining a *realistic* potential.

The total realistic potential for biomass (excluding digestion) in the 15 EU countries is expected to be approximately 4200 PJ by 2010 [ECN 2003] growing to 5000 PJ per year by 2030 [ECN 2003a]. The countries with the largest potential are France, Spain, Italy and Germany, where especially the commercial production of energy crops are expected to make a substantial contribution in Spain and Italy. A likely distribution of biomass resources in 2030 is shown in the figure below [ECN 2003a].

Figure 1. Projected Biomass Resources Distribution in EU 15 in 2030



The potential for electricity produced from biomass digestion gases is estimated to be in the order of 5-10% of that of those fuels that combustion. Biomass digestion currently takes place mainly at landfill sites, where electricity production is not the main objective. In fact, 50% of all biomass digestion gas in Europe is currently flared off. Taking policies for landfill into account, countries with the largest biogas potential are Italy (sewage sludge and landfill gas), and the UK (landfill).

Biomass technology and projects in Europe

Combustion is the most widespread biomass conversion technology for energy purposes, primarily for heat generation. This typically takes the form of either combustion plants providing heat for a individual consumers or facilities supplying heat to district heating schemes.

Power generation from biomass combustion is usually steam based, i.e. utilising steam turbines for the conversion to mechanical energy. For this technology there are considerable cost savings with larger plants and it is usually applied only in relatively large plants. Frequently, it is operated as co-fired schemes, utilising biomass in combination with other fuels, for instance coal.

For power generation as well as co-generation schemes on a smaller scale, alternative routes are being pursued other than combustion and steam turbine combination. Usually, the objective is to convert solid biomass into fuels that can be used in engines or gas turbines.

Anaerobic digestion (AD)—i.e. production of biogas—has been applied for sewage treatment since the late 19th century, in Europe and elsewhere, though mostly in schemes giving low priority to the utilisation of the biogas generated for energy applications. AD—bacteriological decomposition of wet biomass in the absence of oxygen—is the most developed biochemical (or low-temperature) conversion process. Outside of Europe, AD has been extensively tested with several thousand plants having been built. The energy efficiency of these plants generally is relatively poor and furthermore they have a high failure rate. In Europe, the number of plants built is more limited and here the technology has had, and to some extent still has, substantial operational problems.

In the wake of the oil crises in the 1970s, there was a development and expansion of small-scale on-farm AD plants generating methane as energy source. In terms of number of plants. However, the expansion for Europe as a whole was much more limited than for instance in Southeast Asia, India and China, although the plants were typically working at higher energy efficiencies.

From the mid-1980s onwards, there was a new technological development trend based on centralised AD plants taking in

feedstock from more than one farm and supplying heating via district heating schemes and power to the power grid. These plants are typically based on manure from farms, industrial waste and/or the organic fraction of municipal waste.

On this background, the AD plants vary substantially in size. According to a survey carried out in the late 1990s and published by AD-NETT (The Anaerobic Digestion Network, see the link www.ad-nett.org), there is the following rough distribution on size intervals:

- small-scale on-farm plants (a throughput of <25 m^3/day): about half of the plants in terms of number
- medium-scale schemes (100-1000 m^3/day): approximately a quarter
- large-scale schemes (>1000 m^3/day): approximately a quarter

As regard operating temperatures of the digester, there is a strong concentration among the European AD plants. More than 85% are operated at the mesophilic temperature range (25-40°C), 8% at thermophillic (55-70°C) and 5% at psychrophillic levels (5-15°C), according to the same survey. The majority of the thermophillic plants are in Denmark and to a smaller extent in Sweden. In Denmark they constitute the most significant fraction of the plants, both in terms of numbers and, even more so, when taking the plant sizes into account (the thermophillic temperature range is especially applied in centralised AD plants). Psychrophillic plants are primarily found in Italy, but even here they make up a minority of the total number of plants. A variety of basically different plant designs are being applied.

The product gas of the AD process is typically composed of about two-thirds methane and about one-third of carbon dioxide. In addition, there are small amounts of contaminants (notably hydrogen sulphide, H2S). To use the gas as engine fuel the carbon dioxide has to be removed, for which a variety of different methods exist. In addition, it is necessary to desulphurise the gas, i.e. to remove hydrogen sulphide, again using one of several techniques.

Besides AD, the most developed conversion processes from biomass to gaseous fuels can be categorised as thermochemical (or high-temperature) conversions. These are emerging technologies at an earlier development stage than AD. The most advanced principle is gasification - or partial oxidation - while fast pyrolysis has a longer time perspective and probably a higher degree of uncertainty.

There are a number of gasification demonstration plants in operation. There is a range of different plant configurations—updraft/downdraft, fixed bed/fluid bed, different fluid bed concepts—to choose from. The choice of configuration depends on the character of the feedstock used as well as the application of the gas. Updraft gasification, generally, have the best energy efficiency provided it is not necessary to purify the gas, which is necessary to utilise the gas in engines. On the other hand, updraft gasification is more versatile with respect to the feedstock (especially water content and ash melting point). In addition, the plant size is essential for the selection of plant design. Small-scale plants usually apply relatively simple fixed-bed configurations with correspondingly lower overall energy efficiency (electric efficiencies in the range of 15-25%). Such plants are typically in the range of a few hundred kilowatts and use gas engines. Fitted with gas turbines schemes in the lower megawatts range may achieve electric efficiencies in the range of 25-30%. In larger schemes—50-100 MW—more sophisticated technologies based on integrated pressurised gasification/ combined cycle systems may reach electrical efficiencies of 40-50% or more. Above approximately 1 MW, only fluid bed configurations are being considered.

In the current gasification projects, the feedstock is almost exclusively wood. Also, straw has been investigated, but this option involves many problems.

Fast pyrolysis, i.e. thermal decomposition of biomass in the absence of oxygen, is a conversion technology at an earlier development stage than gasification. It is of particular interest in applications that can make use of the liquid fuels that may be produced by condensing the vapour gases generated in the process. The pyrolysis liquids may be used for both energy applications and to substitute chemicals.

In addition, pyrolysis may be an option in conjunction with feedstocks not well suited for gasification, such as straw and other feedstocks with high contents of chlorine and alkali. In pyrolysis at moderate temperatures, the chlorine and alkali content is retained in the charcoal. A demonstration project in Denmark is exploring this option.

Policy issues for biomass in Europe

Targets

The EU described its targets for renewable energy in the 'EU White Paper on Renewable Energy Sources' published in 1997. The total (indicative) target is a 12% contribution of renewable energy to total energy consumption by 2010. Biomass is projected to contribute 135 Mtoe of the total projected 182 Mtoe in 2010, and is therefore expected to be the main resource for renewable energy. For electricity generation, the projected contribution of biomass is 230 TWh by 2010. Biomass will therefore also play a major role in electricity production from renewable resources, together with large and small hydropower (355 TWh and 55 TWh respectively), and wind energy (80 TWh). It is clear that these are ambitious targets. For biomass, much is still to be done in the coming years to grow from the current 33TWh (Eurostat 2002) to the projected 230TWh in the coming 7 years.

Following the White Paper, targets for electricity production from renewable energy sources were set in the Directive 2001/77/EC (October 2001). The total target is 22% of total electricity consumption in 2010. The (indicative) targets are set per country, and take into account resources available. For instance, the target for Austria is 78.1% (compared to 70% already in place in 1997), while that for Germany is 12.5% of gross national electricity consumption. This Directive will be one of the main driving forces behind renewable energy policy formulation in the EU countries in the coming years.

Policy support

One of the main policy issues concerning biomass is the definition of what to support under renewable energy policy, and what to regard as waste treatment issues. The definition of biomass formulated in the Directive is broad, covering not only the biodegradable fraction of products, waste and residues from agriculture, forestry and related industries, but also the biodegradable fraction of industrial and municipal waste. The definition of biomass in several member states however, exclude waste treatment (especially municipal solid waste) from support under renewable energy programmes.

For example in Germany, disagreements on the definition of 'biomass' mainly concerning the utilisation of used wood (e.g. polluted by wood preservatives, etc.) and technologies led to insecurities for the development of the biomass sector. The 2001 regulation on biomass (Biomasse Verordnung) defines the different materials that may be regarded as "biomass" and the technologies for its utilisation, so resolving the former insecurities [IIP 2003]

Financial for biomass and biogas development is available throughout the EU, within the renewable energy policy. Policy support takes place through the available instruments, such as subsidies on investment, quota on the supply of renewable energy, or regulating minimum feed-in tariffs for renewable energy technologies. The levels of support differ substantially per country (for example feed-in premiums from 0.4 €cent/kWh to 14 €cent/kWh, with approximately 4 € cent/kWh as a common premium level). Production of electricity from landfill or combustion of waste is specified in a separate category in nearly all EU countries, receiving a lower level of support (commonly around 1.7 €cent/kWh). Less commercially viable technologies or projects such as small scale biomass digestors or electricity production from energy crops are commonly eligible for additional support, for example through research or demonstration programmes or a special high premium levels.

Biomass forms a special case within renewable energy policy, as it has stronger links with policy fields outside the energy sector than most other renewable energy technologies. For instance biomass use is strongly related to waste management and agricultural policy for the availability and cost of feedstock, to environmental policy for regulations on emissions (especially for biomass combustion) and disposal of process refuse. These linkages can form additional sources of support for the development and deployment of biomass energy technologies, but they can also form a barrier, especially through the existence of incoherent regulations in the different policy fields.

Regulations

As with many renewable energy technologies, the procedure to receive the necessary permits and certificates is commonly complex and requires a long time span. Related policy fields may further complicate the procedures. One major reason for the problems with regulations and procedures is the lack of coherency between different authorities involved at different levels (municipality, region) and for different policy fields (environment, spatial planning, energy). Such lack of coherency causes large delays and uncertainty for project developers. For example in The Netherlands, depending on the region, a farm scale biomass digester producing electricity may be classified as a power plant, and therefore not be allowed in rural areas.

Major influence on the utilisation of biomass for energy in the current and near future are the regulations on landfill or disposal of biomass waste on land. Illustrative with respect to landfill policy are Germany and the Netherlands, both anticipating a zero landfill policy. This means that electricity generation from landfill has no long-term potential for these countries, but electricity generation from combustion of biomass in (adapted) power plants may have larger potential. To indicate the complexity of the issue: combustion of biomass in power plants is currently most attractive in coal-fired plants, but for environmental reasons many of these plants will be closed down or be refitted to gas firing (which is more difficult to combine with biomass fuel).

In the future, regulations for land use for non-food production and agricultural policies are expected to be of major influence, as a large part of the growth of the biomass sector depends on the feasibility of growing crops especially for energy production (energy crops).

Concluding, the expansion of the biomass energy sector would be much helped if coherency is created between the policy fields and policy levels that impact the feedstock supply, permit procedures, and financial feasibility of projects. This is especially important for the biomass sector, as on the one hand the biomass sector is more complex than many other renewable energy technologies, and on the other hand the targets set for renewable energy in the EU depend largely on the growth of the utilisation of biomass for energy production.

References

AD-NETT (The Anaerobic Digestion Network), http://www.ad-nett.org/index.html, information downloaded January 2003

Al Seadi, T. & J. H. Nielsen, 2001, State of the art of biogas in Europe, BioEnergy 2001, Nordic & European Bioenergy Conference, Aarhus, Denmark, 25-28 September

Bridgwater, A. V. et al, 2002**,** A techno-economic comparison of power production by biomass fast pyrolysis with gasification and combustion, *Renewable and Sustainable Energy Reviews*, Vol. 6, No. 2, pp. 181-248

ECN (2003), Admire REBUS, ongoing research, database January 2003

ECN (2003a), BETER, ongoing research

European Commission (2001): Directive 2001/77/*EC on the promotion of electricity produced from renewable energy sources in the internal electricity market*

European Commission, *Energy for the Future: Renewable Sources of Energy*. White Paper for a Community Strategy and Action Plan, (COM(97)599 final)

... Continued in page 8

Biomass for Power Generation in Southeast Asia

- by Dr. Guillermo R. Balce, Tjarinto S. Tjaroko, and Christopher G. Zamora
ASEAN Centre for Energy (ACE), Jakarta, Indonesia

Introduction

Biomass energy, including fuelwood, accounted for 11% of the world's total primary energy supply (TPES) in 2000 (IEA, 2002). It is the fourth after oil (34.8%), coal (23.5%), and gas (21.1%). It surpasses the combined contribution of nuclear (6.8%), hydro (2.3%) and other new and renewable sources of energy (0.5%). However, in electricity production, biomass energy is the least used, sharing only 1% of the world's total fuel consumption for power. In contrast, the share of other fuels are: coal 39%, hydro 17%, gas 17%, nuclear 17%, oil 8%, and the other new and renewable sources of energy 1%.

In Southeast Asia, biomass is an important source of energy since fuelwood is still the dominant source of energy in almost 50 percent of the region. The share of biomass in the TPES of the ten ASEAN Member Countries in 1998 was about 40 percent. By country, the share of biomass in the primary energy supply in 1999 was: Myanmar - 86%; Lao PDR - 86%; Cambodia - 83%; Vietnam - 48%; Indonesia - 29%; Philippines - 21%; Thailand - 17%; and Malaysia - 8% (FAO-RWEDP, 2000). Biomass energy is largely used in the household sector and in small-scale industries. Recently, its use in combined heat and power generation is increasing. The role of biomass is presently limited in power development, but opportunities exist for increasing its share.

Biomass Resources for Power in Southeast Asia

Biomass resources such as wood and agricultural residues are abundant in ASEAN countries and have strong potential as fuels for green power generation. The amount of residues produced from bagasse, ricehulls, palm oil waste and wood waste in five ASEAN countries, namely: Indonesia, Malaysia, Philippines, Thailand, and Vietnam is about 107.55 million tons. Of this total, bagasse accounted for 32%, palm oil waste 27%, rice hulls 23%t, and wood waste 18% (EC-ASEAN Cogen 2003/UN-ESCAP, 2000).

In practice, about half of agricultural residues is utilised for energy generation. It contributes 20% of the primary energy demand of industries. Similarly, the ASEAN wood industry converts about half of the raw wood into residue during the production process.

Status of Biomass Power in Southeast Asia

In 2000, the total installed ASEAN capacity of renewable energy for electricity generation, both captive and on-grid, was 20,942.46 MW (Table 1). Biomass power accounted for about 8.94%, geothermal 11.15%, large hydro 77.31%, mini/micro hydro 2.41%, and solar PV and wind 0.19% (ACE, 2003).

In ASEAN, the potential of biomass for power generation is promising: about 50,000 MW for all biomass resources in Indonesia (NRSE-SSN Report, 2001); approximately 3,000 MW in Thailand (EC-ASEAN Cogen, 2002); about 1,117 MW in palm oil industry of Malaysia (PTM, 2003); about 60-90 MW from bagasse and 352 MW from ricehulls in the Philippines (NRSE-SSN Report, 2001); and 250 MW from bagasse in Vietnam (UN-ESCAP, 2000). About 920 MW in installed capacity could be expected from over 19 million tons of residues in ASEAN wood industry (UN-ESCAP, 2000). Many of this potential could be developed through cogeneration. However, in order to tap the estimated potential, the following key challenges have to be addressed: 1) establishment of a level playing field for biomass power in competition with the often subsidised centralised power generation; 2) establishment of mechanisms to compensate for the avoided external costs of biomass power generation, for example through a so-called environmental "adder" on top of the normal buy-back rate; 3) access to power grid under clear and fair terms and conditions; and 4) development of a market for biomass waste resources. Thailand is facing these challenges by initially launching a competitive bidding for 300 MW of renewable energy generation, mainly biomass.

Table 1. Renewable Energy Status for Power Generation in ASEAN (2000), in MW

Country	Biomass	Geothermal	Hydro	Mini/micro-hydro	Solar	Wind	Total
Brunei D.	-	-	-	-	0.0024	-	0.0024
Cambodia	n.d.	-	18	0.96	0.13	-	19.09
Indonesia	302	363	4,246	21	8	0.4	4,940.40
Lao PDR	n.d	-	621	6	0.16	-	627.16
Malaysia	213	-	2,225	6	2.19	0.15	2,446.34
Myanmar	-	-	340	83	0.24	-	423.24
Philippines	21	1,960	2,480	230	0.44	0.06	4,691.50
Singapore	220	-	-	-	-	-	220
Thailand	1,230	0.3	2,886	94	8	0.17	4,218.47
Vietnam	n.d	-	3,294	62	0.11	0.15	3,356.26
ASEAN-10	**1,986**	**2,323.30**	**16,110**	**502.95**	**19.27**	**0.93**	**20,942.46**

The Thai government has also established a fund to provide developers assistance to cover the differential between production and market price of biomass power. In Malaysia, grid access regulations and buy-back power rates are being developed, and the first grid-based biomass power plant is being constructed (Ramboll, 2003).

Biomass energy could achieve the global targets for CO_2 emissions. However, a lot still needs to be done in order to develop the appropriate processes and technologies to boost the market. Ironically, the lack of immediate demand for biomass energy due to competition with other fuels is a major impediment for the development of these processes and technologies (Ramboll, 2003).

The way ahead is for governments of the ASEAN countries to mobilise the market forces by setting up policies, regulatory framework, and appropriate incentives to address the above mentioned challenges. Thailand is a recent example of a government facing the challenge.

Policy and Regulatory Environment

In ASEAN countries, the development of renewable energy for power generation is basically a policy issue. In many countries, appropriate policy framework is, therefore, developed to ensure that national energy policy goals are met. For biomass power, planning and programme implementation for grid power capacity installation vary in Member Countries. Government regulations set, among others, the guidelines for the purchase and sale of power between generators and electric utilities, clearly defining their obligations and rights.

In Indonesia, the national energy policy aims to reduce dependence on oil and gas and to diversify the energy mix to include other energy resources such as renewable energy. The Ministry of Mines and Energy published the tariff for purchase of electricity under the Small-Scale Renewable Energy Power programme which aims to ensure the availability of electricity and to provide business opportunities for small-scale power investors (DJLPE, 2003).

In Malaysia, the energy policy promotes renewable energy as the fifth fuel source. Under the Third Outline Malaysia Plan (OPP3 2001-2010) and the Eighth Malaysia Plan (8MP – 2001-2005), the Government will intensify and accelerate the development and use of renewable energy. The strategies of the 8MP for RE are: 1) promotion of RE resources such as biomass, biogas, municipal waste, solar, and mini-hydro; 2) in-house biomass-based cogeneration; 3) demonstration projects; 4) commercialisation of research; 5) extension of financial and fiscal incentives; 6) promotion of cooperation between public and private sectors; and 7) R&D on palm diesel and use of alternative sources such as fuel cell, hybrid cell, and hydrogen fuel (PTM, 2003).

In the Philippines, appropriate policies, regulatory conditions, and incentives have been put in place to increase power generation from indigenous resources, which will have positive impacts on the market for biomass technologies. The Omnibus Investment Code, the amended Executive Order 226 which allows the private sector to participate in power generation, Build-operate-transfer Law, and the Electricity Power Industry Reform Act are the relevant laws that will support the development of the renewable energy industry (DOE, 2003).

In Thailand, the national energy policy promotes renewable energy to address key issues on energy security, to reduce energy import, and to reduce greenhouse gas emissions. The Energy Conservation Promotion Fund is the government's tool to implement, among others, power purchase and subsidy programmes for Renewable Energy Small Power Producers (SPP) and Very Small Renewable Energy Power Producers (VSREPP) (ASEAN Energy Bulletin, 2002).

In Vietnam, the 10-year Renewable Energy Action Plan, which will soon be adopted by the Government which will set the policy framework for the development of renewable energy systems for on-grid and off-grid options (ASEAN Energy Bulletin, 2002)

Policy Instruments for Biomass Energy in ASEAN

1. Target Setting

Most ASEAN countries have specific targets for the installation of renewable energy capacity, usually within the planning framework of between 5 to 10 years. Targets are included in the energy plans of the countries and they are achieved by launching specific programmes like small-scale RE power producers programme in Indonesia, Malaysia, and Thailand. In Malaysia, the target for the installation of new RE capacities was set at about 600 to 700 MW by 2005, mostly comprising of grid-based biomass power plants. These targets are usually met through call of proposals or public bidding.

2. Investment incentives/Subsidies

In Southeast Asian countries, project developers of biomass-based power projects can avail of investment incentives in various forms (e.g. subsidies, tax credits).

In the Philippines, the following fiscal incentives are available to encourage investment, with special concessions for biomass power generation projects: 1) tax duty exemption on imported capital equipment, 2) tax credit on domestic capital equipment, 3) income holiday of 6 years; 4) additional deduction for labor costs, and 5) deduction of infrastructure expenses from taxable income.

In Malaysia, project developers can avail of the following incentives: 1) income tax exemption of 70% on statutory income of 5 years or investment tax allowance of 60 percent of capital expenditures incurred within a period of 5 years and to be utilised against 70% of the statutory income; and 2) import duty and sales tax exemption on imported machinery and equipment and sales tax exemption for domestically produced machinery and equipment.

3. Pricing

In Indonesia, the Small-Scale Renewable Energy Power Programme, launched in August 2002, encourages the participation of small-scale RE power producers to sell power of 1 MW and below to the grids of PLN. PLN calculated the

guaranteed price of RE electricity to small-scale RE producers at 80% of PLN's current selling price of electricity at medium voltage interconnection; and 60 percent for low voltage interconnection.

In the Philippines, the possibilities for guaranteed minimum prices for electricity from renewable energy are being investigated. The aim is to enhance the competitiveness of renewable energy projects with conventional technologies.

In Thailand, the price for purchasing electricity under the SPP is based on avoided cost (the wholesale price that distribution utilities pay to EGAT for bulk electricity purchases) of electricity. For those signing contracts to supply a firm capacity, the purchase price is based on the long-run avoided cost of the utility. On the other hand, there is no contracted demand for non-firm contracts, and accordingly, there is no capacity payment.

4. Production incentives

Production incentives are paid for every unit of energy generated, for example, cents/kWh. Thailand provides incentives in the form of subsidy/grant for every unit of kWh generated on top of the agreed power purchase rate between the SPPs and EGAT.

5. Power Purchase Agreements

Power purchase agreements for selling RE electricity to the grids are practiced in the following ASEAN countries, namely; Indonesia, Malaysia, Philippines, and Thailand. In Malaysia, power purchase agreement under the Small Renewable Energy Programme (SREP) is negotiated between the project developer and power utility. The duration of the PPA varies in the Member Countries.

In the Philippines, standard power rates are applied for the purchase of power from biomass cogenerators having less than 10 MW capacity, reflecting the structure of capacity and energy costs of the National Power Corporation for varying levels of power availability and dispatchability.

6. Soft Loans and other Innovative Financing Schemes

Soft loan programmes for renewable energy are established in some countries order to help ease the problem of financing for small-scale RE projects. In the Philippines, an investment window for renewable energy was established in the mainstream lending operations of the Development Bank of the Philippines (DBP). The loan usually involves a low interest rate, reasonable monthly amortisations, simplified procedures, and grace periods.

For biomass cogeneration systems, there are innovative schemes that have been modeled by the ASEAN-EC Cogen Programme. The schemes usually involve sustainable financing mechanisms and strategic alliances for cost sharing, reduction of transaction cost, and risk minimisation.

7. Public-Private Partnership

Public-private partnership (PPP) is encouraged in the ASEAN countries in the development and demonstration of new technologies, including renewable energy technologies. Involvement of the public sector instills confidence of the private sector to invest in renewable energy projects. PPP is proven successful in large-scale and complex renewable energy projects involving advanced technologies such as cogeneration. In the Philippines, examples of PPA schemes are the build-operate-transfer (BOT), build-operate-own (BOO), etc. Under the BOT scheme, projects can be commissioned through two procedures: an open tender calling for bids and unsolicited proposal.

8. Education, training and awareness programmes

Education, training and awareness programmes are indirect measures that help promote positive attitude towards renewable energy among the general public. The current trend is to share information, to identify technology transfer opportunities, and to increase public awareness of the positive attributes of renewable energy.

9. Permits, Grid Access Regulations, and Environmental Compliance

Indonesia, Malaysia, Philippines, and Thailand have developed guidelines on securing permits for installation of RE grid-based projects and grid access. In most cases, environmental compliance certificate must be secured before a project is constructed.

In Thailand, the regulations for the Very Small Renewable Energy Power Producers (VSREPP) programme (1 MW and below) allow for net metering arrangements and streamlined interconnection process and requirements, so as to minimise the costs of connecting a VSREPP to the distribution systems.

Success Factors for Biomass Projects

Policy instruments are gradually opening up the power market for renewable energy in Southeast Asia to a wide range of potential electricity producers, generating incentives for investment for the installation and upgrading of biomass technologies for power generation.

Energy supply security policy is a common policy of the Member Countries that is expected to stimulate the greater utilisation of biomass energy.

Cost competitiveness of biomass power plants is quite attractive, economically and financially, under certain specific conditions and locations.

Environmental benefits from biomass utilisation include, among others, solving the issue of waste disposal and reduction of exhaust gas emissions which are being encouraged under the Global Environment Facility (GEF) and Kyoto Protocol.

Technologies for utilising biomass for power generation are available at higher efficiencies, thus useful for a wide range of energy purposes.

Prospects

Bioenergy will focus mainly on the application of cogeneration technologies (combined heat and power

... Continued in page 8, column 2

UPCOMING EVENT ..... *continued from page 1*

Session 2: Business opportunities and market conditions in Southeast Asia (SEA)

11:15-11:30 "Project structures and financing - market conditions and business opportunities for Green IPP activities", Jessie Todoc, Senior Project Coordinator, Centre for Energy Environment Resources Development, CEERD, Bangkok, Thailand.

11:30-11:45 "Policy instruments and regulation - market conditions and business opportunities for Green IPP activities", Dr. Guillermo R. Balce, Executive Director, ASEAN Centre for Energy, ACE, Jakarta, Indonesia.

11:45-12:30 Lunch

12:30-12:45 "Technology development and resource issues - market conditions and business opportunities for Green IPP activities", Prof. Rowaldo R. del Mundo, University of the Philippines Solar Laboratory, Manila, Philippines.

12:45-13:00 "Market conditions and business opportunities for Green IPP projects in SEA", (to be confirmed)

13:00-13:45 Discussion

13:45-14:00 Coffee break

Session 3: Experiences of European players in Southeast Asia

14:00-14:30 "EcoSecurities experience with developing CDM projects: Palm oil waste to energy in Malaysia", Mrs. Veronique Bovee, EcoSecurities, The Hague, The Netherlands

14:30-15:00 "Experiences of a rural electrification project in Indonesia", Mr. Dauselt, Lahmeyer International, Germany

15:00-15:30 "Experiences of European players investing in wind energy projects in the SEA region", (TBA),

15:30-16:15 Discussion

16:15-16:30 Break

Session 4: European perspectives

16:30-16:50 "Development of biomass projects in Europe" (TBA)

16:50-17:10 "Wind energy in power systems with high shares of renewable energy - case study of Jutland, Denmark", Poul Erik Morthorst, Senior Research Specialist, Risoe National Laboratory, Roskilde, Denmark.

17:10-17:45 Discussion, including general debate

DAY 2` 28 March 2003 (9:00-12:00)

Site visit - wind farms near Copenhagen (9:00-12:00)

A site visit to the two wind farms in the central Copenhagen area - one of which is onshore (inaugurated in 1996) with the other being an off-shore park (from 2001). In spite of this, the two parks are located adjacent to each other. Both of these farms are owned partly by the utility, Copenhagen Energy, and partly by individual shareholders.

The site visit includes a presentation by Niels Lund, KMEK (the Copenhagen Environmental and Energy Advisory Office) of the background - project organisation, financing and technology selection.

In the News

Malaysia Approves Mini Hydropower Plants

Ingress-H2E Consortium has received approval from the Ministry of Energy, Communications and Mutimedia to implement mini hydropower generation in four locations in Peninsular Malaysia for a combined capacity of 8.4 MW. The consortium can now start the construction of plants, with an estimated project cost of RM45 million, within 24 months from January 27 2003, pending the submission of additional requirements.
Source: Hoover's Online, 06 February 2003

Europe Wind Power Capacity up 33% in 2002

According to the European Wind Energy Association (EWEA), Europe's wind energy industry powered ahead last year, spending 5.8 billion euros to boost its generating capacity by 33%. EWEA figures showed Europe built 5,871 MW of new wind power generating capacity in 2001. The EU's total wind capacity stands at 23,000 MW, or 4% of total power generating capacity, according to the EWEA.
Source: Reuters, 06 February 2003

BIOMASS GENERATION IN EUROPE ..... *continued from page 4*

Gunaseelan V. N., 1997**,** Anaerobic digestion of biomass for methane production: a review, *Biomass & Bioenergy*, Vol. 13, No. 1-2, pp. 83-114

IEA Bioenergy, 2001, Biogas and More! Systems and Markets Overview of Anaerobic digestion, Paris, France.

IEA Bioenergy, 2002, Thermal Gasification of Biomass, Paris, France

IIP, ECN, CIEMAT (2003-forthcoming), *Green Independent Power Producers in Europe*

UNDP, UN & WEC, 2000, World Energy Assessment. Energy and the challenge of sustainability, New York.

BIOMASS GENERATION IN SE ASIA ... *continued from page 7*

production) which are proven to bring the cost of energy generation to competitive levels in agricultural enterprises in the ASEAN. The COGEN 3 programme, pursued jointly by EU and ASEAN during the next 3 years, will ensure the rise in commercial application of this scheme.

The various programmes of the ASEAN countries such as the Small-scale RE Power (SSREP) programme of Indonesia, the Small Renewable Energy Programme (SREP) in Malaysia, and the Small Power Programme (SPP) and Very Small Renewable Energy Power Producers (VSREPP) in Thailand are expected to increase the utilisation and investment for biomass energy for power generation.

Overall, the greater utilisation of biomass for power generation will contribute positively to the supply, utilisation, and environmental objectives of the energy sector of all the Member Countries.

For further information, please visit the website of ACE at http://www.aseanenergy.org.

ASEM Green IPP Network Second Regional Workshop

REGISTRATION DETAILS

WORKSHOP DATES 27-28 March 2003

VENUE
Risoe National Laboratory
Frederiksborgvej 399
DK-4000 Roskilde
Denmark
Tel: (+45) 4677 5100
Fax: (+45) 4677 5199

NO REGISTRATION FEE

ENQUIRIES
For further information, please contact:
Kaj Jorgensen, Workshop Coordinator
Risoe National Laboratory, Systems Analysis Dept.
Tel: (+45) 4677 5104,
Fax: (+45) 4677 5199,
E-mail: kaj.joergensen@risoe.dk

2 EASY WAYS TO REGISTER

Fax this registration form to (+45) 4677 5199 or

E-mail kaj.joergensen@risoe.dk

HOTEL RESERVATION:
A bloc booking has been made at the
Hotel Prindsen, Algade 13, DK-4000 Roskilde
Web site: www.hotelprindsen.dk

Rate, single room (incl. breakfast):
880 Danish Kroner (about 125 Euro)

Hotel Prindsen is located near the railway station in Roskilde, about 8 km from Risoe

If you wish to utilize this, please **book directly to the hotel before 17 March 2003:**

Algade 13, DK-4000 Roskilde, Denmark
Phone: (+45) 4630 9100
Fax: (+45 4630 9150
E-mail: info@hotelprindsen.dk

HOW TO REGISTER

WORKSHOP REGISTRATION FORM

Simply register as listed above.

[ ] Yes! Please register me for the **ASEM Green IPP Network** Second Regional Workshop

[ ] Yes! Please send me more details about the workshop

Name: Mr / Mrs / Ms / Dr : _____

Position: _____

Company: _____

Address: _____

_____

Country: _____ City: _____ Zip Code: _____

Tel: _____ Fax: _____ E-Mail:_____

Signature: Date: