SUSTAINABLE ENERGY NEWS

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Computer Tools for NGO Energy Plans

NGO Views on CSD9 & CDM

PV-Wind Hybrid

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INFORSE Secretariat:
P.O. Box 2059, DK-1013
Copenhagen K, Denmark.
Ph: +45-33-121307
Fax:+45-33-121308
E-mail: inforse@inforse.dk
http: //www.inforse.dk/

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Editorial Address
Sustainable Energy News
Gl. Kirkevej 56, DK-8530
Hjortshøj, Denmark.
Ph: +45-86-227000
Fax: +45-86-227096
E-mail: ove@inforse.dk
http://www.inforse.dk/

Editors:
Gunnar Boye Olesen
Judit Szoleczky
Michael Kvetny
Lars Yde (technical editor)
Marie Bille (text advice)

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Photo on the front page:
A mobile PV-Wind hybrid system developed by the Folkecenter for Renewable Energy in Denmark.
See article on pages 10-11.
Photo by Folkecenter, Denmark.

Climate Change & Sustainable Development

Possibilities & Pitfalls

Wiring micro-hydro, Solomon Islands. Photo: Robert Wadell, APACE.

The negotiations currently taking place under the Climate Change Convention (UNFCCC) are devoting much attention to the flexible mechanisms agreed to at the 1997 meeting in Kyoto of the Parties to the Convention. The Kyoto Protocol outlines a Clean Development Mechanism (CDM) which is to allow industrialized countries - Annex I countries - to achieve part of their reduction of greenhouse gas emissions through projects in developing countries. These projects must also contribute to the sustainable development of the country hosting the project. This prospect of additional transfers of technology makes the CDM attractive to developing countries.

So far, the main focus in the negotiations on the CDM has been on certifying emission reductions, the ability to trade them etc. *However, there is reason to be concerned about the missing focus of attention on ensuring that CDM projects will in fact be sustainable and contribute to host country development.* Developing countries are sensitive to any interference with their national decision making, while the industrialized Annex I countries focus mainly on emission reductions and are not inclined to provoke any controversies over the issue.

The result may turn out to be that no real tools are put in place to secure that CDM projects are sustainable and contribute to development. Consequently, all sorts of projects with major negative side effects - such as nuclear plants and large dams - may end up being eligible for CDM funding if only the host government approves them. And there would be no way to ensure that most CDM funding supports the (renewable) energy technologies of tomorrow.

Many developing countries will find themselves in a relatively weak position when negotiating with potential foreign investors. Missing capacity may lead them to enter into project agreements that turn out to be far from ideal from their perspective. Furthermore, competition to attract investments may drive host countries to sacrifice national priorities. This could result in a downward spiral of "sustainability dumping".

When addressing these problems, focus should be on enhancing the capacity of non-Annex I countries to formulate national strategies and to implement them in concrete projects. Civil society and other national stakeholders should be actively engaged in these processes. Furthermore, environmental and social impact assessments should be built into project design and into the verification process that every CDM project will be going through. It should also be verified that projects do not violate other conventions, such as those on biodiversity and desertification.

It should be obvious that North and South share a common interest in developing a CDM that makes real and long-term contributions to sustainable development while eliminating pitfalls.

Please read further on INFORSE's concerns on page no. 4.

Asger Garnak
INFORSE Secretariat

Official CSD 9 Preparations - Slow Start

The 7th meeting of the Commission on Sustainable Development (CSD 7 April 1999) adopted a resolution establishing an ad hoc open-ended intergovernmental group of experts on energy and sustainable development to undertake preparations for CSD 9 (in 2001, with energy as the main topic). The first one-week session of the group will be held for immediately before or after the CSD's intersessional meeting in February 2000. The group will then report to the CSD 8 in April 2000. With this decision, CSD followed the program of action adopted by the UN General Assembly at its special session in 1997 (UNGASS).

The group will be led by a 5-member bureau, with representatives from each of the regional groups of the UN (OECD countries, Eastern Europe, Latin America, Africa and Asia). The bureau will include two co-chairs, one from a developing country and one from a developed country. Iran was selected as the developing country co-chair. Austria and Norway are both interested in acting as the developed country co-chair, but since neither is an elected member of the CSD, it is not clear whether either one will be allowed to serve. This resulted in some bureaucratic problems which have delayed the appointment of the developed-country co-chair at least until August. This, in turn, delays the work of the bureau.

Uphill Struggle?

NGOs are disappointed that preparations are likely to be delayed until the co-chair issue is sorted out and that the substantive agenda for the first meeting was not even discussed at the CSD meeting. Another concern of NGOs is that if two of the main oil-producing countries (Iran and Norway) were to be chairs of the committee, interest for fossil fuel alternatives would not be great, and it could be an uphill struggle to get any substantive proposals adopted by the committee.

The CSD resolution encouraged the participation of NGOs. The participation of NGOs will follow the same rules that apply for CSD meetings, where e.g. INFORSE has general access.

Austrian "Do it Yourself" solar collectors is one of the large-scale success stories included in the INFORSE papers. Photo by: Solarprojekt Mostviertel (Purgstall) and ÖAR-Energieberatung.

CSD Energy Caucus

The CSD Energy Caucus is a an open forum for discussions among NGOs about energy in relation to CSD. It has just extended its activities with a website and an e-mail list. You can sign up on the list via the internet (see below in the box).

INFORSE: NGO Visions on Large-Scale Implementation and NGO involvement

In cooperation with World Watch Institute, INFORSE has started development of NGO visions to use in the CSD9 process. For each world region, a paper is written on *large-scale successes with sustainable energy*, and how NGO experience can contribute to this. (See also http://www.inforse.dk.) The aim is to develop a comprehensive material for the CSD9 and its preparatory expert group on the need for integration of sustainable energy in other sectors, the scope for large-scale implementation of sustainable energy in the 21th century, and the crucial roles of NGOs in this process.

Information: CSD Energy Caucus, Gail Karlsson, e-mail: gkarlsson@igc.org, and INFORSE (See page no. 2).

NGO-involvement, How?

- Join the CSD energy caucus e-mail list: energy-csd@egroups.com, and visit the lists' website http://www.egroups.com/list/energy-csd.
- Join the work of INFORSE to develop NGO material to CSD9: contact the INFORSE Secretariat, att. Michael Kvetny.
- Propose a good candidate from your country to its official seat in CSD9 preparatory committee, and from your region to its bureau.
- Follow the national preparations.

New Wind Record

Wind cooperative "Lynetten". Photo: Bonus

In 1998, about 2,590 MW of new wind power capacity was installed worldwide. This is 66% more than the previous record year, 1997.

The total worldwide capacity reached 10,000 MW by the end of 1998 from some 38,500 wind turbines installed during the past 19 years. These wind turbines will produce about 20 TWh/yr - corresponding to 0.15% of the worlds total demand for electricity today. In 1998, half of the capacity was installed in 3 countries: Germany, Denmark and Spain.

Information: BTM Consult Press Release 22.04.99, http://www.btm.dk.

New Alliance for Cogeneration

A new worldwide coalition for cogeneration for heat and power was formed in end of 1998. This new "International Cogeneration Alliance" (ICA) launched in February a blueprint for the power industry asking for further steps to promote the shift from centralised to localised power production.

ICA is a trade association for cogeneration and local power production industries. It promotes competitive energy markets, and unlike many environmental organisations it supports the "flexibility mechanisms" (Emissions trading, joint implementation etc.) of the Kyoto Protocol. It does this under the condition that these are well-designed and effective.

More information: ICA, rue Gulledelle 98, 1200 Brussels, Belgium. Ph:+32-2-7722611, fax:+32-2-7722508 e-mail:ica@mailandnews.com, http://www.localpower.com.

CDM: A Pro-active Approach to Sustainable Development

By Asger Garnak, FED/INFORSE

A purely market-based CDM may lead to "sustainable dumping".

However, a number of measures can be taken to ensure that CDM projects really will contribute to sustainable development

See also Editorial on page no. 2.

Drawing: Rustan Vania/CSE

One of the two main objectives of the Clean Development Mechanism (CDM) is to contribute to sustainable development in the developing countries (non-Annex I countries.) It follows from this that CDM projects must be acceptable to the host country and in line with the country's priorities and criteria for sustainable development.

The question arises whether the contribution to sustainable development of a CDM project should simply be left to market forces and be negotiated as part of a bilateral agreement between the industrialised country (Annex I country) investor and the host country. There are several reasons why in many cases this will not be sufficient. Thus, supportive initiatives should be taken to ensure that CDM projects contribute to sustainable development:

1.) Many host countries will find themselves in a relatively weak position when negotiating with potential foreign investors that are in possession of more information to assess impacts, both in terms of costs and benefits of a given project. Experience from the AIJ (Activities Implemented Jointly) pilot phase confirms that lack of capacity on the part of host countries is often seen as a serious constraint and may lead host countries to enter into project agreements that turn out to be far from ideal from their perspective.

2.) In the absence of guidance and standards regarding sustainability, a market-based CDM may drive host countries to sacrifice national priorities regarding sustainability and development as they compete for CDM investment. This could result in a downward spiral of "sustainability dumping" which would be in the interest of no party. This perspective is of particular relevance to the least developed countries (LDCs), which are likely to find it more difficult to attract foreign CDM investment.

3.) It would be tragic to see CDM projects implemented that have serious negative social or environmental side effects or fail to contribute substantially to the host country's development. If horror scenarios were to materialize, such as large hydropower dams flooding valuable tropical forest and displacing large numbers of indigenous people, the whole CDM would be compromised.

Recommendations

1.) Host country capacity building is at the core of efforts to ensure that CDM projects contribute to sustainable development. Host countries should be supported in developing and implementing a structured process of defining national sustainable development priorities and strategies in relation to CDM. LDCs should receive special support for this process, which should be open and participatory and involve all relevant national stakeholders.

2.) Non-Annex I countries - in particular LDCs - should be supported in building capacity that will enable host country actors to take part in project identification, negotiation, and monitoring. Project appraisal and approval processes should be put in place that help to ensure that host country benefits from CDM projects are maximized while adverse effects are averted. These processes, too, should be open and participatory, involving local communities affected by the projects.

3.) It is often assumed that sustainability is too vague a concept to be included in a verification and certification process. However, experience shows that it can be done relatively easily. The ILUMEX verification pilot project serves as a good example of this. In that project, verification is based on previous work on sustainable development indicators and cooperation with the host government. The methodology does not aim at quantifying sustainability, but it ensures that development is moving in the right direction and that adverse impacts are identified and minimized. The certifying company for the project recommends that for future CDM projects such a methodology be built into the project design, monitoring, and verification process. The process should help to ensure that CDM projects are not inferior in terms of social and environmental sustainability to projects carried out by UN agencies.

4.) The foreign investor company developing projects in a non-Annex I country has a special responsibility for its actions in the host country, as these will often have important consequences for essential infrastructure development within the country. Annex I investors should therefore be required to adhere to a reasonable code of conduct guiding transnational companies operating abroad in countries that often have limited capacity to monitor foreign investors. Reference can be made to the code of conduct developed by the OECD or the work that has previously been done on drafting a UN Code of Conduct for Transnational Companies.

5.) It is important that coherence among the various UN conventions on sustainable development and environment is sustained. In order to ensure this, the validation and verification process should establish that the project does not violate either sponsor or host country commitments to sustainable development as laid down in international conventions and agreements.

6.) Finally, an indicative list of eligible projects would help facilitate that the bulk of CDM funding is directed toward the energy technologies of tomorrow, i.e. cutting-edge energy efficiency and renewable energy. CDM projects should not provide non-Annex I countries with technologies that only represent marginal improvements over obsolete fossil fuel technologies. Nuclear energy should not be included in such a list either, as it is a clearly unsustainable source of energy.

More information:
Forum for Energy and Development (FED)/
INFORSE Secretariat, P.O. Box 2059,
1301 Copenhagen K, Denmark.
Ph: +45 33121307, fax: +45 33121308,
e-mail: inforse@inforse.dk. or
UNFCCC, http://www.unfccc.de/.
The article was an input paper for a UNFCCC Workshop in Bonn, April 1999.

European Energy Conservation Activities

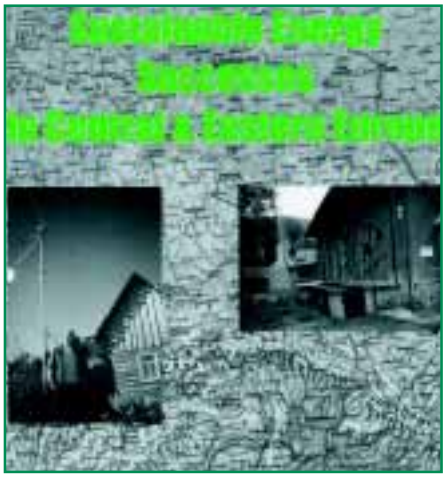
For the Environmental Ministers Conference in Århus, June 1998, a guideline was made for energy conservation in Europe. The ministers further decided to take various actions to increase energy efficiency in Europe (see Sust. Energy News 21 and 22). While it is up to each country to use the guidelines, a follow-up of common actions is under way in several international fora. The UN-ECE committees on environmental policy and on sustainable energy are both discussing follow-up. The issue is also discussed as part of the work on the energy efficiency protocol for the European Energy Charter.

From NGO-side, INFORSE-Europe and the Energy and Climate Working Group of the ECO-Forum will follow the activities. We will:

- follow the UN-ECE work including the Environmental Committee meeting on September 20-24 and the Sustainable Energy Committee meeting in November, both in Geneva.
- follow the international working group on the Energy Charter Protocol from its first meeting, June 10-11 in Brussels
- evaluate the effects and opportunities of these international activities
- develop NGO follow-up activities, e.g. NGO-based evaluations of progress, NGO-proposals for activities

The members of the Energy and Climate Group and INFORSE-Europe will receive further information by email in May.

More information: INFORSE-Europe, e-mail: ove@inforse.dk



Collections of success stories was one of the NGO contributions to the European Energy Conservation Initiative in 1998. The publication is available at INFORSE-Europe. Address: Gl. Kirkevej 56, 8530 Hjortshøj, Denmark. fax: +45-86227096, e-mail:ove@inforse.dk, http://www.zpok2.hu/inforse.

EU Discussion on Renewables

The EU Commission is considering a directive on renewable energy in the open electricity market. After a long consideration period, it published a working paper in April, *"Electricity from Renewable Energy Sources and the Internal Electricity Market"*. The paper favours "market-based" systems for support of renewable energy, e.g. the English NFFO (Non-Fossil-Fuel Obligation), rather than a system with fixed tariff(s) for purchase of renewable energy electricity, as in Germany, Spain and Denmark.

Several environmental NGOs find that EU-action is needed to support renewable energy to achieve EU climate goals. But a number of renewable energy proponents prefer no EU initiative rather than a directive that will abandon the fixed tariff systems that have proven very successful in promoting renewable energy.

Information: INFORSE-Europe and EU-web site http://www.europa.eu.int.

EU Campaign for Renewable Energy "Take Off"

The EU Commission is planning a "Take-off" campaign for renewable energy. This will be one of the tools to achieve the goal of 12% renewable energy by 2010 that was included in the EU White Paper on renewable energy from 1997. The Commission invites all interested parties to take part, but no budget-line directly supports the activities from EU. On the other hand, activities could be supported by the EU ALTENER program as well as the new 5th Framework Program for Research and Technical Development. Within this framework, the JOULE program and the new program for Clean and Efficient Energy Use (replacing the previous THERMIE) has increased budgets for renewable energy.

Source: EU Commission DG17.

'Biomass to Fuel 10,000 MW Electric Power' is one of the proposals. Photo: biopress/T.Skøtt

Jobs and CO_2 Reductions in the Building Sector

900,000 jobs could be created in the construction sector in EU via existing and affordable energy efficiency measures. This would contribute to increasing employment in EU and be a valuable in helping countries meet their CO_2 reduction targets. This is the message of a statement by the European Construction Forum (ECF) and the European Alliance for Energy Efficiency in Buildings (EuroACE). The associations have identified the current lack of regulatory and fiscal coherence in the EU as a major barrier.

Source: ECF (statement 11.03.99) c/o FIEC, 66 Ave. Louise, 1050 Brussels, Belgium. e-mail:fiec-bru@enter.org, Ph:+32-2-515535, fax:+32-2-5110276.

K2R4* Decision May be in July?

EBRD, the European Bank for Reconstruction and Development, has delayed its decision on funding of the K2R4* until July. Now there is a hope for a "no" to the EBRD loan, and that the German Parliament most likely will decide not to support the project at a session in June, and that the G7 Meeting in June will give up the support.

Join the Bankwatch Network's Signature Campaign to stop K2R4!

** Khmelnitsky 2 and Rivne 4 nuclear power reactors in Ukraine.*

Information: CEE Bankwatch Network, Kratka 26, Praha 10, 1000 00, Czech Republic. Ph/fax:+ 420-2-78 16 571, e-mail: petr. hlobil@ecn.cz, http://www.ecn.cz/k2r4.

Belarus Green News

With support from the Danish environmental assistance for Central and Eastern Europe, the Belorussian environmental youth movement "Belaya Rus" is now publishing a monthly newsletter "Zelonije Novosti" (Green News). The main target of the newsletter is Belorussian youth groups and schools, but an English summary will be made for international contacts. The project is co-organised with OVE, the Danish Organisation for Renewable Energy, and includes an environmental information tour in Belarus.

Information: Natasha Petrushkevich, Belaya Rus, Scaruna Av. 65 PB 65, 220027 Minsk, Ph:+375 17 2399129, fax:+375 17 2313049, e-mail: natasha@ecodept.unibel.by, eco_natasha@hotmail.com, and Gunnar Olesen, OVE, e-mail: ove@inforse.dk.

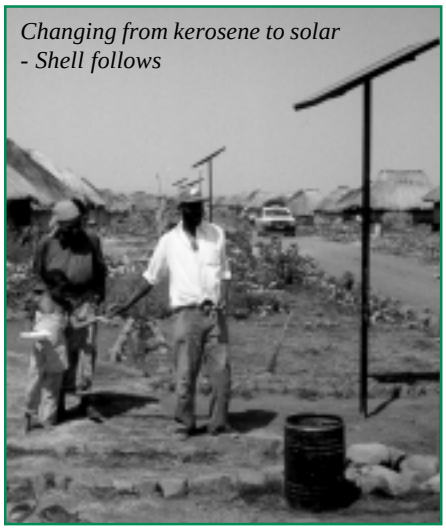
Workshop Supported the Local African Entrepreneur

Kumasi, Ghana, 22-26 February '99

A new breed of African entrepreneurs is entering the private renewable energy technology (RET) market, where they have a vital role to play in the commercialisation and sustainability of RET. There is a vital need to strengthen these African entrepreneurs. They should also be encouraged to develop manufacturing capability through stimulation of demand for their products and technical assistance from R&D institutions. This was one of the recommendations of the UNESCO Workshop on Renewable Energy in West Africa that was held in Kumasi, Ghana, from 22-26 February 1999. The meeting with the theme *"Towards Greater Utilisation of Renewable Energy in the West African Sub-region"*, brought together RET stakeholders from West Africa. AFREPREN/FWD, INFORSE regional coordinator, also presented a paper on the status and the prospects. Other recommendations for the region were:

- Efforts should be made to explore mobilisation of financial resources in the informal sector so that these resources can be used to promote the purchase of renewable energy resources;
- Relevant bodies should be encouraged to develop appropriate standards for the import and local manufacturing;
- Universities and R&D institutions should develop their capacity to design projects that could attract financing from donor agencies. In this regard, training in the preparation of project proposals should be organised for university personnel and researchers; and,
- Network projects involving organisations in different countries should be developed. The UNESCO-supported Renewable Energy Network was recommended to facilitate the identification of specific projects that would be implemented by collaborating institutions in different countries.

More information:
F.O. Akuffo or Abeeku Brew-Hammond, Department of Mechanical Engineering, University of Science & Technology. 48 Okedee Road, Kumasi, Ghana. Ph: 233-51-60231, fax: 233-51-60232/26026, e-mail: foakuffo@africaonline.com.gh and Kite@ghana.com.



Changing from kerosene to solar - Shell follows

Shell's Renewable Initiative Starts in South Africa

Replicable Financing Route

Shell International Renewables (SIR), started its operations last year with a mission to develop sustainable energy globally. This year, it has been examining solar power and biomass solutions in Africa, India, and South America. One SIR initiative is a project planned for South Africa in collaboration with Eskom, the South African Utility. The Eskom Shell Solar Home Systems (the joint venture company to be formed by Eskom and SIR) will install the first 6,000 solar power systems over the next three to four months. A total of 50.000 systems are expected to be in place after a total of 18-24 month period. The project will be marketed through a planned local network of franchised outlets with intensive local community participation.

The public/private sector tie-up evident in the South African scheme offers a replicable financing route else where in Africa. SIR, however requires partners to make such schemes feasible. SIR is willing to contribute 50 % of the resources required to implement the projects. Given Africa's limited range of markets where commercially sustainable rural electrification projects are feasible, multilateral financing agencies (e.g. the World Bank and the African Development Bank) are perceived as SIR's natural partners in promoting renewable energy projects. Countries targeted include Morocco, Ghana and Botswana.

Source: FWD Kenya, INFORSE regional coordinator, Kenya. Extracted from articles: Renewable Energy World (Nov.'98) James & James, & African Energy (Jan.'99) Financial Times Energy.

Graduate Student Forum on Distributed Electricity Services in Africa

Cape Town, South Africa, 1-6 June '99

The Science, Technology and Environmental Policy Program of the Woodrow Wilson School, Princeton University, together with other collaborating institutions, is organising a forum to investigate the prospects for distributed electricity services in developing countries with particular focus on Africa.

The Forum will be held from 1-6 June 1999 in Cape Town. Participants will include graduate students from the collaborating institutions and other universities, Eskom (the South African electric utility) and officials from South African Energy Ministries.

The core components of the Forum are:

- Preparation and presentation of policy papers by student participants
- Students workshops facilitated by expert participants to grapple with difficult technical and policy issues; and
- A joint forum resolution making specific policy recommendations to encourage economically efficient and environmentally progressive use of distributed energy service concepts.

The forum is expected to:

- Educate student participants about trends in and prospects for distributed electricity services with an emphasis on environment and development implications;
- Promote on-going collaboration among student and expert participants;
- Generate and disseminate creative policy oriented research regarding this critical emerging field; and
- Influence public policy towards the rapidly evolving electricity sector.

More information: Daniel Kammen, STEP Program, Woodrow Wilson School of Public and International Affairs, Pinceton University, Five Ivy Lane NJ 08544-1013, USA. Ph: +1-609-258-2758, fax: +1-609-258-6082/2394, e-mail: kammen@princeton.edu, http://www.wws.princeton.edu/~forum/

EIA Training Course in East Africa ´99

By Ulrik Jacobsen, FED, Denmark

The Environmental Impact Assessment (EIA) Fellowship is for NGOs and local authorities. It is organised by Forum for Energy and Development / INFORSE Secretariat, Denmark. Expenses are covered. Application deadline*: 18 June 1999.*

There is an insufficient recognition of the environmental impact of small and medium scale development activities in which NGOs and local authorities are likely to be involved. One major reason for this is a lack of local expertise, suitable tools and methods for assessing environmental impact.

The Environmental Impact Assessment (EIA) training course in East Africa has been designed to address these needs. The course is expected to enable environmental NGOs and local authorities to conduct EIAs. It aims to facilitate the integration of EIA in the mechanisms for planning, approving and funding of small and medium scale development activities.

Training will be in 3 parts:

- *17 July - 1 August 1999*

Introduction course at Arusha, Tanzania.

- *1 August-21 November 1999*

Practice of EIA in the participants' home country and organisation.

- *21-28 November 1999*

Follow-up workshop at Arusha.

New Manual and Internet

Based on the practice, a manual will be worked out that will suit for the local working conditions of NGOs and local authorities. In order to continue and institutionalise the newly acquired skills, an internet conference will be set up which will serve as point of reference and quality control for practitioners of EIA.

Application - Fellowship

The target group is managers and employees from environmental NGOs - local, national and international - and local authorities in Uganda, Tanzania and Kenya. *Women are encouraged to apply!*

Applicants should contact the Danish Embassy in their home country for an application form.

The deadline for submission of applications is*:* **18 June 1999.**

The fellowship covers the expenses for participation in the workshops, travelling and daily allowances. Some of the costs of the practice will be paid as well.

Organisers

The training is organised by FED (Forum for Energy and Development), a Danish umbrella organisation of NGOs, and JEEP (Joint Energy and Environment Projects) in Uganda with support from DANIDA (Danish International Development Assistance). The project cooperates with the offices of the Danish Development NGO MS in Uganda, Kenya and Tanzania and the International Council for Local Environmental Initiatives (ICLEI).

The course will take place at MS TCDC (Training Centre for Development Co-operation) in Arusha, Tanzania.

More information: Ulrik Jacobsen, Forum for Energy and Development (FED) /INFORSE Secretariat, P.O. Box 2059, 1301 Copenhagen K, Denmark. Ph: +45 33121307, fax: +45 33121308, e-mail: inforse@inforse.dk, http://www.inforse.dk/fed.

African Solar Council Meets

Dakar, Senegal, 6-9 July 1999

By Secou Sarr, ENDA -TM, Senegal INFORSE Regional Coordinator

Since the World Solar Summit at Harare in Zimbabwe in 1996 which led to the adoption of the World Solar Program, various meetings have been held throughout the world about the promotion of sustainable energy. The implementation of the Program has already started at different levels. Framework for consultation at a regional level has been made to accompany the execution of the Program.

It is with this perspective that the *Constitutive Meeting of the African Solar Council* will be held in Dakar, Senegal on 6-9 July 1999.

The aim of the Meeting will be to put in place an African framework of consultation, and orient and support countries in the implementation of Solar Programs. Another objective is to strengthen the actors in the domain of solar energy, principally at the state level so that states can commit themselves further to the promotion of sustainable energy.

States, NGOs, institutes, national research centers, electrical companies and associated potential members are invited to this Meeting, which is under the direction of Mr. Abdou Diouf, the President of the Republic of Senegal and President of the African Solar Council.

More information:
Secou Sarr, ENDA TM Energy Program, 54 rue Carnot, BP. 3370, Dakar, Senegal. Ph: +221-8-225983/82224 96, fax: +221-8-2175 95/8235157, e-mail:energy2@enda.sn, http://www.enda.sn/energie/indexnrj.htm

SEED - New Program Started in South Africa

A new program, SEED (Sustainable Energy, Environment and Development) started in South Africa. Its aim is to build capacity in local authorities and service providers thorough training, information campaigns and demonstrations.

The advisor is Rene Karottki from OVE, the Danish Organisation from Renewable Energy. He moved from Denmark to South Africa to work on the project in the next 2.5 years. He has been one of the Secretaries of INFORSE and one of the editors of this newsletter since the network was established in 1992.

In the next issue, we will have a longer article on the SEED.

More information: Please see SEED at the publication list.

Improved Water Mills in Nepal

NGO Promotion

By Ganesh Ram Shretha, Lumin Kumar Shrestha, Centre for Rural Technology (CRT), Nepal. Shortened by the editors.

40,000 families have benefited until now from the program.

The grinding capacity doubles and the quality is increasing.

CRT, a Nepalese NGO and member of INFORSE, is active in improving water mills.

25-40,000 traditional water mills in operation can be improved in the future.

Hydropower has been in use in Nepal for centuries for grinding grain. These water mills (ghattas) have wooden blades/shafts and a low power output (less than 0.5 kW). It is estimated that about 25-40,000 traditional inefficient water mills are in operation. These mills cannot serve the increasing processing needs of the people.

Since 1990, the Centre for Rural Technology (CRT), a Nepalese NGO and member of INFORSE, has been actively involved in the promotion and dissemination of the improved water mills by motivating and supporting the local water mill owners. With German GTZ support, CRT is making efforts to improve the mills' efficiency (up to around 3 kW) and use the power for diversified activities such as efficient agro-processing (grain grinding, paddy hulling, oil expelling).

Improvement

The improvement has been achieved mainly by replacing the wooden runners and shafts with metallic ones.

So far, 467 units of traditional ghattas have been improved in Nepal. This has generated additional power of 712 kW to be used for various rural applications.

The improvement work has so far served about 40,000 rural families (about 60 families/ghatta.) These 467 improved units comprise only 2% of the existing traditional water mills, a fact which indicates the tremendous potential for improvement activities in the country.

CRT´s Promotion Process:

- Information collection and assessment of needs
- Collaborating with partner organizations
- Identification of innovative traditional mill owners and demonstration sites
- Orientation/Demonstration
- Demand collection for the installation
- Survey work
- Support for linkages with bank and manufacturers
- Installation
- Organising field-based training on operation and management
- Identify local promoters
- Regular follow-up/monitoring and feedback collection
- Further promotion through trained local promoters

Double Grinding Capacity

The traditional mill's power output ranges between 0.2-0.5 kW and the grinding capacity ranges between 10-20 kg maize per hour. Improvement of these traditional water mills is achieved by improving the various components of the mill, but the major break-through is replacing the traditional wooden runner with a metallic runner that has a better hydraulic design with cup shaped blades. The improved power output ranges between 0.5-2.5 kW and the grinding capacity ranges between 20-50 kg maize per hour.

Increased Income & Status

The water mills are owned either individually or on group/community partnership basis. Generally, the owner is also the operator. The grain-processing fee is collected mostly in kind and ranges in the ratio from 1:10 to 1:15.

The mill owner's income has increased because of the increased processing capacity. The mill can process more grain and in this way attracts more customers from distant villages. The customers are also willing to pay a higher service charge for more efficient processing. The payback period for the additional investment made on the water improvement is about 6 months.

With the operation of the traditional water mill, only 50 to 75 % of the flour/grain consumed by the mill owner's family came from flour collected from the mill as service charge. After improvement, the service charge collected is enough to feed the family. In some cases, they can even sell extra flour in the local market.

The improved water mill owners now have a higher social status in the village, and the enterprise is considered to be prestigeous.

Operation Time Reduced

The higher efficiency has reduced the necessary hours of operation, which has reduced the drudgery for the owners. Previously, they used to operate their mills day and night (24 hours), especially during the season and festivals. The improved mill generally operates 6 to 12 hours. The decreased processing time also means a drastically shorter waiting time for the village customers. The time saved is utilised for household sanitation, child care etc.

The operation period during dry season was also extended because the mill can be operated with low discharge of water. Some new mills have also been installed at sites where the traditional type can not operate due to insufficient water flow.

Better Quality

The flour from the improved mill is finer than that of the traditional one. The quality is also better than that of the diesel mill. Since the rpm of the grinding stone of the diesel mill is much more (about 700) than that of the grinding stone (natural) of the improved water mill (about 100 rpm), more heat is generated which deteriorates the taste and keeping quality of the flour.

Less Repair, Better Jobs

The traditional mill owners had to replace the wooden runner every 2 years, while the improved mill runner can be used for more than 10 years. The owners had to tighten the wooden blades of the runner every 2 to 3 days. The improved mill only requires the fixing of the pin bearing every 2-3 months.

The technical and management skill of the improved mill owners needs to be upgraded through proper need assessment, and training, especially when they are willing to diversify the end uses. Strengthening of the technical capability of the local blacksmiths and promoters is also needed for the promotion and repair/maintenance of the mills. Consequently, local blacksmiths, carpenters and technicians receive better job opportunities as their technical capabilities are enhanced.

Gender Involvement

If the mill is far away from the village (e.g. more than a 1-hour walk), men are involved in carrying the grain to the mill. The frequency of going to the mill is in this case about twice a month, and the amount of grain taken at a time ranges from 50-75 kg. In a village where the mills are within a short distance, men, women and children are equally involved. The frequency is about 4-5 times per month and the amount of the grain taken to the mill ranges from 5 - 40 kg.

More End-Use Applications

Most of the improved mills disseminated are of the short-shaft type and are only used for grinding. Only a few of the improved mills have a long shaft for multi-purpose application like paddy hulling, and very few can generate electricity. Rural entrepreneurs generally lack the technical, managerial and risk-bearing capacity to go for bigger-scale technology such as cross-flow turbines and other existing micro-hydro technologies. The high acceptance of the short-shaft improved ghatta is due to increased processing capacity; low additional investment cost and risk; simple modification in the existing ghatta set-up; low level of technology; good quality of processed grains; and less repair and maintenance required.

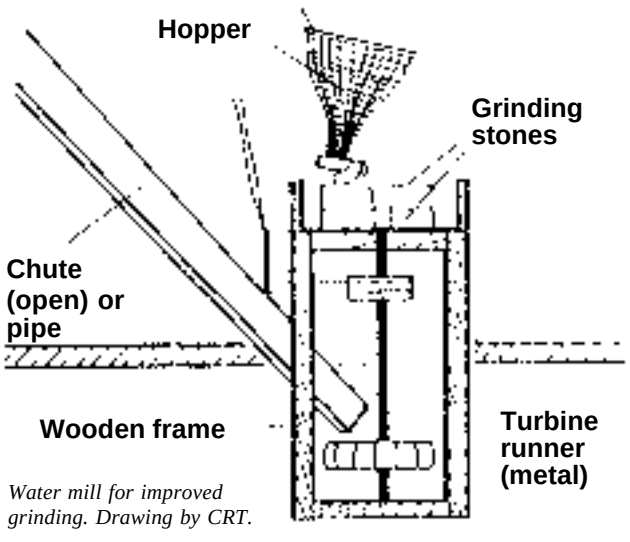
Presently, adequate research, development and financing schemes are lacking for wide dissemination of the diversified uses of the improved mills. The electricity generation option is also affected by the expected extension of the national grid, which is either not fulfilled or fulfilled after a long waiting period. The generated electricity, however, would provide proper lighting with social benefits such as longer working hours and study hours for children.

Subsidy & Support Needed

Water mills generally belong to the poorest section of society and serve many beneficiaries a source of energy for grinding. However, there is no subsidy provision for improved water mills like that provided for biogas plants, irrigation technology, solar energy technology etc.

The water mills have not been given the necessary priority in the national planning process. Most decision makers lack proper insights into the importance of improved water mills, and commitment to their promotion. District-level support agencies need to include the improved water mill promotion activity in their Annual Plan and implement it as part of their rural development project. To achieve this, thorough orientation is needed at all levels.

The inter-links have to be strengthened among the research organisations and local bodies such as district and village development committees, government extension agents, local banks and GO/NGO community based support organisations.



Water mill for improved grinding. Drawing by CRT.

More Flexible Loans Needed

The majority of the mill owners installed the improvement kit by paying its full cost, but some also received bank loans. Our experience is that the financing institutions generally have to be more supportive and rural minded in relation to the mill owners and make simpler lending procedures. However, there have been changes in the financial policy of the banks in recent months.

Phase out Diesel

Since water mills must compete with diesel mills run by subsidised diesel oil, there should be subsidy support for improved water mill promotion as well. Such support could be for hardware, software and interest. From the environmental and economical aspect, improved water mills should be given more focus than the diesel mill with a view towards sustainable development of power for enterprise development in mountainous regions. Systematic phasing out of diesel mills needs to be given highest priority.

Improved installations have already reduced the number of diesel mill installations and the consumption of diesel oil, and subsequently reduced the draining of money out of the village. But the diesel mill is still a threat to the water mills, as villagers sometimes prefer it due to its fast processing even though the processing charge is comparatively high and the quality is poor.

Further Efficiency Potential

There is need for continuous and adoptive research to develop more appropriate and more versatile technical solutions for the wider acceptance of the technology. This could be done in the areas of water intake from the canal, the chute, grinding stone and mill housing.

Database Needed

A database and an inventory study is needed on the number and status of the existing water mills and the potential scope for the improvements required. This could be the basis for a proper long-term plan and an implementation project.

More information:
Centre for Rural Technology (CRT)
PO.Box 3628, Kathmandu, Nepal.
Ph: +977-1-260165/-256819, fax: +977-1-257922,http://www.panasia.org.sg/nepalnet/crt/home.htm.

Canadian Green Energy Versus Nuclear

The Canadian Nuclear Awareness Campaign and Greenpeace Canada have launched a campaign to keep the oldest Canadian reactors closed, the A series reactors at the Pickering A and Bruce A nuclear power plants. These 8 reactors are now closed for repair and it will cost an estimated CAN$ 5 billion to start them again. The campaign has a number of proposals:

- promote renewable energy with minimum quotas for renewable energy plus mandatory labelling of electricity specifying where it comes from
- promote efficient cogeneration of heat and electricity
- funding for electricity conservation
- phase out coal-fired power plants
- do not allow the power company "Ontario Power Generation" to avoid the payment of its debt of CAN$ 23 billion for its power plants via a bailout.

Source: Nuclear Awareness Project, Ontario, Canada. e-mail:nucaware@web.net, Ph/fax:+1-905-8520571.

303 US NGOs & Businesses for Sustainable Energy

On April 15 1999, a large group of environmental organizations, consumer groups and businesses released a statement for a US national energy strategy. Its proposed goals for 2020 are:

- to decrease energy use by 10% from today's level;
- to use renewable energy to meet at least 25% of the nation's energy demand;
- to reduce reliance on fossil fuels by at least 30%; and
- to phase out the use of nuclear power.

The statement was delivered to all members of US Congress and key officials in the Clinton Administration.

Source: Sunday Campaign and Sustainable Energy Coalition, http://www.ecomall.com/activism/sec26.htm, sec27.htm, sec28.htm and e-mail list *(See page no.14.)*

Stand Alone Mobile Hybrid PV-Wind Plant at Folkecenter, Denmark

By Lars Yde, Folkecenter for Renewable Energy, Denmark

A mobile hybrid PV-Wind plant was developed at the Folkecenter for Renewable Energy in Denmark.

It can be easily packed and transported in a container, which then serves as an office.

Mobile Power Plant

A mobile PV-Wind hybrid system has been designed and installed at the test field at the Folkecenter for Renewable Energy in Denmark. The plant consists of a 1.5-kW wind turbine, 1.0-kW solar panels and a battery bank with an accessible capacity of 20 kWh.

The hybrid system can be easily transported and erected anywhere in the world that is accessible by a lorry with a 20-foot container. The batteries, solar panels, frames and wind turbine with tower foundation and blade can all be easily packed inside the container for transportation. After arrival at the site, the transport container serves as a very fine and secure office for the power plant.

Presently, the PV panels are attached so that they function as a shelter at the southern side and the wind turbine is erected just 5 meters away.

What are the advantages of a combined system?

A photovoltaic plant has, under Danish climate conditions, a relatively high production in summer and a relatively low production in winter. A wind power supply has serious problems in summer, as periods of up to 2 weeks with very low wind may occur. A combination of solar and wind energy supply reduces the demand for storage capacity considerably.

Results of Computer Simulation and Analysis

In the spring of 1998, a data acquisition system was applied and the necessary data for investigation of the plants performance by computer simulation was collected. The simulations are carried out by the program "Hybrid2 Simulation Model" which was developed by NREL, National Renewable Energy Laboratory, Golden, Colorado, USA. It is a very strong tool for detailed analysis of hybrid systems.

The Danish Design Reference Year (DRY) is used for climate data for the simulations in order to investigate the plant's sensitivity to :

- Size and age of the battery bank
- Different consumption patterns
- Different size and ratio between wind turbine, solar panel and battery bank.

The analysis confirms the assumptions made in the design phase that optimum performance (that is, the maximum coverage of the wanted consumption), under Danish climate conditions, is obtained when the ratio between rotor area and area of the solar cells is one to one.

Another assumption made in the design phase was that the battery bank should have a capacity to cover 2 days' consumption. The simulations have shown that with an accessible capacity of 3 days the percentage of coverage of the wanted consumption is 85.9%. However, if the battery is decreased to a capacity of 1.5 days, the coverage would only be reduced to 80.7%.

The plant proved to be insensitive to the pattern of consumption. Shifting the load from constant 300W (7.2 kWh/day) to a pattern with peaks at 7 a.m., 12 a.m. and 7 p.m. only decreased the load coverage from 85.9% to 84.5%, a reduction of 2%. If the consumption mainly takes place during the daytime, the load coverage increases to 87.2%, also 2%.

Surprisingly, the simulations showed that the optimum number of batteries is somewhat lower than assumed in the design phase. The mistake was to use the MPP (Maximum Power Point) at 15 volts because it corresponds to the standard conditions at 25°C. At least 85% of the solar energy that radiates the solar panels is changed into heat. Therefore, it is more likely that the average temperature is 65% when the panels produce electricity.

Economy

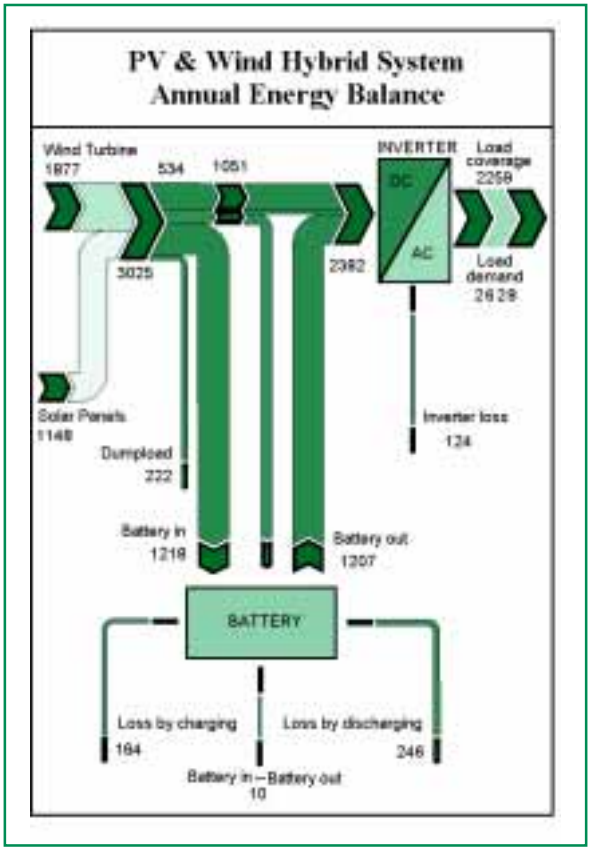
The final and most important question is what is the price per covered kWh? The economic analysis for the optimum system solution shows an average kWh price of 5.95 DKK. (0.9 US$).
The lifetime of the plant is assumed to be 20 years and the battery bank shall be replaced every 5 years.
Using a battery of half the size would reduce the kWh price to 5.14 DKK (0.8 US$) and the load coverage from 85.9% to 80.7 (6%) if the lifetime of the battery is still considered to be 5 years.

Real Life Experience, Lesson Learned

The PV panels have a V_{OC} (open circuit voltage) of 20 volts. That makes 500 volt for the 22 batteries and 22.7 volts for each. However, the dump load in the inverter will start operating at 405 volts and will thus protect the batteries. 405 volts, 18.4 volts per battery, is still a bit too much. It will not damage the batteries, but it may cause extra water consumption. That is exactly what was the experienced. Another experience is that it is important to have easy access to the batteries for refilling water, which is unfortunately not the case in this plant.

More information:
Lars Yde, technical editor of Sustainable Energy News,
Folkecenter for Renewable Energy,
P.O. Box 208, Kammergaardsvej 16,
7760 Hurup Thy, Denmark.
Ph: +45 97956600,
fax: +45 97956565,
e-mail: energy@folkecenter.dk,
http://www.folkecenter.dk.

Source of the photo and graph:
Folkecenter for Renewable Energy, Denmark



Computer Tools for NGOs' Alternative Energy Plans

What is the cheapest way to increase renewable energies for electricity?

How to convince a utility that renewable energies are their future?

How to ascertain that a computer planning model does not cheat renewables?

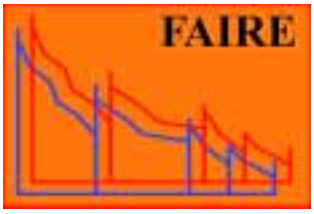
By Gunnar Boye Olesen OVE, Denmark

For NGOs working for renewable energy and a sustainable energy strategy, questions like those above will arise whenever they are involved in discussions about the future of grid-based electricity supply. It is common experience that electric utilities make their plans according to their traditional experience, and do not give fair consideration to renewable energy, energy efficiency and other local solutions. Their arguments for this are often based on results from large computer models of their electricity network and supply. Their models are not publicly available. With no access for independent reviewers or NGOs, it is not possible to check the data.

Several NGOs have found it necessary to work out their own, alternative plans and models for the energy system, particularly for the electric grid. Also, a number of computer tools exist with which NGOs and independent researchers can make their alternative models and scenarios. Such tools and models have been crucial on several occasions for campaigns for sustainable energy:

- A Danish model developed by three university groups was used already in 1983 to make a detailed alternative energy plan for Denmark, a plan that was supported by many Danish NGOs and in many ways inspired the official Danish sustainable energy plan "Energy 2000" launched in 1990. The model was further developed into the SESAM model that has been used by regional planners in two Danish counties as well as in the Czech Republic, Poland and Germany.
- The Californian part of the Environmental Defence Fund developed the Elfin model during the 1980's for its debates with utilities and public utility regulators. This model is now used by the Californian Pacific Gas & Electricity and other large utilities as well as by NGOs in several countries

Some models (e.g. SESAM) have a detailed modelling of cogeneration and heat supply, while others (e.g. Elfin) primarily give a detailed model of the electricity supply system.



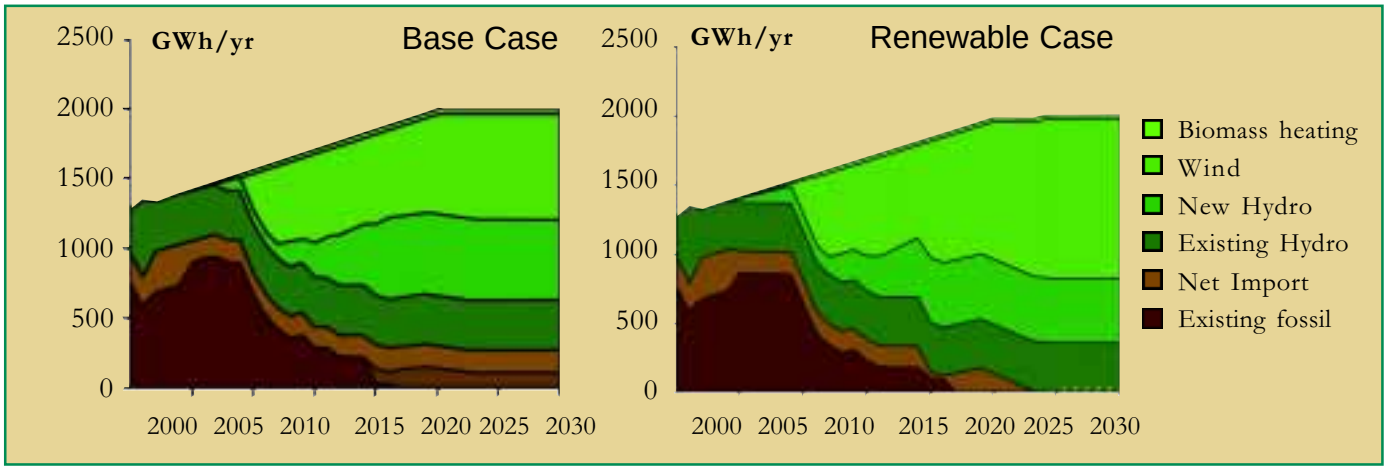
FAIRE Project

OVE, The Danish Organisation for Renewable Energy, and six other NGOs and university groups have just finished a project (the FAIRE project) in which the Elfin model was used to develop scenarios for five local supply systems in EU. Via the project, economically optimal scenarios were found with and without environmental costs for each of the areas. Most of the scenarios included increased use of renewable energy.

In addition to plans for the five smaller systems, an optimisation of the French electricity supply was carried out. Even though this was done with official (low) cost figures for nuclear power plants, the economically optimal solution of most of these scenarios was to phase out the nuclear power plants within the next 20-30 years and not build new ones.

The FAIRE project was supported by the EU JOULE Program.

Graphs from the FAIRE project: Optimisation of electricity supply for Corsica.
(Left) No externalities. (Right) Only renewable energy in future investments, this costs an extra 0.7 EURO-cent/kWh.



Demanding Tools

While the benefits of independent energy plans can be large, their development is demanding, requiring data and time. The development of a model and some sustainable energy scenarios can easily require half a year's of work or more (see box). Previously, computer power was also a limitation, but today a modern office computer can perform most optimisation.

It is often advisable to start with simpler models, e.g. based on spreadsheets. They do not give economical optimisation, but they are good tools for calculating environmental and economic effects of a given investment plan. They can also be helpful for generating inputs to optimisation models. Several such models are available for NGOs, e.g.:

- a simple spreadsheet used for a Danish "Energy Vision Project" 1998;
- the ESM-model, a more advanced spreadsheet model with detailed sectoral breakdown, used for a Nordic energy study and in Estonia; and
- the LEEP model, used for several international studies by the Stockholm Environmental Institute and others.

The first two models are available from OVE / INFORSE-Europe (see below), while the LEEP model is available from the Stockholm Environmental Institute in Boston, USA (e-mail:praskin@tellus.com).

More Information:
FAIRE Project and Elfin model:
OVE-Europe (Denmark), att. Gunnar Boye Olesen, e-mail:ove@inforse.dk,
INESTENE (France), att. Antoine Bonduelle, e-mail: inestene@wanadoo.fr
Elfin, also: EDF (Oakland, California), e-mail:elfin@edf.org
SESAM: ECO Consult (Denmark), att. Klaus Illum, e-mail:illum@post1.tele.dk.

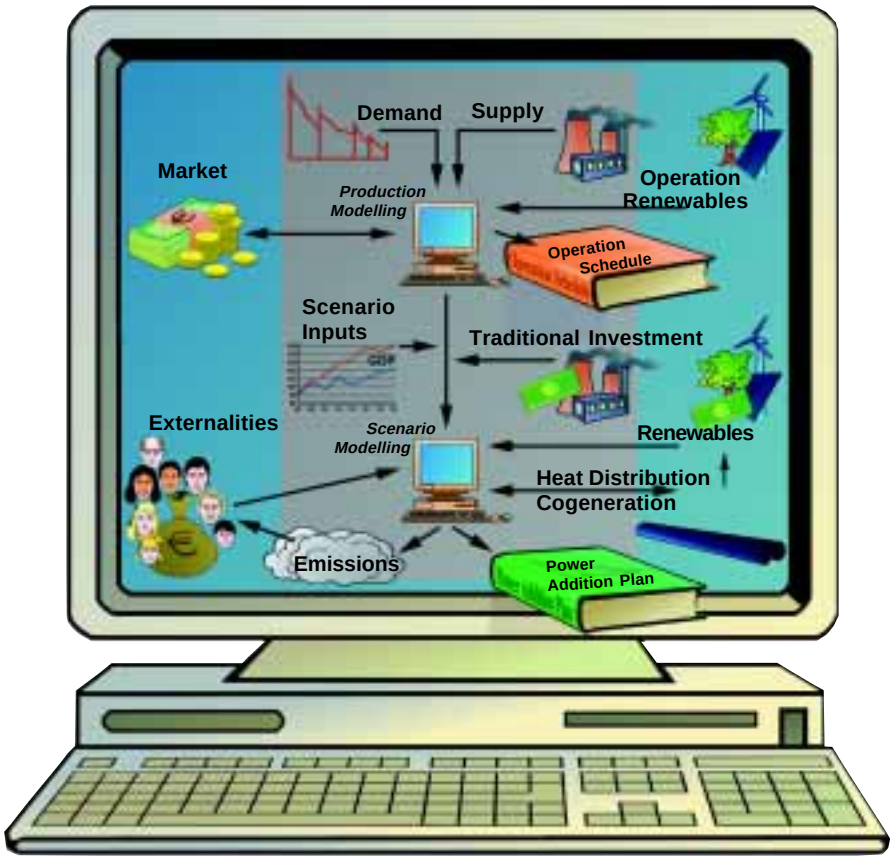


Illustration of the FAIRE Project Methodology

Data Needed for a Sustainable Energy Plan:

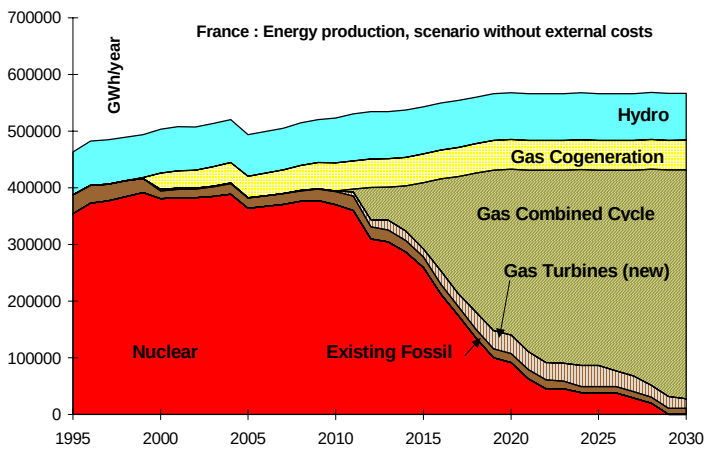
Renewable Energy Potentials: An overview is needed of the potentials for renewable energy in the area, e.g. developed with the "Guideline for Estimation of Renewable Energy Potentials, Barriers, and Effects" (INFORSE-Europe '97) and a wind atlas. Biomass fuel prices are also needed.

Technology Catalogue: A description of each of the potential technologies is needed, including e.g. efficiency, availability, investment costs, running costs, lifetime, expected future improvements and cost reductions.

Existing Supply: The existing supply (power plants, import options etc.) should be described in similar ways as the new technologies.

Demand: The present and expected future energy/electricity demand is needed: total energy, peak power, load curve(s), expected future development, and expected increase of end-use efficiency.

System parameters and requirements:
A number of additional information is needed to describe the system, e.g. network losses and limitations of the grid, as well as, the acceptable probability that the system cannot meet demand.



Graph: Optimisation of French electricity system. 30-year lifetime for nuclear reactors, no externalities.

Graphs are made by Mads Eskesen, Ann Vikkelsø, OVE, Denmark

Publications:

E-mail News Lists:

TRENDS in Renewable Energies
Weekly e-mail list.
A 'heads up' overview of developments in renewable energy.
Subscription is free.
Information:
Bill Eggertson, The Canadian Association for Renewable Energies.
e-mail: eggertson@renewables.ca, or
e-mail: trends@renewables.ca
Archives are posted at
http://www.renewables.ca.

Renewable News Network
News, events, solar utilities info, environmental review on e-mail.
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Information:
Ross M. Donald,RNN, 44 Norfolk Street, Needham, MA 02492 USA.
Ph: +1-781-453-9668,
e-mail:rnn@rnn.com.

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Information:
Institute for Global Futures Research (IGFR). P.O. Box 263E, Earlville, QLD 4870, Australia. Fax: 61 7 4033 6881, e-mail: igfr@peg.apc.org.

BankWatch Network CEE
E-mail list. About 10 messages monthly on the activities of major banks (EBRD, IMF, World Bank etc) in Central Eastern Europe(CEE).
Updated news on financing of the nuclear power plants.
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-MDBs CEE List:
E-mail:mdbs-europe-l@ecn.cz
http://www.bankwatch.org
-K2R4 Update List:
E-mail:k2r4update-l@ecn.cz
http://peu.ecn.cz/K2R4
-Petr Hlobil, Energy Coordinator, CEE Bankwatch Network, Kratka 26, Praha 10, 100 00 Czech Republic. Ph/fax: 420-2-781 65 71, e-mail:petr.hlobil@ecn.cz.

SEED logo

SUN DAY Campaign
E-mail Media List with news providing critical views on the US Federal Budget on renewable energy and energy efficiency.
Published by the Sustainable Energy Coalition which is a coalition of 35 US business, environmental, consumer, and energy policy groups founded in 1992 to promote increased use of energy efficient and renewable energy technologies.

Information:
Sustainable Energy Coalition, 315 Circle Avenue, #2; Takoma Park, MD 20912-4836, USA.
Ph: +1 301-2702258;
fax: +1 301-8912866.
E-mail: kbossong@cais.com.

RIET News Service
RIET is a regional not-for-profit organisation facilitating environmental business in Asia and matching the Asian demand for environmental best practices. RIET News Service electronic information service is partially supported by the European Commission.
RIET Publishes:
- "Environmental News Asia (ENA)"
- "Asia Environmental Trader (AET)",
- Quarterly Renewables Newsletter of the European Forum for Renewable Energy Sources (EUFORES).

Information:
Wong Ee Ling, RIET Regional Institute of Environmental Technology, 3 Science Park Drive, PSB Annex # 04-08, Singapore 118223.
Ph: 65-7772685,
fax: 65-773 2800,
e-mail:eeling@riet.org.sg
http://www.riet.org.

WEB sites:

SEED program
See article on page no. 7.
http://www.seedlinks.org.za.

- **Urban SEED,** Energy & Development Group , att. Project Manager Sarah Ward, PO Box 261, Noordhoek 7985
Ph: +27 21 789 2920, fax: +27 21 789 2954, e-mail: admin@edg.co.za, http://www.edg.co.za
- **Rural SEED**, Energy for Development Research Centre, att. Project Manager Bill Cowan, University of Cape Town, Private Bag, Rondebosch 7701.
Ph:+27 21 6503230, fax:+27 21 6502830, e-mail: energy@energetic.uct.ac.za, http://www.edrc.uct.ac.za
- **SEED Program Advisor**:
René Karottki, SEED program
e-mail: rene@energetic.uct.ac.za,
Ph: +27 21 6503230.

Do-It-Yourself in the USA
The homepage of a US columnist and mechanical engineer, James Dulley, offers plans and diagrams of windmills, solar water heaters, solar dryer, food cooker, solar pool heating kit etc.
Information:
James Dulley, WWW-Books, P.O. Box 54987, Cincinnati, Ohio 45254, USA.
http://www.dulley.com/solar.shtml

CD-ROM:

NEG MICON Photo CD
62 pictures of wind mills.

Information: Marketing Department, NEG Micon A/S Alsvej 21, 8900 Randers, Denmark. Ph:+45-8710 5000, fax:+45 87105001, e-mail: mail@neg-micon.dk, http://www.neg-micon.dk.

EVENTS

May 25-27, 1999
SUSTAIN '99, Amsterdam, Holland
The World Sustainable Energy Trade Fair: Exhib. & Conf., EU Renewable Energy Campaign to "Take Off"
Info: European Marketing Ltd. PO Box 259, Bromley, Kent, BRI IZR, UK. Ph: +44-181-289-8989, fax: +44-181-289-8484, 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 3-4, '99, San Francisco, CA USA
October 7-8, '99, Atlanta, GA USA
December 2-3, '99, Washington DC, USA
How to Buy Electricity and Other Energy Services Under Deregulation
Info: American Management Association, Ph: +1-800-262-9699; fax: +1-518-891-0368, e-mail:cust_serv@amanet.org, http://www.amanet.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 12-17, 1999
Solar'99 Growing Market, Main, USA
28th Annual ASES Conference.
Info: American Solar Energy Society (ASES), 2400 Central Ave., Suite G1 Boulder, CO 80301, USA. Ph: +1-303-4433130, fax: +1-303-4433212, e-mail: ases@ases.org.http://www.ases.org/solar

June 14-15, 1999
Implementing Kyoto Protocol, London, UK
Info:The Royal Institute of International Affairs, Chatham House, 10 St. James's Square, London SWIY 4 LE, UK. Ph: +44-171-957 5700, fax:+44-171-3212045, e-mail:gwright@riia.org.

June 14-27, 1999
International Biogas Training Course
Info: Hu Rongdu, Asia-Pacific Biogas Research & Technology Center (BRTC), 4-13 Renmin Nan road, Chengdu 610041, China. Ph: +86 28 5222658, fax:+86 28 5227610, e-mail:obrtc@shell.scsti.ac.cn, brtc@bigfoot.com.
Gratis training, food and accomodation!

June 15-18, 1999
ACEEE Summer Study, Saratoga Springs NY, USA
Info: American Council for an Energy-Efficient Economy (ACEEE), 1001 Connecticut Ave., 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, UK
- Climate Network Europe, 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
See article in issue no. 24 page 6.

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
Info: 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 6-9, 1999
Constitutive Meeting of the African Solar Council, Dakar, Senegal
Info: See article in this issue on page no 7.

July 17-August 1 -November 21, 1999
Environmental Impact Assessment Training Course, Tanzania
Info: FED/ INFORSE Secretariat
See article in this issue on page no. 7

July 12-23, 1999
SUN Summer Study Energy Policy
Info: Central European University, Nádor u. 9, Budapest, Hungary 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 & 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 15-16, 1999
Global Conference on Renewable Energy Island, Ærø, Denmark
Info: FED/INFORSE Secretariat
See article in this issue on the back page.

September 4-10, 1999
Renewable Energy: Advancing Technology for Industrialization & Sustainable Development, Brighton, UK
Info: World Renewable Energy Network,UK. Ph: +44-1189611365, fax: +441189611365, http://www.wrenuk.co.uk/renew/renew.html

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 Int'l Conf. on Passive & Low Energy Architecture, 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
Solar Challenge, Adelaide, Australia
Electric & Solar Vehicle Conf., & Race.
Info: PO Box 8178, Station Arcade, Adelaide SA 5000, Australia. Ph: +61-8-83873877, fax: +61-8-83226290, e-mail:myriad@wsc.org.au,http://www.wsc.org.au/

November 2-5, 1999
Environment '99, Guangzhou, China
Info: Stefanie Niebuhr, Gima Exhib. & Conf., Heidenkampsweg 51, 20097 Hamburg, Germany. Ph:+49-40-23524341, fax: +49-40-23524403.

January 24-28, 2000
WCEC 2000
World Clean Energy Conference
Info: World Sustainable Energy Coalition, Kellerweg 38, CH-8055, Zürich. Ph: +41-1-4630226, fax: +41-1-4630252.

April 22, 2000
Earth Day 2000
Info: Att. Mark Dubois, 91 Marion str., Seattle, WA 98104, USA. Ph: +1-206-2640114, fax:+1-206- 6821184, e-mail:worldwide@earthday.net http://www.earthday.net.

May 1-5, 2000
16th European PV Energy Conference and Exhibition Glasgow, UK.
Info: WIP, Sylvensteinerstrasse 2, 81369, München, Germany. Ph: +49-89-720-1235, fax: +49-89-720-1291, http://www.wip.tnet.de/

June, 2000
EXPO 2000, Hannover, Germany
Info: Thurnithistr. 2, 30519 Hannover, Germany. Ph: +49-511-8404332, fax: +49-511-8404440, e-mail: hubrich@expo2000.de.
See article in the issue no. 22

June 19-22, 2000
EUROSUN, Copenhagen, Denmark
Info: Danish Solar Energy Society, DANVAK, Ørholmvej 40B, 2800 Lyngby, Denmark. Ph:+45-45 877611, fax:+45-45-877677, e-mail: info@danvak.dk.

Contents

Conference on Renewable Energy Islands

Ærø Island, Denmark, 15-16 September 1999

150 participants are expected to discuss further cooperation.

A *Global Conference on Renewable Energy Islands* will take place on the Danish island of Ærø on 15-16 September 1999.

The main objectives are to exchange experience, increase awareness, and establish a platform for future co-operation and networking.

The themes to be discussed in plenum and in workshops are the local and global agenda for energy, environment and development, organisation, financing, awareness, and resources.

Approximately 150 participants from national and local governments, NGOs, utilities, research institutions, and regional and global organisations will be invited to the conference. The conference is organised by the Forum for Energy and Development (FED), an umbrella organisation for Danish NGOs, which also hosts the International Secretariat of INFORSE.

More information:
Thomas Lynge Jensen, Forum for Energy & Development (FED) / INFORSE:
P.O. Box 2059, 1301, Copenhagen K, Denmark. Ph: +45 33 121307,
fax: +45 33 121308,
e-mail: inforse@inforse.dk.
http://www.inforse.dk.

A wind mill park and the world's biggest (8,000 m2) solar district heating plant on the Ærø Island . Photos by Marstal Fjernvarme and Ide Seidelin, Ærø Energy & Environment Office.