SUSTAINABLE ENERGY NEWS

Newsletter for INFORSE International Network for Sustainable Energy. No. 24, February 1999

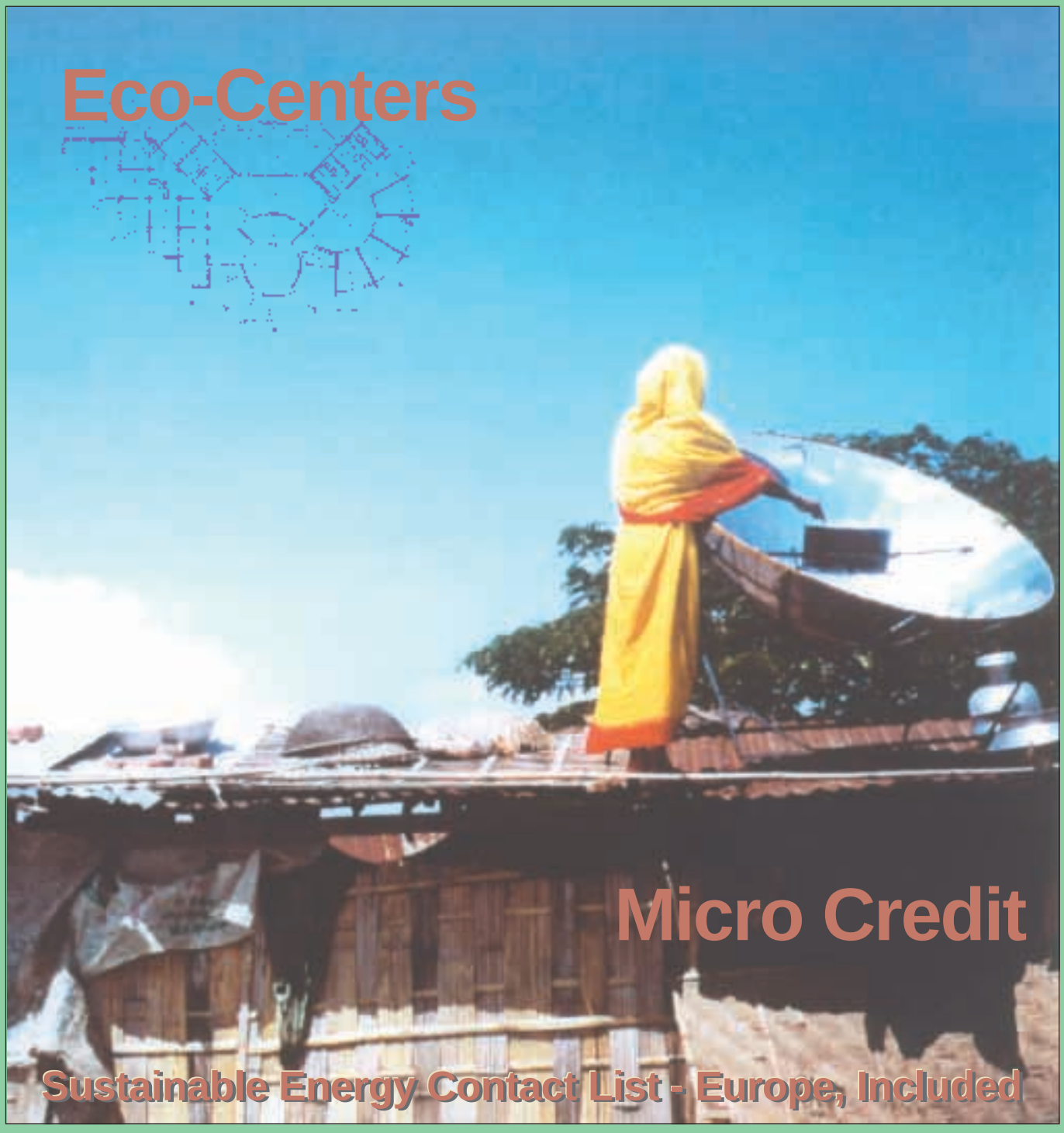

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Photo on the front page:
A splendid way to cook with a solar cooker on the top of a house during a terrible flood in 1998, in Bangladesh.
See article on pages 16-17.
Photo by EG Solar, Germany.

New International Activities for Sustainable Energy

Offshore Windmills in Denmark. Photo by Bonus A/S.

The international community will have energy at the top of its agenda when the UN Commission for Sustainable Development meets for the 9th time (CSD 9) in the Spring of 2001. The process to prepare for this session is starting within a month (see next page) and will be open to NGOs.

The new focus on energy and sustainable development shows an increased understanding worldwide of the key role that energy plays in environmental as well as in developmental questions. While it was not possible to agree on a special chapter on energy in Agenda 21 at the Rio summit in '92, this was possible 5 years later at UNGASS* in '97. The stage is now set for new international activities to support a sustainable energy development.

The challenge to NGOs is now to develop a proper agenda for energy and development. We must take into account the global inequalities in energy consumption, the problems of climate change and desertification, and the energy problems of the poor.

The agenda must lead to a large-scale implementation of renewable energy and energy efficiency. It must address the South where sustainable energy solutions can help to meet basic needs, as well as the North where they are needed to solve global environmental problems. And the old international structures with no efficient entity working for sustainable energy must be changed. There is a need for a co-ordinated effort among UN organisations, multilateral development banks, and others to direct all energy-related activities towards sustainable development.

In INFORSE, we have decided to follow closely the preparations for CSD 9. We will work to ensure that NGO input is incorporated into the process whenever possible. Further, we will contribute input based on a dialogue among NGOs within our network as well as between INFORSE and other NGO networks working for sustainable development. We invite all interested organisations to join INFORSE in this effort. We hope to be represented at most of the preparatory events for CSD9. We will follow up on these developments in the next 10 issues of Sustainable Energy News.

Michael Kvetny Gunnar Boye Olesen

INFORSE Secretariat

** The UN General Assembly Special Session (UNGASS), in June, 1997, agreed upon a chapter on energy in the "Programme for further implementation of Agenda 21" that was adopted at the session.*

INFORSE at Climate Conference COP4

The INFORSE Secretariat and several members were present at the UN Climate Convention fourth conference (COP4) in Buenos Aires, November '98. The focus of INFORSE was primarily on:

- The Clean Development Mechanism (CDM). Major issues were ensuring that CDM projects are truly additional, ensure the sustainability of CDM projects, and the possibility of small-scale, NGO-type projects to benefit from the CDM.
- Large-scale wind-power penetration at the global level.

INFORSE hosted two official side events at the conference. The first event focused on NGO perspectives on the Clean Development Mechanism. Representatives from a number of leading NGOs presented their views on the CDM. The second event focused on large-scale implementation of wind energy, and was based on a study of the global wind-energy potential. The study was commissioned jointly by the Forum for Energy and Development (FED) in Denmark and Greenpeace.

REJIMA from Buenos Aires offered support as local organiser to the participating INFORSE members.

Hans Bjerregaard, Chairman of Forum for Energy and Development (FED), Denmark at the wind side event at the Climate Conference in Buenos Aires, November 6, 1998.

Photo by Søren Krohn.

More information: INFORSE Secretariat (see page 2 or back page)

INFORSE
International Network for Sustainable Energy

Thoughts After COP4

By Roque Pedace (left) and Marcelo Alvarez (right), INFORSE Regional Coordinators

CDM

It became quite evident that there was a need of capacity-building in most developing countries with regards to Clean Development Mechanism (CDM) and in general. It was discussed that this could be an INFORSE initiative, to be developed with others. At the meetings organised by CAN (Climate Action Network), the "southern" input was minimal, and in most cases, the same imbalance occurs at the national level, i.e., mitigation strategy development is done by the governments with little input from of the civil society.

A very interesting discussion took place at the SEI (Stockholm Environmental Institute) workshop. The equity issue was critically addressed by Sunnita Narain from Center for Science and Environment (CSE), opposing CDM.

Large-Scale Developments

It became apparent that there are differences between countries that facilitate local involvement in renewable energy development with a proper regulatory framework and high rates for electricity sold to the grid and other countries that leave these matters in the hands of their utilities. The approach cannot be the same, as Mr. Johansson from UNDP explained. It is quite clear that the scenarios and recommendations presented in the wind energy study commissioned by FED and Greenpeace need to be refined if they should form the basis for regional/country campaigns. (See in the issue no. 23 page no. 3) The Risø Laboratory in Denmark can be instrumental in this process.

Deregulation and regional integration seem to be a common feature that deserved international (The World Bank, UN agencies, etc.) attention at COP 4. Since INFORSE as a network has already begun to play a role in this process with considerable impacts on renewable/efficiency penetration, it is in a better position to address the problem regionally.

Demonstration Centers

Demonstration Centers could play a crucial role in the National Strategy for Climate Change Mitigation. They should be a part of sustainable-energy strategy everywhere. Climate Awareness Programs will be launched at a national level, in compliance to the Climate Change Convention (articles 6), which calls for studies to be done with public participation. Other components intimately linked are clearinghouses for information retrieval, processing, and delivery.

Demonstration centres and clearinghouses are parts of diffusion networks, which help strengthen institutions and build capacity within the sectors involved, including NGOs in a decentralised way. It contributes to market transparency and to openness in decision-making processes, including relevant public policies and R&D priorities.

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CSD9

The process leading to the ninth meeting of the UN Commission on Sustainable Development that is dedicated to energy, CSD 9, will start before the seventh CSD meeting, CSD 7, which is to be held in May-June, 1999. The UNGASS revision of Agenda 21 (in June'97) that dedicated CSD 9 to energy also recommended the establishment of an international group of experts to prepare for CSD 9. The expert group will be an open-ended group, open to NGOs.

During CSD 9, the sectoral theme will be "Atmosphere and Energy," with cross-sectoral themes "Information for decision-making and participation" and "International co-operation for an enabling environment." The Economic sector/major-group issues will be Energy and Transport. The agenda for discussions in the Intergovernmental group and at the CSD 9 session will be paragraphs 42-56 of the report of the UNGASS session entitled "Overall review and appraisal of the implementation of Agenda 21". So far, the following activities are scheduled within the official CSD9 process:

1999

- Meeting of open-ended intergovernmental group of experts in conjunction with "inter-sessional" (preparatory) meeting of CSD (March);
- Meeting on global energy demand and supply, with particular emphasis on electricity (July);
- Ad-hoc Expert Group meeting on barriers to sustainable energy development in developing countries, with emphasis on Africa;
- Ad-hoc Group meeting on South/South co-operation in renewable energy development.

2000

- Committee on New and Renewable Sources of Energy and on Energy for development (February);
- Meeting of open-ended intergovernmental group of experts in conjunction with "inter-sessional" meeting before CSD (March);
- Meeting on investment opportunities and constraints in the energy field (July).

2001

- Meeting of open-ended intergovernmental group of experts in conjunction with "inter-sessional" meeting before CSD 9 (March);
- CSD 9 (May-June).

INFORSE at the Desertification COP2

The INFORSE Secretariat, ENDA, and several other INFORSE members participated in the 2nd conference of the UN Convention to Combat Desertification (UNCCD) in Dakar, November '98. The main aim was to create awareness of the relationship between desertification and the potential role of sustainable energy in the drylands, as well as to increase contacts between INFORSE and the RIOD-network of NGOs involved in the combat of desertification.

Two small meetings were held with participants primarily from INFORSE organisations. At the meetings, some potential projects were identified, and there were suggestions for continued involvement in the UNCCD process.

The participation in COP2 will be followed up by a number of activities, e.g., development of sustainable energy projects to combat desertification and organisation of a NGO workshop on how to integrate sustainable energy into the CCD National Action Plans.

Further information: www.inforse.dk

EXPO2000 HANNOVER

In 1997 INFORSE proposed a number of sustainable energy projects to EXPO2000, the coming world exhibition in Hannover. Of the 19 projects proposed by INFORSE five have been selected for EXPO2000 while two are still pending. The seven projects are:

- Promotion and Dissemination of Improved Water Mills for Rural Applications in Nepal;
- Sunstove Organisation, South Africa;
- Dissemination of Solar Systems by Do-it-yourself groups in Austria;
- Sustainable Human Settlement on the Altiplano, Bolivia;
- Large-scale Solar Heating Plant in Marstal, Denmark;
- Improvement of rural production systems through electrification, Senegal (pending); and
- Tunoe Knob Offshore windturbine park, Denmark (pending).

The selected projects will now be included in the EXPO2000 catalogue, but still have to negotiate their physical presence at the exhibition.

Further information: EXPO2000, 20510 Hannover, Germany Ph: +49-511 8408-0, fax: +49-511 8404-100, e-mail:info@expo2000.de, http://www.expo2000.de or INFORSE Secretariat (see page no. 2)

INFORSE Coordinators' E-mail Meeting

During the last week of January '99 and continuing a few days into February, the INFORSE coordinators held a virtual meeting via e-mail. Major conclusions of the meeting are:

- INFORSE will continue to follow 3 international processes, i.e., CSD9 (see editorial), the UN Climate Change Convention (UNCCC), and the UN Convention to Combat Desertification (UNCCD).
- Along with these activities, the INFORSE secretariat will continue its dialogue with multilateral donors to increase funds for NGOs' sustainable-energy projects. This can include assistance to INFORSE members that are developing proposals for funding.
- The media and environment initiative will be continued building on the workshop that was held in Denmark in June of '98.
- The South-South-North Fund will continue supporting development of sustainable energy projects in INFORSE member organisations, primarily in developing countries. The guidelines for the fund are available from the secretariat upon request.
- Following the renewable-energy island-oriented activities of INFORSE, the secretariat is currently raising funds for a world conference on renewable energy for smaller islands, to be held in Denmark in second half of '99.

Photo from "Erneuerbare Energie"

100,000 Solar Roofs in Germany

On January 1, 1999, the new German "100,000 roofs" photovoltaic program started. The aim is to create a total energy-generating capacity of 300 MW within six years. The costs of the program to the Federal budget is 1 billion DM. It is currently the world's largest program to introduce PV energy. The program was initiated by Dr. Hermann Scheer, member of the German Parliament and president of EUROSOLAR.

More information: EUROSOLAR e.V. European Association for Solar Energy, Plittersdorfer Str. 103, D-53173 Bonn, Germany. Ph: +49 22 8 / 36 23 73, fax +49 22 8 / 36 12 79, e-mail: inter_office@eurosolar.org, http://www.eurosolar.org/.

INFORSE-Europe e-mail list

INFORSE-Europe will increasingly use e-mail for communication within the network. All INFORSE-Europe organisations will receive an e-mail with further information. Organisations that have not received such an e-mail by the end of February are kindly asked to send a note to INFORSE-Europe and include their current e-mail address. Send it to <ove@inforse.dk>.

Solar Conference in Sofia in May

INFORSE-Europe organisations have been invited to the Pan-European Conference on Solar Energy, May 25-27, 1999, in Sofia, Bulgaria. It is a conference under the auspices of UNESCO and within the framework of the World Solar Program. From INFORSE-Europe we will consider to make an INFORSE-Europe event in connection with this conference.

For more information on INFORSE participation: INFORSE-Europe (see back page) or Academic Youth Environmental Club, Sofia, att. Vladimir Dvoretzky, email: dvoretzky@yahoo.com.

Environment & Health: London ´99

The European ECO-Forum, is now preparing for NGO participation in the Pan-European Environment & Health ministerial conference that is to be held in London, 16-18 June (London'99). The NGO approaches to energy and climate issues are being coordinated by Climate Network Europe as well as by the ECO-forum coordinating board.

Seen from a sustainable-energy perspective, the most interesting parts of London'99 will be:

1) A ministerial declaration stating the strong need for action to prevent adverse health effects from climate change. This declaration provides us with a lobbying tool for much-needed domestic policies and measures.

2) A transport charter potentially leading, and that's the interesting part, to a legally binding transport convention, which would help to stem emissions from this fastest growing GHG emissions sector. Frazer Goodwin of T&E (e-mail: fgoodwin@arcadis.be) is working on this issue.

INFORSE-Europe coordinated the ECO-Forum energy and climate activities at the Pan-European Environmental Ministers' Conference in June '98 in Århus, but will not be directly involved in London99. INFORSE-Europe continues to follow relevant official Pan-European activities, e.g. the implementation of the European Energy Efficiency Guidelines that were agreed upon in Århus in '98.

More information:
- Climate Network Europe Delia Villagrasa, 42 rue de Taciturne, 1000 Bruxelles, Belgium. Ph: +32-2-2310180, fax: +32-2-2305713, e-mail:canron@gn.apc.org,
- ECO-Forum, Att. Gaudenz Silberschmidt, e-mail: gaudenz.silberschmidt@student.unisg.ch

K2R4

The public participation period of the process for EBRD financing of the two Ukrainian nuclear reactors Khmelnitsky 2 and Rivne4 (K2R4) ended on December 15, '98. Over 100 organisations and many individuals protested against the plans. One of the protesting letters came from INFORSE-Europe. This letter stressed the environmental problems of the two projects, as well as the environmental and economical benefits of alternatives with renewable energy.

The process in EBRD is now coming to an important point, with the decision of the EBRD directors likely to be taken in March. It is quite important that concerned NGOs now use their influence to lobby nationally for a stop of this loan, and for replacement of the plan with better proposals for Ukraine.

G7 pushed Ukraine into K2R4

According to Greenpeace, the G7 countries have pushed the Ukraine government to complete K2R4 instead of building a new gas-fired power plant. This is proved by a confidential letter revealed by Greenpeace that was sent by Ukranian President Leonid Kuchma to the British Prime Minister, Tony Blair. In this letter dated May 17th, 1998, President Kuchma writes:

"... the most difficult is the situation with completing the construction of two nuclear reactors in Rivne and Khmelnitsky NPPs. The project to complete the construction of these power units was proposed by Western partners as an alternative to the Ukrainian bid to build a steam-gas power plant nearby Slavutytch."

More information:
- INFORSE-Europe (about letter from INFORSE-Europe), e-mail: ove@inforse.dk, address: see back page.
- CEE Bankwatch Network, Kratka 26, Praha 10, 1000 00, Czech Rep. Ph/fax:+420-2-781-6571, List by e-mail: petr.hlobil@ecn.cz, http://www.geo.ut.ee/bankwatch, http://www.ecn.cz/K2R4.

New Solar School

A number of European universities and institutions are co-operating in creating a school with master-level courses in solar energy engineering. At the European Solar Engineering School (ESES) there will be courses in active and passive solar thermal, photovoltaics, solar energy for tropical climates, and utilization and management, each approximately one month long. A limited number of qualified students will be admitted to a one-year program that also includes supervised research activities.

Tuition is free. For the courses in 1999, priority will be given to those applications arriving before 15 April.

More information: Högskolan Dalarna, S-78188 Borlänge, Ph: +46-23778707, fax: +46-23-778701, e-mail:lbr@eses.se, http://www.eses.org/ .

Uganda Employs Sustainable Energy for Health

Since 1992, the Health Technology Development Centre (HTDC) within the Uganda Ministry of Health has worked to achieve energy savings within the sector. It started out with a base-line study that found that 80-90% of the energy in the health sector is used to heat water for cooking, washing, sanitary purposes, etc. The energy sources are firewood and electricity. The traditional but inefficient "three-stone" fireplace was widely used.

Efficient Stoves

HTDC tested four types of institutional stoves in the range of 40-200 ltr. The test concluded that three of them used 50-65% less energy than a three-stone fireplace, when used for boiling water and cooking a traditional dish. The last saved a meagre 10%. Further, the stoves relieved the cooks from working in the smoky conditions around a normal fireplace. The payback periods for the three efficient stoves were found to be 2-4 years with current firewood prices in Uganda.

A field test with these institutional stoves at 10 hospitals showed that the stoves in general worked well, with the only problems being that the chimneys had to be cleaned regularly, in particular when humid firewood was used. One hospital had problems with corrosion of chimneys, while another had the problem that the personnel tend to use the old fireplace to avoid having to chop the firewood into smaller pieces. A different kind of problem was that, at 4 of the 5 hospitals that had electric cookers, these were used instead of the efficient wood stoves. The HTDC has documented that the use of electric cookers is an expensive solution: it costs 2.5 times as much to cook with electricity as with efficient wood stoves.

Solar Heating

HTDC has tested 5 solar water heaters available on the Ugandan market. They all heated the water to above 50'C on a sunny day, and three of them were able to maintain the temperature at 48'C or more during the night for use the next morning. Electrical water heaters are commonly used at hospitals in Uganda. The pay-back periods for these three solar heaters were 1-3 years. The cheapest was a type developed in Uganda and produced using local materials. The other two types, respectively were produced partly with imported materials, and simply imported. A field test at three hospitals showed good results. Some types, however, needed adjustments before working satisfactorily, and the solar collectors have to be cleaned from time to time to keep the performance high.

A number of other ways to save energy have been tested, and are now recommended by HTDC for use in hospitals and health clinics in Uganda:

- compact fluorescent lamps with payback periods 10 months,
- solar PV systems for use outside the reach of the electric grid,
- efficient cookstoves and solar energy for sterilisation,
- simple ways to save energy by the users.

The energy-saving methods and recommendations are documented in a number of publications under the common title *"Energy Saving in Health Sector"*.

Contact: Health Technology Development Centre (HTDC), End of 7th Street Industrial Area, P.O.Box 20014, Wabigalo, Kampala, Uganda.
Ph +256-41341611, fax +256-4134 6714.

Photos: Three PV panel and a solar water heater at Maanyi Health Unit, Uganda. The photos are from the report: "Implementation of Renewable Energy Technology in the Health Sector". By C. Nsaba, Youssef Arfaoui (HTDC), 1998, Uganda.

ISES Utility Initiative for Africa

Power utilities around the world are gradually embracing solar energy and other renewable sources as viable alternatives. Despite Africa's substantial new and renewable energy resources, few power utilities in the region have expressed interest in the application of renewable-energy technologies. The scenario is changing, however, with initiatives such as the solar electrification program of ESKOM in South Africa and the 550KW wind power installation of Kenya Power and Lighting, Limited.

To focus attention on utility use of renewables, the International Solar Energy Society (ISES) recently launched the "Utility Initiative for Africa" with an Initial Implementation Conference held at the offices of the Development Bank of Southern Africa in Johannesburg, South Africa on 26-27 March, 1998. The objective of the conference was to bring together utilities and the scientific and commercial communities to identify sustainable energy alternatives in the African region. A unique characteristic of the Conference was the creation of a set of resolutions forming a common denominator for the actors cooperating in the initiative in the future.

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http:// www.ises.org/

Solar Projects in Mozambique

Station to Test PV Systems, Mapping Solar Radiation

With support from SIDA-Sarec, the Solar **Energy Research Program** (*) has established a station for testing photovoltaic systems and a laboratory for testing photovoltaic components. The laboratory is being upgraded to support testing of other solar-energy components. The laboratory is also mapping solar radiation. A good understanding of the behaviour of solar energy resources is a prerequisite for rational use of solar-energy technologies. With this range of activities, the Solar Energy Research Program is establishing the necessary capabilities to respond to energy policy problems and to formulate the requisite strategies.

Demonstration Projects

Between 1995 and 1997, the Solar Energy Research Program was contracted by the Institute for Rural Development and the Ministry for Coordination of Environmental Affairs to formulate and to implement two demonstration projects on the use of solar energy in rural areas. Currently, a UNESCO project to establish a "Demonstration Solar Village" is being implemented by the unit in collaboration with other national institutions. The project is supported by the UNESCO regional office in South Africa and by the local UNESCO office in Maputo.

150 Rural Health Centers

Another project to electrify 150 rural health centres is scheduled to start in 1999 and will be funded by the Norwegian Development Agency (NORAD). The unit has been given the responsibility of monitoring some of the installations.

Action Plan for Rural Energy

The Solar Energy Research Program, in collaboration with the Ministry of Mineral Resources and Energy and other institutions, is preparing a project on rural energy for Mozambique. The objectives of the project are to compile the background information on energy demand and resources, to develop strategies and policies for promoting the use of high-quality energy technologies, and to propose an action plan for rural energy supply.

*(*) **Solar Energy Research Program** is a research unit based at the Department of Physics, Faculty of Sciences of the Eduardo Mondlane University, Mozambique. The unit was established in 1991 with the support of the Swedish Agency Sida/SAREC, in a cooperative agreement with the Eduardo Mondlane University. The activities of the program include:*

- *Testing and optimisation of solar energy systems and devices.*
- *Development of capabilities for local manufacture of solar energy systems.*
- *Solar radiation studies.*
- *Energy policy studies.*

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Photovoltaic Market Transformation Initiative - PVMTI

US$5 million each to co-finance development in Kenya and Morocco

The Photovoltaic Market Transformation Initiative (PMVTI) is a major new program designed to strengthen private-sector investment in power generation from photovoltaic (PV) sources in Kenya, Morocco, and India. PMVTI was created to accelerate industry commercialization of PV technology, and to help reduce greenhouse gases. The International Finance Corporation (IFC), the private-sector funding wing of the World Bank, has made available a total of $25 million from the Global Environment Facility. These funds will be used to co-finance PV development in the private sector. About US$ 5 million has been earmarked for each of two projects, one in Kenya and one in Morocco. The IFC has designated IT Power Ltd and Impax Capital Corporation Ltd as its External Management Team for the 10-year duration of the projects' program.

More information: Photovoltaic Market Transformation Initiative (PVMTI), c/o Impax Capital Corporation Limited, Broughton House 6-8 Sackville Street, London WIX 1DD, UK. Ph: +44-171-4341122, fax: +44-171-4371245
e-mail: pvmti@impax.co.uk.

Business Forum for Renewable Energy in Africa

Harare, Zimbabwe, 29-31 March 1999

ADEME, the French State Agency for Environment and Energy Management, along with UNESCO and other European partners in the framework of the European THERMIE, is organizing a *"Business Forum for Renewable Energy in Africa"* in March 29-31, 1999 in Harare, Zimbabwe. THERMIE is the demonstration component of the Research and Technological Development JOULE-THERMIE Program of the European Community in non-nuclear energy technologies. One of its objectives is to promote cooperation in the field of renewable-energy technologies between the European Union and African countries. The Forum aims to be a place where European industrialists, NGOs, and investors will meet African partners in order to develop renewable-energy projects in Africa.

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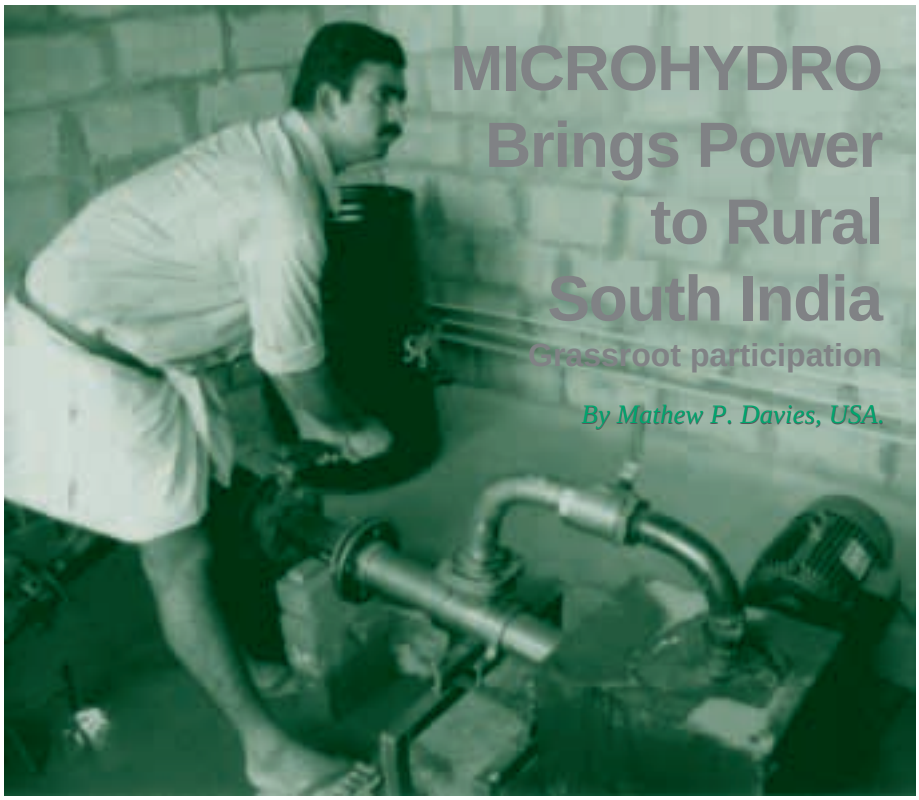

MICROHYDRO Brings Power to Rural South India

Grassroot participation

By Mathew P. Davies, USA.

In a small village in Kerala, India, a group of environmental and social activists has realized the dream of clean decentralized power with a 6-kW micro-hydroelectric facility. The facility supplies power to Pathanpara, a rural community of about sixty families who contributed the resources for the facility's construction. Because of its size and remote location, the village had never been connected to the national grid, which is itself chronically short of power. In the view of Mr. K. Sahadevan, who helped initiate this project, the Pathanpara accomplishment demonstrates the viability of grassroots participation as a means for sustainable development.

Low-impact Hydroelectric Power

Sahadevan sees micro-hydroelectric power, or "microhydel," as an ideal alternative to centralized production of power from large dams or power plants. He and a handful of local engineers and other activists formed a group to promote and realize environmentally conscious, socially motivated public works. The group is based in Kannur (Cannanore). Members oppose most conventional hydroelectric, thermal, and nuclear capacity-building projects in India on environmental and social grounds. These projects are detrimental to the majority poor, whom they displace; they have a severe impact on fragile ecosystems; and they benefit only the minority of consumers in cities.

Unlike large-scale hydropower, microhydel serves the needs of rural areas with minimal impact, requiring no large reservoirs and minimal construction. The group tested the technical feasibility of the idea first with a 1.5-kW installation at Asankavala (Kerala), leading to the current installation at Pathanpara, which is the group's fourth micro-hydel undertaking in southern India.

Success in Pathanpara

The installation consists of a catchment pond, 300 meters of 4-inch (10-cm) diameter polyethylene pipe, a power house, and distribution lines to the village, about a kilometer from the power house. Water from two streams flows into the pond, then descends 70 vertical meters through the pipe to turn independent Pelton wheels on two generators, of 1500 and 4500 watts' capacity, respectively. The generators are reversed electrical motors, delivering a regulated supply of 240 volts to 32 houses, 14 shops, and numerous street lights in the village. The system is provided with safeguards against too high voltage, tripping, and ground faulting. The present configuration represents the first of three stages for the project. Later stages will expand the capacity to 10 kW, then to 14 kW, suitable for powering small industrial units.

The real success of this project lies not in the power installation itself, but rather in the means by which the project came about, namely, by the approval and through the help of its beneficiaries. All land and labor required by the project, as well as the cost of materials and electrical contracting (about Rs. 200 000, or US$ 5000), was supplied by the inhabitants of Pathanpara. Such a substantial investment (about a year's income for the village) indicates the determination behind the project. This kind of cooperative public effort, Sahadevan believes, can be a model for safe, sustainable and socially just development.

The Future of People's Participation

The Kerala state planning commission (KSSP) already relies upon public participation in its planning procedures. Participatory planning begins with local initiatives for development projects, which are submitted to the KSSP for approval. According to a commissioner at the Kannur district office, 40% of Kerala's state development funds are currently distributed according to local initiatives. The next five-year plan calls for fully 50% of development funds to be allocated by the participatory mechanism.

This is promising for microhydel and other renewable energy initiatives in Kerala, which are presently quite limited

in scope. Although grassroots energy development may function as a catalyst, even its proponents consider it insufficient to bring about real change. Sahadevan states, *"Pathanpara and Asankavala are only collective efforts to demonstrate that environment-friendly power projects are possible with people's initiative. These isolated efforts can never be a permanent solution to the power problem. What is needed is a radical change in the power policies, as well as implementation at the government level."*

As for the Pathanpara installation, practical and technical problems remain. Chronic shortage of water limits the production of power to just four hours a day in the dry season, and debris in the water can rapidly degrade the Pelton wheels. Such obstacles, however, are comparatively minor next to the enormity of India's power crisis. If renewable options like microhydel are to mitigate this crisis substantially, they must ensure concerted public involvement, such as through participatory planning. Otherwise, a real change in the character of government-sponsored development will be unlikely.

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Photos by Mathew P. Davies, USA.

PV to 1 Million Vietnamese Households in 10 years

$ 750,000 International Finance Corporation Loan to SELCO-Vietnam

By Neville Williams, SELCO

Leverage to $5 Million Loan

In 1998, The Solar Electric Light Company (SELCO) got a $750,000 loan from the International Finance Corporation (IFC) towards financing household solar electric lighting systems in Vietnam. This is the first loan made by the IFC's Small and Medium Enterprise (SME) Program to finance consumer purchases of solar home systems (SHS), and their second such loan for solar rural electrification. The SME Program is funded by the Global Environment Facility (GEF). The loan is consistent with the GEF objective of overcoming barriers to the implementation of renewable-energy technologies. The IFC is a member of the World Bank group and is based in Washington, DC. The IFC's loan will help SELCO-Vietnam to provide collateral on credit extended by the Vietnam Bank for Agriculture to SELCO customers who wish to purchase SHS over 3- and 4-year terms. The financial leverage will provide up to $5 million in consumer loans in local currency.

11 Million Members of the Women's Union Set up a Solar Network

SELCO-Vietnam is setting up a solar electricity supply network in association with the National Vietnam Women's Union (VWU), whose 11 million members constitute a substantial market for solar electricity. "The solar program will extend wireless power initially to 12,000 Vietnamese families," said Shawn Luong, Managing Director of SELCO-Vietnam, which has raised $700,000 in equity capital to launch its operations. This is the first phase of a 10-year undertaking by SELCO-Vietnam and the VWU to electrify up to one million households with solar home systems (SHS). SELCO and its predecessor the Solar Electric Light Fund, along with the VWU, electrified 340 families's homes in a Mekong Delta pilot project launched in 1994. SELCO's second shipment of 760 solar home systems has arrived in Ho Chi Minh City, where the components are currently being "integrated" for installation next month in Tra Vinh and Can Tho Provinces. Vietnam, with a population of 78 million, has electrified less than half of its rural population's homes. Recently, power shortages have afflicted the cities, leaving little hope for millions of rural families yet to be reached by the electricity network.

SELCO/SELF

The Solar Electric Light Company is a photovoltaic service and distribution company founded in 1997. It has its headquarters near Washington DC, and operates in India, Vietnam, China, and in Sri Lanka. New operation is under development in South Africa. The main aim of the company is to provide off-grid electricity from PV systems to communities in developing countries. The Company is an outgrowth of the earlier work of the Solar Electric Light Fund (SELF), an international development organisation that pioneered the use of PV home lighting systems through rural electrification pilot projects in eleven countries. SELF received several international awards for its work. Neville Williams, the president of SELCO, is the founder and former chairman of SELF.

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http://www.selco-intl.com.
- SELCO-Vietnam, ph:+84-8-832-2547.
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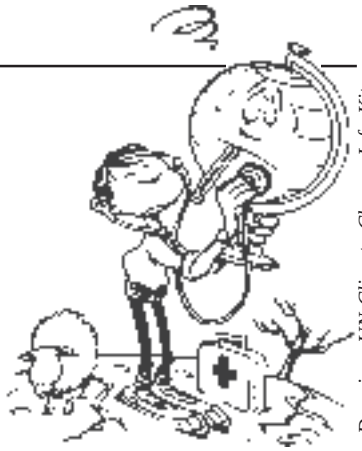
USA Climate Change Funds to Increase, But Not Enough

White House, Washington DC

The US federal budget for the year 2000 is being negotiated. The US president, Bill Clinton, and his administration have proposed that next year's budget include a climate-change tax package of $3.6 billion over five years and a 34% increase to $1.4 billion for the research, development, and deployment of clean energy technologies and energy-efficient practices in the year 2000. The $3.6-billion tax package includes tax incentives for renewable energy and for the purchase of energy-efficient homes, cars, and appliances.

Sixteen member groups of The Sustainable Energy Coalition argue that the proposed measures are not enough, and propose a doubling of the climate-change tax package to at least $7 billion (over five years). With the increasing evidence of climate change, and with the increasing greenhouse-gas emissions of the USA (currently 10.7% above 1990 levels), they do not believe that the proposed $3.6 - billion climate-change tax package is adequate. This new measure is not enough to meet the US Administration's own climate-change goals. Among the organisations in the Coalition are the American Council for an Energy Efficient Economy (ACEEE) and the Natural Resources Defence Council, both of which are INFORSE members.



Drawing: UN Climate Change Info Kit

More information:
- US Federal Administration, http://www.whitehouse.gov/,
- Sustainable Energy Coalition, 315 Circle Avenue, #2; Takoma Park, MD 20912-4836, USA. Ph:+1-301-270-2258; fax: +1-301-891-2866, http://www.ecomall.com/activism/sec20.htm.

Standard on Its Way for Renewable's Performance

By Arlene Thompson, National Renewable Energy Laboratory (NREL), USA.

IPMVP

The International Performance Measurement & Verification Protocol (IPMVP) discusses procedures that, when implemented, allow building owners, energy service companies (ESCOs), and financiers of buildings' energy efficiency projects to quantify energy-conservation-measure (ECM) performance and energy savings. The IPMVP provides an overview of current best practice available to verify savings from traditionally and third-party-financed energy- as well as water-efficiency projects.

House in New Jersey. FIRST (Fully Integrated Residential Solar Technology) Scheme. Photo by NREL, http://www.nrel.gov/data/pix

Renewable-Energy Subcommittee Completed a Draft

The Renewable-Technology Subcommittee for the IPMVP has completed a draft section of the IPMVP, addressing the special issues related to performance measurement of renewable energy systems. The document provides a tool for measuring project benefits, which is essential for realizing the promise of renewable energy. Measurement and Verification (M&V) provides a framework for renewable energy in performance-based contracting, financing, and emissions trading.

The co-chairs of the Subcommittee are Dr. Andy Walker, NREL, and Dr. David Mills, ISES. Subcommittee membership includes key players of the renewable-energy industry within the financial community, governmental agencies, non-governmental organizations, private firms, and academia. Much attention has been directed towards the voluntary, consensus-building process necessary for international adoption of the IPMVP. Implementation of a thorough baseline, measurement, and verification procedure guarantees the reliability of energy-generation estimates and other associated benefits. Actual M&V results of existing projects based on the IPMVP can prove success and can provide developers, investors, lenders, and consumers with more confidence in the value of future projects. One success can grow from another. As innovative renewable-energy financing increases worldwide, so will the need for the IPMVP and its internationally standardized framework.

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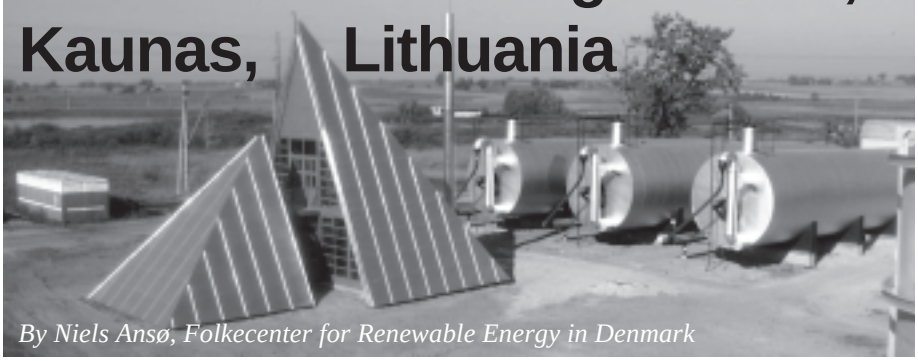
Demonstration Biogas Plant, Kaunas, Lithuania



By Niels Ansø, Folkecenter for Renewable Energy in Denmark

Technical buildings (control room, show room, laboratory, boilers), Digesters at the biogas plant in Kaunas, Lithuania.

The biogas, produced from the manure of 11,000 pigs, is being used to generate electricity. The project is intended as a pilot demonstration and education plant for Lithuania and for the surrounding Baltic countries.

At the Rokai pig farm in Kaunas, Lithuania, the daily 60 m^3 of manure from the 11.000 pigs is converted into a more "ready to use" fertiliser by anaerobic digestion. Co-generation converts the biogas into electricity and heat, which will reduce the farm's expenses for energy significantly. The technology gives possibility for producing surplus of electric energy, which will be sold to the public grid. The system is based on the Danish Folkecenter's "Farm Biogas Concept", which means that the plant is scaled to the amount of resource available on the farm.

The biogas plant consists of 3 horizontal digesters in a parallel configuration, all fed by the same raw material: the manure. This opens up unique possibilities for gathering continuous information on local experiences with the plant. Different additives and operating conditions can be tested, and the results can easily be compared.

Function

Each 300-m^3 digester receives 20m^3 manure per day in the 30m^3 individual mixing tanks. Waste additives are added and mixed in the same tank. The manure is pumped into the digester at intervals during the 24 hours, for instance every 2 hours. An equivalent volume of manure is displaced at the outlet end of the digester. The process is heated to a temperature between 35°C and 50°C. Heating is done by an integrated heat exchanger, and heat losses are minimised by 200-mm layer of insulation covered by a weatherproof steel-plate coating. To keep the manure homogeneous and to avoid formation of scum, the manure is mixed at intervals by a slowly rotating axial agitating system. The agitator also transports the sediments to the sand outlet, where they can be removed. The biogas exits through the top of the digester at a low pressure, sufficient to overcome the losses in pipes and the counter-pressure from the floating gas holder. The gas holder delivers pressure enough to operate the gas burner and the co-generation motor without any compressor to raise pressure. If the system pressure exceeds 45 mbar, the gas is released from the digester by a siphon trap.

Finance

The project was initiated by the Danish Folkecenter for Renewable Energy. The total project cost is 4.440.000 DKK (1 USD ~ 6,50 DKK). The Danish Environmental Protection Ministry provides 88% of the financial support, and the remaining 12% comes from the AB VYCIA Farming Company, where the biogas plant is located. The project has been supported by the Lithuanian Environmental Protection Ministry and Energy Agency. The Lithuanian Energy Institute, the Kaunas Energy Office, and the Lithuanian Academy of Agriculture also assisted during the project implementation.

More information:
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- Alfredas Kontrimavicius or Kazys Cesnavicius, AB Vycia Farming Company, Roku apyl, LT- 4311 Kauno raj, Lithuania. Ph: +370-7-745118/ +370-7- 545187.

Technical data:

Manure:	60 m^3 pig manure / day.
Waste, concentrated:	~ 3 t / day (depending on availability).
Digester:	3 x 300 m^3 horizontal steel digesters.
Gas production:	1200 - 3600 m^3/day.
System pressure:	25 mbar, (max. 45 mbar by safety siphon trap).
Gas storage:	60m^3.
Co-generation:	1 x 75 kW, 1 x 110 kW.
Boiler/burner:	1 x 300 kW gas burner and 1 x 300 kW oil/gas burner.
Sulphur cleaning:	Aerobic external biological process.
Control system:	PC based control- and data acquisition system (developed by Folkecenter).

Production data:

Biogas production:	1,200 m3/day (*).
Electricity production:	2,400 kWhel/day.
Electricity production:	700,000 kWhel/year.
Heat production:	4,200 kWh heat/day.
Heat production:	1,600,000 kW heat/year.

Farm Energy Consumption:

Electricity:	3.700.000 kWhel /year (**)

(*) From manure only. If concentrated waste is added, the technology allows gas production of 3600 m3/day.

(**) 2.300.000 kWh is used for heating. This will be replaced by heat and electricity from the biogas.

Manure outlet, gas outlet.

Eco Demonstration Centers

By Roger Kelly, (RK) UK

Artefact. Photo by R.K.

Changing the world in the direction of more sustainable energy practices is a complex and demanding business. There are so many different kinds of people who have to be influenced, from global decision-makers to individual householders, and there are so many different levels of information to be communicated, that a very wide range of techniques needs to be used. The growing numbers of non-profit eco-demonstration centres around the world demonstrate efficiency and renewable energy at work with an effectiveness that no amount of written or even multimedia material can match. This article looks at a small number of these centres, in Europe, from the perspective of someone who was the director of one of them - the C.A.T. in the UK - for 10 years. Each of the centres has its own unique character, but there are also many similarities, particularly in their underlying philosophies. Most, if not all, see energy issues as integral to an ecological approach to human society. They are also concerned with ecologically benign building practices, biological food production, the water and waste cycles, and general resource management. Some are almost purely research organizations that demonstrate the results of their research with the buildings and energy installations they use. Others concentrate mostly on education, but use practical demonstration as an important teaching tool. Others again are open on a daily basis to the visiting public and put their emphasis on communicating basic principles to as wide an audience as possible. Some are concerned with changing the patterns of consumption in the North, others with helping to introduce appropriate technologies to the South. Some have existed for more than 25 years; others are very new.

This brief tour around some of Europe's eco-centres is of necessity, very limited. The descriptions are partly based on my personal experience, partly on descriptions provided by the centres themselves or by others who have visited them.

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C.A.T. UK

Little History: C.A.T. - Centre for Alternative Technology - is one of the earliest centres, established during 1973 in a 16-hectare abandoned slate quarry in the mountains of Mid Wales. Its original aim was to create a new form of sustainable rural community which would experiment with "alternative" technologies and ways of life, then disseminate the results through writing, teaching, and demonstration projects. Almost from the beginning, however, it began to attract growing numbers of casual day visitors. The emphasis shifted to providing a "good day out" for visitors, who were mostly holidaymakers in the area combined with a simple educational approach to the whole range of ecological lifestyle issues.

C.A.T. Photo by R.K.

Visitors: 75,000 people each year - in the summer often more than 1,000 a day.

High level of self-sufficiency: There is a stand-alone electricity generating system comprising hydro, wind power, and a recently installed 13kW photovoltaic roof. Grid-linking allows surplus electricity to be exported. Most of the space- and water heating is provided by a boiler burning local forestry waste. Water for all purposes is supplied from a small rain-fed reservoir. Sewage and waste water are treated on-site by aquatic plant systems, and all organic wastes are composted to build up soil fertility. One of the wonders of the Centre is the extent to which a barren mountain of slate waste has been transformed into an extraordinarily rich and diverse ecosystem containing many species of plants and animals which have long disappeared from the surrounding landscape.

Staff: The Centre is still based on the original vision of a living and working community, run on cooperative principles by a staff committed to education and change.

Courses: 40 courses are open to the public each year. Many of them are about renewable energy.

Publications/outreach: There are thriving publications and consultancy departments, a popular restaurant and shop. C.A.T. is also involved with a new local initiative, the Dyfi Eco Valley Partnership, which aims to turn the whole area into a model of renewable-energy development.

Finance: C.A.T. depends for its financial

survival very much on earned income - from what visitors pay on entrance and what they spend in the shop and restaurant, but also from residential courses, publications, and consultancy.

Contact:
C.A.T. Centre for Alternative Technology, Machynlleth, Powys, Wales SY20 9AZ, UK. Ph: +44 1654 702400, fax: +44 1654 702782, e-mail: cat@catinfo.demon.co.uk, http://www.cat.org.uk/.

The Small Earth, Holland

Little history: Although almost contemporary with C.A.T. (founded in 1972) and with the same underlying philosophy, 'The Small Earth' Center has many differences which result mainly from its location. Far from being in a remote and mountainous rural area, it is on the outskirts of the small town of Boxtel in the southern Netherlands, on an almost entirely flat site with good fertile soil.

Gardens and Buildings: The gardens (although only 1.5 hectares) are the most important part of the demonstration function. The main building contains lecture rooms, kitchen, and offices. 3 demonstration buildings (the Recycling House, the Pyramid House, and the Eco-house) were added between 1973 and 1991. Then, in 1995, a new building was initiated to provide residential accommodation for students (22 beds) as well as a central reception area, shop and café, offices, and storage. This building includes composting toilets, solar water heating, and a photovoltaic roof to the central atrium which supplies about 30% of the building's annual electricity needs.

Small Earth. Photo by R.K.

Visitors: Around 15,000 people a year.

Courses: There are about 20 courses each year mostly on ecologically sustainable gardening and whole-food cookery, but also on sustainable building practices.

Publications/outreach: The Center publishes books about food production, building, and sustainable lifestyles. It is heavily involved in the local Agenda-21 process. It has helped the development of a sister centre in Kenya. It is twinned with a similar centre being implemented in a remote Hungarian village by Hungary's Ecological Institute for Sustainable Development.

Staff: As at C.A.T., the 18 staff work as a cooperative with equal (but low) pay after three years; a 32-hour week in normal for full-time staff, but about 40% of staff work a 24-hour week. There are also some volunteer staff and graduate trainees. Unlike C.A.T., the Center's houses no resident community.

Finance: Income is divided almost equally among government grants, mainly Ministry of Environment for education, donations, and earned income of the sale of vegetables, publications as well as from courses and visitors.

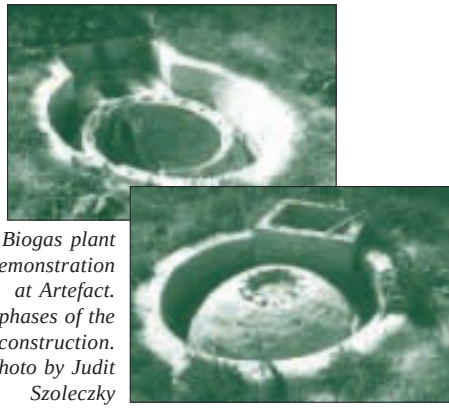
Contact: De Kleine Aarde, P. O. box 151, 5280 AD Boxtel, Netherlands. Ph: +31 41-16 84921, fax:-1683407 http://www.pz.nl/kleineaarde/

Artefact, Germany

Little history: Situated in the far north of Germany, virtually on the Danish border, Artefact is a non-profit organisation which acts primarily as a training and education centre focused on technology, the environment, development and the "Third World". The centre itself was opened to the public in June, 1995 after a six-year construction period, funded by the Government of the State of Schleswig-Holstein, during which over 300 unemployed young people worked through job creation schemes and more than half of them subsequently found permanent jobs.

Buildings: There is a seminar and conference centre with seminar rooms for up to 50 people and accommodations for up to 24, a cafeteria, and offices. These are built predominantly of earth and timber with some fascinating structural forms, and there is a design philosophy which specifically aims to reduce the use of timber in building as a demonstration for the increasingly deforested areas of the world.

Self-sufficiency: The whole Center was designed to be self-sufficient in energy, generating electricity from wind and solar together with a biomass gasification plant. Heating is provided by solar thermal, backed up by heat recovery from the gasifier and a vegetable oil-fired co-generation system. The wind power system exports to the grid but also runs irrigation pumps for the gardens. The rainwater is collected in underground tanks to be used for flushing toilets and cleaning the buildings. Wastewater is treated in a reedbed system. There is also a composting toilet.



Biogas plant demonstration at Artefact. Different phases of the construction. Photo by Judit Szoleczky

Courses: The Center has a number of its own courses but it also designs training programs, workshops, and conferences on request. The courses cover a wide range of appropriate technical subjects as well as policy issues and educational curriculum planning. It has close links with a two-year postgraduate course at Flensburg University called ARTES (Appropriate Rural Technologies and Extension Skills) and the AT-Association, Bonn, which publishes a magazine, "Appropriate Technology Forum".

Finance: Having had its initial capital investment funded from outside, Artefact now has to be financially self-sufficient. It combines education work with a consultancy business.

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Folkecenter, Denmark

Little History: The Folkecenter for Renewable Energy was established in 1983 to develop renewable-energy technologies that could be manufactured by small or medium-sized businesses to supply local electricity needs. The emphasis, therefore, has always been on hard research aimed at the commercialisation of technology. In this, it has been very successful, spearheading Denmark's dominance in the wind-power industry and, more recently, developing a new biogas industry for Denmark's pig farms. The total area of almost 10 hectares was originally a farm, sloping gently southward towards Skibsted Fjord in the northern Jutland area of Denmark.

Setting up windmill at the Folkecenter. Photo by J. Kruse

Renewable Energy: The wind turbine testing area has a dozen or so small and medium-scale turbines which are constantly monitored and tested as they generate electricity for on-site consumption. Most of the electricity demand is in fact met by a single 75-kW turbine, although there is also an increasing contribution from photovoltaics mounted on existing and new buildings around the site. Other energy technologies which the Folkecenter has experimented with and has demonstrations of include plant oil (mostly rape seed based) as a liquid transport fuel, hydrogen production, biogas, cogeneration, and solar water heating.

Dome. Photo by J. Kruse

Buildings: The main buildings have been developed around the original farmhouse. These contain offices, laboratories, a particularly fine library of reference material, kitchen, dining room, and sleeping accommodations for staff and volunteers. There is also a large engineering workshop building nearby, and this whole area radiates a feeling of technical professionalism. Almost more impressive to the visitor, however, are some of the experimental buildings - the Plus Energy House with its passive solar technology and mobile insulation, the Bio-dome with its aquatic plant treatment system, and the new earth-sheltered Training Centre with its impressive conference hall, library, and dining room. This building also incorporates a pioneering system of integrating PV cells into window glazing, with an expected annual output of 2100kWh from the south-facing facade.

Visitors: There are 10,000 visitors a year.

Courses/education: There are international courses and cooperation projects. Technology applications developed by the Center can be found in several countries all over the world. A 3-6 month training program is offered. Modest stipend available for a number of trainees.

Publications/outreach: There is an impressive list of 130 publications in Danish and English. They are relating to all the technologies with which research and development work has been done.

Finance: Unusually among the eco-centres described here, it is financed almost entirely by Danish central and local government sources, partly with a fixed subsidy for core costs and partly with specific project funding that must be opened to bids regularly.

Contact: *Nordvestyjysk Folkecenter for Vedvarende Energi,* PO Box 208, 7760 Hurup Thy, Denmark. Ph: +45-97956600, fax: +45-97956565, e-mail: energy@folkecenter.dk, http://www.folkecenter.dk/ (Danish/English).

Living Earth, France

Little history: In 1979, a non-profit Association was set up in Paris to produce and disseminate information about organic agriculture and horticulture, diet, health, and sustainable lifestyles, all of which were of interest to only a small minority in France at the time. The centrepiece of their work was the publication of a journal on organic gardening which gradually expanded its readership. A longer-term dream was to have a demonstration centre for sustainable living, concentrating on the techniques of ecologically sound landscaping, and this was realised in the early 1990s with the purchase of a 20-hectare site in the beautiful Trièves area south of Grenoble in southeastern France. The basic funding was raised from the publishing activity and from many public bodies.

Landscape: The essentially poor land, used previously only for hunting purposes, now has an astonishing range of displays and habitats, from formal flower and herb gardens to vegetable-growing areas, a composting display, bamboo plantation, ponds, a reedbed sewage treatment system, and wildflower meadows.

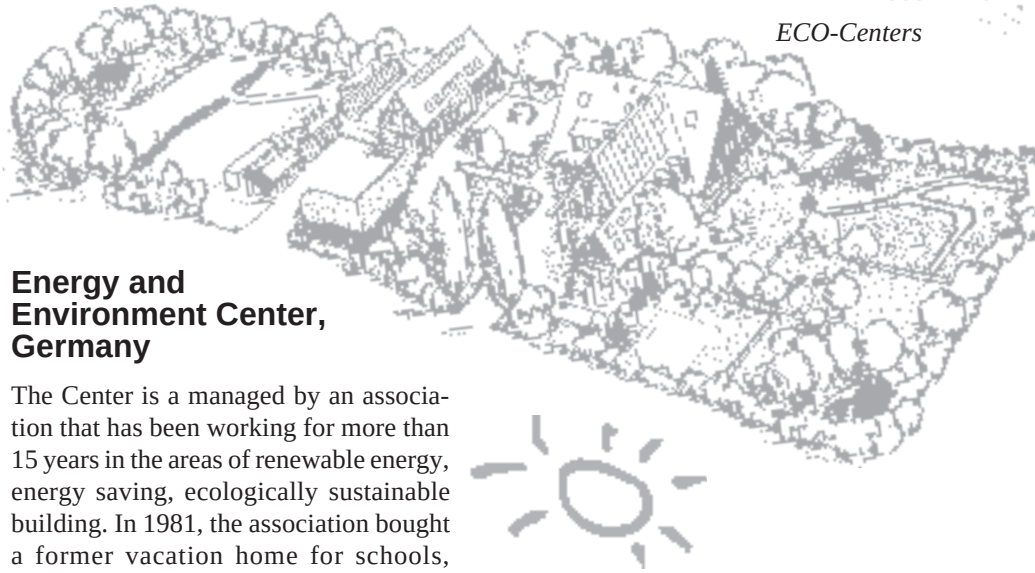
Buildings/energy: What is perhaps more surprising, however, is that the buildings and energy technologies are no less important than the landscape. The first main building is passive solar, timber-framed with earth block walls, having beautiful views south over the surrounding area and housing the publishing business, administrative offices, and a shop. Close to this is the restaurant building, a masterpiece of vaulted earth brick construction, cool in summer, warm in winter, and a memorable space in which to eat in. The experience is enhanced, as you would expect in France, by fine cooking, often using plant ingredients which have almost disappeared from culinary use. In 1998, a new display was inaugurated under the name "[néga]watts house", showing how domestic energy consumption could be cut by half, firstly in the design of buildings through orientation, choice of materials, and bioclimatics, then through all the techniques of energy efficiency in use.

Publications/courses: The center's publishing is flourishing and producing an increasing range of books in French. Each year a number of one-day courses are also run, on subjects related to organic gardening and ecological building. The centre is generally open from May to October.

Contact: Terre Vivante, Domaine de Raud, BP 20, 38711 Mens cedex, France. Ph: +33-4-76348080, fax: +33-4-76348402.

Tingvall's Eco, Sweden

Little history: One of the most recent European eco-centres, Tingvall's Eco is based on an 80-hectare farm in the Bohuslän district of southwestern Sweden. The land has been a demonstration and experimental farm owned by the Swedish Society for Rural and Agricultural Development since 1940. From 1990, it has specifically concentrated on organic milk production from a herd of 55 dairy cattle. More recently, local development groups in the area got support from the local authority to expand Tingvall into a wide-ranging centre for ecology and sustainability.



Buildings/facilities: The design and functioning of the buildings were based on C.A.T.'s experience with its eco-cabins and the principle of a self-contained building ecosystem that can be managed and monitored by the residents. The buildings include composting toilets and a stand-alone energy system using wind, solar, and biofuels, the production and consumption of which are monitored on computers and meters within the buildings. There are a total of 48 beds. Self-catering kitchens are provided, but full board is also offered. The minimum requirement for course participants is that they start the day by stoking the wood stove and preparing their own breakfast. The farm as a whole has also been laid out as an Eco Park where the visitors can also explore the mixture of pasture land, forest, valleys, and the organic gardens. An eco-shop, a café, activities for children, and guided tours are available.

Contact: Tingvalls Eko, 450 84 Bullaren, Sweden. Ph: +46-52540120, fax: +46-52540061, e-mail: tingvall@hs-o.hush.se, http://www.tingvalleko.hs-o.hush.se/ (in Swedish).

Eco-Garden, Hungary

"Eco-Garden" is a 5,100 m^2 park situated on an island of the Kis-Duna river. It was started in 1995 by the Nature Association in Esztergom. The members of the Association cleaned the place of illegal wastes and turned it into a showplace. The exhibition area is connected by footpaths to an organic garden, a windmill, a 12-m^2 solar collector, a photovoltaic (PV) system, a composting toilet, and a composting facility. Pupils and children from kindergartens very often visit the garden. They get hands-on experiences in how to restore the natural ecological system. In the summer, people can organize camps with the aim of showing how to protect the environment and nature.

Contact: Esztergomi Környezetkultúra Egyesület, (Nature Association in Esztergom), Széll Kálmán, Bajcsy Zsilinszky road 4. I.e.106, 2500 Esztergom. Hungary. Ph/fax.: +36- 33-400-150, e-mail: eke@zpok.hu, http://www.vjrktf.hu/ekoint/ekoku.htm (in Hungarian).

Children at Eco-Garden in Hungary.

Energy and Environment Center, Germany

The Center is a managed by an association that has been working for more than 15 years in the areas of renewable energy, energy saving, ecologically sustainable building. In 1981, the association bought a former vacation home for schools, which was rebuilt to model ideas in these fields. The building's fuel consumption was reduced by 70 % and the water consumption was reduced by 50 %. This was done by changing the heating system, installing solar panels, and using well-water and rainwater. There are also an 18,000-m^2 reed-bed sewage system, an organic vegetable garden, and an orchard.
Staff: 24 members of permanent staff earn their living by teaching, organizing exhibitions, and consultancy. It is a self-managed, non-profit project.
Courses: 70 courses are offered throughout the year. The guesthouse provides 30 beds and whole-food catering. There is a travelling exhibition for hire on 300 m^2 of open space, a shop with technical literature, publication of books. Every first Saturday in the month is an "Open Door Day". Guided tours are available.

Contact: Energie- und Umweltzentrum am Deister, Am Elmschenbruch, 3257 Springe, Eldagsen, Germany. Ph: +49-5044-975-0, fax: +49-5044-975-66, e-mail:e-u-z@t-online.de, http://www.e-u-z.de/ (in German).

Eco-Park, Slovakia

Eko-park is a non-profit organization established by three Slovak NGOs in 1996 in the capital of Slovakia, Bratislava. The plan is to build up a 10,000 m^2 area as an open-air exhibition for renewable-energy technology. It will also exhibit most of these technologies available on the Slovak market. At the end of 1998, several developments were completed, and there are further ambitious plans. Presently, the following attracts the visitors attention: a small (1 kW) hydro power plant connected to a hydraulic ram; a small windmill charging a set of batteries and supplying electricity to a TV set, radio, and a few lights; solar water collectors, and a solar cooker. There is a big collection of videos, books, and magazines. Until now, Eko-park has been a Slovakian activity. There is, however, an idea to offer cooperation for Hungarian and Austrian groups or individuals, since the Park is situated within 20 km from the borders of both countries.

Contact: Ekopark Bratislava, Opletalova 16, 841 07, Bratislava, Slovakia. Ph: +421-6477-8807 or Foundation for Alternative Energy (FAE). Ph/fax: +421-7-63-836964.

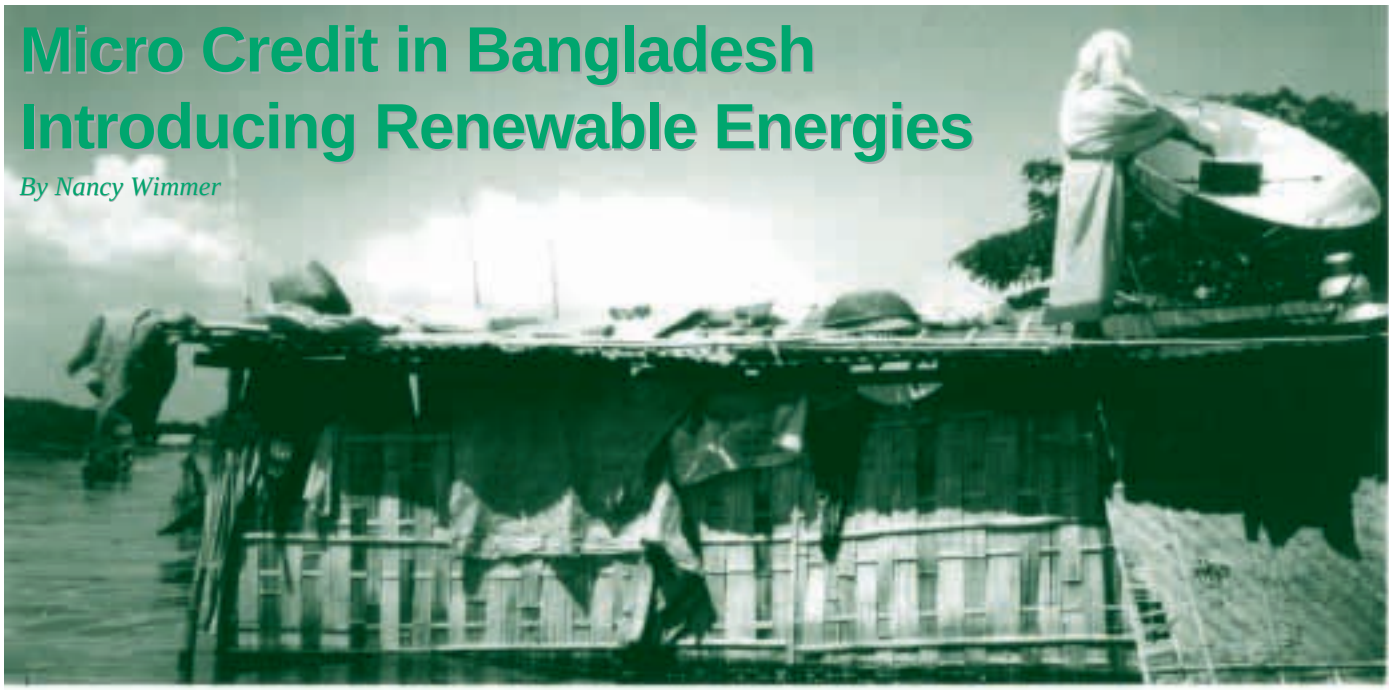
Earth Center, UK

A big and ambitious project, the Earth Centre, is being built in a depressed former industrial area of northern England, on the site of an old coal mine between the towns of Doncaster and Rotherham. The Earth Centre, which is budgeted to cost a total of over 150 million EUROs, sets out to use all the techniques of Disney and the other major Theme Park operators to "promote the understanding of sustainable development and to help people become involved in the process of achieving it in their own lives and for the world". It would be easy to be cynical about such a project if the person behind it, Jonathon Smales, had not been general manager and an international trustee of Greenpeace before taking this on. He has a genuine commitment to the achievement of sustainability but believes a project of this size is necessary to change the millions of people who do not yet take environmental issues seriously. Phase One is due to open this year, so if you are in England, make sure you visit and decide for yourself.

Contact: Kilner's Bridge Doncaster Road, Denaby Main DN12 4DY, UK. Ph: +44 1709 512000, Fax: +44-1709-512010, e-mail: becky@earthcentre.org.uk.

Micro Credit in Bangladesh Introducing Renewable Energies

By Nancy Wimmer



The solar cooker offers a splendid way to cook on the top of a house - even during the terrible flood in 1998 in Bangladesh. This cooker was evaluated to be the best in a European comparative study of cookers. (32 minutes to boil water in a 12 liter pot). There is no need for charity - microcredit for renewables generates income. Photo by EG Solar, Germany.

Innovation and Success

Innovation transforms an obstacle into an opportunity. Imagine a program to overcome poverty: a bank that gives loans to the poor for self-employment. Imagine a *bank for the poor* that has achieved a 98% repayment rate, and that has now introduced innovative companies to increase its clients' income: *Grameen Uddog* (rural initiative) to market the textiles they weave; *Grameen Telecom* to provide them with cell telephones; *Grameen Shakti (rural energy)* to introduce solar, biogas, and wind energy. This is innovation at work in one of the poorest countries in the world, Bangladesh.

Microcredit for the poorest: The Grameen Bank

The Grameen Bank is the outcome of an experimental program launched by a university in 1976 for rural landless people who were desperately in need of credit and to whom the banking system remained inaccessible. Grameen, working at the village level with rural populations, revolutionized poverty alleviation efforts by offering very small loans to poor entrepreneurs, most of whom are women. These loans, initially on the order of $50 to $100 US, allowed the entrepreneurs to acquire capital for crafts, food production, and animal husbandry. Members join the Grameen Bank in groups of five, agreeing that if any member defaults on a loan, the others will not be able to receive loans. This peer support network has led to 98% loan recovery rates, far higher than those of most commercial banks. Grameen Bank found that *women*, in particular, tend to use their profits to improve the quality of life of the family, which also improves women's status in the society. Thus, loans to women have been especially productive.

Today Grameen lends ca. $ 30 million a month to over 2 million borrowers, 95% of them women. The Bank employs 12,000 bank workers, who serve the poor in half the villages in rural Bangladesh. The Grameen model is so successful that it is being replicated in 58 countries worldwide.

The beginning of a microcredit program for poor women in Nepal, NIRDHAN, a replication of the Grameen Bank model. The woman from the bank is disciplining them. Since 1995, the program grew from 500 to 3000 members - all women - in 3 years and is now in the process of becoming chartered Bank. Photo by Nancy Wimmer.

Create Your Own Environment - NO Need for Charity

The **Grameen Bank** was created in Bangladesh to serve the rural 85% of the 125 million inhabitants, whose inability to provide collateral barred them from obtaining commercial bank loans. Moneylenders were taking advantage of this situation to charge many of the landless poor interest at the rate of 10% a day or more than 3,000% a year. In spite of their potential to become self-employed, these borrowers were helplessly trapped in debt and poverty. Muhammad Yunus, the professor of economics who later founded Grameen, first gave loans of only a few dollars from his own pocket, and was amazed at the result. It took one enterprising woman only a few months to establish her own business making bamboo chairs, to increase her income seven-fold, and to repay the loan. Yunus concluded that the poor are credit-worthy! They possess both ideas and skill. They do not need charity. Thus, the idea of a bank for the poor in rural Bangladesh was born.

Financing Energy Services

Grameen Shakti was also created to serve the poor, this time by bringing them electricity and modern technology. Despite the great demand, only 15% of the total population have access to electricity, with little chance that the grid will

reach the rural areas in the near future. Bangladesh is behind in the development of renewable energy sources, offering little institutional or financial support. Grameen Shakti is a rural power company that was established in 1996 in affiliation with the Grameen Bank to promote and supply renewable energy resources to the rural households of Bangladesh.

In the process of bringing renewable-energy technologies to rural Bangladesh, Grameen Shakti has developed new ways of financing them. New employment, income generation opportunities, and acceptance of new technology have arisen in the process.

To date, the best local approach has been the **Solar Home System (SHS)**, which has the following components: solar panel, battery, charge controller, DC Lamp, and other DC applications. Grameen Shakti further develops local expertise in selling, maintaining, and repairing renewable energy systems. Shakti-trained and -certified technicians can then provide on-site training and maintenance.

Grameen Shakti customers take loans to buy renewable-energy systems costing between US $ 300 and US $ 500. These customers then use their energy resources both to increase their income and to improve their standard of living. Because most of Grameen's borrowers are women, many of the microenterprises are keyed to work that women can do at home, e.g., basket-making, weaving fishing nets, sewing. Loan can be given to a husband of a Grameen Bank member also. Like it was done to Mr. Manik helping him to operate his repair shop for electrical appliances. With the help of a solar system, he is using a DC soldering iron and solar light in his shop, which enables him to work at night.

In summary:
Solar Home System (SHS)
Cost: $US 300-500
Benefits:

- Increased income; longer working and selling hours.
- Use of solar energy for electric motors, refrigerators, lamps, telephones.
- Improved standard of living and communication in rural Bangladesh.

Business areas:

- Repair of appliances.
- Rental of lamps.
- Provision of cell phones.
- Many other crafts, e.g., basket-weaving, sewing, fishing-net weaving.

Grameen Shakti had installed 412 SHSs as of August, 1998 with a capacity of 16.740 KWp. It has a plan to install 6000 systems within the next 3 years. This will require opening 8 more branch offices, making a total of 20 Grameen Shakti offices in rural Bangladesh. There are also plans to open some special branches through which Grameen Shakti can do research on marketing policy. This network would allow Shakti to move quickly to disseminate and commercialize any improvement in the technology.

Nancy Wimmer studied Political Science and Law in the United States and received her Masters of Arts in Philosophy in Germany. She worked as a Systems Analyst in the field of conceptual modeling for German industry and did university teaching before visiting the Grameen Bank in Bangladesh in 1990. She became National Director of Resultate Germany to mobilize support for microcredit and savings programs, later designed the project European MicroCredit Support and studied microcredit programs in Nepal, Peru, El Salvador, Honduras, India and Bangladesh . She has expanded her role to promote the introduction of renewable energies through microcredit and to advise business and industry of their role in integrating the poor into the economy. She is also Project Leader for Microcredit for Terra, One World Network, and designing innovative ways for private enterprise to support the poor to start their own businesses- particularly in India with Grameen Bank Uttar Pradesh.

Microcredit - a Catalyst for Change.

The environment in which the Grameen Bank was created supported no access to credit for the poor in rural Bangladesh. Until Grameen Shakti was created, that same environment also failed to support rural access to electricity and to renewable energy. With the introduction of the Bank and Shakti, the environment and the lives of the rural poor started to improve.

What we have learned from both enterprises is that you have to create a new environment for new ideas and innovation to flourish. We have to create a *new* environment to remove the obstacles that keep poverty in place. Through the experience of Grameen, we see the poor in a new light: they are good business partners, open to modern technology. They can and must be integrated into the economy. Microcredit creates not only purchasing power, but acceptance of new ideas and technologies. Microcredit is a catalyst for change. Our challenge is to create an environment that allows change to take place; to create an environment that finances sustainable development. Sustainable development is everybody's business.

More information:
- Nancy Wimmer, Resultate e.V., EMCS, European MicroCredit Support for the Poorest, Amselweg 7, 85591 Vaterstetten, Germany.
Ph: + 49-810634147, fax: +49-81064771
e-mail: NWimmer1@compuserve.com.
- Grameen Bank, Mirpur-Two, Dhaka, 1216 Bangladesh. Fax: +880-2-803559.

Woman with cell telephone. An example of Grameen Telecom and Grameen Shakti. Photo by Nancy Wimmer.

Publications:

- Energy Solutions in Denmark, 1998, 31 pages;

- Combined Heat and Power in Denmark, 1998, 34 pages;

- Energy in Denmark 1998, brochure data, charts 14 pages;

- Straw for Energy Production, 1998, 53 pages;

- Wood Chips for Energy Production, 1993, 46 pages;

- Solar Energy Plan of Action 1998-2000, 50 pages;

- Optimise Energy - Danish Solution, 36 pages;

- Map of Denmark, Renewable Energy, in English, German, and Danish, 1996

- Energy 21, The Danish Government's Action Plan for Energy, 1996, 80 pages;

- Renewable Energy Islands in Europe, Case studies, 1998, 53 pages.

Published by the Ministry for Environment and Energy, Danish Energy Agency. Contact:
-Danish Energy Agency, 44 Amaliegade, 1256 Copenhagen K, Denmark.
Ph: +4533926700, fax: +45-33114743, http://www.ens.dk.
-The Energy Information Office, Energioplysningen, Teknikerbyen 45, 2830, Virum, Denmark.
Ph: +45-70218010, fax: 70-218011, e-mail: Energioplysningen@ens.dk, http://www.energioplysningen.dk/.

Renewable Energy Applications, PV Wind and Small Hydro
Proceedings of the International Workshop December, 1996.
Organised by NAM S&T, and APCTT.
25 presentation of case studies and overviews mainly from India. 15 Country report , mainly from Asia.
1997, 444 pages.
Contact: K.N.Johry, NAM S&T, Centre for Science & Technology of the Non-Aligned & other Developing Countries, India Habitat Centre, Zone-6, 2nd floor, Lodi Road, New Delhi 110003, India. Ph: +91 -11-4644974/-4645134, fax: +91-11-4644973, e-mail:namstct@giasdl01.vsnl.net.in.

Climate Change and Employment in the European Union
By Christine Lottje, CNE.
Contact: Climate Network Europe (CNE), 42 rue de Taciturne, 1000 Bruxelles, Belgium. Ph: +32 -2-2310180, fax: +32 -2-2305713, e-mail: canron@gn.apc.org, http://www.climatenetwork.org/.

Periodicals:

New Energy Magazine
No. 1. December 1998, 60 pages.
Country reports and world overview.
Wind WEB sites on page 56.

Contact: The German Wind Energy Association, Herenteichstr 1, D-49074 Osnabrück Germany. Ph: +49-541-35060-0, fax: +49-54135060-30, e-mail: NW-BWE@t-online.de, http://www.wind-energie.de/.

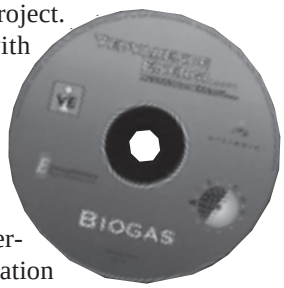
Pico Hydro
New
No. 2 in April 1998.
Newsletter of the new world-wide Pico Hydro network.
Free to developing countries.

Contact: Micro Hydro Centre, Department of Electrical and Electronic Engineering, The Nottingham Trent University, Burton Street, Nottingham, NG1 4BU, UK. Ph: +44-115-9418418, fax: +44-115-9486567, e-mail:n.smith@ntu.ac.uk.

Climate Notes
Contributions to Climate Change: Are Conventional Metrics Misleading the Debate? October 1998, 16 pages.
Contact: 1709 New York Avenue NW, Washington DC 20006, USA. Ph: +1-202-6622554, fax: +1-202-6380036, http://www.wri.org/wri/climate.

CD-ROMS:

Wind Energy, Biogas, Solar Energy
ALTERNER Project.
3 CD ROM with sound, graphs and text.
The CDs aim to give information to everyone who is interested in information about renewable energy, whether they are potential purchaser, interest groups or school pupils.



Contact: The Danish Technological Institute, Teknologiparken, 8000 Aarhus C, Denmark. Ph: +45-89-438943, fax: +45-89-438543, http://www.dti.dk.

Windpower in English, German, Danish
Wind energy design, Computing wind turbine output, technology, design, research and development, environment and economics, modern wind turbine history.

Contact: Danish Windpower Industries, Vester Voldgade 106, 1552 Copenhagen V, Denmark, Ph: +45 -33730330, fax: +45 -33730333, e-mail: danish@windpower.dk, http://www.Windpower.dk/.

Humanity Development Library 2.0
1230 publications, including many copies of Sustainable Energy News.

Contact: Oosterveldlaan 196, B-2610 Antwerp, Belgium. Ph: +32-3-4480554, fax: +32-3-4497574, e-mail: humanity@globalprojects.org, info@globalprojects.org, http://oneworld.org/globalprojects/humcdrom.

Software Design Programs:
Several design programs are listed with links on the web site:
http://www.eren.doe.gov/buildings/tools_directory/index.cgi.

EVENTS

March 1-5, 1999
European Union Wind Energy Conference & Exhibition, Nice, France
Organised by EWEA.
Info: WIP, Sylvensteinerstrasse 2, 81369, München, Germany. Ph: +49-89-720-1235, fax: +49-89-720-1291, http://www.wip.tnet.de/.

March 4-5, 1999
World Sustainable Energy Day, Wels Austria
Renewable Energy & Energy Efficiency for the EU, English, German, French, Slovak/Czech interpretation.
Info: O.Ö. Energiesparverband, Landstrasse 45, 4020 Linz, Austria. Ph: +43-732-6584-4386, fax: +43-732-6584-4383, e-mail:esv1@esv.or.at, http://www.esv.or.at/esv/

March 15-16, 1999
EU-India Renewable Energy Business Development Forum, New Delhi, India
Organised by WIP, UK Chamber of Commerce, TERI.
Info: WIP, Sylvensteinerstr. 2, 81369, München, Germany. Ph: +49-89-720-1235, fax: +49-89-720-1277, e-mail: renewables@tnet.de, http://www.wip.tnet.de/.

March 29-31, 1999
Business Forum for Renewable Energy in Africa in Harare, Zimbabwe.
Benedicte Meyer, ADEME, 27, Rue Louis, Vicat 75 737 Paris, Cedex 15, France. Fax: +33-1-46420558, e-mail:Benedicte.Meyer@ademe.fr.
See article on page 7 in this issue.

April 11-14, 1999
Renewable and Advanced Energy Systems for the 21st Century, Hawaii, USA
Info: Stanley Kleis, ASME Solar Division , Department of Mechanical Engineering, University of Houston, TX 77204-4792, USA. Ph: +1-713-7434536, fax: +1-713-7434503, e-mail: kleis@uh.edu.

April 12-14, 1999
Int'l Course on the Implementation of Wind Energy, Petten, The Netherlands
Info: J. Dekker, ECN, Energy Research Foundation, PO Box 1, 1755 ZG Petten, The Netherlands. Ph: +31-224-564278, fax: +31-224-563214, e-mail: j.dekker@ecn.nl, http://www.ecn.edu/8ewind/.

May 15-30, 1999
2000 Walk for Nuclear Disarmament
The walk is from the UN Int'l Court of Justice in the Hague to the NATO headquarters in Brussels.
Info: For Mother Earth International, Lange Steenstraat 16-d, 9000 Gent, Belgium. Ph/fax: +32-9-2338439, e-mail:international@motherearth.org, http://www.motherearth.org/.

May 25-27, 1999
PanEuropean Solar Forum, Business and Investment, Sofia Bulgaria
INFORSE-Europe Meeting?
Info: Ministry of Energy and Fuel Bulgaria and the UNESCO World Solar Commission, att. Boris Berkovski, Division of Engineering and Technology, 1 rue Miollis, 75732 Paris cedex 15, France. Ph: +33-1-45683901, fax: +33-1-45685821, e-mail: solar@unesco.org. http://wwwunesco.org/general/eng/programmes/science/wssp/ or http://www.worldsolar.org.
See article on page no. 5.

May 25-27, 1999
SUSTAIN '99, Amsterdam, Holland
The World Sustainable Energy Trade Fair: Renewable Energy, Waste-to-Energy, Sustainable Transport
Info: European Marketing Ltd. PO Box 259, Bromley, BRI IZR, UK. Ph: +44-181-2898989, fax: +44-181-2898484, e-mail: sustain@emml.co.uk, http://www.emml.com.

May 31- June 6, 1999
Business and Investment for Renewable Energy in Russia, Moscow, Russia
Info: Intersolarcenter, 2, 1st, Veshniakovsky proezd, Moscow 109456, Russia. Ph: +7-095-171-9670, fax: +7-095-171-9670, e-mail: intersolar@glas.apc.org.

June 8-11, 1999
WREC '99 Kuala Lumpur, Malaysia
World Renewable Energy Congress
Info: Secretariat, 3rd Floor, 78 Jalan SS 22/21, Damansara Jaya, 47400 Petaling Jaya, Selangor, Malaysia. Ph: +60-3-7172612/13, fax: +60-3-7172616, e-mail:transe@tm.net.my.

June 12-16, 1999
Solar'99 Growing the Market, Main, USA
Info: American Solar Energy Society (ASES), 2400 Central Avenue, Suite G-1 Boulder, CO 80301, USA. Ph: +1-303-4433130, fax: +1-303-4433212, e-mail: ases@ases.org.

June 15-18, 1999
ACEEE Summer Study, Saratoga Springs NY, USA
Info: American Council for an Energy-Efficient Economy (ACEEE), 1001 Connecticut Avenue, NW Suite 801, Washington DC 20036, USA. Ph: +1-202-429-8873, fax: 1-202-4292248, e-mail: conf@aceee.org, http://aceee.org/.

June 16-18, 1999
Pan-European Environment & Health ministerial conference, London
See article on page 5

June 20-23, 1999
Windpower ´99 AWEA, Vermont, USA
Info: American Wind Energy Association (AWEA), 122 C Street, NW, 4th Floor, Washington DC, 20001, USA. Ph: +1-202-383-2500, fax: + 1-202-383-2505, e-mail: laura_keelan@awea.org.

June 21-24, 1999
International Conference on Wind Energy, Copenhagen, Denmark
Info: Danish Maritime Institute, Hjortekarsvej 99, 2800 Lyngby, Denmark. Ph: +45-45-879325, fax: +45-45-879333, e-mail:icwe99@danmar.dk.

July 4-9, 1999
ISES Solar World Conference, Jerusalem, Israel
PO Box 50006, Tel Aviv 61500, Israel. Ph: +972-3-514-0000, fax: +972-3-514-0077, e-mail:ises99@kenes.com. http//tx.technion.ac.il/~meryzse/ises99.html.

July 12-23, 1999
SUN Summer Study Energy Policy
Info: Central European University, Budapest c/o SUN CEU, Nádor u. 9, Budapest, 1051 Hungary. Ph: +36-1-3273069/-3273811, fax.: +36-1-327-3124, e-mail: summeru@ceu.hu, http://www.ceu.hu/.
See article in issue no. 23 on page no. 12.

August 11-14, 1999
North Sun'99, Edmonton, Canada
8th Int. Conf. Solar Energy in High Latitudes and the 25th Conf. of SESCI.
Info: The Solar Energy Society of Canada SESCI,116 Lisgar str., Suite 702, Ottawa, Ont. K2P 0C2, Canada. Ph: +1-613-2344151, fax:+1-613-2342988, e-mail: sesci@cyberus.ca, http://www.solarenergysociety.ca.

September 22-26, 1999
Husum Wind '99, Husum, Germany
Info: Osterwungweg 2, 25813, Husum Germany. Ph: +49-841-8355-0, fax: +49-4841-8355-55, e-mail:peter@wellmann.allcon.com.

September 25 - October 3, 1999
PLEA 1999, Brisbane Australia
16th International Conference on Passive and Low Energy Architecture
Symposium, workshops, tours.
Info: Sally Brown, The University of Queensland, Brisbane, 4072 Australia. Ph: +61-7-33656360, +61-7-33657099, e-mail: sally.brown@mailbox.uq.edu.au.

October 17-26, 1999
World Solar Challenge. Adelaide, SA, Australia
Electric and Solar Vehicle Conference.
Info: PO Box 8178, Station Arcade, Adelaide SA 5000, Ph: +61-8-83873877, fax: +61-8-83226290, e-mail: myriad@wsc.org.au, http://www.wsc.org.au/.

November 2-5, 1999
Environment China '99, Guangzhou, China
Info: Stefanie Niebuhr, Gima Exhibitions & Conferences, Heidenkampsweg 51, 20097 Hamburg, Germany. Ph:+49-40-235-24341, fax: +49-40-235-24403.

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INFORSE in Brief

International Network for Sustainable Energy (INFORSE) is a world-wide network of 157 NGOs formed at the Global Forum in Rio de Janeiro, Brazil in 1992.

INFORSE's common goal is to achieve long-term sustainable energy development and phase out of nuclear and fossil energy consumption.

INFORSE is open to membership for independent organisations. Membership is free of charge.

The member organisations and the regional coordinator(s) organise INFORSE meetings and initiatives including workshops, campaigns, and projects.

INFORSE lobbies for and develop projects to promote sustainable energy solutions. All activities seek to protect the environment and to achieve development based on decentralised approaches.

INFORSE participated in several UN events and their parallel NGO Forums including: Climate Convention (UNCCC) Conferences, Conferences of the Convention to Combat Dersertification (UNCCD), follow-up of the Rio Conference (UNGASS and CSD), World Conference on Women'95, the World Summit for Social Development '95, UNESCO World Solar Summit'96, UNESCO Conference on Adult Education '97. INFORSE has Consultative Status to the UN.

INFORSE publishes this quarterly newsletter *"Sustainable Energy News"* and the annual *"World-wide Sustainable Energy Contact List"*.

Please feel free to contact us.