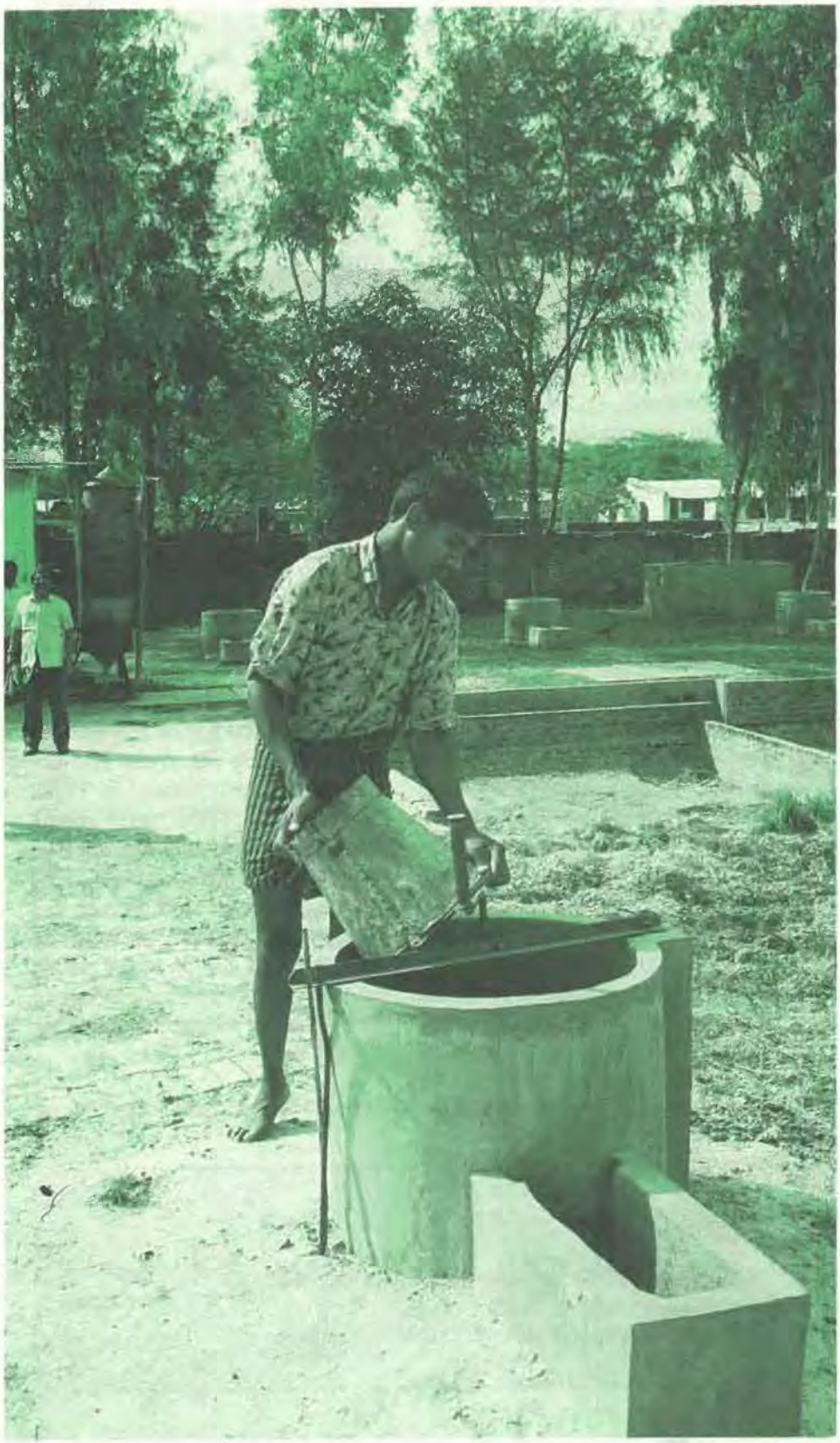
Sustainable Energy News

No. 10 September 1995

Newsletter for the International Network for Sustainable Energy

- INforSE



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The Sustainable Key to Employment

While many industrialized countries in Europe and North America experience increased economic growth, they also experience that this growth does not solve fundamental problems of society: unemployment, environmental damages, and social problems.

The INforSE campaign "Sustainable Energy for Social Development" addresses these problems. During the campaign, comprehensive documentation has been compiled showing that a shift to a more sustainable energy system will provide more employment. Other green sectors have similar job-potentials, for instance, in recycling, in public transport, and in organic farming. Even a single measure, the change of taxes from labour to an energy/CO2 tax, will have a positive employment effect.

Many of the green proposals are cost-effective in a narrow economic sense, but they are not implemented on a large scale due to a number of barriers. A combination of national policy measures and local, targeted programmes is needed to overcome these barriers. International cooperation can exert a positive pressure, supporting the national and local activities.

The green solutions may not increase economic growth in the North, but they contribute to solve the pressing problems of unemployment and overconsumption of resources. Reduced unemployment will lead to decrease of social problems and social tensions. Further, reduced resource consumption will lead to greater availability of resources for development in the South - a more equal distribution of the available ecological space - and thus less tension internationally.

Many INforSE member-organizations have worked nationally on the connection between sustainable energy and employment. Early September, one of them, Forum for Energy & Development, is co-organizer of a European conference on Jobs and the Environment with focus on "Eco-renovation", including sustainable energy. The next step must be to transform the proposals into policies and programs on local, national, and regional levels.

One of the main future activities of the INforSE campaign in Europe will be to work for inclusion of a sustainable energy strategy in the European Union-actions for increased employment. So far, these EU actions have been limited to Trans European Networks, and it seems that external pressure is needed to bring about more sustainable proposals. INforSE and Forum for Energy and Development invite all interested NGOs to cooperate on elaboration and promotion of proposals for job- and sustainable energy actions in EU.

Rene Karottki & Gunnar Boye Olesen

Front page:

Development of Biogas Plants at Aligarh in India.
See article on page no 14-15.
Photo: Folkecenter for Renewable Energy, Denmark

INforSE Coordinators' Meeting, India, November 6 - 10, 1995

This year, the INforSE Coordinators' Meeting will take place on November 6-10, in New Delhi, India at the new biogas training center built by AFPRO in Aligarh, 250 km from New Delhi. The meetng will discuss the continuing INforSE Campaign on Sustainable Energy for Social Development, the new INforSE training and information program, and an INforSE Award, as well as INforSE participation in the World Solar Summit Process, Habitat II Conference, and other international events, along with other coming INforSE activities.

All INforSE organizations are hereby invited to submit proposals for potential future INforSE activities for consideration at the meeting. Proposals must be received before October 15 by the respective coordinator or by the Secretariat of INforSE.

World News

World Solar Summit March '96

UNESCO, the UN Educational, Scientific and Cultural Organization, has launched a World Solar Summit Process in cooperation with the French energy efficiency agency ADEME, the EU Commission, International Energy Agency, and two NGOs, EUROSOLAR and ISES. The culmination of the process will be a World Solar Summit in Harara, Zimbabwe in March, 1996. This Summit will discuss a World Solar Programme for 1996-2005, consisting of:

- A World Plan of Action with 300 high-priority renewable energy projects,
- Several strategic projects, including a Global Solar Energy Information system, a World Solar Energy Education, and a Training Programme,
- A World Solar Fund to finance the above plan of action and strategic projects (the first-draft proposal for this fund was criticized by Masse Lo, INforSE - West Africa in the March issue of this newsletter),
- A World Solar Charter with guidelines for national activities and networking, and
- An International Solar Convention.

Preparatory to the Solar Summit and the Solar Programme, six "High-level Experts Meetings" are to be held.

WORLD SOLAR SUMMIT PROCESS
1993 - 1995

These include the Mediterranean Conference on Solar Energy in Marrakech, Morocco, October 1995; the Mediterranean Workshop on Renewable Energy, Israel, October 22-25, 1995; the Asian Solar Summit, Kuala Lumpur, Malaysia, January 22-26, 1996; and "Solar Energy in the Russian Federation," Moscow, Russia, March 1996. In addition, a major congress will be convened in 1995 to draft the World Solar Programme. The secretariat of the Solar Summit has invited INforSE to participate in drafting the documents, in developing a round-table on the World Solar Fund, and in organizing regional solar summits. In INforSE, the Solar Summit activities will be coordinated by the Secretariat and by INforSE - West Africa, att. Masse Lo.

Address of World Solar Summit Secretariat: UNESCO Engineering and Technology Division, att. Boris Berkovski & Richard Wyhn, 1 rue Miollis, 75732 Paris Cedex 15, France. Fax:+33-1-4065-9535, ph: +33-1-4568-3900.

UN Conference on Women, with INforSE Participation, Beijing, China, September '95

The fourth United Nations Conference on Women will be held in Beijing, China, September 4-15, 1995. Parallel to this, 30,000 women are expected to gather for the "NGO Forum on Women" in Beijing, August 28 - September 8.

The key issues for these conferences will be livelihoods, economic empowerment, political participation, science & technology, education, health, violence, & human rights. All discussion will be aimed at formulating action plans to improve the status of women. Both INforSE and AFPRO (Action for Food Production, coordinator of INforSE - Central Asia) have received accreditation to participate as observers in the UN conference.

Lalita Balakrishna, INforSE India Coordinator, will participate on behalf of INforSE. In addition, INforSE will be represented at the "NGO Forum on Women" in the Once and Future Pavilion with an exhibition on sustainable energy for social development and with one or more workshops on sustainable energy issues.

AFPRO, a socio-technical development agency, has nominated two women from AFPRO to participate in the UN conference. They will be presenting a case study conducted by AFPRO in its role as a key promoter of biogas technology amongst women.

New UNDP Structure for Sustainable Energy

The Sustainable Energy and Environment Division (SEED)

The Sustainable Energy and Environment Division (SEED) was formed in August, 1994 as part of the UNDP's (United Nations Development Program) Bureau for Policy and Programme Support (BPPS). The new SEED division consists of existing environmental units plus a new unit: The Energy and Atmosphere Program (EAP). The division's new director, Roberto Lenton, took up his assignment in August, 1995. Previously he worked at UNDP in Sri Lanka.

The SEED has 5 units:
1. UNSO, Office to Combat Desertification & Drought
2. Capacity 21, to finance Agenda 21 activities
3. Natural Resources Management (Agriculture & Food Security, Water & Oceans, Forest & Biodiversity)
4. GEF, Global Environment Facility (manages UNDP's part of GEF, including the Small Grants Programme for NGOs).
5. EAP, Energy and Atmosphere Programme

The SEED mission statement, role, plans, and activities are still in preparation. Each of the SEED units prepared draft workplans in March 1995. The plans will be finalised in the Fall.

The Energy & Atmosphere Programme (EAP)

The Energy and Atmosphere Programme (EAP) was established in September, 1994. The unit is headed by Thomas Johansson, previously professor of energy systems analysis, at the University of Lund, Sweden.

One of the reasons establishing of EAP is that however historically, UNDP has had a substantial energy portfolio, no strategy guided the project selection and there were no cosiderable support for sustainable energy projects. EAP incorporates:

- the existing Montreal Protocol Unit (established in 1991),
- the new Energy Unit and,
- a programme on air pollution prevention and clean-up, which will be developed in the near future.

The New Energy Unit of EAP:

Energy Account, FINESSE

The Energy Unit administers the UNDP Energy Account which was established as the channel for specific contributions for energy activities within UNDP in June 1980. Project activities are mainly focused on the identification, formulation and funding of environmentally - sound renewable energy and energy efficiency programmes, including capacity building. These activities are aimed at meeting the basic energy needs of rural communities and on demand-side management in residential, commercial and industrial sectors. Recent activities include FINESSE (Financing Energy Services for Small-Scale Energy-users) projects for Asia and Southern Africa. The FINESSE projects aim to mainstream sustainable energy projects into the lending operations of the multilateral development banks e.g. World Bank.

Advisory Service & Training

In addition, the Energy Unit provides advisory services to UNDP Bureaux (through which it contributed US$ 430 million to 981 energy sector projects since 1974). In the near future, it will fund and organize training workshops on subjects related to sustainable energy development.

UNISE

One of the strategic activities of the Energy Unit is the formulation of UNDP's Initiative for Sustainable Energy (UNISE). It was discussed in the Sustainable Energy News no 9.

UNISE focuses on four key areas: more efficient use of energy and energy-intensive materials, increased use of renewable sources of energy, more efficient production and use of fossil fuels, and fuel substitution from high-carbon to low-carbon based fuels.

New Publication of EAP

In August 1995, EAP issued a new publication, "Energy as an Instrument for Socio-Economic Development", which describes the important links between energy and development and shows how energy can be used in ways that improve people's lives. The conclusion that emerges is that energy use, as practised today, is indeed a serious obstacle to development and to the improvement of living standards. The report makes also clear that strategies and public policies, aimed at improved energy end-use efficiency and increased use of renewable sources of energy, would go a long way in solving the energy problems of developing countries.

Source, more information:
John Vos & Thomas B. Johansson, EAP/SEED/BPPS, UNDP, 304 East 45th Street, New York, NY 10017, USA. Ph: +1-212-906-6639/-5030, Fax: +1-212-906-6947
Email: john.vos or thomas.johansson at@undp.org.; Webpage:http://WWW.undp.org/seed/seed.html.

Front page of the new EAP /UNDP publication: Energy as an Instrument for Socio-Economic Development. Edited by Jose Goldenberg and Thomas B. Johansson, 112p, 1995.

Regional News - Africa

By Lugard Majoro, FWD/AFREPREN, INforSE - East and Southern Africa, Kenya.

Regional INforSE Meeting in September 19, 1995 in Harare after the ISES Conference.

FWD, Foundation for Woodstove Dissemination - Kenya, is currently in the preparation of the regional workshop to be held on September 19, 1995 in Harare. The workshop will launch the regional INforSE study.

The meeting will bring together 6 participants from 6 countries to review the strategies and modalities for implementing the study. This will take place immediately after the International Solar Energy Society (ISES) meeting at the same venue in Harare Zimbabwe.

Energy Sector Rehabilitation in Rwanda

The civil war in Rwanda resulted in major destruction of the infrastructure and loss of human lives. The energy sector was not spared the effects. Machinery was looted or vandalized and qualified personnel either fled the country or in tragic instances, died in the war. There are shortages of virtually all types of fuel and their prices have risen sharply. To provide the basic energy services, repair and replacement of the energy infrastructure as well as recruitment and training of personnel will have to be undertaken.

FWD/AFREPREN in Collaboration with Rwanda's Ministry of Public Works and Energy (MINITRAPE) is conducting a study that will enable the energy sector to prioritize its rehabilitation requirements. This will be accomplished through:

- Data collection and analysis. To date, a report has been compiled on the status of the energy sector and the priority requirements in each sub-sector;
- Capacity building through training;
- Institutional support, and
- Rational energy management.

The energy sector status report giving the initial findings was presented and discussed at a national seminar that was held in Kigali, Rwanda on August 11-14, 1995.

The participants of the seminar were collaborating institutions such as ministries, utilities and NGOs. FWD/AFREPREN was represented by Stephen Karekezi.

Photovoltaics in Kenya

Today more than 1 MW of photovoltaic power has been installed in Kenya. Around 20,000 households have purchased solar energy for their homes compared to the 17,000 or 0.5% connected to the official rural electrification program (REP).

Solar electricity systems are successful despite the taxes and import duties, which, combined, amount to more than 30% of the final price that users pay. In comparison, REP pays a subsidy for each new rural grid-connection.

Competitive Prices

For users with a light load, up to 40 kWh/month, a grid connection and a solar electric system are comparable from a users' point of view. For lighting only, solar power is the more attractive option. The cost of lighting is some 10% lower for the solar electric system than for the grid: 2.0 versus 2.2 Kenya shillings per kilo-lumen-hour (1 kilo-lumen-hour is roughly the light from using 1 kWh electricity in incandescent light-bulbs).

The costs of providing equivalent light from kerosene wick lamps are 10 times higher than that of either the grid or the photovoltaic systems.

The grid and the genset (a small kerosene/petrol generator set) option are capable of satisfying a higher demand for power than the rural users normally have. On the other hand, the solar panels can be purchased at any time if the user wishes to increase electrical output.

Rural households would benefit if the Kenyan Government removed a number of barriers to the solar power market. This would include:

- Change the import duty and tax regime to a more rational one, comparable to that of rural electrification program equipment.
- Implement financing mechanisms for solar electric equipment.
- Apply technical standards to avoid too-frequent equipment failures that have long-term negative effects on the development of the market.

Source: RERIC News, March 1995.

Regional News - Asia

The Green Aspects of the Philippine Energy Plan

By Benjamin Gertes, PCATT and INforSE East Asia & Pacific, Philiphines

Batanges, Philippines

The creation of the Department of Energy (DOE) mandates that the department develop and update the Philippine energy program. There is a need to provide integrated, comprehensive guidelines for the production and utilization of energy, emphasizing the need for environment-friendly, indigenous, and low-cost sources of energy.

However, its thrust to develop and exploit indigenous oil, gas, coal, and geothermal resources, along with the need to construct and operate power facilities, exerts significant stress on the environment. Therefore, environmental issues continue to affect energy development efforts.

Basic environmental issues include:

- Absence of clear-cut criteria for social acceptability
- Implementation of stringent environmental standards;
- Lack of local experience with tested and economically viable technology;
- General misconceptions of the impacts of energy projects.

Environmental Impact Analysis

DOE adopted the use of the Environmental Impact Analysis (EIA) to address the above- mentioned concerns. It also will be used to maintain and enhance environmental quality in the implementation of energy programs.

An initial evaluation indicated that very few current major development projects complied with EIA requirements. The EIA system is composed of three phases, and calls for an Environmental Impact Statement/Study (EIS/S). This is a detailed analysis of the environmental consequences of the project, a key criterion for granting an Environmental Compliance Certificate.

The Three Phases for EIA

In the pre-study phase, the project proponent cooperates with the environmental authorities to determine whether EIA is appropriate for the project and establishes the information requirement for the EIS/S study. The EIA is required for heavy industries e..g., petroleum industries, resource-extraction industries, and major infrastructure projects like power plants and dams. It is required, as well, for all projects in 12 types of environmentally critical areas.

In the study phase, the proponent predicts and quantifies the direct and indirect impacts of the project on human welfare and on environmental integrity. The proponent also identifies and assesses mitigating measures as well as alternatives to the project.

In the post-study phase, the EIS/S Review Committee assesses the study. This Committee is a multidisciplinary group of consultants from academia, the private sector, private consultancy groups, and government agencies. There may also be a public hearing. After this, the environmental authorities can issue an Environmental Compliance Certificate if the project proponent properly addressed the environmental issues in the study. This certifies that the project will have minimal environmental effects and complies with the EIA system. Following this, the environmental authorities monitor the project for compliance with regulations.

The EIA provides policy makers, planners, affected groups, and government agencies with a means of assessing the implications of project proposals and make the necessary decisions and actions.

Alternatives Replace Arun III Dam

The World Bank has decided not to proceed with plans to support the Arun III hydropower project in Nepal. Following this, the Bank and the government of Nepal have agreed to work expeditiously to develop alternative approaches to meet Nepal's energy needs.

The Arun III project was abandoned for three primary reasons:

- it would entail increases in electricity prices;
- there is limited institutional capacity in Nepal to solve the problems related to the project; and
- there were intractable difficulties with partly funding from sources other than the World Bank.

The Arun III project was criticized earlier by NGOs in Nepal by way of the Arun Concerned Group. They have serious complaints about the lack of public access to related information and about failure to include the public sufficiently in project preparation, and feared that the dam would pose serious problems for the development of Nepal.

Sources: World Bank News, August 10, 1995 and The World Bank & Nepal's Arun III Project: A Case Study of Anti-Social Development by the Arun Concerned Group/INHURED, Kathmandu, Nepal.

Narmada River Dam

In India, the Sardar Sarovar Dam on the Narmada river has been increased by 11 meters to 80.3 m in 1995.

Thousands of people and 1500 houses were submerged this year in addition to those that were submerged in the previous years. To make things worse, some of the people that were resettled by the project in the last 5 years has moved back because the land they were given for resettling was very bad and could not sustain their lives.

The bad situation for the affected people, both those that were resettled and those that stayed, has resulted in several protests, a camp at the Narmada river with hundreds of people whose slogan is, "we will drown, but not move", as well as a demonstration

Continues next page

Regional News - Asia

in Baroda, Gujarat by 400 resettled people, who are representing thousands of unsatisfied displaced residents who were poorly resettled in Gujarat.

The dam is under evaluation by the Supreme Court of India, which is reviewing a case on the continuation of the project, and by a Review Team commissioned by the Indian Prime Minister Narasimha Rao. The Review Team was set up as a result of a 49-day hunger-strike by the Indian environmentalist Mr. Bahaguna, which ended on June 27.

Information: International Rivers Network (email:patrickirn@igc.apc.org) & Narmada Bachao Andolan.

Sustainable Energy NGO Network Created in Vietnam

VSED, a Vietnamese Support Program for Sustainable Energy Development, was set up in May, 1995.

VSED is a NGO network with voluntary participation of organisations, institutions and individuals in Vietnam, who are working in the fields of renewable energy, energy conservation, and efficiency. VSED was set up by the Vietnam Union of Science and Technology Association (VUSTA). The present network includes the 12 main research and technical institutes working on the sustainable energy area in Vietnam.

VSED works in the areas of practical implementation, supporting development, exchange of information, and formulation of strategies and policies. It organises training courses, seminars, and workshops, and it seeks technical as well as financial support for developing projects.

More info: Nguyen Thuong, VSED coordinator, C/O Ministry of Science, Technology & Development, 39 Tran hung Dao Str. Hanoi, Vietnam. Phlfax: 84-4-261843/-252733.

Regional News - Latin America

Brasilia Meeting & Statement

The Brazilian INforSE organizations decided to take an active part in the "2nd Brasilia Meeting for Development of Solar, Wind and Biomass" in Brasilia, Brazil, June 5-9, 1995. (See SEN no. 9). They joined the organiser 'Permanent Forum of Solar and Wind Energy', which is constituted of both governmental and non-governmental organizations.

The main output of the Brasilia Meeting was the Brasilia Statement signed by 313 participants from over 100 institutions. It updates and enlarges the Belo Horizonte Statement with the proposal of 14 programs to reach commonly agreed targets for solar, wind, and biomass energy development in Brazil by the year 2005.

The Programs suggested were:

1. Incentives to substitute renewables for fossil fuels in remote energy systems
2. Incentives for complementary power generation from solar, wind and biomass energy by independent producers and utilities
3. Sustainable development of the Amazon region based upon biomass resources
4. Use of solar energy in the residential sector
5. Use of renewables for irrigation and energy supply to small rural producers
6. Temporary exemption from taxes for renewables (equipment and energy generated)
7. Higher priority for the use of renewables in public works and buildings
8. Energy development of states and municipalities
9. Scientific, technological, and industrial development of renewables
10. Education and training on the subject of renewables
11. Inventory of Brazilian solar, wind, and biomass energy potentials
12 Development of multi-purpose forests
13. Use of biomass fuels for transportation in selected regions: blending and replacement of petroleum products
14. Integrated systems for sustainable development: production of food, energy, and industrial feedstock

Guidelines for the execution of these programs were established in different fields: political, legal, administrative, industrial, technological, financial, fiscal, training of human resources, and information diffusion.

It is expected that the appropriate implementation of the 14 programs under these guidelines will meet the following targets by 2005:

- 50 MW of installed capacity in photovoltaics
- 3 million m^2 of thermal solar collector surface
- 1,000 MW of installed capacity of wind-power generation
- 3,000 MW of installed capacity of co-generation from sugar-cane bagasse
- 1,000 MW of installed capacity of co-generation from wastes in the pulp and paper industry
- 250 MW of installed capacity in small power generation systems using vegetable oils as a fuel
- 12 million tons of charcoal production, with all the increase from the present level (around 10 million tons/year) being met by renewable feedstock
- 18 billion liters/year of ethanol production to run vehicles
- 20 million liters/year produced of vegetable oils used in transportation
- 3 million hectares of additional surface of reforestation projects

More Information: Ana Lucia Nadalutti La Rovere and Emilio Lebre La Rovere, IED, INforSE-Latin America.

Regional News - Europe

European Sustainable Energy Seminar in Budmerice, Slovakia

INforSE - Europe was co-organizer of this seminar, which brought NGOs from 13 countries together on June 19-24. Thanks to the Association of Slovak Writers, it was possible to hold the seminar in the nice, old Budmerice Kastiel.

Highest on the agenda was cooperation among the three networks INforSE - Europe, Climate Network Europe, and Greenway Energy Group. The Central and Eastern European organizations decided to collaborate on three projects:

- compare the energy situation and policies of CEE countries,
- work together to generate new information material to raise general awareness of sustainable energy,
- develop a network of information centers with up-to-date information on technical and political aspects of sustainable energy.

These activities replace the previous ideas of a secretariat with full-time staff for the Greenway Energy Group. In addition to these CEE activities, the activities of INforSE were generally supported, notably the new project on assessing renewable energy in CEE countries and the new INforSE - Europe exhibition that was presented at the seminar.

The seminar included a number of exciting lecturers like the presentations of Freda Meissner-Blau and Paul Blau both of whom played a central role in the Austrian decision to change its energy plans from the use of nuclear power to more sustainable sources.

INforSE - Europe Meeting

At the end of the European Sustainable Energy Seminar, the 4th annual meeting of INforSE Europe was held. During the meeting, the action plan of INforSE - Europe 1995-96 was discussed and approved together with a budget for 1995-96. Some of the points of the action plan are:

- The project to develop a tool for Central and Eastern European NGOs for assessing renewable energy potentials is supported by INforSE-Europe (see Sustainable Energy News no. 9),
- A project shall be started to identify barriers against sustainable energy solutions, and to generate proposals to overcome the barriers. (A proposal has been given to the EU Thermie program to fund this project.)
- The INforSE-Europe poster exhibition displaying sustainable energy solutions shall be used throughout Central and Eastern Europe. 10 additional posters will be made. Two extra copies will be made of the exhibition.

INforSE-Europe organizations shall be involved in the preparations of and participation in the Urban Ecology Conference "The City as an Organism", Copenhagen, Denmark, July 1996. INforSE organizations are invited to give inputs and to propose speakers for the conference.

- INforSE-Europe supports the Central and Eastern European (CEE) projects developed at the European Sustainable Energy Seminar (see above)
- The Campaign on Sustainable Energy, Employment and Social Development will continue in the coming year. Through the campaign activities, the network will give inputs to the European Environmental Conference in Sofia in the Fall of 1995. During the year, one or more roundtables will be held, presenting and discussing the campaign theme.
- Lobbying international organizations
- Cooperation with other INforSE regions, including preparation of INforSE inputs for UNESCO Solar Summit.
- INforSE-Europe supports the Chernobyl + 10 years campaign and will coordinate its activities with the activities of the campaign.
- An organization eligible for the coming INforSE Award shall be identified.

The meeting finished with the re-election of the two INforSE-Europe coordinators: Foundation for Alternative Energy, att. Emil Bedi, Slovakia and OVE, The Danish Organization for Renewable Energy, att. Gunnar Boye Olesen.

Chernobyl + 10 Years

The 10-year anniversary of the Chernobyl disaster will be marked with a large campaign against nuclear power in Central & Eastern Europe (CEE). The campaign will include documentation on the energy situation in CEE countries, a large conference in Kiev on the anniversary week around April 26, 1996, an exhibition on sustainable energy that will be shown in 10 Ukrainian cities, and a number of other actions. The documentation will be published as book by Öko-Institut in Berlin. The conference will sum up the consequences of Chernobyl, discuss radiation protection, and plans to present alternatives to nuclear power. The exhibition will use the moblile sustainable energy exhibition trailer decribed in earlier issues of this newsletter.

For more information, contributions to the documentation and participation in the campaign, please contact: SNEEZE, att. Paxus Calta, c/o Hnuti Duha, Jakubské Nam. 7, 60200 Brno, Czech Republic. Phlfax: +42-5-4221-0438/-0347. email: sneez@ecn.gn.apc.org.

Renewable Energy Gets a Start in Mongolia via Super-Insulating Straw Houses

By Scott Christiansen, ADRA, Mongolia

The Adventist Development and Relief Agency (ADRA), an international NGO operating in 92 countries, recently introduced super-insulating, inexpensive plastered straw-bale houses to Mongolia in an effort likely to be copied widely.

Mongolia is rich in renewable energy potential, with almost 300 sunny days each year and a great deal of wind in most seasons. Yet, Mongolia makes little or no use of renewable energy at this time. Settled areas in Mongolia, including the three large cities, were centrally planned according to the Siberian model, including massive central coal-burning steam plants.

Now, that the Soviets and their huge annual subsidy are part of history, the Mongolian infrastructure is breaking down and schools, hospitals and other institutions are often going without heat during the long, -40 °C Mongolian winters. In looking at the energy and infrastructure problem, ADRA decided that its first step should be to introduce the use of low-cost insulation to the country, as the only insulation currently in use is bricks in institutional buildings and about 2 cm of felt in the tent-like gers (ger is the Mongolian name for yurt) that are used for most housing situations. Families who live in gers often spend as much as 60% of their income on heating fuel (coal, wood, etc.).

The material of choice for ADRA was straw-bales: they are produced locally, are very inexpensive, are virtually fire-proof and insect-proof when plastered, and have an insulation value of R-50+. Plastered straw-bale building techniques originated in the Canadian and American plain regions about 100 years ago. Many buildings from that era are still in use.

In an effort to gain the widest possible dissemination and use of the building technique within Mongolia, ADRA worked closely with the Mongolian Ministry of Infrastructure to have straw-bale buildings approved at the national level. American straw-bale architect, Bob Theis, was instrumental in this phase of the project.

The project culminated in the building of two straw-bale houses with load-bearing walls. Only the roof and floor required wood, though straw-bale infill was used in both floor and ceiling to make a super-insulated R-50 "box" (U-value of 0,104 W/m^2 °C)*. There were many technical difficulties that straw-bale consultants Matts Myhrman and Steve MacDonald overcame. Mongolian bales turned out to be loosely baled and needed to be re-compressed by hand; there was no chicken wire in Mongolia to use as a plaster net over the bales, etc.,.

The houses have walls 85 cm thick including 10 cm of plaster that gives the walls an estimated R-value of near 60 (U-value of 0,095 W/m^2 °C) *. Though three times the size of a ger, the houses should require only about 10% of the fuel a ger requires - and it is cheaper to build a straw-bale house than it is to buy a new ger. A one-hour television special was broadcast on Mongolian National Television about the building project and reports of plans to build straw-bale structures are coming in from all over the country.

Straw-bales structures and the super-insulation they employ are important to renewable energy efforts in Mongolia because they make it possible to use structures with much lower energy inputs than is otherwise possible. ADRA plans to find the funding to build a post-and-beam structure with straw-bale infill. Such a structure does not have the size limitations that are inherent with load-bearing straw walls. Such buildings can inexpensively replace cold and crumbling clinics and schools at a price the Mongolians can afford. Most important, such buildings can function quite well using passive solar and PV systems.

Mongolia is at a cross roads in terms of resource utilization. The choice to continue burning massive amounts of coal and virgin forests, or to use renewable energy in significant amounts, is made each time a house is built, each time a new facility is designed or an existing one repaired.

During construction - the super-insulating straw-house in Mongolia.
Photo:ADRA.

More information: Scott Christiansen, ADRA, P.O. Box 1038, Ulaan Baatar 210613, Mongolia. Ph/fax: +976-1-323086, e-mail: adramon@Magicnet.mn. ADRA is an NGO interested in PV, passive solar, super-insulation.

**) Note of Lars Yde techn. editor.*

AFPRO and the Indian Biogas Development

Inspection at the Deen Bandhu plant at Aligarh 250 km east of New Delhi. Photos: Folkecenter for Renewable Energy, Denmark

By Preben Maegaard, Folkecenter for Renewable Energy, Denmark

India is known for the world's most ambitious biogas programmes. An important actor in this field is AFPRO (Action for Food Production), which has been involved in 70,000 of the 2 million Indian biogas plants. The biogas plants of AFPRO are developed by its dynamic leader, Raymond Myles, who has been executive director for AFPRO for several years. AFPRO's plants are known as DEEN BANDHU Biogas Plants (Hindi for "friend of the poor"), and they are developed from the classical Indian types that have such names as Khasi and Village Industries (KVIC), Janata, Gobar, etc. All the plants are underground and function naturally without the heating and insulation that are necessary for biogas plants in temperate climates. In India, the soil temperature is always 20-25°C, which is enough for the biogas process.

The Indian biogas plants are family size plants of 2 m^3. 3 or 4 cows plus the humans in a family produce enough waste to feed into the biogas plant to produce 2 m^3 of gas per day. This is enough to supply a family with fuel for cooking. Often, the gas is also used for a gas lamp or maybe for a gas-driven refrigerator, which, however, only is seen in the homes of wealthier biogas-plant owners.

Biogas History in India

Already, by 1937, India had started to use biogas. It became a tool for Gandhi in his fight to make India independent of the imperial power. Many village industries were created to generate new employment, income for the villages, and an independent agricultural economy. One of the companies supported by Gandhi was KVIC, which, in addition to manufacturing biogas plants, was a driving force for many other products and village industries, and was an important factor in India for decades.

After the attainment of independence in 1948, biogas development got a new push ahead. A research station was created, the Gobar Gas Research Station. Its leader, Ram Bux Singh, was an important person in the development of biogas, first gaining expertise in India over a period of 25 years. Later, in the late 70's, he broad-

The base of the cow dung tank. Soil temperature is always 20 - 25 °C which is enough for the process.

Cement and bricks with plaster inside. Bricks can be replaced with weaved bamboo and cement.

ened his experiences to include projects in the USA, Iran, Denmark, and other places. In 1978, he spent six months at the Folkecenter for Renewable Energy in Denmark and was an invaluable source of inspiration.

Biogas development in India has concentrated on underground plants for single families. Even though the changes are not very visible from outside, the technical development of the types has been immense. The types with a gas-container of steel are not used any longer; the typical modern Indian biogas plant is a brick or cement construction with the gas storage built into the plant. A gas storage tank of steel, even priced below 100 US$, makes the plant too expensive, and it rusts too quickly.

Why Biogas?

Biogas in India is a simple element in a sustainable organic farm. The cow dung has always been collected and dried to be used as fuel in the kitchens, but, in the process, the nitrogen is lost. With biogas, it was possible to raise agricultural production without importing expensive artificial fertilizer. In addition, Indian families got a clean and pleasant fuel that also improved working conditions in the home.

It is said that an Indian housewife, if she uses cow dung as kitchen fuel, inhales smoke similar to smoking 20 packs of cigarettes per day. The result of this is respiratory diseases, eye diseases, and other illnesses. Along with increased agricultural production and improved health conditions, biogas plants produce a fuel as convenient as propane gas and other fossil fuels.

AFPRO is the center for 100 local organizations that promote rural development, working for better water supplies, agricultural programmes, use of biogas, and other projects. AFPRO has 400 employees throughout India. The developing programmes are supported by Canada, Holland, and Germany. Church organizations, especially, support AFPRO. Each local AFPRO office has a leader and technical consultants who train local craftsmen in construction of biogas plants. For transportation, the local office has a motorbike. The staff members do their work in the countryside, where many millions of Indians live, and where cars cannot go. Therefore, the biogas program of India has not been of much interest to rich countries' official development assistance programs.

Training of local instructors takes place at AFPRO's modern training center in Aligarh, 250 km east of Delhi. Here, it is possible to follow the construction of a biogas plant in all its phases in a very concrete and instructive way from the hole that is dug out to the building of the walls and the final dome, which is the gas storage.

The Deen Bandhu plant is built of bricks and cement-mortar. It is plastered inside, which makes it tight. A new, untraditional version has just been developed by Raymond Myles. The bricks are replaced with a weaving of bamboo that is the reinforcement in a wood-cement construction. The construction has convincing benefits. The costs of the bricks are about half of the 250 US$ that a plant costs. Further, the bricks require transport and coal to burn them. Bamboo can be grown locally and can be woven together locally under appropriate guidance. The normal AFPRO biogas plant is already one of the cheapest in India. With the new construction, the price is reduced to about 180 US$. The lower price makes more families able to afford a biogas plant, which increases living standards and makes it more attractive to stay in the countryside.

With the new technology, it is no longer necessary to use bricks and steel. Only some sacks of cement must be delivered from outside. Even the tubes are made locally. A normal PVC plastic tube is used as a mould for the cement casting. When the cement is dry, the plastic tube is removed and can be re-used elsewhere. The local master mason and his two helpers build the biogas plant in three weeks, including digging out the hole. The bill for the working hours is 80 US$. A tube is laid that runs into the kitchen, where the gas cookers are placed. Then, the plant is ready to use. The local extension office instructs the family in the correct handling of the biogas plant, for security reasons and to maintain good, stable production of biogas.

Translated by the editors.

Community solar PV system Polynesia, Pacific.

Photo:Pene Lefale.

Climate Change and Renewable Energy - the Pacific Way

By Rene Karottki, Secretary General, Forum for Energy and Development, and INforSE-Secretary. Rene Karottki visited the South Pacific in July - August of 1995.

The environmental and socio-economic constraints of Small Island Developing States (SIDS) have been discussed at a number of major international conferences over the past few years.

The SIDS reports to these events have painted a rather gloomy picture of small island countries, which are subject to the devastating impacts of global warming, as well as to the constraints caused by remoteness and small sizes.

Visiting small island states in the Pacific confirms these reports. Coastal erosion and coral bleaching, as well as the increased number and intensity of tropical cyclones, are just a few visible impacts of climate change.

Electricity from Diesel - a Headache for National Budgets

An important problem relates to production and consumption of electricity. Due to remoteness and small economies, production costs in Pacific SIDS average US Cents 20 per kWh, appr. 4 times higher than the average costs of electricity known in industrialised countries. On many smaller 'outer islands', production costs reach US Cents 100 per kWh.

In most places, electricity tariffs do not reflect these costs. The average revenues from sales of electricity are about US Cents 16 per kWh, often with a fixed tariff independent of location. End-users are heavily subsidised, with the largest subsidies going to the outer islands.

These subsidies are a burden on national budgets. Justified as they are on economic development and social grounds, it is politically difficult for the governments and the power corporations to let tariffs reflect true production and distribution costs. Consequently, most of these governments should be keen on reducing electricity consumption at the end-user level by promoting energy efficiency and introduce mature renewable energy systems that often can compete successfully with diesel fuels.

In addition to the purely economic considerations there is a political agenda as well, related to the International Climate Negotiations. Even though the SIDS emissions of greenhouse gases, such as CO^2, are insignificant on a global scale, a sustainable energy policy reducing those emissions and showing the world that the SIDS themselves are moving along the way, they want the industrialised countries to take, will give the SIDS more leverage in future negotiation processes.

Renewable Energy - Failures and Successes

In the 1980's many donors were active in funding renewable energy projects, including biomass and photovoltaics.

Unfortunately, most of the projects failed, because they were narrowly technology-oriented, and did not address the crucial institutional aspects.

Most of the technologies were unproven, and were spread out over a large number of countries and islands. Since pilot technologies need a close hand in operation and monitoring, the lack of organisational back-up was disastrous. They imposed on the governments costs that exceeded the benefits, and consequently created a lot of resentment towards renewables.(1)

In addition, the donor organisations became sceptical of the viability of renewables in substituting as replacements for diesel fuels in power generation.(2)

The trial-and-error process with photovoltaics in the 1980's revealed problems with inappropriate designs, unreliable components, improper installations, and poor maintenance. On the other hand, these experiences led to improvements in the technologies. Decentralised Solar Home Systems (SHS), comprising PV panels, batteries, and controller, can now be regarded as a mature technology.

According to a recent World Bank report (3), SHS are now competitive in narrow economic terms with stand-

alone diesel systems, considering the full life-cycle costs, provided that diesel generation costs are in the range of US Cents 50-65 per kWh, as on many outer islands.

Another, even more important, development has taken place on the institutional side. One particularly interesting case is the Tuvalu Solar Electric Cooperative Society (TSECS), formed in 1984 as a commercial enterprise with the objective of providing electricity to outer islands.

The end-users are shareholders in the TSECS and are represented through an elected island "Branch Committee" and through a national "Management Committee" whose members are the chairmen of the island committees. The Management Committee acts as the board of directors, led by a Chairman, and is responsible for policy, annual reviews, and the setting of monthly fees.(4)

After several years of trial and error, TSECS is now providing reliable electricity to 415 households on the outer islands, equivalent to 42% of outer islands' households, with another 180 households on request.

TSECS now provides electricity to as many households as does the diesel utility, the Tuvalu Electricity Corporation. TSECS employs on each island a local technician, who is responsible for a monthly technical check-up and for fee collection. The installations are owned by TSECS, not by the users, thus providing flexibility and the ability to change or upgrade systems without user investment. The end-users (and shareholders) pay an initial entrance fee of USD 40 and a monthly fee of USD 5 for a single panel system and USD 6.1 for a two-panel system. Whereas the investment costs are provided by international donors, the running costs (including battery replacement after 5-7 years and the salary of a technician on each island) are recovered via the fees. Over time, the fees may also be sufficient to replace the PV-panels, which may have a lifetime of 20-25 years.

The Tuvalu experience, together with similar experiences from countries such as Kiribati (where the PV-systems are owned and maintained by the utilities), clearly shows, that the Pacific has come a long way in addressing one of the key problems related to decentralised off-grid electrification.

In the Pacific context, PV-systems for households can thus be regarded as a mature technology that is ready for dissemination on non-electrified islands and to rural areas outside of the grid.

Renewables on Diesel Grids

In many Pacific Island Developing States, a large share of the population is connected to a diesel grid. In these countries, grid-connected renewables, used to replace diesel for demand on the power stations, may be even more attractive than off-grid applications.

This may be a future avenue for PV systems that could be feasible on islands, where the present generation costs are excessive. Apart from the diesel savings, grid-connected PV, as an alternative to individual systems, could also address the problem for the end-user of being forced to use low-voltage appliances.

Other mature renewable energy systems may be even more promising in the short term. Some experience already exists with hydro power stations. A number of micro hydro installations are planned. Biomass for electricity generation (mainly gasifiers and steam power generation from bagasse) has also been tested. The experiences are mixed, and the problems are mainly related to financial and institutional issues.

The potential of grid-connected wind turbines has not been considered systematically in the Pacific. The Forum Secretariat recently initiated a wind energy data collection program on Cook Islands, Niue, Fiji, Tonga, and Vanuatu, where the wind speeds seem promising. Some time is still needed before there are sufficient data for evaluation. Given the diesel generation costs of from 15 up to US Cents 100 per kWh, even a medium annual average wind speed of, e.g., 6 m/s could make wind power feasible. On larger islands, grid-connected wind turbines can operate just as they do now in, e.g., Europe and the US. In addition, recent experience from small island grids indicates that up to 50 % of the power could be supplied from wind turbines, using standard components and control systems.

A New Era for Renewables?

Since diesel generation costs remain high, the availability of mature solar, biomass, hydro, and wind power technologies may open up a new era for renewable energy in the Pacific. The fragile economies of the small island states still call for donor involvement, e.g., in providing capital on soft loan terms as well as assistance in institution building and in training.

The Pacific area is important on a global scale. Some small islands already have 100 % coverage with electricity from solar energy. Within the short- to medium term, many more small- and medium-sized islands could have a large share of their electricity from renewables. The technical, institutional, and financial experiences from this development will be very important for other regions of the world, where renewables have an increasing potential as the costs of renewables, such as PV-panels, decline in the future.

The Pacific Island States may be among the first regions in the world to demonstrate how a modern society can be based on renewable sources of energy. As such, they will also be able to maintain and strengthen their role as forerunners in, e.g., global climate negotiations.

1. An evaluation of the European Community's Lome II Pacific Regional Energy Programme. Final report, August 1994 Prepared by Peter C. Johnston for the Energy Division, South Pacific Forum Secretariat, Fiji.

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This first resource pack of 3 includes 40 A2 size posters, a guide to 700 publications on disk. Every school of architecture in the EU will receive 1 of the 3 packs free of charge.
By Energy Research Group, School of Architecture, University College Dublin.
Contact: James and James Science Publisher Ltd., Waterside House, 47 Kentisch Town Road, London NW1 8NZ, UK. Ph/fax: 44-1712843-833/-737.

Renewble Energy Systems
Handbook guiding in the commercially available PV, solar water heating, small wind generating systems. Product specifications, schematic design, photographs, installation details. Simple do-it-youself methods for assessing system specific environmental benefits by calculating avoided emissions of greenhouse gases and acid rain precursors.
Published by Interstate Renewable Energy Council. 135p.
Contact: Vicki Mastaitis, New York State Energy Office, Agency Building 2, Empire State Plaza, Albany, New York 12223, USA. Ph/fax: 1-518-473-5577/-8687.

Vital Signs 1995: The trends that are shaping our future.
The world growing warmer, more crowded, and less stable. Negative trends outnumber positive ones. Tracking key indicators on 10 areas. More than 100 graphs and tables, accompanied by concise analysis. Data from graphs, tables available on disk.
By Lester R. Brown, Nicholas Lenssen, Hal Kane. 175p, 1995.
Contact: Jim Perry, World Watch Institute, 1776 Massachusetts Ave., NW, Washington, DC 20036-1904, USA. Ph/fax: 1-202-4521999/-2967365.

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Contact: Foundation for Alternative Energy, FAE-SZOPK, Gorkeho 6, 81101 Bratislava, Slovakia. Ph/fax: 427-364665.

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Easy to understand material with key data colourful charts.
By Robert Engelman, Population and Environment Program, 47p, 1994.
Contact: Population Action International, 1120 19th Street, NW Suite 550, Washington DC 20036. Ph/fax: 1-202-6591833/-2931795, Email: popact@igc.org.

Environmental Indicators:
Systematic approach to measuring and reporting on environmental policy performance in the context of sustainable development. Information pyramid, matrixes of indicators, composite indices. Two case studies how indicators influence action.
By Allen Hammond, Albert Adriaanse et.al. $13.50 plus shipping 45p, 1995.

Keeping it Green: Tropical Forestry Opportunities for Mitigating Climate Change
By Mark C. Texler, Christine Haugen, 52p, 1995
Contact: WRI, World Resource Institute, 1709 New York Avenue, NW, Washington DC. 20006. Ph/fax: 1-202-638-6300/-0036.

Production and Use of Plant Oil as Fuel in Mali
Intermediate report of the project.
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Contact: Project Pourghere, DNHE-GTZ, BP 134, Bamako, Mali. Ph/fax: 223-227-803/-184.

Energy Policy in the Greenhouse Volume II Part 3D: Renewable Power
The Cost and Potential of Conventional and Low Carbon Electricity Options in Western Europe.
By Florentine Krause, Jonathan Koomey et.al. 133p, $50 /discount for non-OECD countries, 1995.
Contact: IPSEP, 7627 Levistone Ave, El Cerrito, CA 94530, Ph/fax: 1-510-525-7530/-4446.

Motors as Generators for Micro-Hydro Power
By Nigel Smith 82p A5, 1995, $9.50.

Pumps as Turbines, A user's guide
By Arthur Williams, 58p A5, 1995, $9.50.
Contact: IT Publications Ltd, 103-105 Southampton Row, London WC1B 4HH, UK. Ph/fax: +44-71-436-9761/-2013.

Partnership for the Planet: An Environmental Agenda for the United Nations
World Watch Paper 126.
By Hilary French, 71p A5, $5, 1995.
Contact: Jim Perry, 1776 Massachusetts Ave.,NW ,Washington DC 20036, USA. Ph/fax: +1-202-4521999/-2967365.

Periodicals

Biomass News
Newsletter of the European Biomass Association
Contact: Denis Savanne, ADAME, Scientific Directorate, 27 rue Louis Vicat, 75737, Paris Cedex 15, France. Ph/fax: +33-1-47652391/-40957453.

Greenway Energy Review
First issue April 1995. Focus on Slovakia, Energy Efficiency in the Czech Republic, Press cuttings, Book Stall. Free.
Contact: Foundation for Alternative Energy, FAE-SZOPK, Gorkeho 6, 81101 Bratislava, Slovakia. Ph/fax: 427-364665.

GO Between, UN News
Newsletter for NGOs on the UN activities. Free.
Contact: United Nations Non-Governmental Liaison Service, Palais des Nations, 1211, Geneva 10, Switzerland. Fax. +41-22-788-7366

Built Environment
Quarterly Newsletter, Free.
Contact: Sumita Gupta, Centre for Built Envieonment 2/5 Sarat Bose Road, Calcutta 700 020 India. Ph/fax: -745424/-943333.

Greenline
For a leafy green future, 10 issues/year for £10.
Contact: PO Box 5, Lostwithiel Cornwall, PL22 0YT, UK. Ph: 1726-850500.

EcoExpress
Bimonthly newsletter. Bilingual. Info on the env. movement in Ukraine.
By a new Ukrainian NGO Network EcoMissia. $10/year. The English version exist on E-mail.
Contact: Unicom, PO Box 429, 254060, Kiev-60, Ukraine. Ph/fax: +38-044-4423171/-440-3017. Email:unicom@envinet.kiev.ua.

Events

*** INforSE Campaign activities**

*September 9-19, 1995**
ISES Solar World Congress '95, In Search of the Sun, Harare, Zimbabwe
With workshop of INforSE-Eastern & Southern Africa. See page No. 5.
Info: PO.Box 2851, Harare, Zimbabwe. Ph/fax: +2634-730-707/-700, and INforSE-Eastern & Southern Africa.

October 2-4, 1995
Int. Conf. on Engineering and Urban Sustainability Beyond 2000, Budapest, Hungary
Info: P.Steingaszner, WEPSD, c/o Conference Tours, Garibaldi u. 1, H-1054 Budapest Hungary. Ph/fax: +36-1-1329999/-1117428.

October 9-12, 1995
Water & Energy 2001, Int. R&D Conf. New Delhi, India
Info: C.V.J.Varma, CBI&P Malcha Marg, Chanakyapuri, New Delhi-110021, India. Ph/fax: +91-11-301-5984/-6347, Email: cbip@cbip-del.uunet.in.

October 10-12, 1995
4th Int. Energy Efficiency & DSM Conference "The Global Challenge", Berlin, Germany
Info: J. Appel, Synergic Resources Corporation, 11 Presidential Boulevard, Suite 127, Bala Cynwyd, PA 19004-1008, USA. Ph/fax: +1-610-667-2160/-3047.

October 17-19, 1995
Energy Efficiency Business Week, 4th Int Conf. & Exhibition, Prague, Czech Republic
Info: SEVEn, Slezska 7, 120 56 Prague 2 Czech Republic. Ph/fax: +42-2-242475-52/-97. Email:seven@ecn.gn.apc.org.

*October 23-25, 1995**
European Environmental Ministers Meeting, Sofia, Bulgaria
Info: National Ministries of Environment
NGO parallel conference. see page: 9.

October 23-27, 1995
13th European PV Solar Energy Conf. & Exhib. Nice, France
Info: WIP, Sylvensteinstr 2, D-81369 München, Germany. Ph: +49-897-2012-32/-91.

November 8-10, 1995
2nd European Wave Power Conference - Lisbon, Portugal
Info: G. Elliot, NEL, Nasmyth Avenue, East Kilbride, Glasgow, G75 OQR, UK. Ph/fax: +44-1355272-079/-333.

November 13-15, 1995
5th Int. Conference on Environment & Sustainable Development in the Baltic Region, Nyköping, Sweden
Info: Jan Magnusson, Centre for Research on Natural Resources & the Environment, Stockholm University, S-10691 Stockholm, Sweden. Ph/fax: +468-161777/-158417, Email:janm@system.ecology.su.se.

November 20-24, 1995
Int. Africa Conf.: Sustainable Energy for Development, Maputo-Mozambique
Languages: English and Portuguese.
Info: Jose de Abreau, AITP, Av. Amilcar Cabral 212, PO Box 1574, maputo, Mozambique. Ph/fax: +2581-4759-38/40.

November 22-23, 1995
Int. Forum on Energy Management in Buildings and Cities, BATITEC'95 Trade Fair, Lausanne, Switzerland
Info: EE2000, UN Economic Commission for Europe, Palais des Nations 1211 Geneva, Switzerland. Ph/fax: +41-22-917-1234/-0227.

November 20-24, 1995
Int. Symposium: Energy, Env., Economics, Victoria, Australia
Info: Faculty of Engineering, University of Melbourne, Parkville, Australia, 3052.

November 28-30, 1995
Indoor Climate of Buildings, High Tatra, Strbske pleso, Slovakia
6th Int. Conf. on Health & Comfort vs Energy Conservation,
Info: Dusan Petras, SSTP, Kocelova 15, 815 94 Bratislava, Slovak Republic. Ph/fax:+42-736-2586/-1137.

December 4-8, 1995
China Resources Recycling '95, Beijing, China
Int. Equipment & Techniques Exhib.
Contact: Elaine Wong, Business & Industrial Trade Fairs Ltd., 18/F First Pacific Bank Centre, 56 Gloucester Road, Wanchai Hong Kong. Ph/fax: +852-286-52633/-61770.

December 5-7, 1995
Energy and Environment, Marseilles, France
European Conference and Exhibition
Info: Philippe Jacqué, SAFIM, Parc Chanot, BP2, 13266 Marseille Cedex 8, France. Ph/fax: +33 91-761600/-221645.

December 15-16, 1995
Eurpean Summit Alternative Forum, Madrid
Info: Aedenat, Campomanes, 13, E-28013, Madrid, Spain. Ph/fax: +34-1-5590334/-5717108.

January 8-12, 1996
3rd Int. Eco-City Conference, Dakar Senegal
Info: Ecovillage at Ithaka, Anabel Taylor Hall, Cornell University, Ithaka N.Y. 14853. Email: ecovillage@cornell.edu.

January 22-24, 1996
2nd Int. Renewable Energy, South Asia '96 Conference, New Delhi, India
Focus on marketing, financing.
Contact: Cassy Kurtzman, Alternative Development Asia Ltd. 5F, 3 Wood Road, Wanchai, Hong Kong. Ph/fax: +852-2574-9133/-1997, Email: mcseym@hk.super.net.

March 4-7, 1996
Afro-Asian, Kathmandu, Nepal
3rd Int. Conf. on Power Development
Contact: C.V.J. Varma, See at event October 9-12.

June 3-7, 1996
Energex '96, Beijing, China*
The 6th Int. Energy Conf. & Exhib.
Info: Meng Xiangan, China Solar Energy Society, 3 Huayuan Road, Beijing 100083, China. Ph/fax: +86-1-201-7009/-2880.

*June 3-14, 1996**
Habitat II UN Conference on Human Settlements, Istanbul, Turkey
Info: UN Centre for Human Settlements, Room DC2-0943, United Nations, New York, NY 10017, USA. Fax: +1-212-963-8721.

June 15-21, 1996
World Renewable Energy Congress IV, Denver, Colorado, USA
Info: A.A.M. Sayigh, WREN, 147 Hilmanton, Lower Earley, Reading RG64HN, UK. Ph/fax: +44-1734-61136-4/-5.

June 20-24, 1996
ÖKO'96 Messe, Freiburg, Germany
Info: BUND, Landesverband Baden-Württemberg e.V. Dunansrtasse 16, D-79110, Freiburg. Ph/fax: 49-761-88595-0/-90.

June 24-27, 1996
9th European Bioenergy Conference, Copenhagen, Denmark
Info: DIS Congress Service Copenhagen A/S , Herlev Ringvej 2C, 2730 Herlev, Denmark. Fax: +45-4492-5050.

*July 1-8, 1996**
The City as an Organism, Urban Ecology Now and in the Future, Copenhagen, Denmark
Conf. & exhibitions on sustainable energy & urban environmental solutions. Part of Cultural City Copenhagen '96.
Info: Niels Lyck, OVE, Blegdamsvej 4, 2200 Copenhagen N, Denmark. Ph/fax: +45-3537-3565/-3676.

Coconut Oil Production in the Philippines

By Benjamin Gertes, PCATT, INforSE - Eastern Asia & Pacific Coordinator, Philippines.

After almost a decade of research and development, a Filipino project team has developed and produced an enzyme that can be used to produce coconut oil without consuming electrical energy.

The small-scale processing system produces coconut oil from fresh matured coconuts via the use of an organically produced enzyme developed by PCATT associate Mr. Ignacio 'Boy' Felizardo, a professional mechanical engineer.

The new method eliminates the need to boil the coconut milk, as Filipino grandmothers did, to produce coconut oil. It is simple and it does not require special skills, since it was designed at a farm-kitchen level to be easily understood and carried out. Even the materials used are encountered in everyday life. Thus, there is no need to worry about complicated innovations.

The coconut oil is made to separate naturally from the proteins and skim milk with the use of the enzyme. The high-strength enzyme was derived from the coconut itself made into powder form. It aids in the opening of the cells of the coconut meat and ensures the separation of proteins, coconut oil, skim milk, and solids.

The oil is extracted enzymatically in 12 hours, with no heating or boiling of the coconut milk, and the oil produced has a very low content of free fatty acid. It has a long shelf life; even in 6 months of storage no rancidity occurs.

Moreover, the oil produced by the enzymatic process not only is of high quality as a food; analysis also has shown it to be of pharmaceutical grade.

Other byproducts are useful as well. The skim milk can be processed to make a soft white cheese, and the whey produced can become an excellent naturally fermented vinegar. With this process, a coconut, which is worth less than one peso (1P) or ($0.04) for most coconut farms in the Philippines, will have a value of ten pesos (P10) or ($0.40), ten times of the current value.

Coconut palm.

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