

THE LONG ROAD TO IRENA

From the Idea to the Foundation
of the International Renewable Energy Agency

Documentation

Edited by EUROSOLAR and WCRE

THE LONG ROAD TO IRENA

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of the International Renewable Energy Agency

Documentation

1990 – 2009

Promoting Peace and Economic Prosperity,
Human Security and Quality of Life,
Climate and Nature Protection

Edited by EUROSOLAR and
World Council for Renewable Energy (WCRE)

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Introduction

The global community has founded IRENA with more than 100 member states. The agency is now getting ready to start its crucial work. As an International Governmental Organisation, IRENA will create a level playing field for the acceleration of the deployment of renewable energy everywhere. The agency will be instrumental in overcoming the persistent bias of international organisations in favour of atomic and fossil energies. These agencies ignore, denounce or underestimate the full potential and manifold benefits of renewable energy. The establishment of IRENA has been overdue for decades.

This documentation displays the long road to the formation of IRENA from the first proposal in January 1990 to its founding in January 2009. The proposal for IRENA was advanced in face of doubts that were expressed repeatedly and many obstacles that turned up along the way. EUROSOLAR was the first, and for many years, the only non-governmental organisation that campaigned for IRENA. In 2001, the newly established World Council for Renewable Energy (WCRE) joined the battle. We are proud that our campaign has finally succeeded; in these 19 years, it was necessary to repeatedly push the idea forward and encourage an increasing number of supporters worldwide.

The speeches in this documentation underline the central meaning of IRENA for a new energy age and its manifold benefits for the future of its member states and civilisation as a whole. Moreover, they provide inspiration and direction for the future work of IRENA.

Hermann Scheer, President of EUROSOLAR, General Chair of the World Council for Renewable Energy, and Member of the German Parliament has been the main driving force behind the establishment of IRENA. He pioneered the concept and design of IRENA and advanced the initiative in all his different roles. In place of the growing number of supporters for IRENA, we dedicate this documentation to him.

Irm Pontenagel
Managing Director, EUROSOLAR

Wolfgang Palz
Chair, World Council for
Renewable Energy (WCRE)

The Long Road to IRENA – A Chronology

From the First Idea in 1990 to the Formation of IRENA in 2009

15 January 1990

EUROSOLAR-President *Hermann Scheer* presents the „Memorandum for the Establishment of an International Solar Energy Agency (ISEA)“ in Bonn. Here the word “solar” signifies all kinds of renewable energies.

2 April 1990

Hermann Scheer presents the ISEA-Memorandum at the UN-Headquarters, invited by *Ahmedou Ould Abdallah*, advisor to the UN-Secretary General for Energy. As a result, UN-Secretary General *Pérez de Cuéllar* implements the task-force „United Nations Solar Energy Group on Environment and Development“ (UNSEGED). It comprises 30 member states of the UN and *Hermann Scheer* as „special member“. The Swedish representative *Prof. Thomas B. Johansson*, is appointed as chair to that group.

29 April till 2 May 1990

At the invitation of the US-Senate, the „Interparliamentary Conference on the Global Environment“ is hosted in Washington, chaired by *Al Gore*. Following a proposal of *Hermann Scheer*, the call to establish an „International Solar Energy Agency“ (ISEA) is included in the Final Resolution of this conference.

9/10 May 1990

At the UN-conference „Action for our Common Future“ in Bergen / Norway under the chairmanship of the Norwegian prime minister *Gro Harlem Brundtland*, *Hermann Scheer* calls for the establishment of the ISEA as the most important institutional measure towards a common sustainable future.

27/28 May 1990

At the Conference on Renewable Energy in New Delhi, which was jointly organised by EUROSOLAR and the Solar Energy Society of India (SESI) and chaired by *Rajendra Pachauri* and *Hermann Scheer*, Nobel Peace Prize laureate *Willy Brandt* declares in his keynote speech: „I support the swift installation of an International Solar Energy Agency, as has been proposed by EUROSOLAR. This agency will serve the global community, which cannot wait for another ten years for joint actions“.

The Indian minister for the environment *Maneka Gandhi* supports this statement and adds that an international institution like IAEA that has been established for nuclear energy is also necessary for renewable energy.

The president of SESI *Rajendra Pachauri* – who currently chairs the Intergovernmental Panel on Climate Change – states at the end of the conference: „The Solar Energy Society of India supports EUROSOLARs proposal to establish an International Solar Energy Agency. ISEA could make a substantial and effective contribution to facilitating the technology transfer to the developing world“.

18 September 1990

After consultations between *Hermann Scheer* and the Austrian Chancellor *Franz Vranitzky*, the Chancellor declared in Vienna that the Austrian government will take the initiative to found an ISEA as international governmental organisation on the global level.

8 October 1990

Willy Brandt addresses the Economic and Social Council of the UN-General Assembly in New York: „In addition to those initiatives that are currently taken by governments, we need an international institution for comprehensive technology transfer in the field of renewable energies. This would be the task for an international energy agency as has been proposed by EUROSOLAR“.

November 1990

In his speech at the UN-General Assembly the Austrian foreign minister *Alois Mock* suggests that EUROSOLARs proposal to establish an ISEA will be considered within the UN.

December 1990

The *UN-General Assembly* decides in one of its resolutions to establish an “international institution“ for the promotion of renewable energies.

November 1991

UNSEGED submits its final report to UN-Secretary General *Pérez de Cuéllar*, which contains the recommendation to establish an ISEA. The UN-Secretary General refers this proposal to the Preparatory Committee of the „UN-Conference for Environment and Development“ (Rio-Conference). The committee rejects the proposal.

7 till 9 July 1993

In his function as programme director of the „World Solar Summit“, *Hermann Scheer* introduces a draft resolution, which calls for the establishment of ISEA. The conference was organised in Paris by UNESCO in collaboration with EUROSOLAR and the International Solar Energy Society (ISES).

16 till 18 March 1994

In his speech at the EU-conference „An Action Plan for Renewable Sources in Europe“ in Madrid, *Hermann Scheer* appeals to the EU-Commission to start an initiative for an ISEA.

Summer 1994

At the federal election in 1994, EUROSOLAR posts advertisements in national newspapers on the Strategic-Energy-Initiative (SEI). This initiative requests that the German government take the lead to found an International Solar Energy Agency.

15 February 1995

EUROSOLAR publishes a „European Charter for Solar Energy“. This charter proposes to „amend the nuclear non-proliferation treaty with an agreement for the promotion of renewable energy and to establish an International Solar Energy Agency for the non-commercial technology transfer in the field of renewable energy“.

June 1995

EUROSOLAR drafts a strategic study for the EU-commission „Power for the World“. This study argues for the establishment of an ISEA, which should be mandated to promote the production and use of renewable energy in developing countries.

5 till 7 May 1997

In his speech at the EU-conference „Renewable Energy Implementation“ in Athens, *Hermann Scheer* renews his call for an ISEA because existing international institutions continue to neglect renewable energy.

14 April 1998

The Egyptian Ministry for Energy hosts the conference „The Establishment of an International Solar Energy Agency“ in Cairo with *Hermann Scheer* as Conference Chair.

May 1998

Hermann Scheer succeeded in introducing the call for an International Solar Energy Agency into the election programme of the Social Democratic Party (SPD) for the federal election.

January 2001

Hermann Scheer presents a „Memorandum for the Establishment of an International Renewable Energy Agency (IRENA)“. It is argued that IRENA should be established as international governmental organisation outside of the UN-system, supported by a group of nations.

June 2001

EUROSOLAR organises the Impulse Conference „Promoting Global Transfer Activities for Renewable Energy“ in Berlin. This conference was attended by 450 participants from different continents and mobilised support for IRENA. The World Council for Renewable Energy (WCRE) was established with *Hermann Scheer* as General Chairman. The WCRE's main aim is to work for the establishment of IRENA.

Heidemarie Wieczorek-Zeul, federal minister for economic cooperation and development declared in her speech: „I view the proposals for the founding of a new International Agency for Renewable Energies as providing an important and necessary impulse for the intensification of international co-operation“.

Summer 2002

In its campaign „Model Solar Germany“ during federal elections, EUROSOLAR asks the German government to take the initiative to found the International Renewable Energy Agency. As member of the executive committee of the SPD, *Hermann Scheer* introduces

this demand into the government programme of the SPD for the federal elections. At the initiative of *Hans-Josef Fell*, MP, the German Green Party associates itself with this demand.

13 June 2002

The WCRE and EUROSOLAR host the First World Renewable Energy Forum in Berlin. They submit an „Action plan for the global dissemination of renewable energy. It states: “Among international organisations one is missing which concentrates with its entire strength on the promotion of renewable energies and constitutes with regard to that the international point of reference: the International Renewable Energy Agency (IRENA). The contradiction must be overcome that the IAEA promotes the international proliferation of atomic technologies, while there is no comparable international organisation for renewable energies“. Federal minister *Heidemarie Wieczorek-Zeul* declares: „Almost exactly one year ago we held the pioneering “International Impulse Conference” for the creation of IRENA here in Berlin. And I can tell you something: since then I have been unable to get this topic out of my mind!”

8 July 2002

Hermann Scheer proposes to Chancellor *Gerhard Schröder* that the federal government of Germany invites governments around the world to come to an international conference on renewable energy, and to introduce the initiative to found an IRENA at that conference.

26 August 2002

In his speech at the UN-Conference on Environment and Development, Chancellor *Schröder* invites delegates to an international conference of governments for renewable energy in order to push them forward and beyond existing recommendations at the UN level. The conference “renewables 2004”, took place in June 2004.

October 2002

Hermann Scheer and *Hans-Josef Fell* introduced into the coalition agreement between SPD and Green Party explicitly that the German Federal Government will launch an initiative for the establishment of IRENA.

January 2003

On the occasion of the war in Iraq, EUROSOLAR starts an international campaign „Peace through solar energy instead of war because of oil“. It asks for an immediate implementation of the coalition agreement on the establishment of IRENA.

10 April 2003

Drafted by *Hermann Scheer*, the German Parliament adopts the resolution „Initiative for the Foundation of an International Renewable Energy Agency“.

8/9 May 2003

EUROSOLAR hosts the impulse conference „From EURATOM to EURENEW“ in Berlin. Analogical to the EURATOM treaty, the conference calls for the establishment of an EURENEW treaty at the European level and an IRENA at the global level.

2 June 2004

At the invitation of the German parliament and in parallel to the „renewables 2004“ conference, the *International Parliamentary Forum on Renewable Energies* convenes in Bonn, chaired by *Hermann Scheer*. In the conference's Final Resolution, more than 300 members of parliament coming from more than 70 countries unanimously call for the establishment of IRENA.

June 2005

The SPD once again called in its election programme for the coming federal elections for an initiative to establish IRENA.

October 2005

By the initiative of *Hermann Scheer*, the intention to establish IRENA is once again stated in the coalition agreement of the newly elected German government.

January 2007

The Federal Government, under the responsibility of the foreign office, the ministries for the environment and for economic cooperation and development, initiates a series of bilateral talks with governments all over the world to get their support in establishing IRENA. Three special ambassadors, *Harald Ganns*, *Peter C. Hauswedell* and *Hans Ulrich Spohn*, are appointed. Together with *Hermann Scheer* they hold talks with governments from every continent between spring 2007 and summer 2008.

April 2008

The first preparatory conference with participants from more than 60 countries takes place in Berlin. Here the German government declares that the establishment of IRENA is no longer a matter of “if” but rather one of “how.”

19 June 2008

Drafted by *Hermann Scheer*, the German Parliament votes in favour of a resolution that welcomes the first steps of the German government to establish IRENA.

June/July 2008

Hosted by the German Parliament, Germany holds an IRENA workshop with representatives from more than 40 governments. An initial work-programme of IRENA together with the statutes and the financial regime are discussed.

October 2008

Hosted by the Spanish Government, delegates from more than 50 governments attend the Final Preparatory Conference in Madrid. IRENAs statutes are finalised.

26 January 2009

IRENA is established in Bonn, 75 states signed the statute of the agency.

February until June 2009

More than 100 states become members of IRENA.

29/30 June 2009

The second session of the Preparatory Commission of IRENA convenes in order to decide, among others, about the location of IRENA's headquarters and to appoint the founding director general of the agency.

Memorandum for the Establishment of an International Solar Energy Agency (ISEA) within the United Nations

by Hermann Scheer, President of EUROSOLAR, 1990

I

The international political association for solar energy, EUROSOLAR, proposes the establishment of an International Solar Energy Agency (ISEA) within the framework of the United Nations.

EUROSOLAR calls upon the governments and the Secretary General of the United Nations to propose a corresponding motion to the General Assembly of the United Nations.

EUROSOLAR proposes that the United Nations Conference on Environment and Development to take place in 1992 devote particular attention to renewable energies. The global environmental problem is due to a considerable degree to current forms of energy provision and therefore cannot be tackled unless drastic measures to increase energy efficiency are taken and unless solar energy sources are introduced on a large scale worldwide. EUROSOLAR calls upon the United Nations Conference on Environment and Development to support the establishment of an International Solar Energy Agency.

At the same time, EUROSOLAR calls upon governments to introduce measures for the global introduction of renewable energies in the World Climate Convention. International efforts regarding the protection of the earth's atmosphere require a global initiative for the introduction of renewable energies. The work done by the ISEA would be an indispensable prerequisite to these efforts.

II

The ISEA is to rapidly increase the share of solar energy sources in human energy provision in the world community. The agency will be concerned with unconstrained international technology transfer in the field of direct and indirect solar energies (in other words: renewable energy sources), their storage and worldwide utilization in the form of electricity, heat and fuel, as well as with potentials for energy-saving.

With the help of renewable energy sources we can cut the share of fossil and nuclear fuels in world energy provision. Thus we can make an essential and indispensable contribution to the protection of the natural basis of life, to the protection of the atmosphere, to the improvement of public health, to autonomous energy provision for all countries, to economic development and resource conservation, and to domestic and international security for all nations. The ISEA will promote international cooperation and peace.

III

The ISEA is thus to help each country concerned to seal existing gaps between states and national economies and build up an independent infrastructure for the use of renewable energies – from training and research to the production of technical compon-

ents and the construction and operation of installations. Within the framework of these tasks, the ISEA shall in particular

- promote and support research, development and practical application of renewable energy sources and the saving of fossil and nuclear energies on a global level;
- provide materials and services, as well as equipment and facilities;
- foster the exchange of scientific and technical information on the state of the art of renewable energies and energy efficiency technology, as well as on the practical utilization of such technologies;
- promote the exchange and training of scientists, engineers and administrators working in these fields;
- advise on the financing of solar energy projects;
- purchase or construct the facilities, installations and equipment necessary to carry out the agency's assigned tasks.
- Counsel interested countries on how to build up their own production lines for renewable energy use technologies.

IV

The ISEA should, in addition to its head office, set up regional organizations in Africa, Asia and Latin America. The developing countries in particular should thus gain rapid and extensive access to solar use and efficiency technologies. This will also facilitate the exchange of experience and thereby narrow the North-South divide.

V

The ISEA shall be financed by contributions from member states. Membership fees shall be proportional to gross national product.

VI

The ISEA shall work in close cooperation with other special organizations and subcommittees of the United Nations (IDA, UNESCO, FAO, WHO, WMO, UNDP, UNIDO, UNCTAD, UNEP), as well as with the World Bank and regional development banks. It shall carry out joint projects and advise and support them in introducing and using renewable energy sources and making use of energy efficiency options within the framework of their programmes on agriculture, forest preservation, foreign aid, environmental protection and the promotion of training, science and public health. Although we deeply appreciate the contribution of these UN organizations, including their efforts in the field of renewable energies, we deem it necessary to concentrate the transfer of technology and expertise in this area in one agency and enable participation of all interested countries on a focused level of global communication and promotion.

VII

The ISEA shall thus take on those tasks for the transfer of technology as regards the use of renewable energies and the saving of conventional energy sources and carriers that the International Atomic Energy Agency (IAEA) has carried out in the field of nuclear energy since 1956. What was necessary for nuclear energy in the 1950s and conse-

quently led to the establishment of an international agency, is now even more important and more urgent for solar energies.

VIII

The ISEA is the institutional measure that logically follows from numerous recommendations on the part of international committees and conferences. The World Climate Conferences since 1979, the report of the North-South Commission from 1980, "North-South: A Programme for Survival", the "Report of the United Nations Conference on New and Renewable Sources of Energy" from 1981, UNEP's 1982 report "The World Environment 1972-82" and the 1987 report "Our Common Future" of the World Commission on Environment and Development – all these draw attention to the urgent need for intervention to rapidly increase the share of renewable energies in world energy provision. Yet no practical results on a global level have been achieved from these recommendations. The ISEA can be a means to overcome the gap between theoretical knowledge and policy initiatives.

IX

The ISEA, as an institution, would also work towards the reform of the United Nations, enabling it to better carry out its growing global tasks.

X

The 1980s were a lost decade for Third World development and the preservation of the natural basis of life. The North-South Summit of Cancun in 1981 was not succeeded by any initiatives. Currently, a working committee led by the Swedish Prime Minister Ingvar Carlsson is preparing another North-South Summit which is to draw up a programme of action for the 1990s. Bearing in mind the key importance of renewable energies for global environmental protection, the International Solar Energy Agency within the United Nations would be a crucial element in this.

Exposition

1. It is internationally recognized that the preservation of the environment, which is under threat worldwide, requires an urgent increase in the share of renewable energies in global energy provision.

There are no doubts in the international expert debate that

- nature provides a potential of renewable energy sources which far outweighs the actual demand for energy even in view of a growing world population;
- there is already a variety of practical technologies available both for solar energy utilization in general (involving mainly solar radiation, wind power, water power and biomass) and for the passive use of solar heat in buildings.

Neither are there any doubts in the international discussion with respect to the following two points:

- The continued consumption of fossil fuels poses a serious threat to the natural basis of life, especially through the damage to the earth's atmosphere caused by trace gases depleting the ozone layer. The continued consumption of fossil fuels represents a most irresponsible waste of precious industrial raw materials in the long term, if the planet's fossil resources are used up for the short-term purpose of energy production.
- The use of nuclear power also involves serious risks and requires more comprehensive national and international safety measures. These safety and security requirements increase the longer and more extensively nuclear power is used. Moreover, doubts have been increasing in recent years whether nuclear energy is at all suitable for energy provision in developing countries where 75 % of all people live. There the needs are for decentralized energy supply. Nuclear power technology, in contrast, is highly centralized and requires the prior development of a costly supply grid.

The conclusion is that the share of solar energies in global energy provision can and must be increased quickly. This applies especially to developing countries which, within the framework of their agricultural and industrial development programmes, are faced with fundamental decisions on the choice of energy sources and carriers. Although developing countries are mostly situated in warm regions where conditions for the use of solar energies are favourable, they still, for the most part, lack independent access to the necessary technologies.

2. There are, however, doubts about the practical possibilities of using solar energies. Despite the fact that the grounds for their utilization are becoming more and more compelling, doubts about their short and medium term practicability have indeed in some respects even grown in recent years. The World Energy Conference of 1983, for instance, considered a 6 % share of renewable energies in world energy provision by the year 2020 realistic, whereas in 1989 it reduced its expectations to a mere 1,5–3 % share.

At the same time, the World Energy Conference has also reduced its expectations regarding the share of nuclear energy from 10 % (1983) to 8 % (1989). This is mainly due to the fact that even the World Energy Conference – which is, after all, partly backed by nuclear energy producers – does not judge structural conditions in the Third World to be favourable for the introduction of nuclear energy. This is in clear contrast to the expectations that led to the formation of the IAEA in the 1950s and which were maintained over subsequent decades. Nonetheless, the IAEA currently has many developing countries among its members which help finance this agency with their contributions (See also point 7 of the exposition).

3. An International Solar Energy Agency could help allay the doubts that obstruct a rapid expansion of renewable energy use. Such doubts are usually expressed along the following lines:

- a. No one denies that there are varied ways of tapping renewable energies for electricity generation, such as in photovoltaic and solar thermal plants or in power stations fuelled by wind, water or biomass. Yet this kind of energy supply is subject to

diurnal and seasonal variations which do not correspond to the respective level of demand. Moreover, energy requirements are not restricted to electricity, but include fuels and heat. Since the main emphasis in connection with solar energy is – with the exception of biomass – on electricity generation and since storage technologies currently provide only short-term capacity at high cost, the potential of renewable energies is considered very limited by many experts.

- b. From an economic point of view, the utilization of renewables is not considered feasible – even in the longer term. Here it is argued that costs of technologies for the use of renewable energy are too high and that they will therefore still need a rather long period of preparation.

One of the reasons why we do not share these sceptical views is that they much too sweepingly dismiss the opportunities already available in current renewable energy technologies:

- The argument that electricity generated by renewable energy sources does not have adequate storage capability can be countered in that such electricity can be fed into the existing supply system and thus begin to replace conventionally generated electricity. In this case conventional power stations in conjunction with the supply grid take over the storage function. Incidentally, the problem of variability in supply associated with solar radiation or wind power does not arise in the case of biomass.
- Yet beyond that, modern storage techniques (batteries, metal hydride, hydrogen and fuel cells) still require further intensive research and development efforts.
- The argument that running costs are too high, which basically refers to the costs of installations, is already only partly correct, and indeed in some cases no longer valid. It can already be shown that a variety of solar energy technologies – such as in the field of passive and active use of solar sources in new buildings and for hot-water supply – are competitive with or only slightly more expensive than the conventional methods.

Moreover, examples show us already that

- water power could be used on a much larger scale and at low cost even in small plants;
- wind power and biomass, if used within the framework of appropriate energy supply models, are only slightly more costly than electricity generation based on fossil or nuclear resources.
- Solar thermal electricity generation is already economically viable in appropriate climatic regions, even in power stations of 100 MW and upwards.
- Homes can already be built to use active and passive solar energy in a way which requires little supplementary energy, with acceptable additional costs.
- With “island concepts”, which save power supply system and grid costs, solar energy in Southern countries has in many cases no longer any cost disadvantages, not even if photovoltaic technology is used. This is particularly important for economic

development programmes in developing countries, in which the energy supply has to be brought to settlements and functional units are located far apart from each other;

- some individual solar use technologies (such as the solar-powered vehicle in local private transport) are already practical and viable.

4. The examples listed above show how manifold current use options in solar technology already are. The arguments become yet even more compelling if political and economic attention is given to the following four crucial points:

- Environmental and social costs must be included even in medium and longterm economic perspectives, because all economic activity is in principle dependent on an intact environment to ensure the health of humanity and the continued availability of raw materials. If used sensibly, solar energy involves the fewest social costs and causes no irreversible global damage. The more these factors are taken into consideration, the more compelling the contemporary economic necessity of introducing solar energies becomes.
- The use of solar energy generally increases opportunities for an autonomous energy provision for each country. This leads to more independence overall. Especially for Southern countries, i.e. mainly for developing countries, solar energy may also become an important export factor at a later stage. The Third World may thus become partners in a new and fairer international division of economic activity.
- Cost-efficiency of solar energy will improve according to how soon modern series production of solar technology is achieved. The vicious circle of “no market – expensive installations and expensive installations – no market” can be broken through a politically controlled and financed market intervention for series production. By inducing cost reductions, such a market at the same time opens up a large private market – until a point is reached where public market incentives become dispensable. The dynamics of economic development should therefore not be neglected when considering solar energy from an economic point of view.
- The economic development dynamics of solar energy technologies and the drastically improved conditions for a more efficient global environmental protection which can thereby be achieved, leave no doubt that solar technologies are a key factor in a new cycle of industrial production in closer harmony with the natural environment. The saving of costly fossil fuels, the resulting preservation of nature and resources, improved health standards and reduced technical risks all result from the creation of comprehensive new production lines for solar technologies. Since this involves a mass demand for the entire world population, it signals the chance of a new environmentally oriented industrial policy, creating much new employment.

5. The economic obstacle is obviously only temporary. In view of the global threats to the environment, enhanced political development efforts will have to overcome this obstacle speedily. In this context, we cannot ignore the facts that

- the evaluation basis on which political and economic decisions on energy issues are made is too narrow and, thus, biased. Conventional evaluation takes into account

the costs of energy resources, conversion and transport costs within the existing structures of agriculture, urban planning, the transportation system and industrial production. A more broadly based planning framework needs to include evaluations and objectives with regard to the economy, agriculture, transport policy, urban planning, as well as development aid policy, international trade and environmental concerns in general.

- There are substantial information deficits. So far there are insufficient links between research and development on the one hand, and potential producers and users on the other.
- There are large disparities between countries in terms of research, development and use of solar energy. This already is the case among OECD members themselves. The disparities between OECD countries and Comecon members and the Third World are even greater.

Between 1977 and 1987, the OECD countries spent about 10 billion dollars on research, development and testing of renewable energies, whereas in the rest of the world only about one tenth of this amount was spent for this purpose. Of OECD countries, only the Federal Republic of Germany, Japan and the United States currently spend more than 100 million dollars for R&D of solar energy use – all other countries are far below that level. In December 1989, the European Parliament decided to raise the European Community's R&D expenditure on renewable energies to the same level as that for nuclear fusion, which has been the main focus of attention so far. At the same time it can be observed that big German and Japanese high tech companies have been clearly intensifying their R&D in renewable energies recently. As a consequence, the existing development gap between countries in these fields will be widened yet further.

6. However, in principle each country must come to use solar energy technologies, and, therefore, will have to have at its disposal expertise of its own in terms of application, research, development and production. It is therefore necessary for each nation in the world community to immediately

- maintain R&D centres;
- have test and demonstration facilities for the entire range of solar technologies to be able to keep pace with technological development at its disposal;
- promote the training of scientists and engineers, as well as to disseminate general information to improve the basis for independent production and use of renewable energies and efficiency technology;
- introduce renewable energy technologies as soon as possible.

At the present juncture it is an important global requirement in environmental and economic policies to bridge existing disparities in development and reduce information deficits. The objective of environmental conservation by means of renewable energies is a race against time in which the speed of environmental destruction has accelerated rather than decelerated. In order to secure extensive access to technologies for the use of solar energy, international cooperation is the imperative of the hour. This cooperation shall be secured and advanced by the ISEA.

7. A strong argument in favour of establishing the ISEA is the existence of the IAEA. This agency, which is associated with the United Nations and has its headquarters in Vienna, was founded in 1956 and now has 2200 staff members and a budget of ca. \$ 168,000,000 for 1991. The IAEA has contributed to the development and present status of nuclear energy considerably.

It is evident that an ISEA could, in many aspects, learn from IAEA how to build up such an organisation and how to run know-how transfer and technical cooperation with member states.

The IAEA cannot be considered simply as a promoter institution for spreading nuclear energy. One of the major reasons for its establishment was to avert the danger of nuclear wars by building up the safeguard system. In its 1991 budget, \$ 57,000,000 are allocated to these activities. Another ca. \$ 24,000,000 are foreseen for non-energy application of nuclear technics in food and agriculture, nuclear medicine, industrial control, hydrology and earth sciences and basic scientific research. Ca. \$ 62,000,000 will be used for direction and support, especially for technical cooperation with member states and ca. \$ 10,000,000 for nuclear safety and radiation protection. Only \$ 15,000,000 are directly used for the promotion of nuclear power in the member states.

Currently, only 31 of the 113 member states of IAEA are running nuclear power stations. The other 82 mostly developing countries are preferably interested in the non-energy applications of nuclear technics. Most of them are not expected to build up a technical nuclear energy capacity.

In the case of ISEA, the situation would be quite different. Besides practically all industrialised countries, there is hardly any major developing country which has not yet expressed its interest in developing solar energy. Most of them have already started work – of course very often on a rather modest level. It has to be emphasized that there are reasons for not embarking nuclear energy in most of the developing countries. Lack of well trained personnel might increase safety risks. Furthermore, decentralized forms of energy provision will be more suitable for these countries due to the missing infrastructure for energy transportation.

Solar energy by its photovoltaic systems is at this time economically efficient for electricity supply in remote areas which are distant from any electric energy grid. Solar energy is much nearer to being economically efficient in the field of heat applications, e.g. heat processing, warming and perhaps also cooling of rooms, cooking, drying, desalination, etc.

The argument might be brought up that solar energy including all created renewable energies (excluding hydro-power) does not contribute more than about 0.3 % to world energy consumption at the present time. But one should not forget that in 1956, when IAEA was established, the contribution of nuclear energy was practically zero. In 1960 it amounted to 0.15 % of world electric generation. Thirty years later, it now gives 17 % electric energy to the world and ca. 5 % primary energy. Even with great pessimism and scepticism, one has to admit that these figures might be exceeded 30 years from now as far as solar energy is concerned.

8. The establishment of an ISEA would be a step toward the reform of the United Nations that enables them to do justice to their growing importance in solving urgent problems of mankind. New global challenges such as the accelerated use of renewable en-

ergies require new institutionalized responsibilities. It is not recommended to assign the duties intended in this memorandum for the ISEA, to the existing subcommittees and international agencies on top of their other tasks. However necessary it may be that the ISEA, in observing its special duties, work together with the FAO, UNEP, UNDP, IAEA, UNESCO, the World Bank, and non-governmental organisations, it is equally necessary that expertise in and transfer of solar technology is systematically coordinated in a specialized agency. It makes international cooperation easier and optimizes the capacity of other UN organisations to include solar energy in their programmes.

It would not be recommendable to assign the solar development tasks to the IAEA. Solar energy requires experts quite different from those working in nuclear energy and is based on different scientific foundations, as well as on different production and introduction procedures. Whereas the scientific basis of nuclear energy is high energy physics, solar energy involves thermodynamic solid-state physics and physical chemistry. Nuclear energy demands highly specialized nuclear technology, which even after four decades, only few countries possess, while the great variety of technologies for the use of renewable energies can be accommodated more easily in existing production systems and in addition, provide a great opportunity for extensive and diverse economic development.

Whereas nuclear energy aims at a centralized form of energy provision, which, at the same time, by safety reasons cannot be fully integrated in the overall economy, solar energy aims at decentralized forms of energy provision which involve the particular potential of adaptation natural processes and integration in the economic cycle, as well as in existing dwelling and settlement structures.

When setting up the ISEA it will, however, be very reasonable to make use of the administrative and organisational experiences available in the IAEA.

In principle, the tendency of international authorities growing larger and larger by assigning further tasks to an existing subcommittee should be countered, since this only leads to additional administrative friction. What is needed is an international agency specialized in renewable energies that is linked in a network with UN subcommittees, national governments and solar research and development institutions as well as with NGOs.

9. Since the beginning of the 1980s the United Nations and other international bodies have repeatedly called for increased efforts as regards the use of renewable energies to promote both environmental preservation and resource conservation, as well as the independent economic development of developing countries.

- In 1980 the North-South Commission stated in its report "North-South: A Programme for Survival", "The long-term solutions lie in the development of alternative and renewable energy sources; but the short-term difficulties are acute. Both require nothing less than a global strategy for energy." The report came to the conclusion that humanity "must rely on inexhaustible sources of energy, solar in the broadest sense, which includes biomass, wind and tides." In order to develop low cost technology for their exploitation, "research on a large scale is necessary".
- In 1981, the United Nations organized the Conference on New and Renewable Sources of Energy in Nairobi. Fundamental for this was UN Resolution 33/148 from

December 20th, 1978, which set the target of preparing measures for joint action to promote the development and use of new and renewable energy sources with the objective of ensuring that future overall energy needs be met, particularly those of developing countries.

The Conference adopted the “Nairobi Programme of Action for the Development and Utilisation of New and Renewable Sources of Energy”. The recommended measures referred to

- research, development and demonstration
- transfer, adaptation and application of tested technologies
- information exchange and training.

Special emphasis was put on the still then largely unexploited potential of water power and on the potential of individual solar energy technologies, small-scale wind power generators and biofuel installations.

- In 1982, the report of the United Nations Environment Programme (UNEP), “The World Environment 1972–1982” was published. This report referred to scientific studies according to which it is “conceivable and possible” that the entire energy provision of mankind be met by energy from renewable sources, but stated that the biggest problem would probably remain costs which would not drop until a growing mass demand mobilized market forces.
- In 1987 the World Commission on Environment and Development published its report “Our Common Future”. The Commission was of the view that every possible step should be taken to develop the potential of renewable energy, which should form the basis of the global energy structure in the next century. Many more joint efforts would be needed to realize this potential. The report pointed out the high costs of these efforts and therefore stated that developing countries could at best bear a small portion of the costs, due to their situation in terms of resources, although they would become important consumers and possibly even exporters. Comprehensive financial and technical assistance would therefore be required.

10. One of the most crucial causes for the discrepancy between international knowledge and practical initiatives is the fact that appropriate institutions have not yet been created to the required extent. The establishment of institutionalized accountability was recommended by the North-South Commission in 1980. The report states:

“We recommend the setting-up of a global energy research center under UN auspices which could, in the first place, provide a focus for research, information and projections. Such a center could support in particular research in the field of renewable sources of energy.”

The UN Conference in Nairobi thus also dealt with the issue of institutional measures. At that conference developing countries called for the establishment of a new authority. Yet this was rejected by the other participants as was the demand to introduce a specifically fixed financial obligation on the part of the industrialised countries to make additional funds for organizations in the UN system available.

The rejection of the appeal to establish a new authority has turned out to have been a grave mistake. It is impossible to take international measures to exploit the potential provided by renewable energies without a United Nations agency with this specialization. As no such authority exists, disparities in technological development have widened instead of narrowed since the beginning of the 1980s. In terms of a global strategy for energy provision by solar energy sources, a decade has been wasted. It is high time to draw a positive conclusion from this negative experience and set up the International Solar Energy Agency (ISEA) without further delay. The ISEA would at the same time be an element of reform of the United Nations, enabling it to adequately carry out its ever more demanding mission of securing the survival of humankind.

Criteria for ISEA's Organizational Structure

1. The agency requires an efficient decision-making structure so as to be able to respond quickly to the demands placed on it.
The council should be elected by the General Assembly of the United Nations and consist of representatives from no more than 20 member nations. Each of the following should represent one half of the council:
 - Industrialized nations with advanced experience in the area of renewable energies and which especially can transfer technological know-how and
 - Developing countries which can articulate their most urgent needs to the agency.
2. Further institutionalized counseling structures should be avoided so as to prevent paralysing the agency with a lot of communication formalities.
3. Responsibilities must be clearly delegated so as to avoid an overlapping of jurisdiction.
4. Cooperation and joint projects with special organizations and sub-organizations of the United Nations which take place within the framework of the programme should be institutionalized.
5. The supervision of finances and the evaluation of implemented projects is necessary to guarantee the effective self-assessment of the Agency's work.

The International Solar Energy Agency

Excerpt from the Book by Hermann Scheer „A Solar Manifesto“, 1993

The establishment of an International Solar Energy Agency was demanded in 1990 in a EUROSOLAR memorandum. Many non-governmental organizations plus a few governments and political parties have supported this demand. In 1992 it became a central part of the recommendations of the United Nations Solar Energy Group on Environment and Development (UNSEGED), which had drafted recommendations on solar energy for the UN Secretary General before the Earth Summit in Rio. As early as the 1981 UN Conference on Renewable Energies in Nairobi, representatives from developing countries demanded the creation of a UN agency to support solar energy. This demand was rejected in 1981 by the industrial countries, and again in 1992, primarily by the American and Japanese governments, which shot down the suggestion for an International Solar Energy Agency in the preparatory conferences for Rio. There are a few UN development organizations that support solar energy programmes, but none of these has the authority that a Solar Energy Agency would have to have.

This agency would be mandated to assist any country to close gaps in its development of solar energy and build an independent infrastructure for its use, from research and training to production. This should include:

- assistance in setting up research institutes;
- construction of demonstration facilities in every country for the entire spectrum of new solar technologies;
- the exchange of scientific and technical information and training programmes for scientists, engineers, business executives and administration officials;
- consultation on establishing manufacturing facilities;
- dissemination of experience of launch programmes and planning such programmes;
- cooperation with governments, financial institutions, development and environmental organizations;
- execution of development projects.

The most important organizational task of such an agency would be to create technology transfer centres in numerous locations around the world, especially in the developing countries, with multiple tasks: development of solar technology applications; motivating, advising and training business executives and entrepreneurs, manual workers and local administrators; and carrying out regional projects.

It is not really surprising that the concept of solar technology transfer has been rejected so far. While the transfer of nuclear technology improves the market prospects of only a few power plant manufacturers, the opposite is true for solar energy technology: because it is less complex and free from danger, solar technology can be manufactured in developing countries themselves. Since transferring solar technology is thus not part of the global marketing strategy of industrialized countries, it is the precondition for an independent energy supply in developing countries. By rejecting the creation of such an agency, industrialized countries want to reserve for themselves a future market in whose expansion they have no real interest at present. If the industrial countries were to

start manufacturing solar technologies on a large scale for developing country markets, then there would be no reason to delay the introduction of solar technologies to the home market. The energy-industrial complex believes essentially that, if the time is not yet ripe for using solar energy at home, it cannot yet be ripe for developing countries. If developing countries were to begin mass production of solar energy technology and could sell them to industrial countries as well as to their home markets, it would represent a serious challenge to the manufacturing monopoly of the rich industrial nations.

The need for solar energy, especially in the developing countries, is barely questioned any more. This explains why developing countries are regarded as future markets for this technology from industrial countries and why, therefore, the West does not want to nurture local competition. Its obstruction of the establishment of an International Solar Energy Agency reveals the unscrupulous egotism of the Western energy establishment, which is indifferent to the development disaster of the South, the approaching climate catastrophe, and the growing streams of refugees. It also reveals a dangerous shortsightedness: the developing countries cannot be big markets for solar technologies because they do not have the purchasing power. Either they will produce most of their solar technology themselves, or Western sales will amount to the equivalent of a few drops of water in the desert sands.

The successful resistance so far to such an agency also reveals how tightly the political, economic and scientific elites of the developing countries are interlaced with those of the industrial countries. It is difficult to explain otherwise why time and again developing countries let themselves be persuaded to stay away from solar energy, or, rather, why they don't opt for solar on their own.

Obviously, the reasons cited here for blocking a Solar Energy Agency are never officially confirmed. Instead, so the argument goes, it would make little sense to create yet another international agency; existing ones could or should handle this additional task. Yet none of these existing organizations has been given either the required mandate or the funding. Another poor excuse, contradicting the first one, is that the poor performance of existing UN organizations discourages the formation of a new one. Surely, if their work is so unsatisfactory, that should be an even better reason to create a new, efficient institution.

The time is overdue for the majority of states not to let themselves be prevented from recognizing and acting on their own interests by a minority of oil-producing and industrial countries. It is absurd to make the establishment of an International Solar Energy Agency dependent on the agreement of those governments who do not want it in the first place, and whose involvement would only do damage because they would obstruct the agency's efforts. Such a Solar Energy Agency could be the link for a cooperative alliance between the developing countries and the enlightened industrial countries. Whenever international economic associations have been formed in the past, their initiators did not ask whether there would be objections from those whose economic interests might suffer. For all these reasons, some governments should go ahead and launch such an agency on their own, without waiting for a general consensus that will never come; the Austrian Chancellor Vranitzky hinted at such a possibility in 1992. The agency would have to remain open for other countries to join subsequently.

Without an international agency, the necessary transfer of solar technology will remain dependent on more or less fortuitous bilateral cooperation agreements among

individual states. With such an agency, the economic blossoming of solar technology would no longer depend on competition and jealousy among global economic competitors – who have pretty much outdone each other in stifling solar energy. With their minimal activities, these go-slow specialists with small energy departments keep one foot in the door of a future solar market, but with the other foot simultaneously attempt to slow down market development. If the solar market takes off without them, they want to make sure they are part of the action. However, solar energy technology is too important for mankind to let it be subject to that sort of gamesmanship any more. With the help of technology transfer via the Solar Energy Agency and widely distributed solar technology centres, every effort must be made to ensure that all countries become solar technology producers of their own in the shortest time possible. Only then will the developing countries be in a position to satisfy their solar energy needs. Once they produce solar technology of their own, they will have the chance to become exporters of industrial products, thus advancing beyond the role of mere exporters of raw materials and agricultural products, a process that chips away at their natural assets as they are forced to sell foodstuffs they urgently need to feed their own people.

Precisely because the creation of many of the initial facilities for an energy supply system in the world's southern regions are at stake, the prospects for launching solar energy are greater there than in industrial countries. The task of a Solar Energy Agency would also include creating a system of patent information covering solar technology and offering patent counselling in this field; helping to arrange licensing and joint-venture production; and drafting uniform industrial standards for solar technology to facilitate global interaction (see the following Figure). Solar technology transfer is an alternative to development credits and services that so far have focused mainly on the use of fossil energies. Independent and unhindered economic development of the South is impossible without solar energy.

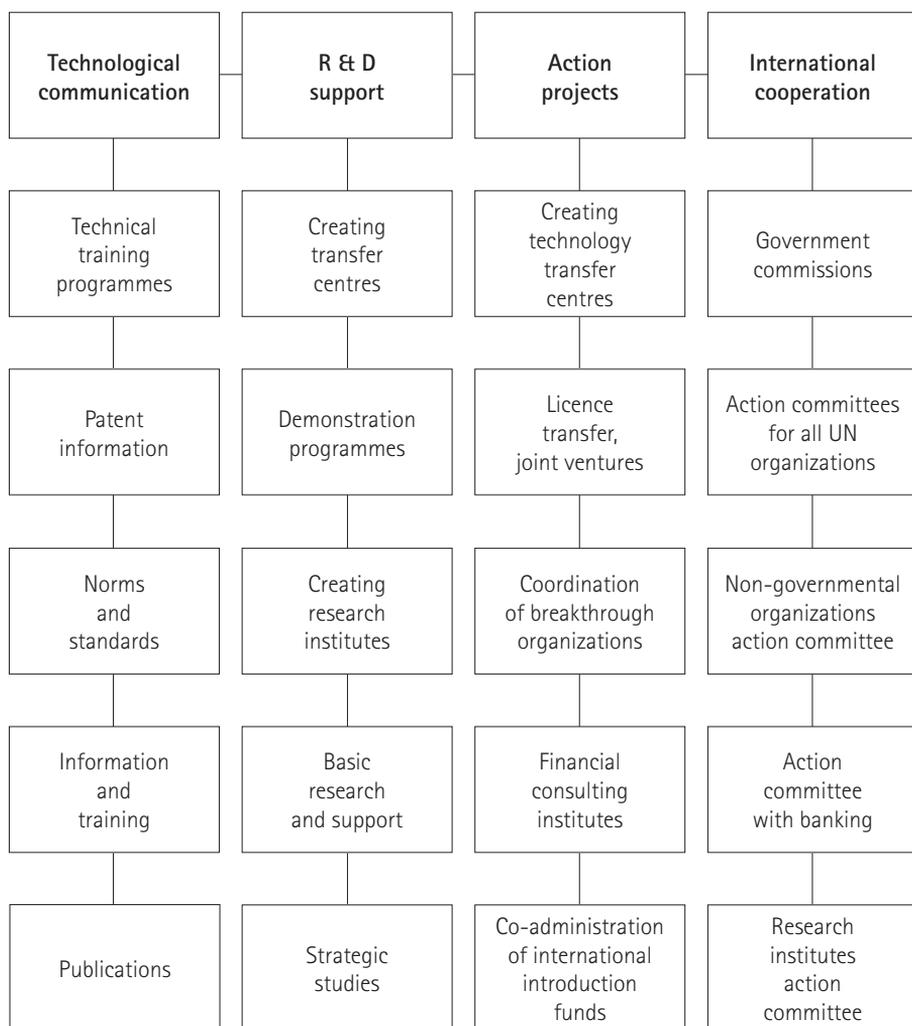


Figure: International Solar Energy Agency: tasks and management structure

Memorandum for the Establishment of an International Renewable Energy Agency (IRENA)

by Dr. Hermann Scheer, President of EUROSOLAR, 2000

Summary

The global climate changes, the impending exhaustion of fossil energy sources, the dangers of nuclear based security as well as the proliferation of atomic weapons will result in our relying globally on Renewable Energy. This maxim applies for all countries throughout the world, for developing countries as well as industrial ones. Time is pressing; the introduction of Renewable Energy is not keeping up with increasing energy consumption.

Industrial countries with established systems of conventional energy supply need to implement a thorough structural change to replace conventional energy sources with renewable ones, and in the meanwhile make greater efforts to reduce their over-proportional energy consumption.

Developing and transitional countries also have an increasing demand for energy which is necessary for their economic development. Most of them are still at the stage of introducing efficient energy systems, especially in rural areas. It is reasonable to conclude that they should start out with new technology for Renewable Energy, rather than going the long way round via nuclear and fossil energy systems. Because most of mankind lives in developing countries, a mass introduction of these new types of technology is not only in the interest of these countries, but in the interest of mankind as a whole. However, to date the broad technological and industrial know-how for the use of Renewable Energy is only available in a few industrial countries.

The fundamental structural difference between conventional and Renewable Energy is that conventional ones are mostly supplied by large power stations, renewable ones mostly by smaller systems. Hence widespread participation in promoting Renewable Energy is necessary. Moreover, Renewable Energy systems are usually less complex, so that developing countries could well build their own systems. Unfortunately, so far this has not been the case. A prerequisite for the introduction of this new technology is therefore a speedy increase of the number of potential participants, who can organize a non-commercial transfer of knowledge and technology.

Since this transfer has to be implemented quickly and on a broad scale, there should be a specialized international agency expressly created for this purpose. The proposal is for the creation of an „International Renewable Energy Agency (IRENA)“. IRENA should be supported and monitored by member governments. Membership must be open to any country that supports IRENA within the framework of its statutes. The agency is particularly important to developing and transitional countries which have few means of their own to organize transfers of knowledge and technology. The G8-“task-force“ recommendations, to introduce new technology for using Renewable Energy for 1 billi-

on people within the next 10 years, would not be possible without an organisation like IRENA.

One of the tasks of IRENA will be to advise governments on:

- drawing up national programmes for the introduction of Renewable Energy;
- supporting education, training, and the dissemination of information about Renewable Energy;
- implementing training activities for administrators, technicians, craftsmen and for small and medium enterprises (SME);
- the cooperative foundation of regional centres of research, development, and transfer;
- evaluating and processing information on applied technology and best practice experience;
- advising on and arranging financing options for Renewable Energy;
- collecting data and drawing up statistics.

IRENA's tasks should be complementary to the activities of governmental and non-governmental organizations and enterprises. It shall not replace their activities, but support them if necessary and be active especially in those countries and regions where there are no relevant activities so far. It shall mainly work towards establishing and linking existing structures. It is a global project to help people help themselves to introduce new technologies for using Renewable Energy.

These are the advantages of IRENA:

- a competent international structure for non-commercial transfer of technology;
- consistent introduction and proliferation of Renewable Energy;
- a global contact point for development and concepts in the field of Renewable Energy;
- global support for activities that make the use of Renewable Energy more efficient.

The organizational model for this agency is the „International Atomic Energy Agency (IAEA)“, which was established in the 50s. Its task, among others, is the non-commercial transfer of nuclear technology. What was thought necessary for nuclear energy decades ago, is now imperative for Renewable Energy, in a specialized new agency. As worldwide interest in nuclear energy wanes, interest in the utilization of Renewable Energy is growing.

Motivations:

Renewable Energy: helping create an ecological world economy

In recent years, the use of renewable forms of energy has found increasing recognition as one of the foundations of an ecologically responsible world economy.

Nowhere is this truer than in the nations of the Third World. These countries require help in making renewable sources of energy the core of their efforts to meet growing energy demands, so that future expansion can be achieved in an increasingly self-reliant fashion. In no other area – with the exception of agriculture – is „helping others help themselves“ more crucial, and nowhere are the prospects for success better. If no action

is taken, there is risk that the Third World countries will copy the energy policies of the industrialised nations.

Without a strong commitment to renewable forms of energy, the countries of the Third World will

- add to the world's climatic problems, due to the increased demand for energy that automatically accompanies economic expansion,
- spend an increasingly disproportionate share of their comparatively small budgets on importing primary energy, which would put a strain on their developing economies (particularly those without access to reserves of fossil fuel) and have negative effects on social infrastructures as well as on the reliability of the energy supply
- continue the trend toward a centralisation of their populations, leading to ever bigger cities with ever greater slums, because the infrastructure needed to provide conventional forms of energy to rural areas – where the majority of the population lives – is too expensive.

But industrialised nations, too, are facing the challenges of moving from established forms of conventional energy production to renewable forms of energy – challenges made all the more difficult due to insufficient know-how and planning.

Only with the increased application of technologies designed for the use of renewable forms of energy can we put an end to the vicious circle and insure a healthier global climate, global and regional environmental protection as well as economic expansion. Besides making emission-free energy available, these technologies reduce the dependence on primary energy imports and save money usually spent on the infrastructure needed to distribute conventional forms of energy. Currently, two billion people live in areas of the globe with no access to power grids. Renewable Energy can be collected and converted for use at the very location where energy is needed. It's the only way of making power available without building expensive energy grids, and the only way of making fuel available without having to transport it over long distances. In order to raise awareness of potential uses in developing countries, and to thus increase the number of those involved, it is necessary to ensure the non-commercial transfer of technology.

Until now, the techniques for exploiting Renewable Energy have been primarily developed in a handful of industrialised nations. Germany, Japan, the United States, Switzerland and Denmark, and – to a lesser degree – Spain, the Netherlands, the United Kingdom, Austria and Australia have, during the last twenty years, invested in research and development and created programmes to introduce Renewable Energy to the market. Thus, the corresponding industries exist mainly in these countries. The technology transfer resulting from the commercial export of Renewable Energy systems is, in itself, insufficient to correct existing world-wide discrepancies. Trade in Renewable Energy also ultimately encounters obstacles stemming from a lack of information and training.

In terms of renewable sources of energy, most nations exhibit

- insufficient research and development activities,
- a lack of familiarity with the potential uses of renewable forms of energy on the part of decision-makers in the political and economic spheres,

- insufficient technical knowledge and trained technical experts, as well as educational programmes related to the uses of Renewable Energy,
- a lack of financing institutions for small investors,
- a general lack of public awareness about the possible economic benefits of using Renewable Energy,
- the non-existence of policies geared toward introducing these forms of energy.

In recent years, a growing number of international organisations and non-governmental organisations have taken initiative to introduce new technologies for the use of renewable forms of energy. Each of them has run into the obstacles mentioned above, however, which they cannot overcome single-handedly and not without enormous additional organisational and financial burdens. Typically, the costs incurred in solving these problems well exceed the costs of the installations themselves, rendering them inefficient. This is also true of projects within the context of foreign aid. A considerable number of projects peter out and become so-called „solar ruins“ due to a lack of qualified operations and service personnel. In addition, the ratio of personnel costs to investment costs in foreign aid projects is disproportionately high.

The International Renewable Energy Agency (IRENA)

As we see, there is a great need to consolidate international efforts in the form of an International Renewable Energy Agency focusing systematically on the non-commercial transfer of technology for the use of renewable forms of energy – one which can play a central role in the distribution of information and in the areas of planning and development. In the past, none of the existing international organisations have been able to completely fill this very specialised role, due mostly to statutes which have required them to place their priorities elsewhere. A specialised central body could make an enormous difference in lessening the load placed on individual initiatives for Renewable Energy, and allow them to be conducted more rapidly.

The creation of such an agency was first suggested in 1980, in a report published by the North-South Commission chaired by Willy Brandt. The idea was the main topic of discussion at the first UN conference on Renewable Energy in Nairobi (1981), but was rejected by the industrialised nations, which were not convinced of the necessity of such an agency. In 1990, EUROSOLAR reiterated the proposal in a memorandum to the Secretary General of the UN. In 1991, Greenpeace also called for the creation of such an agency.

The Austrian government headed by chancellor Franz Vranitzky presented EUROSOLAR's suggestion for the creation of an agency to the General Assembly of the United Nations in 1990.

The recommendations made by the United Nations Solar Energy Group on Environment and Development (UNSEGED) presented to the Rio conference (1992) and those of the Interparliamentary Conference on Global Environment, chaired by U.S. Vice President Al Gore in Washington (1991) also proposed the creation of such an agency. The suggestion was not included in Agenda 21, however, because the idea of a new international organisation was rejected.

There were various reasons for these developments. The fact that renewable forms of energy could play a significant role in the energy supply was not yet widely recognised

at the beginning of the 1990s. Then, as now, any suggestion to create a new international body was generally unpopular, due to widespread scepticism about the effectiveness of organisations already in existence. The majority argued for working within the framework of existing UN institutions. Additionally, there was (and is) strong opposition against the use of Renewable Energies because they compete with the commercial structures of conventional forms of energy supply. Today as well, it would be unrealistic to make the creation of an agency for Renewable Energy contingent upon a global consensus amongst all governments and organised energy interest groups.

A decades' worth of practical obstacles have not stalled the idea of creating such an agency; on the contrary: the need has become clearer than ever before. The necessity for the new technologies for the use of Renewable Energy has, by now, found general acceptance, and the pace at which this is happening is much too slow. The idea that such an agency must only come about as the result of a consensus taken at a global conference of governments has, meanwhile, also been discarded. As with the founding of the International Atomic Energy Agency in 1958, a movement on the part of just a handful of governments suffices for the creation of such an agency, which would offer membership to all interested nations, either presently or in the future. By putting its basic commitments into practice, the agency can establish a positive reputation and thus attract new member countries.

Existing international organisations can meet demands with neither the depth nor the degree of specialisation this vital field requires. Each of them – UNEP, UNDP, FAO, UNIDO and UNESCO as a sub-organisation of the UN – has a much broader mandate which makes it impossible to concentrate solely on the use of renewable forms of energy. The International Energy Agency (IEA) is an organisation representing the OECD countries which, though incorporating all types of energy supply, focuses to a large degree on fossil fuels, thereby limiting the prospects for alternative forms. Taken together, the organisations mentioned are no substitute for an International Renewable Energy Agency. Similarly, IRENA would not be designed to replace or eliminate existing organisations operating in the field of Renewable Energy, but rather would work together with and aid in the efforts of these groups and non-governmental organisations.

During the 1990s, energy agencies focusing on Renewable Energy and energy efficiency were founded in many industrialised countries and in a few developing nations. Most of these operate on a regional level, some on a national one. Within Europe, these agencies are organised under the larger FEDARENE. The work of this organisation can be seen as proof of the necessity for an International Renewable Energy Agency.

The recommendations of global climate conferences, as well as the current initiative to mobilise renewable forms of energy introduced by the G8 nations at the G8 summit in Okinawa (July 2000), indicate the extremely urgent need for the wide-spread re-orientation to renewable forms of energy. The realisation of these recommendations is, however, completely dependent on an extensive and efficient, non-commercial transfer of technology. This goal can hardly be achieved without first creating a competent, specialised institution.

The Goals and Methods of IRENA

1. IRENA will help interested states close developmental gaps between their own and other national economies and to build up a functioning infrastructure for the use of re-

renewable forms of energy. It will work in conjunction with the activities of governmental and non-governmental organisations, i.e. support their activities where necessary and become active where no Renewable Energy-related activities are currently being conducted.

More specifically, IRENA will

- advise federal governments, regional administrations and municipalities in the development of programmes to introduce new technologies for the use of Renewable Energy;
- support the creation of research and development institutes, of „Centers of Excellence“ and of national and regional energy agencies;
- drive forward the development and co-ordination of global standards of quality control and of discrimination-free norms;
- promote the exchange and dissemination of information about the latest developments in technologies for the use of renewable forms of energy and for energy efficiency, as well as promoting the „best practices“ for the use of such technologies;
- conduct educational and training programmes and develop the relevant curricula; promote the exchange and training of scientists, technicians, and managers in related fields;
- support the creation of specialised service providers and of small- and medium-sized enterprises (SMEs) operating in the field of Renewable Energy, as well as advising countries interested in starting their own production of technologies for the use of Renewable Energy;
- help in organising the financing of Renewable Energy;
- publish statistical studies.

2. IRENA will be financed through the payments of member nations. The share of the financing to be carried by each individual nation will be based on UN criteria.

3. IRENA will work in close co-operation with other specialist organisations and organs of the United Nations (IDA, UNESCO, FAO, WHO, WMO, UNDP, UNIDO, UNCTAD, UNEP), as well as with the World Bank and other foreign aid banks. IRENA will assist these organisations operating in the areas of agriculture, forest preservation, development aid, environmental protection, education, science and health by providing advice, support and aid in the foundation of projects related to the introduction and use of renewable forms of energy and energy efficiency. Recognising the valuable work of UN organisations in the field of Renewable Energy, IRENA will make knowledge available for transfer at the highest global communication standards.

4. IRENA will focus its efforts on the latest technologies for the use of renewable forms of energy (solar thermal, photovoltaic solar energy, wind power, regenerative biomass, wave and tidal power), including the exploitation of small hydro-electric power systems.

Arguments for the creation of an IRENA

1. By now, it has been generally accepted that in order to protect an endangered global environment, international efforts must be made as quickly as possible to increase the proportion of the world's energy demands being met by new technologies for the use of Renewable Energy. The energy nature makes available to us in the form of Renewable Energy sources is, in fact, significantly greater than the actual amount of energy consumed by the earth's population, even at its current significant rate of growth. There are any number of practical technologies for the use of solar energy sources, particularly solar radiation, wind power, hydro-electric power and biomass.

2. Given the proper location and competent application of available technologies, Renewable Energy can be exploited immediately without any economic disadvantages in comparison to conventional forms of energy. In fact, there are even economic benefits.

This is especially true in the case of

- small hydro-electric power systems;
- solar thermal power generated by facilities upwards of 100 MW in appropriate climate regions;
- photovoltaic solar energy in an increasing number of applications, including: small, self-charging appliances; integrated use as building components in the field of solar architecture; in solar-electric refrigeration appliances, and in so-called power generation „islands“, i.e. in isolated locations where large investments would be necessary to transport and access power;
- biomass, especially as a way to produce fuel, which could eliminate the need for fuel imports;
- wind energy employed as a source of power generation, as well as in the areas of seawater desalination and water purification;
- small solar thermal systems used to generate heat or for drying processes in agriculture.

3. The examples mentioned above show the great scope of possibilities already available to us in the area of solar energy technologies. These possibilities can be realised only in as far as the following four basic points receive greater consideration in the political and economic realms:

- Environmental and social factors must be considered an integral part of any mid and long-term economic planning. Every commercial activity is fundamentally dependent on an intact natural environment, which insures the health of the human population and that natural raw materials continue to be available. Properly applied, solar energy not only has the lowest social costs, it also avoids doing irreparable damage to the earth's environment.
- The use of solar energy generally increases a country's chances to become self-sufficient in terms of energy supply and is therefore a prerequisite for greater independence. Furthermore, especially for countries with tropical and sub-tropical climates (i.e. primarily for developing countries), solar energy has the potential to

become an important export commodity and thus contribute to a given country's participation in a reformed international marketplace based on fairness.

- The cost effectiveness of the use of solar energy will increase in direct proportion to growth in modern mass production of solar energy technologies.
- The existing Catch-22 situation – there is no market for this technology because it is too expensive, and it is too expensive because there is no market for it – can be rectified. One condition is a political commitment to financing the introduction of Renewable Energy to the market and the enabling of mass production. Initial access to a segment of the energy market brings with it an immediate reduction in the costs of manufacturing, thus opening up an ever expanding free market with ever decreasing costs for Renewable Energy. It is therefore mandatory, when analysing the economic potential of solar energy, to consider the dynamics of market development. These factors – and the accompanying increase in the chances for improved environmental protection on a global scale – suggest that solar technologies can be a central factor in a new, more natural industrial and agricultural product cycle. Expanding the production of solar energy technologies would: reduce dependence on expensive fossil fuels; serve to protect nature and its resources; improve general levels of health, and reduce the potential dangers inherent in other technologies. As energy is a basic need of the entire human population, a new orientation as described here would help expand the jobs market within the framework of a new, ecologically responsible industrialisation policy.

4. Economic opposition to the expansion of new technologies for exploiting Renewable Energy is dubious, especially as it applies to developing and threshold nations. The fact that decisions concerning energy policy and energy economics are often based on too-narrow and rather biased information cannot be overlooked. The factors generally considered include the costs of exploiting, converting and transporting energy via the infrastructure currently existing in industrialised nations. A broader view must include economic, agricultural and transportation factors; urban and town planning and population policy; development policy; trade policies and broader environmental-political goals and considerations.

5. It is imperative that every nation in the international community:

- create research and development facilities;
- begin using a wide range of solar energy technologies, in order to keep pace with new technological developments;
- promote the education of scientists and technicians and increase public awareness as the basis for increasing self-sufficient production and use of Renewable Energy and energy efficiency methods;
- move quickly to introduce Renewable Energy technologies.

Bridging development gaps and reducing deficits in the availability of information is a crucial global, environmental, economic and political issue. The effort to preserve the natural foundations for life on earth through an increased reliance on Renewable Energy sources is a race against time and against continued environmental destruction,

whose pace has sped up rather than slowed down. Immediate co-operation on an international level is the only way to insure widespread access to technologies for the use of Renewable Energy. IRENA will serve to insure and promote such co-operation.

6. The existence of the International Atomic Energy Agency (IAEA) also demonstrates the necessity for an organisation such as IRENA. The Vienna-based IAEA is affiliated with the United Nations and employs over 2,200 people with an annual budget of approximately 250 million dollars. There are currently 130 member nations. Besides being responsible for nuclear safety, monitoring the distribution of fuels and promoting the further development of nuclear science, the IAEA, which was founded in 1958, serves to help eliminate technological barriers to the introduction of nuclear energy. About one-third of its annual budget is set aside for this purpose. As dictated in Article 4 of the Nuclear Non-Proliferation Treaty (NPT) of 1970, the IAEA is to support its member nations in the non-commercial transfer of technology. The IAEA uses the financial means available through its „Technical Co-operation Fund“ to conduct exchange projects, to organise training programmes and courses, to advise in the planning and implementation of nuclear energy facilities, to maintain information systems related to nuclear power plants and state-of-the-art technology, and to support isotope research.

The majority of the members are developing countries. Twenty-five of them are located in Africa alone. Thus, many of the nations belonging to the IAEA neither currently have nor plan to build their own nuclear power plants. It should also be pointed out that the events of the past three decades have led to wide-spread scepticism about the actual potential of nuclear energy. Even industrialised nations such as Germany, Italy, Sweden and Austria have either banned the use of nuclear power or set dates for its future elimination. Because of the high costs of meeting stricter demands for nuclear safety, the construction of nuclear power plants has become much more expensive, which has had a chilling effect on their economic attractiveness. The lack of an appropriate energy-supply infrastructure in developing countries is a further obstacle to the introduction of nuclear energy. To date, the problems of nuclear waste management have not been solved sufficiently. Although many of the hopes attached to nuclear energy at the time of the founding of the IAEA have meanwhile been dashed, the IAEA has failed to adjust its aims. During the 1990s, in fact, the organisation even managed to expand its membership.

We needn't say more here about the current state of nuclear energy or the IAEA. The role the IAEA plays in ensuring nuclear safety and in monitoring the distribution of fuel is of the utmost importance. But its work in the field of technical co-operation and the motives behind it set a precedent that clearly demonstrates the need for an International Renewable Energy Agency. In as much as it was once necessary to create an IAEA, it is today equally necessary to create an IRENA in the form of an independent agency operating in conjunction with the United Nations. The IRENA will not have to concern itself with issues of „solar safety“, because safety is not an issue in the case of Renewable Energy. Instead, its task will be paving the way for an effective, international transfer of technology for a global mobilisation of Renewable Energy to meet the world's energy demand – a transfer of technology occurring independently of competing economic interests. Considering IRENA's transfer of technology for Renewable Energy to be at

least as important as the transfer of technology within the framework of the IAEA would suggest a minimum annual budget of approximately 80 million dollars.

7. When new global challenges like increasing the use of Renewable Energy are faced, new institutions are necessary to assume responsibility. It would be inadvisable to assign the tasks which an IRENA could be responsible for to already-existing sub-organisations and international agencies. While it is necessary for IRENA to co-operate with such existing bodies in the carrying out of its tasks, it is also clear that only a specialised agency like IRENA could satisfy the demands required for systematic co-ordination of expertise in the transfer of technologies for Renewable Energy. It would pave the way for increased international co-operation and help other UN organisations integrate solar energy in their respective programmes more effectively.

Speeches at the International Impulse Conference for the Creation of an International Renewable Energy Agency

powered by EUROSOLAR, Berlin, 8 June 2001

I. Heidemarie Wieczorek-Zeul, Minister for Economic Co-operation and Development, Federal Republic of Germany:

Economic Co-operation for Renewable Energy

Particularly from the perspective of development policy, I see three urgent reasons for a future energy policy based on renewable sources of energy.

Moving away from oil

For many developing countries, in particular, their dependency on imports of fossil fuels for energy is a serious obstacle to development. Since these countries have few other alternatives to turn to, this dependency is a far greater burden for them than it is for the industrialised nations. The developing countries in particular therefore stand to benefit in the long term if they move away from using fossil fuels for energy towards renewable energies. Today more than three quarters of all world trade in fossil energies is accounted for by crude oil and petroleum products. The developing countries, which account for just 21 % of global value added, import almost 40 % of all the oil traded throughout the world. Although crude oil was, for a long time, cheap and fairly easy to obtain on the world market, the most recent increase in world market prices has made petroleum imports considerably more expensive for many developing countries. At the same time their export revenues are falling, so that they have lost about one-third of their foreign exchange receipts. This means that the terms of trade, which are already unfair, have become even worse for them. The rise in the price of oil is a painful reminder that we are dealing here with a limited resource. If the price remains at a high level or rises still further, people will begin to realise that the remaining oil is too valuable to simply burn. Our task in development policy is to open up alternatives for the poor countries too and one such alternative is developing renewable energy based on resources that are available locally.

Economic development and employment

Such alternatives are all the more necessary since 2 billion people – one-third of the world's population – lack access to commercial forms of energy. Providing such energy is one of the key factors in poverty alleviation and economic development. We can see that, generally speaking, wherever energy is available, poverty is on the decrease. Electrical household machines and tools mean savings in labour and increased productivity. Electric light not only increases the length of the day for productive activities,

it also protects people's eyesight and helps lengthen their active working life. Finally, television and the internet bring the wide world into even the remotest village. The digital divide between rich and poor can only be bridged if energy is available to run the computers. They cannot be powered by kerosene or charcoal; they need electricity. Energy, especially electricity, creates areas of activity and employment opportunities. It makes an important contribution towards improving rural living conditions and thus stops many people from migrating to the towns.

It is not only the poor countries that can derive work and development from the technologies involved in regenerative energies. If the potential market is large enough, it also opens up interesting economic prospects for those German companies that are involved in technology transfer and in developing permanent marketing structures in partner countries. Energy helps fight poverty. By the same token, however, we must also accept that a minimum income is initially required for people to be able to actually afford „clean“ energy. What is true for the industrialised countries is doubly true for the developing countries: sustainable energy for the future must be affordable. I see the task for development policy as one of working with the partner countries to ensure that the huge gap is bridged between, on the one hand, the high prices of anything available on the market connected with renewable energies and efficient equipment for end-users and, on the other, the low purchasing power of poor people.

Climate protection

The earth's climate is in danger. Scientists tell us that the consumption of fossil fuels is changing our climate and threatening the very foundations of human existence. It is the developing countries in particular that are becoming the first to learn how climate change affects us in practice, as evidenced by the increasing frequency of natural disasters like floods and droughts in recent years. This danger is truly global in nature. Co-ordinated action is urgently needed. If the efforts of the international community with regard to development and poverty alleviation succeed – something that we all hope and expect – then there will be a considerable increase in global energy consumption in this century. If the structure of the primary energy base remains unchanged, i.e. the proportion of energy derived from coal and oil remains the same, this will mean an enormous increase in emissions of greenhouse gases. In fact, even holding emissions at current levels will not be enough to prevent further global warming. Effective reduction is needed. There is therefore no alternative to the systematic development of renewable energies.

In the Climate Convention and the Kyoto Protocol the industrialised countries have made commitments to reduce their emissions of greenhouse gases, whilst recognising that the developing countries are going to increase their emissions as a consequence of their development. It is therefore unacceptable that the new administration in the USA, the country with the greatest energy consumption and the highest CO₂ emissions, wants to back out of its commitments to reduce emissions. This attitude shows an ignorance about the global risks that we believed had long since been overcome.

Just as disturbing are the plans to make nuclear energy socially acceptable again because it supposedly represents no danger to the climate. That is like calling on Satan to cast out the devil. The nuclear risks are just as unacceptable as climate change. It shows a lack of courage and of faith in the capability of technological innovation, if we

are unable to imagine a sustainable future for energy beyond such antediluvian technologies as fossil and nuclear fuels. I personally hope that the growing resistance in the USA towards this policy will not fail to have an impact, and I am grateful to the German Chancellor for making it quite clear what we Europeans expect in terms of climate policy. The statement issued by the spokesman of the White House, which was reported in the press, cannot be the last word on this issue. I quote: „The President believes that [the amount of energy Americans consume per capita is part of the] American way of life and that it should be the goal of policy makers to protect the American way of life. The American way of life is a blessed one.“

What are the obstacles to using renewable energy and what must be done to overcome them?

If we want a sustainable energy future, then what we need first of all is a sober analysis of where the barriers lie and what must be done to overcome them. Whilst for many years scientific and technical questions dominated in the field of renewable energies, today it is the economic issues that are our foremost concern. Today it may be said that, from a scientific and technical point of view, there are no insurmountable obstacles in the way of supplying energy from renewable sources. But there are other questions: What will it cost us? How are the investments to be financed? What incentives are needed for the market, i.e. for energy suppliers and consumers? How can the economies of the developing countries cope with this challenge? Ultimately, the goal must be for renewable energies to penetrate the market and convince consumers, and for them to cash in on their special competitive advantages – namely environmental friendliness and low consumption of resources. This applies for us here at home, but it is also equally valid for the developing countries.

We still have a long way to go. That is why we need the same kind of goal-oriented promotion of renewable energy that we now have at home in the developing countries as well. I say this because no one should be under the illusion that the market will take care of things. The market can take care of things and will take care of things, but only if policy makers give the market a legislative framework within which to act, a framework within which sustainability is rewarded and the wasting of resources penalised. There is a saying that hits the nail on the head here: „The market is a very good servant, but a poor master.“ This is also true in the field of energy policy.

Where are the crucial obstacles to the broad use of renewable energies and what must be done to overcome them?

1. Remove discrimination

First of all the discrimination against renewable energies that can be found in many parts of the world quite simply needs to be removed and renewable energy needs to be given at least an equal chance in the energy market. In other words, we need to create a level playing field. The discrimination we are talking about here takes many forms:

Sometimes it is direct, for example when special taxes or duties are levied on solar installations because they are classed as luxury goods or because they are quite simply seen as a profitable source of revenue.

Sometimes the discrimination is indirect, for example when the consumption of conventional forms of energy is subsidised. For a long time now, environmental economists have been calling for these harmful subsidies to be phased out, thereby putting an end to state support for environmental pollution. Since the Rio Conference this call has been made the subject of UN resolutions, but realising this aim is a slow business.

2. Include environmental costs in the equation

When prices come to include the environmental costs of energy consumption we will have made a decisive step forward. If the true ecological costs were included in the price of environmentally harmful energy consumption, then the consumer would be able to make an informed choice about the best form of energy in economic and environmental terms.

In Germany we have taken a huge step in this direction with our eco-tax. This was and is the right step to take, even if – due to factors which have nothing at all to do with the eco-tax – the price of petrol at the pumps has now reached a level that is close to the pain threshold for many people. Ultimately, for our partner countries and our competitors alike, there is no alternative to including the environmental costs in the price of energy. With regard to the costs of climate protection, the Climate Convention and the Kyoto Protocol offer an effective approach, which must be used.

3. Promote market development

A further barrier is the lack of distribution systems and the lack of mechanics to carry out repairs and maintenance. In our partner countries there are plenty of machines and technical installations standing around unused having given up the ghost due to lack of maintenance. Some of these are solar installations. A functioning market also includes the traders and mechanics who bring the machines with the new technology to the customer and take care of maintenance and repair. Such people will only be prepared to retrain and invest in new technology if they are convinced that there will be a sustainable demand. That is why the donors have become convinced that subsidised inputs of hardware, such as are familiar to us from the field of solar and wind energy, are of no help when carried out as isolated measures, since they do not create confidence in a long-term, market-based demand. What we need instead are integrated approaches which foster long-term use and economic viability, and which can in particular ensure maintenance and repairs.

4. Develop the technology further and make use of opportunities for co-operation

These are elements of a strategy for a sustainable energy future with renewable energies. But don't let's kid ourselves: it will not be easy to realise this strategy and enable renewable energy to compete with other forms of energy on the open market. The fact is that, in most regions today, renewable energies have considerable cost disadvantages when only commercial considerations are taken into account. This is especially true for solar power, but also applies to wind energy as well. We therefore need a strategy for promoting renewable energies that aims to remove these cost disadvantages.

This includes further technological development with the aim of considerable further reductions in the costs of energy transformation. To put it more simply: solar power must be made cheaper and it will be made cheaper. In the past 10 years the price per

watt of installed power has fallen from about US \$ 6 to about US \$ 4. The experts tell us that the costs can be lowered a great deal more both through further technological development and as a result of decreasing costs due to increased demand. Production costs of US \$ 1 per watt of installed power are achievable. That would be just a quarter of today's price.

Here it is particularly important to see and use the opportunities for co-operation between the industrialised and the developing countries. Currently it is in the technologically advanced countries such as Germany that the technologies are being developed. However, increased demand and a resultant decrease in costs can only be realised if we achieve broad application in the industrialised countries and in the developing countries as well. Special support for renewable energies is therefore absolutely necessary until they are able to compete successfully in the market.

Political consequences

I have spoken about the obstacles standing in the way of a rapid spread of renewable energies and about the strategic goals that must be aimed for, particularly from the point of view of development policy, if we are to achieve a sustainable energy future. What are the political consequences of all this? What must be done?

1. Increase our support

We need to increase our support for renewable energies within development policy. This is not just my view as the minister responsible for development policy; this view is shared and supported by the entire coalition government. I therefore welcome the motion put forward by the coalition parties in the German Parliament for a special programme for „Renewable Energies“ within the framework of development policy. I will be supporting Parliament in the consultations concerning this motion and I am confident that, with Parliament's backing, it will be possible to develop a higher profile in this area.

Two years ago I set a financial target for German development co-operation: we want to spend DM 200 million a year on renewable energies from the budget for bilateral development co-operation. Last year I achieved this target. A special effort was required to manage this and we are making a special effort this year too.

What German development co-operation is doing in the field of renewable energies is set out in an attractive brochure produced by my Ministry, which I am happy to recommend to you. In it you will find many more examples of projects and an overview of ongoing and completed projects. The promotion of renewable energies is thus an important element of development co-operation in the energy sector. Apart from that, I would like to draw attention to two other priority areas, which are no less important; they are

- improving energy efficiency, above all in connection with electricity generation and distribution, and
- rational energy use that seeks out and exploits the enormous potential for savings in energy consumption.

2. Improve the regulatory framework

It is not only more, and financially well-endowed, promotional programmes that are needed. Even more important is the creation of an intelligent regulatory framework that

creates the right market incentives. Here in Germany we have drawn the appropriate conclusions and, with the Renewable Energy Sources Act, have created a regulatory framework that is helping to increase sales of electricity from renewable sources, thereby contributing to a lowering of the generation costs. I consider this route in particular to be of interest for the developing countries as well. It opens up opportunities for renewable energies because it makes it possible to charge different prices depending on the technology used. It does not place any burden on the public purse since the additional costs are borne by the electricity consumers.

The regulations covering electricity feed-in and minimum prices that have been in place in Germany since 1991 were conceived in such a way as to promote wind energy in particular. The result was the emergence of a domestic wind power technology industry in Germany in the 1990s which, today, is at the cutting edge of this technology in the world market and is now also able to help bring wind power technology to developing countries. This boom refutes the argument that minimum price regulations are an obstacle to productivity development. The new Renewable Energy Sources Act is a further development of the instrument for regulating electricity feed-in and minimum prices. Differentiated prices reflect the different generating costs for the various types of technology. They will now stimulate dynamic development in all areas of power generation using renewable energies, not just for wind power. Particularly in the case of photovoltaic technology, this will make it possible to break through the vicious circle of low piece numbers, high unit costs and a lack of competitiveness. This unbureaucratic price-regulating mechanism will, in the medium to long term, help all the different regenerative forms of energy compete with conventional sources of energy. I see here a crucial advantage over other promotional models, such as the quota systems which the USA for example is pursuing. This is also our starting point for bringing our influence to bear on the World Bank, an institution that in other instances has shown a tendency to follow the American example.

This law, this new regulatory framework, was a breakthrough for the spread of regenerative energies in Germany. In the past two years there has been a rapid increase in the amount of power generated from the sun and from wind. As the development minister I have observed this process with mixed feelings, because the manufacturers are now faced with the problem of capacity bottlenecks, so that their interest in the difficult markets in the developing countries has diminished. And yet I am still convinced that renewable energies will be an interesting economic prospect in the developing countries most particularly, since the natural conditions in these countries are often much better for such energies than the conditions in Germany. It is a fact that Africa gets far more sun and Egypt for example has far more wind than Germany.

A regulatory framework which makes sense in both development and environmental terms is also needed in the developing countries. We are helping our partners to develop such a framework. China is in the midst of intensive efforts to develop a regulatory framework for the promotion of renewable energies, and we are helping with these efforts by sharing our experience with our Chinese partners.

3. International co-operation; networking

The special topic of this Congress is how international co-operation can be improved in order to achieve greater success in spreading renewable energies in the developing

countries in particular. There is also urgent need for this as well, because these countries need our help in connection with the introduction of the technology, the application of the know-how and the financing.

It is in the long-term interests of the developing countries themselves to step up the introduction of regenerative energies. But it is also something that is in the interests of the developed countries with their high energy consumption and high emissions of pollutants. That is why it is quite understandable if our partners view our offers in connection with renewable energies with a certain degree of mistrust. Our partners are asking us: Is the South supposed to pay the price with this more expensive technology for the North's continued preference for cheaper conventional forms of energy? This cannot be what the international division of responsibilities is all about! That is why an agreed, jointly owned strategy is so important, a strategy supported by a convincing, sustainably designed energy policy in the developed countries.

And that is another reason why the USA's decision to quit the Kyoto Protocol is so damaging, because it gives credence to the doubts in the developing countries about whether the developed countries are really serious in their intentions regarding a shift towards an environmentally friendly climate policy. The principle of joint, but differentiated, responsibility for the environment and for sustainable development, which was adopted at the Rio Conference, means that the strong should not expect the weak to bear the consequences of environmentally damaging energy consumption and shoulder the costs of avoiding further damage.

Where can we make a start on improving our efforts in terms of international co-operation? Let us first take a look at what is already being done in the international institutions and what has been achieved in the past few years.

The most important step was the establishment of the Global Environmental Facility and its endowment with considerable financial means. This fund, financed by the industrialised countries, eases the financial burden on developing countries arising from the additional costs that result when global environmental goals are taken into account in projects. Since the founding of the Facility in 1991, specific support for climate projects has been funded with a total of US \$ 1.2 billion from the fund and a further US \$ 5.9 billion through co-financing. Some US \$ 600 million from the fund has gone into projects to promote regenerative energies and low-emission production. Germany is the third most important donor, contributing about 12 percent of the funding for the Global Environmental Facility. That also means that Germany has channelled more than US \$ 70 million towards the promotion of renewable energies via the Facility. The forthcoming third replenishment of the fund will once again include a substantial contribution from the German government.

The World Bank, UNDP and UNEP are also involved in the activities to promote renewable energies – not just by implementing projects financed through the Environmental Facility, but also by organising their own projects. The same is true of the International Energy Agency (IEA). There are also a number of institutions that have been set up to work on the further development of technology and know-how, such as the Fraunhofer Institute for Solar Energy Systems in Freiburg, the Danish Risø National Laboratory or the Basle Agency for Sustainable Energy. A wide range of expertise covering technology, economics and social sciences has been built up here. All further efforts should make the best possible use of this expertise. The variety of the approaches

is also important, because here the motto is: there is more than one way to a successful sustainable energy future. Each country needs its own way and its own decisions.

What matters most now is that these institutions and initiatives are effectively networked, that a common vision is strengthened and that political stimuli are developed for co-ordinated action. With this aim in mind, the G8 group of governments decided at the last G8 Summit in Okinawa to set up the working group „Renewable Energies“. The group will present a report with recommendations at the upcoming G8 Summit in Genoa. These recommendations will cover how the use of regenerative energies can be intensified, particularly in the developing countries. The recommendations are currently being examined by our governments, but I will not be revealing any secrets if I say that this report will emphasise in particular the role and the obligations of the major industrialised countries with regard to intensifying their efforts and making better use of the possibilities of joint institutions. You will not be surprised to hear that a substantial amount of the analyses and political consequences that I have presented to you here today can also be found in the working group's report, because the German government, as a G8 country, was of course also a participant in the consultations.

Another aspect is also important to me here: half of the working group members were government representatives and the other half were from the private sector. This underlines the strategic importance of the alliance with the business world, with the people who have an important role to play in the growing market of renewable energies as producers or utility companies. I am encouraged by the large number of companies, many of them medium-sized businesses, that are interested in getting involved in the developing countries and are already in some cases partners in our development projects.

IRENA – providing an important and necessary impulse

I view the proposals for the founding of a new international agency for renewable energies as providing an important and necessary impulse for the intensification of international co-operation, especially with a view to strengthening technology transfer and the dissemination of experience and know-how. I would like to offer my express thanks to Mr. Hermann Scheer and to EUROSOLAR for these proposals, because they will help us give even more impetus to this transfer and establish a better network for the many activities at the international level.

We would all be well advised not to try to reinvent the wheel. There is, for example, already plenty of experience to be found in the institutions of German development co-operation when it comes to technology transfer; the GTZ and the Carl Duisberg Society are just two institutions which I would like to mention particularly here. The same holds true for most of the big development policy agencies. And I would like to suggest that you make use of their experience when you are considering new initiatives and elaborating a work programme. There is an urgent need for better co-ordination between the central players on the donor side and in the partner countries. There is likewise a need for the political forces that are the advocates for a sustainable energy future to get together, in order to increase the pressure on the international decision-making bodies through concerted action.

I would like to thank EUROSOLAR for its tireless work in generating this pressure. Without you our policy in Germany and in Europe would not have progressed so far along this path. However, this thank-you should not be seen as a sign to take a break. It is not

only the climate of the earth that is at stake; the development opportunities of billions of people also depend on our making the right decisions here today and also investing the energy necessary to implement these decisions. I therefore wish this conference every success and you can be sure that in me you will have a good partner.

II. Hermann Scheer, MP, President of EUROSOLAR:

Towards an International Treaty to Promote the Use of Renewable Energy

Three major contradictions support the argument for establishing an International Renewable Energy Agency (IRENA) in the form of a multinational intergovernmental organisation:

First, the lasting contradiction between the perceived dangers resulting from the use of nuclear and fossil energy and the dearth of political initiatives to introduce renewable forms of energy with which to avert those dangers.

Second, the fact that within the system of international institutions there is not one organisation similar to the International Atomic Energy Agency to promote the global development and introduction of renewable sources – despite their being the only hope of sustaining an independent and emission-free supply of energy for mankind which, according to the reasoning of the fifties and sixties was supposed to come from the peaceful use of nuclear energy. Today, the slogan is not „atoms for peace“, as called for by US President Eisenhower in his address to the UN General Assembly in 1953, but „solar energy for peace“.

And third, the widespread tendency to underestimate renewable energy potential, both natural and industrial. This applies not only to politicians and businessmen, but to scientists and thus the general public as well. It is partly a common failure to realise that the political, economic and socio-cultural conditions governing the use of renewable energy differ from those applying to conventional sources.

As there are relatively few providers of conventional energy, greater concentration and usually large facilities are necessary. By contrast, renewable energy requires many providers, and their facilities should be mostly small and decentralised.

1. The contradiction between growing world energy requirements and the slow introduction of renewable energy

World demand for energy, and hence its supply, are still increasing faster than the introduction of renewable sources. This is clear from statistics since 1990 – the reference year for the proposed international climate protection agreements – and from forecasts up to the year 2020 by various organisations ranging from the IEA to the WEC.

This means that in spite of the many initiatives to stimulate the growth of renewable energy, consumption of conventional energy continues to increase. All of these initiatives – whether by the World Bank and other development banks, UN organisations or bilateral development aid agencies, or in the form of government or business projects – have a part to play in the process. They are the building blocks.

But the overall picture tells us that it is far too little and far too slow. There are not enough players and they have too little scope. Unless they are mobilised on a massive scale, unless the providers are given wider and better scope, the world civilisation will lose the race between the demand for energy and its non-polluting provision.

The political mobilisation of renewable forms of energy is mankind's most vital field of activity. It is the greatest challenge of the 21st century upon which everything else depends – from global environmental protection to economic development.

2. The ambivalence of the Nuclear Non Proliferation Treaty (NPT) and the discrepancy between the existence of the IAEA and the non-existence of an IRENA

When the IAEA was established in 1957 it had fewer than 20 member states. Its task is to maintain nuclear safety, to ensure the non-proliferation of nuclear weapons, and to promote peaceful uses of nuclear energy. It is a product of the fifties, the „atoms for peace“ concept. At that time it never entered anyone's head that the world's power supply could one day come from renewable sources.

Today, the IAEA has 130 members, including most African countries. Its nuclear safety and non-proliferation responsibilities remain. In the case of renewable energy, on the other hand, responsibilities of this kind are not necessary.

The IAEA has a second task, however, which is to promote the transfer of nuclear technology. It has an annual budget of more than 100 million dollars for this purpose – in spite of the fact that the majority of its members do not have any nuclear power stations. Nor do they want them any more, whether on principle or for economic, structural or security reasons.

Yet this transfer responsibility – and with it the IAEA – is even enshrined in international treaty law. The crucial provision is article IV of the Non Proliferation Treaty of 1 July 1970, which was not extended indefinitely until the sixth review WCRE conference held in New York in May 2000.

Article IV, paragraph 2, of the NPT reads: „All the Parties to the Treaty undertake to facilitate, and have the right to participate, in the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy. Parties to the Treaty in a position to do so shall also cooperate in contributing alone or together with other States or international organisations to the further development of the applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States being Party to the Treaty, with consideration for the needs of the developing areas of the world.“

This article is not mere theory. It is, of course, being implemented by the IAEA and was unanimously endorsed in the review conference's final document in May 2000. Thus it is also upheld by those countries which have decided and already begun to phase out nuclear energy. That document includes the following passages:

„The conference notes the contribution that the peaceful use of nuclear energy can make to progress in general and helping to overcome the technological and economic disparities between developed and developing countries.“

„The conference underlines the role of IAEA in developing countries in the peaceful use of nuclear energy through the development of effective programmes aimed at improving their scientific, technological, and regulatory capabilities.“

„The conference commends IAEA for its efforts to enhance the effectiveness and efficiency of the Agency’s Technical Cooperation Programme to ensure the continuing relevance of the programmes to changing circumstances and needs of the recipient member states.“

„The conference welcomes the new strategy for technical cooperation which seeks to promote socio-economic impact within its core competences, by integrating its assistance into the national development programme of each country with a view to ensuring sustainability through expanding partnerships in development, model project standards and the use of country programme frameworks and thematic plans.“

„The conference recommends that IAEA continue taking this objective and the needs of developing countries, notably least developed countries, into account when planning its future activities.“

This places member states in a dilemma. It implies that those who support the principle of non-proliferation and thus underscore the validity of the NPT must continue to favour the transfer of nuclear technology, otherwise they will breach the terms of the treaty.

In the case of renewable energy, there is as yet no adequate treaty framework and no binding international, institutional and financial initiatives comparable to those applying in the field of nuclear energy. This contradiction is intolerable and ignores the needs of the world civilisation. All governments asked about this situation find it embarrassing.

The same international effort that has been put into the development of nuclear energy is required for the development of renewable forms of energy, particularly so in view of the fact that the world’s energy problems are more acute than ever. Anyone who believes that a specialised agency for renewable energy is unnecessary ought to be consistent and stop providing funds for the IAEA’s technology transfer activities.

The world demands binding requirements in connection with renewable forms of energy, but hardly anyone still asks about nuclear energy. It is imperative that renewable energy receive equal treatment with nuclear energy within the system of international treaties and institutions. Consequently, we require not only an IRENA, which should have at least the same institutional and financial resources as the IEAE – more in fact.

Also needed is a supplementary protocol to the Non Proliferation Treaty, which should be adopted not later than at the 7th review conference in 2005. It should take the form of an International Treaty for the Proliferation of Renewable Energy. The main provision should read as follows:

„The present Treaty permits the parties to the Nuclear Non Proliferation Treaty to replace the assistance in the peaceful use of nuclear energy provided for in article IV with assistance in promoting the use of renewable energy.“

We intend to communicate this proposal to the UN Secretary General and all parties to the Non Proliferation Treaty. Such a supplementary protocol would be an indication rooted in international law that we are leaving the nuclear age of 50 years ago and entering the solar age.

3. Underestimating the potential benefits of renewable energy

The main argument put forward to justify the continuing use of nuclear and fossil energy is that renewable forms would not be sufficient to meet world requirements. This is a biased view which is not rendered any more valid simply through being shared by scientists who have received the Nobel Prize for physics. Here is not the place to go into this aspect. Let it suffice to say that world energy requirements really can be met from renewable sources.

In its World Energy Outlook the International Energy Agency forecast that by 2010 global electricity consumption would be 20.8 trillion kilowatt hours, with 3.4 trillion coming from large hydroelectric power stations and only 154 billion from other renewable forms of energy. Based on this requirement, therefore, about 17.2 trillion kwh would have to be covered by renewable instead of conventional sources of energy in order to secure emission-free production. This is easier to achieve than the advocates of conventional energy would have us believe. We only have to free our practical imagination from the shackles of current dogma. For instance, a wind power station with a capacity of 1.5 megawatts produces about 3 million kwh a year under average wind conditions. Thus, to produce 17.2 trillion kwh some 5.7 million such facilities would be needed all over the world. This number of wind turbines, though much smaller in size, were already being used to produce electricity in rural parts of the United States during the thirties, until overhead lines were installed to supply electricity from the big power stations.

Photovoltaic energy can be projected in the same way. Starting from the current 10 % annual effectiveness of solar cells – a figure which can be improved considerably – and based on an average global solar radiation of 1,700 kilowatt hours per square meter, approximately 100,000 square kilometres of solar cell modules would be required in order to generate the world's total energy requirement for the year 2010. This is but a fraction of the area covered by the buildings which would house such modules.

These are only two means of calculating the full requirement, though they would not have to be applied exclusively because renewable energy is always provided in various mixed forms. In addition to wind and photovoltaic energy there are countless ways of generating electricity using small facilities operated by flowing water and wave movement, large solar-thermic systems in the earth's sun belts, or tidal power stations in flat coastal areas. It is also possible to tap the natural heat of the earth, and of course there is bio-energy. If all of these options were to complement one another there would be no need to exhaust any of them completely. This also answers the standard question about what happens if the sun doesn't shine or the wind doesn't blow.

All home-heating energy, which in Europe accounts for about one third of the total energy requirement, could be supplied over the next few decades by construction systems which make it possible to collect and retain solar heat in buildings. Houses of this kind, which are not dependent upon traditional fossil energy and do not emit any pollutants, already exist, even in Germany, which is not exactly over-endowed with sunshine, and they cost little more than ordinary houses.

The International Energy Agency estimates that demand for oil products, that is to say, fossil fuels required for road, waterway and air transport, will reach 1.3 billion tonnes in the year 2010.

The most obvious substitute for such quantities is bio-energy. Here again the natural potential of this source energy has been grossly underestimated. Annual organic photo-

synthetic production from the earth's total vegetation is 220 billion tonnes of dry mass. This vegetation has about half the energy content of mineral oil. Given an average yield of only 15 tonnes of dry mass pro hectare (about 2.5 acres) – which is a modest amount – the oil energy equivalent would be 7.5 tonnes. Thus, 1.3 billion tonnes would require the output of 1.75 million square kilometres of sustainable forest and farmland. Compare this with the world's total forest area of 40 million square kilometres, 10 million square kilometres of agriculturally productive land, and 49 million square kilometres of desert and semi-desert, a large part of which is capable of revegetation, be it in the form of reforestation.

These figures in themselves suffice to show that mankind's total energy requirements could be met from renewable energy in various mixed forms, albeit not by the year 2010. But the time needed can be reduced and the path made smoother by increasing energy efficiency and thus economising, and by making the best possible use of conversion technology, which up to now has hardly been in the forefront of public and private R & D activities.

Most energy experts, it seems, do not have the curiosity, imagination or will to mount a global projection of the use of renewable forms of energy which have been found viable in practice. Or they are too opportunist vis-à-vis the powerful conventional energy organisations. Otherwise they couldn't make the ridiculous assertion that renewable sources are not sufficient to cover the world's energy requirements. We realise, of course, that substitution cannot be completed by the year 2010 – but how about 2050?

However, since energy supply is the key to all else, this presupposes the biggest structural transformation since the beginning of modern economic history. No one can say how long this will take. It depends on the extent to which we can mobilise the necessary players.

One thing is certain: Transformation must take place more rapidly and on a larger scale. This is yet another reason for establishing an IRENA, which must be a highly efficient instrument for this purpose. It will have to overcome widespread resistance, whether in the attitudes of conventional suppliers or in the minds of energy consumers.

Where participants in world climate conferences have mostly gone astray is in trying to square the circle, that is to say, they want to protect the climate, but at the same time show leniency towards those responsible for climate change. This is like the dog chasing its own tail. The failure to see the potential inherent in renewable energy has been a common feature of such conferences and explains their lack of success. The transition to renewable forms of energy is regarded as an economic burden to be shared equally, in spite of the fact that conditions are unequal.

Yet this is actually a unique economic opportunity for all, whether it be to avoid environmental damage or save the cost of imported energy, whether it be to create new industries or prevent international conflicts over natural resources.

4. The arguments against an International Renewable Energy Agency are not valid

This brings us to the argument put forward time and time again ever since such an agency was first proposed. For the past twenty years its opponents have been claiming that the existing international organisations are adequate. Some contend that this proposal reflects a lack of appreciation of their work. Even several national development organisations with renewable energy as part of their remit react in this way. Moreover,

a number of companies that export renewable energy technology consider the idea of an agency to be an encroachment on their territory.

But none of these arguments are sound. After all, it would be a case of supporting, not replacing, the work of the existing organisations. The truth of the matter is that the activities of governmental and non-governmental organisations combined have not been sufficient to meet the challenge. Either they lack the funds with which to expand their practical initiatives, or their work is focused on other tasks. All of them should devote greater attention to the use of renewable energy, and do so on their own responsibility. If, however, we look at a map of the world to see where renewable forms of energy are being developed we find that 95 % of it is blank, in other words that nothing has been done so far. And where the human capacity is absent there is also no production capacity and no market. Creating that human capacity and building quality standards must be the prime responsibility of the IRENA. No network of research institutes can cope with this task alone.

The IRENA should have a subsidiary function. It should step in where there is a vacuum, where no one else is playing an active role, and where it is asked to provide assistance. And it can withdraw whenever – largely a due to its support – the transfer of technology can be taken over by others or where an independent system has been developed. No company can expand its market if it also has to train its clients. What would the computer market be like if manufacturers also had to pay to have their customers trained?

The global demand for renewable energy is so great that there is plenty of room for all concerned to expand – be they international or national governmental and non-governmental organisations, be they training centres, research institutes, banks or companies. A much greater effort is required, far greater than has been possible so far. This will apply to the IRENA also, even if it is funded as well – preferably better – than the IAEA. The aim is to make it an international driving force for all initiatives, both practical and psychological. As a joint agency of governments focused entirely on renewable energy – in tandem with the proposed International Treaty for the Proliferation of Renewable Energy as a supplementary protocol to the NPT – it should be a sign that the community of nations are at long last seriously applying themselves to the task of developing renewable energy. It merely has to launch the kinds of organisational initiatives that emerged in the fifties for the development of nuclear energy.

III. Raymond Myles, Chair, Integrated Sustainable Energy and Ecological Development Association (INSEDA):

Capacity Building for the Effective Adoption of Renewable Energy Technologies in Rural Areas – Experience of India NGO's

I. Prologue

The rapid industrialization and economic growth in several developing countries has placed a heavy demand on the use of energy. The rapid privatization in some of these countries is getting linked-with generation of more energy in an unsustainable manner, which is resulting in throwing up new problems related to environmental and social aspects. On the other hand there are 2 billion people (1/3rd of the world population) who presently have no access to electricity, majority of them are living in villages as well as remote and inaccessible regions of the world. Yet another very large group of people (specially in rural areas) have only limited quantity and lesser hours of supply of electrical power, to meet their entire energy requirements. Both these groups (un-served and under-served) not only require un-interrupted energy & power supply from environmentally friendly, energy from renewable resources but also quality energy services at an affordable cost and sustainable basis to meet their regular energy needs. At the same time, additional power would also be required to meet the growing demand of those groups who are already being served well at the present level of consumption and energy use.

The experience of Indian NGOs involved in rural energy programme for over 2 decades has shown that the centralized generation of power from large power plants (whether hydro, thermal and even renewable energy based electrical power generation, e.g., from the large wind turbine farms in the coastal belts of India connected with large grids) has not been able to meet the needs of rural people, especially the rural poor.

The renewable energy (RE) promises to meet new and emerging challenges on the domestic energy and electrical power supply front in a decentralized manner. It also provides scope for promoting people-centred, sustainable human development with distributive justice, while protecting the environment as well as the rich socio-cultural diversity of the large humanity living across the globe. In spite of this, the large-scale applications and adoption of RE options by local people has been very, very slow. At the same time, to meet the needs of un-served and under-served people, especially in the rural and far-flung areas of the developing countries, it is apparent that any future development strategy of such regions should be based on biomass, solar, wind, hydro, animate and other sources of renewable energy, to ensure sustainable growth and development of people in these regions.

The NGO networks involved in the rural energy based development programme for the last over 2 decades in India, now recognizes that when ever the issue of poverty alleviation and the improvement in the quality of life of the rural poor is to be addressed, the sustainable energy would have to be treated as one of the key inputs for promoting „Su-

sustainable Human Development“, provided its application is based on the “people centred development” and not just the growth centre development- or at least there would have to be an appropriate combination/mix of both the approaches.

II. Existing Approach for the Generation of electrical Power in India and its Impact

Even though it is widely recognized that the human society requires continuous supply of energy, the solution found by the modern man has always been based on the consideration of growth-centred development. Some of the examples are big hydroelectric and coal based power plants. Looking at the majority of developing countries, especially in India, it is evident from the energy development in the past that it has been based on the centralized energy/power generation, transmitted at great distances from the point of utilization, mainly to urban centres. The majority of power (electricity) generations (especially from the large power generation) units are mainly located in rural areas, closer to where the major raw materials (inputs) for the operation of these plants are available. In spite of this, one of the main concerns of Indian NGO network of INSEDA members involved in the rural energy programmes is that, the benefit of electricity power (EP) generation has mainly gone to the urban centres, whereas the people living around the EP generation centres had to face and are still facing the negative impacts due to air, water and soil pollution, cutting and destroying of large forest cover in the region, degradation of productive agricultural lands and health hazards as well as displacement & rehabilitation problems.

III. Energy and Power Supply Situation in the Rural Areas of India

The centralized power generation in India transmitted through the high-tension power transmission lines goes across the rural areas and several times through the farmers' field, yet most often the benefit never reaches the villagers, but used mainly for the benefit of urban centres and industries. Even if the electricity connections are given to the rural people, either the power supply is erratic or it is not available when it is required the most or the voltage is too low. Thus one can see that in terms of using commercial energy from centralized grids, there is a great disparity between urban and rural areas within the country itself.

The bio energy (cattle manure, crop wastes etc.) is the main source of cooking in the developing countries, including India. Those peasants, who have biogas plants, may also use it for lighting purposes (if electricity supply is not there or kerosene is not easily available). The locally generated biomass play very important role in meeting the cooking fuel needs of villagers- the biomass is usually collected (in the form of harvested crop stems and crop residues) and stored by villagers at the time of harvesting of crops for personal use and also given to landless agricultural labourers used by them for harvesting and threshing of crop in the season. Thus it is clear that the major share of the rural energy demand is at present met by the natural renewable sources which would continue to play the important role in meeting their energy needs, therefore its efficient use has to be looked in very critically. Rural people who can't afford biogas plants depend upon kerosene for lighting, which apart from being in short supply also drains the limited foreign currency, which (kerosene) at the same time are also very difficult to get in remote regions of the country and are becoming expensive by the day at the same

time is also contributing to greenhouse gases (GHGs), and hence not environmentally sound option.

IV. Main Reasons for Low Acceptability of RETs in Rural Areas in India

The renewable energy technological (RET) options such as biogas, smokeless biomass stoves and improved wood stoves, solar cookers, and to a limited extent the solar PV system, are being promoted for more than two decades now in India. Out of these, India took a big leap forward in the systematic promotion of two most appropriate rural oriented renewable energy (RE) technologies, namely, biogas plants and improved biomass and wood stoves.

However, several of these RETs (e.g. solar cookers, PV systems etc.) had been/ are being sold/marketed in rural areas of the country by the manufacturers without fully understanding the local socio-cultural and socio-economic aspects of a given region, supply of low quality products, by often giving lots of false promises to rural people, without appropriate awareness and training about/on these new RE products, adequate after sales or post-installation services- some of the main/key reasons for the failure of RET programmes in the rural areas of India are summarized below:

- a) The majority of RET programmes are being promoted using rural areas as a market without realizing that they (RE gadgets/devices/equipments) are still new to them and at the same time too costly, where as the rural people have other priorities for using their limited earnings and resources.
- b) The RETs are often promoted in rural areas by manufactures telling them that these technologies are fool-proof, once they are bought no repair & maintenance are required for the life of the product- e.g. solar PV panels for pumping water and solar lighting.
- c) In the past, after selling their RET products in rural areas, the manufacturers did not educate the people, didn't provide back-up support and couldn't supply even simple spare parts, resulting in to low efficiency and operational problems, e.g. solar PV lamps.
- d) Certain RET gadgets/devices like solar cookers were initially promoted, backed by heavy subsidies with the promise to solve all the cooking problems with out much supervision, care and maintenance. In the case of box-type solar cookers, the promise of reaching the required temperature and the year-round cooking of all the major meals, could not match the reality due to quality of products (especially the much inferior quality and lesser quantity of insulation than prescribed, with a view to make short-term gain by taking advantage from the government subsidies and incentives by these manufactures) in majority of cases, resulting in to major set-backs in such programmes.
- e) Even if RET programmes (such as PV, biomass gasifiers etc.) are now getting linked to credit programmes; no systematic field level studies of implemented projects are conducted to ascertain the repaying capacity of the rural people.

V. Important Factors for the Wider Acceptability of RETs in Rural Areas of India

Some of the example mentioned above could easily demonstrate that instead of viewing rural areas only as a market place by treating RETs solely as commercial products for short term financial gain, use the RE programmes to also empower people and community, by developing RE based small and medium scale enterprises (SMEs), by initiating appropriate capacity building of local people, training of unemployed rural youth for taking up maintenance, repairs & servicing. If possible, the RE promotion and implementation needs to be integrated with other developmental programmes in the rural areas; and where ever feasible this could be supported by developing appropriate infrastructure involving group of villages for promoting RET based ancillaries and cottage/home industries for strengthening rural economy, which would enable creation of employment and self-employment, thus ensuring sustainability of RE programme.

The primary interest of people (End Users) in India is the availability of sustainable supply of energy which is affordable, efficient and supported by quality & reliable back-up service which, as far as possible, needs to be provided to them on-demand at their door steps. The urban population is able to get these energy services, especially in the case of electricity, at comparatively affordable and more or less on continuous basis. The large rural population depending for centuries on the locally available traditional sources of fuels, though interested in convenient and efficient energy to improve their quality of life, would normally not like to be bothered from where and how these services are available to them, so long as they are affordable, of better quality, reliable and regular in supply. This would require innovative approach and change in strategy for the promotion of sustainable development & growth, keeping in mind the need for improving and maintaining the natural micro-eco-system for the future generation.

VI. Promotion & Implementation of Household Biogas Plants and Other Renewable Energy Technology in India and the Role and Achievements of the NGO Biogas Network

The systematic development and promotion of biogas technology programme is over 60 years old in India. The first scientific development of family size (household) biogas units was initiated by IARI (Indian Agricultural Research Institute), New Delhi in 1939, and the first field worthy household (Hh) model with floating steel gas holder was developed by KVIC (Khadi and Village Industries Commission), Bombay in 1956. The demonstration and limited extension phase of Hh biogas plants was first initiated in India by KVIC, using their floating steel gas holder model, in 1960. However, the implementation of Hh plant got impetus in India, only after the Ministry of Non-Conventional Sources of Energy (MNES), Govt. of India, launched a centrally sponsored scheme, known as National Project on Biogas Development (NPBD), in 1981–82, to give a massive thrust for achieving a big target, country wise, using a decentralized implementation strategy and a Multi-Model and Multi-Agency approach adopted under the NPBD (National Project on Biogas Development), India has been able to achieve massive target of over 3 million household (Hh) biogas plants, which has also ensured wider coverage throughout the country. Though it is still a drop in the ocean when considering the total potential of over 15 million Hh biogas plants (BGP). The role and contribution of NGO network (since the inception of NPBD in 1981–82 of the Govt. of India), who later on formed INSEDA in 1995, as their national registered association, has been very

important and crucial in the promotion, technology transfer, capacity building and systematic extension of Hh biogas plants in the rural areas of the country.

This NGOs network of over 60 INSEDA members operating across the length and breadth of the country, has built over 125,000 biogas units and till date have trained a large number of field functionaries, over 6,000 rural artisans as well as awareness, motivation and training of over 250,000 end users of RETs and the prospective plant owners. The various levels of trained field functionaries and rural artisans have been involved in providing regular construction as well as back-up services in repair, maintenance and capacity building of biogas plant owners, thus creating ripple effect.

The NGO network of INSEDA have been involved in the extension of household biogas plant for over 2 decades. Apart from awareness creation and motivation of rural people through building of demonstration plants in new areas, this network under took systematic capacity building programme as a part of the long term promotional strategy before embarking on the large scale implementation of fixed dome household plants, which paid rich dividend. The NGO network have been the active partners in the National Project on Biogas Development (NPBD) of the Ministry of Non-conventional Energy Sources (MNES), Govt. of India since its inception in 1981–82, and played an important role in the capacity building activities of all the possible actors involved in household (Hh) biogas units. This network has now built over 125,000 biogas units, under the NPBD (MNES), Govt. of India. In the process of implementation of biogas programme, the members of INSEDA Network have also built-up and strengthen infrastructure at the grassroots level to implement other low cost RETs, like efficient smokeless cook stoves, and now gearing-up to provide services and capacity buildings in other appropriate RETs (e.g. simple PV systems, micro-hydro and small scale biomass briquettes and gasifiers, as well as demonstration of small scale decentralized electrical generation units from biogas units) for rural applications.

VII. Capacity Building by NGOs for Promotion of Household Biogas Programme in India

In the backdrop of above, the implementation of low cost RETs and the capacity building of different level of functionaries and rural artisans as well as the development and promotion of low cost, household biogas plant by this NGO network to empower the rural people and the community is of great significance.

Based on over two decades of experience of INSEDA's network of NGO members in biogas promotion and implementation, the various stakeholders involved in this programme could be categorised in three major groups. They are- (1) ENERGY PRODUCERS, (2) ENERGY SERVICE PROVIDERS and the (3) ENERGY END USERS. In some cases the (1) and (2) could be the same and in some cases (1) and (3) could be the same. All these groups required appropriate capacity building in order to ensure effective coverage, leading to a successful rural energy (in this case biogas energy) programme. The capacity building programme for the key stakeholder/actors/players, during the last two decades were one of the most important activities undertaken by renewable energy network of NGOs. The involvement of NGOs in the capacity building of various groups/stakeholders in appropriate rural energy technologies, with specific reference to (Hh) plants and the lessons learned are summarized in the subsequent paragraphs.

Service Providers: For the Implementation of Biogas Development Programme

a) NGOs Functionaries and Local Artisans:

- (i) For the systematic promotion and extension of biogas units, depending on the number of district covered with in the States, type of services and the size of operations, some of the key personnel appointed by the NGOs members of the network were Project Directors, Extension Managers, Technical Officers/ Junior Engineers, Supervisors/ Motivators, Technicians/Master Masons.
- (ii) Majority of these NGOs operated in one district for biogas implementation, and had by and large a combination of at least three staff on their regular roll- namely (1) Biogas Extension Manager, (2) Biogas Supervisor and (3) Biogas Master Mason. Funds for appointing a team of these three categories of staff came form a common programme of the NGO biogas network, funded by an overseas funding agency for 10 years (divided in to two project phases of approximately 5 years each), through a nodal national NGO. The Chief Functionary of the respective NGOs normally performed the role of Hon. Project Director. As the biogas programme got evolved, over the period, some of the NGOs pushed their programme at a very fast pace to respond to the local demands, thus making it as one of their major activities. Such NGOs with much wider spread prepared separate projects to secure additional funds for supporting additional infrastructure with more staff for efficient operation for the larger coverage in their area of operation.
- (iii) Apart from this, there was provision in the NPBD to give service charges (commonly referred as turn key fees) to the recognized service providers (for implementing biogas programme), on pro-rata basis. In the initial years the turnkey fees was 250 Indian Rupee (IRP)/Biogas plants (BGP) constructed and commissioned, which has now been increased to 500 IRP/BGP. The recognized NGOs who qualify to get this turnkey fees under NPBD, were/are also supposed to give guarantee to plant owners for a minimum of three years period against defective construction. They also provide free post-plant installation services, maintenance, service and repair during the guarantee period as well as undertake free of cost construction of new BGPs in the event of major structural and construction defects found in any of the plants build by them.
- (iv) Brief description of capacity building programme for different levels of functionaries of NGOs involved in the implementation of household biogas programmes in rural India under the NPBD of MNES of GOI, are given as under:

Workshop for Chief Functionaries (CF)/Project Directors (PD):

Three days duration annual workshops/seminars were organized for CFs/PDs during the programme period. These workshops/seminars were utilized for in-house discussions on the achievements against the annual target of each NGO set by them self in the last annual workshop and agreed by the network as a group. The workshops were held in a participatory manner, with the objective of learning from the field experience of each other. The group also addressed to some of the individual problems, which were location specific, as well as discussions were also held on some of the common problems, e.g. subsidies, turnkey fees, bank loans, and their timely release, relationship with the state level Nodal Agencies and networking with other biogas service providers in the block,

district, states and regions (2–3 states) etc. The workshops/seminars were also utilized to discuss relevant technical matters and clarifications by the appropriate specialists/experts. Some of the new RETS (or new ideas for new RETs, including new biogas designs or improvements in existing designs) also formed part of the discussions. The participants also got the opportunity to discuss the new policy directives of the National Nodal Ministry (MNES) about the biogas development programme, and its negative and positive impact and to decide on the appropriate strategy(ies) for dialogue with the state level Nodal Agency(ies) based on local realities. The most important aspect of these workshops was the field visits to the BGPs constructed by the NGO hosting the workshop, where apart from participatory critical appraisal & monitoring of the host NGO's programme, the participants also learnt new things by interacting with the plant owners. These workshops contributed a lot to the capacity building process of the participants (senior and top management staff of NGOs) by enabling them to learn new and practical ideas for them to implement in their own situations as well as to give practical tips to the CF/PD of the host NGO from their own experience, thus helping each other for making qualitative improvements in their biogas extension programme, by keeping abreast with the latest information. The last part of the programme of these workshops had been to draw-up and present the Action Plan by each NGO for the coming year for discussions and endorsement by the house as well as, deciding on the venue of the next annual workshop. With the MNES recognizing many other national, regional & state level competent NGOs as biogas 'NODAL AGENCIES' for channelling funds for biogas subsidies, turnkey fees and training programme for their members, this role is now being performed independently by them.

Capacity Building of Biogas Extension Managers (BEM)/Biogas Extension Coordinators (BEC):

Normally those NGOs who were operating Biogas Extensions Centres (BECs) in more than one district in a state and have larger targets, appointed a regular Biogas Extension Managers (BEM) for the effective management of their biogas implementation programme. If the NGOs were operating in only one district, having comparatively lesser targets then they employed one Biogas Extension Coordinator (BEC). The BEM/BEC have been one of the key personnel for the success of NGO network's implemented household biogas programme in rural areas.

A one-week duration training programme was designed for especially up grading the knowledge and skills of this group (BEM/BEC) of functionaries. In the initial years of biogas implementations, one to two such programme was/were conducted each year. This one-week programme was meant for upgrading the basic knowledge about the low cost biogas technology for rural applications. Where ever possible exposure was given to the practical aspects of the construction techniques/skills as well as the explanation about the finer and key points for building biogas plants, selection of appropriate beneficiaries, plant size and plant site, building materials, evaluation of capabilities of biogas technicians and master masons, testing of new biogas plants for leakage, initial and regular feeding of plants, commissioning of gas, utilization of biogas and the digested slurry (manure) from the biogas plant and it's composting as well as general care, maintenance and repair aspects. The training also covered different designs and models of household biogas plants, their merits and demerits, and simple design of biogas projects, management, financial and reporting aspects, collection and monitoring of

socio-technical information about the plant owners as per designed format for reporting to nodal government agencies as well as donors, filling of applications for bank loans, forms for government subsidies etc.

Capacity Building of Technical Officers (TO)/Junior Engineers (JE):

As the biogas started becoming popular in rural areas of the country, more demand started getting created; due to this several NGOs expanded their programme to meet the growing demand. Thus the need was felt by NGOs to attend to more technical issues, independently, rather than depending on a single national level technical service NGO. Thus these NGOs started hiring technically qualified staff. Based on the need for the capacity building of these technical people, a special training programme of one-week duration was designed and launched. This programme covered the designs of popular Indian household models, design principles, design calculations key factors in designs, design for different agro-climatic conditions, merits & demerits of different designs, and how to design different types of simple digesters, as well as daily care, routine servicing and maintenance aspects of the plants for efficient operation, initial loading of plants and testing & commissioning of gas, emptying, cleaning, checking and reloading of plants. This group (TO/JE) of functionaries were also taught about the correct selection of building materials, plant sites, plant capacity (for size of families and availability of quantity of feed materials), quantity required to be fed when the plant (which were essentially designed for operating on bovine manure) was to be used for other domestic animal manures and human wastes (excreta) for biogas production. The curriculum also included, reading and correct interpretation of dimensional drawings, correct construction techniques of fixed dome biogas plants, identifications of technical problems in BG plants (design and construction), testing of fixed dome plants (for digester and gas storage chamber leakage), identification & location of faults, and trouble shooting as well as different methods of repairs & sealing of digester for slurry leakages, and gas leakages from the gas storage chamber and the dome of the fixed dome biogas plants. In addition trainees were also taught about how to build these household fixed dome biogas plants under special field conditions, e.g. high water table and black cotton soil etc., as well as precautions in construction and operations.

Capacity Building of Technical Supervisors (TS)/Sr. Technicians (ST):

Normally NGOs employed one technical supervisor (TS)/senior technician (ST) per block, to effectively cover 40–50 KM radius from the base- a block may have 80–100 villages. A person appointed as TS normally had to have at least 1 year of formal training in technical certificate course. Where as an ST would normally be selected by NGOs out of the systematically trained Master Masons having long practical experience of constructing and supervising biogas plant construction, who had some informal training in reading and writing with strong technical aptitude and supervisory quality. The capacities of Technical Supervisors (TS)/Senior Technicians (ST) were strengthened and periodically upgraded through these programmes. After participating in these trainings the TS/ST would be able to effectively conduct village level surveys to ascertain the potential of household biogas plants, undertake motivation and awareness programme for the prospective plant owners (on one to one basis) as well as conduct periodic motivational and awareness camps for group of rural people, explaining the benefits of

biogas plants. They would also assist the prospective plant owners in correct filling of application forms for plant construction by the NGOs as well as assisting them in filling loan applications (if they wanted to get their biogas plant built through bank financing) and submitting the application either directly to the local branch of the bank or alternatively sending to the Biogas Extension Managers (BEM)/Biogas Extension Supervisors (BEC) at the headquarters of the NGO for checking and submitting to the banks. Except the design related aspects of the biogas plants (which are part of the training programme of only the Technical Officers/Junior Engineers), the TSs/STs were also given training on all the other technical aspects of household plants (but to a lesser degree, as compared to TOs/JEs). The first training of TSs/STs would normally be of 3–4 weeks duration, which would also include the constructional aspects of household fixed dome biogas plants along with the master masons. During this period they were exposed to hands-on experience of building plants from scratch along with the master masons (MMs). This helped them (TSs/STs) to build their confidence in supervising local master masons in the construction of biogas plants. During this period they were also taught about reading the drawings, locating faults in the plants if any, testing for digester slurry and biogas leakage and rectifying the fault or repair the plants. They were also trained in selection of appropriate pipes and correct laying of biogas pipelines, accessories and biogas appliances, construction of compost pits attached with biogas plants, feeding and commissioning of plants as well as utilization of biogas for different applications and the digested manure for crop production. Later on they were normally given one-week duration training once in a year or in two years in groups as well as provided in-house periodic training for up-gradation of their socio-technical skills and knowledge.

Capacity Building of Master Masons/Artisans (MM/MA):

The NGOs network had been mainly promoting and building fixed dome household biogas plants constructed from bricks and cement mortars. Therefore the master masons (MMs) played very important role in the success of this technology. The rural masons in India normally come from the families of brick-layers whose ancestral profession is normally masonry for generations and they live in villages. They can do the construction of traditional rural houses and simple building structures, but lack the necessary skills to build a civil structure that would be gas-leak-proof. Since the fixed dome biogas technology required special skills for either making cylindrical structure with airtight dome cover or an ellipsoidal shaped plant without formwork and build airtight, therefore required special kind of technical skills training. For this purpose a three-week duration, brick-by-brick construction training was designed for this group of rural artisans. The construction trainings by NGOs were conducted (at the farmers' sites) by technical expert with the assistance of an experienced Technical Supervisor (TS) or a Senior Technicians (ST). During each training 10–15 masons were trained by them constructing 2–4 household fixed dome biogas plants of different capacities for the cooperating farmers (who also contributed their family labour and the cost of building material, accessories and biogas appliances), who would use them, therefore had to be foolproof construction. The NGO network trained over 6,000 rural masons through out the length and breadth of the country, during the initial period of the programme; out of this about 30 % were categorised as MASTER MASONS, who could build fixed dome plants independently. The balance of trained masons would normally work under the

guidance and supervision of master masons for some time, till they developed enough skills & confidence to build plants independently. Most of the NGOs involved in the biogas extension programme kept at least one master mason on their regular rolls, and hired trained local rural masons (on daily wages) as and when the need arose. Several of the trained master masons who could not be provided regular appointment by NGOs and other agencies also motivated rural people on their own and directly contacted the prospective plant owners to build biogas plants for them.

Capacity Building of Technical Supervisors (TS)/Sr. Technicians (ST) and Master Masons (MM) on for Repairs of Household Plants:

During the earlier stages of implementation of National Project on Biogas Development (NPBD) of MNES (earlier DNES), Govt. of India, which was launched in 1981–82, a large number of biogas plants failed (about 20 %) due to faulty implementation, as during this period too much emphasis was given by the implementing agencies on achieving/chasing the annual targets under the NPBD, with out employing systematically trained personnel- as at that point of time, there were still shortage of appropriately trained technicians and master masons with most of the field and extension organisations. However, after the initial period of five years when a large number of master masons, technicians, supervisors, engineers and technical officers were trained, backed by the qualitative inputs provided by NGOs in the systematic implementation of this programme, using developmental oriented extension approach, things started improving. During this period the need was also felt by NGO Network to design a special training programme for training of technical supervisors (TS), senior technicians (ST) and master masons (MM) on the repairing of the faulty fixed dome biogas plants.

Thus one-week duration programme was designed to give hands-on training to technical supervisors (TS), senior technicians (ST) and experienced master masons (MM) on identification of design as well as construction faults, testing of plant for checking leakages of slurry from the digester and biogas from the gas storage chamber of the biogas plant and then undertaking appropriate repairs to rectify the faults, as well as seal the leakage of slurry from the digester and biogas from the gas storage chamber and dome. The faulty plants were selected in advance by the experienced trainers, close to the venue of the training. The plant(s) selected for repair trainings had to be constructed more or less as per the standard design by a systematically trained master masons, to ensure that the plants were built as per the manual and correct dimensions and there were no major design and structural defects/faults- other wise the entire plant would have to be dismantled and new plants would have to be built, which would require 3–4 weeks, which could normally be done by a team of very skilled and experienced trained supervisor and master masons.

Refreshers Training for Different Energy Service Provider Groups:

The experience of biogas implementation by the NGO network showed that each group (functionaries) of the ENERGY SERVICE PROVIDER in the implementation of biogas programme, required to upgrade and update their skills and knowledge to remain relevant and effective, therefore, when ever required, either they were invited for refreshing their existing skills or need based training was designed to meet the requirement of a

particular group. The experience showed that the REFRESHERS TRAININGS made significant qualitative improvement in the implementation of biogas programme.

Capacity Building of Biogas Technicians/ Master Masons as Master Biogas Construction Trainers (MBCT):

With the increase in demand for biogas, the pressure on the existing master masons grew several folds, both from the local government agencies as well as the other biogas service providers. Most of the technicians and masons were good in constructing or supervising construction of biogas plants, but lacked the skills in training other local masons to make them 'Biogas Construction Master Masons'. Thus several training programmes for systematic up-gradation of skills of experienced technicians and experienced master masons for meeting the need of Master Biogas Construction Trainer (MBCT) were launched by NGOs. The duration of these MBCT trainings were of two-three week duration, through which a selected group of these technicians and master masons, were taught to conduct classes, first in the class-room, followed by practical on the brick-by-brick construction techniques for building fixed dome household biogas plants at the site of the cooperating farmers. Each evening the selected trainees for MBCT training would also review the day's activities along with the facilitator/trainer and also learn to use construction slides, construction manual and cut models of plants to train other masons. They were also taught about some of the finer points, which they would have to explain to their trainee masons, while conducting 'Mason Training Programmes' in their respective projects.

Training of Trainers (TOTs):

After the biogas programme picked up then need was felt by the members of the NGO network to take up capacity building programme of other NGOs in their respective regions. Thus a special Training of Trainers (TOTs) programme was launched. The duration of these trainings were meant for Biogas Extension Managers (BEM) and Technical Officers (TO) were of one week. Some time very experienced Biogas Extension Supervisors (BES) and Junior Engineers (JE) were also invited to participate in the TOTs programmes. Apart from review of their knowledge (theoretical and practical) in a participatory manner, under the guidance of a team of experienced training facilitators, the trainees learnt to use the various teaching aids and slides on the constructional, operational and maintenance aspects of biogas plants and how to conduct effective training. After the training these trainees were given appropriate training & related materials and teaching aids to be used by them for training in their respective programmes.

Special Training Programmes for NGO Functionaries:

Apart from the above-mentioned regular capacity building programmes of the different 'Biogas Energy Service Provider', a few special training programmes were designed and conducted, based on the need to upgrade skills and knowledge to effectively implement other types of biogas systems and effective management of the biogas programmes.

Some of the special trainings planned, designed and organized for NGO functionaries were- all aspects of (i) Night soil biogas plants, and (ii) Animal manure based community biogas plants, (iii) Other biomass (green & dry) based biogas plants (iv) Integrated biogas systems; and (v) Management programmes for chief functionaries/project directors.

b). Biogas Energy Producer-Cum-End User (Producer-Cum-Consumer)

- (i) In the case of household biogas plants, the plant owners are both, the PRODUCER of the biogas Energy as well as the END USERS. The prospective PLANT OWNERS, as the ENERGY PRODUCERS-CUM-END USERS had to invest certain percentage of their own capital for building biogas plants and after that to operate them on regular basis. Thus, right from the inception, the NGOs recognised the plant owners of the household plants as the primary stakeholders of the biogas promotion programme.
- (ii) Because of their long developmental experience, the NGOs, instead of treating the biogas plant as a consumer product, accepted it as one of the important tools for rural development, which if implemented properly, could contribute to the empowerment of rural people, more especially the rural women. Due to this, the NGOs followed an extension approach (rather than market oriented approach) backed by awareness, motivation and educational programme with patience, which led to its successful dissemination, acceptance and adoption by the rural masses.
- (iii) Accordingly the following capacity building programmes were planned, designed and undertaken by the NGOs for the BIOGAS ENERGY PRODUCER-CUM-END-USERS.

Awareness-cum-Motivational Camps:

A number of such camps were organized by NGOs in villages for the prospective plant owners, for explaining about the benefits of biogas technologies, supported with slide shows, charts and distribution of simple leaflets on household biogas plants. During these camps the villagers were told about the comparative advantages of recycling their bovine manure through biogas plants. They also got the opportunity to clarify their doubts and got information about the various financial incentives under the National Project on Biogas Development (NPBD), MNES, Govt. of India, as well as the availability of technical assistance from NGOs to build their plants.

Operational-cum-Care and Maintenance Camps for End Users:

Normally after the commissioning of each biogas plants, the plant owners were given training on the proper feeding, biogas & slurry utilization, and the care & maintenance aspects of their plants, accessories and appliances- in the initial years the MEN-FOLKS mainly participated in such camps. But after a number of biogas plants were built in a given area, regular one-day duration operational-cum-care and maintenance camps were organised by NGOs, jointly for both rural men and women.

Special Capacity Building Programme for Women End Users of Biogas:

Right from the beginning, the NGOs recognized the rural women as the most important group even amongst the primary stakeholders, as they were the main beneficiaries of the energy from their biogas plants. After the biogas plants were built and commissioned, women were the ones who collected the bovine (cattle and buffalo) manure daily and after mixing it with equal quantity of water, fed the manure slurry in the plants, and used the biogas for cooking. After the implementation of a large number of household biogas plants by the NGO network, as envisaged, it was regularly reported from the field that if biogas plants had any problems the women-folk in the household were

affected. The main reason for this was that, in the initial years of implementation of biogas programmes, most often due to social-cultural constrained majority of NGOs and other implementing agencies could mainly target the men-folks in the households for training in the technical oriented aspects of the plants. Therefore, the women-folks had to depend on their men-folks to solve even some of the minor operational and technical flaws and problems, and had to wait till men in the family could take out time to attend to them, who often had other priorities. However, if the biogas plant didn't work properly or stopped working at all, even due to minor problems either in the biogas stoves or accessories or pipeline, the women end users were the ones who were affected the most. Their dependence on their men-folks for solving their day-to-day operational problems could add to their misery, once they got used to cooking on this convenient, clean and healthy bioenergy available at their doorstep.

In view of the above, the NGOs recognized that the success of biogas adoption by rural people depended to a large extent on the active participation of rural women in this programme, rather than treating them only as the beneficiaries. Therefore, to ensure that the women end users played active role in the on solving the simple technical problems related to operational, daily care and routine maintenance on their own as they were the ones who were involved in the day-to-day operation of the plant, the NGOs started organizing regular training camps of one-day duration each for the 'Women End Users (WEU)'.

During these camps the 'Women End Users' were first given practical demonstration on the proper adjustment of flames to give maximum energy, how to cook to conserve the biogas, cleaning of burners of the biogas stoves to enhance its efficiency, checking the gate valves on the plant's dome for leakage of biogas, proper adjustment of biogas burner valve to get the right mixture of air and biogas for getting blue flame while burning, removing the condensed water from the pipeline (also checking the automatic water remover units attached to the pipeline when the biogas flame fluttered while burning in the stove, and the efficient ways of cooking different kinds/types of their daily meal. After the demonstration, all the Women End Users (WEU) were asked to practice under the guidance of the trainers, to enable them to get the feel of it. By having practice during several WEU camps organised by the NGOs, the "WOMEN END USERS" eventually developed confidence to perform these minor yet very important tasks themselves. This brought about qualitative improvements in the biogas implementation programme.

Camps for Demonstrations on Utilisation of Biogas Digested:

Even though all the plant owners were told about the benefits of biogas digested slurry, and need for proper composting to get maximum advantages of the biogas system, yet during the follow-up visits and post-plant installation survey, it was discovered that the farmers were not able to make best use of the digested slurry. In view of this the NGOs decided to organize demonstration-cum-training camps, twice in a year, once in each season, to teach them the correct use of digested slurry either directly or by using it for composting along with other biomass available from local seasonal crops during the different seasons. The new plant owners were also shown the comparative growth of standing crops of existing plant owners who had been using their biogas manure for crop production. This created good impact and also contributed to the wider acceptance of biogas plants in that particular area.

VIII. Lessons Learnt From the Two Decade of Capacity Building and Implementation of Biogas & Other Renewable Energy Programme by NGO Network in Rural Areas of India

Following are some of the lessons learned, based on the experience of NGO network INSEDA members in the promotion of biogas and other renewable energy technologies (RETs), including in the capacity building of “Energy Service Providers” and the “Energy End Users”, for over two decades in rural areas, which could be kept in view while designing programmes for the promotion and implementation of any RETs in rural and far-flung and areas of the developing countries:

- a). Most of RETs are new and aliens to the rural people, as they are developed outside the rural environment, therefore would be first viewed with skepticism by the villagers.
- b). Any new RE technology selected for promotion should be fully matured before it is transferred, demonstrated and promoted for rural applications.
- c). In the initial stages of demonstration of RETs in rural areas of developing countries, failure of even one unit could create negative impact in villages, within a radius of 30–50 KMs and its short-comings would be spread like a wild fire. Therefore it is always important to first demonstrate the new RETs involving the local field agencies or NGOs who have implemented other successful developmental programmes as well as established their credibility with the local people/communities.
- d). Once the rural people are convinced about the benefits of RE technology, which should also be affordable then it can succeed very well. This requires process-oriented approach with a longer gestation period, either for a new technology or for the field application of a new technological concept, for acceptance and internalization by the local people in rural areas.
- e). Instead of treating rural areas solely as market place for RETs, the RE promotion and implementation programmes should be used for ‘creating employment’ for villagers, especially for unemployed rural youth by promoting ‘skills development training’ and over all ‘capacity building’ of all the stakeholders, including the ‘village community’; as well as integrating the renewable energy technology (RET) promotion activities with the programme for ‘strengthening village/rural economy’.
- f). Lots of innovations and flexibility, based on local situation, are required for promoting rural energy programmes in the rural areas of the developing countries which could be done most successful by involving NGOs.

IX. Epilogue

The experience of NGO network in the promotions of biogas and other low cost RET gadgets, devices, equipments and machines in the rural areas of India, for over two decades, have shown that there are several problems yet challenging opportunities in the promotion and implementation of renewable energy technologies in villages. First of all, the field and extension organizations should recognise that these technologies are new & aliens to the rural people, therefore like any other technologies, developed outside the rural environment, RETs are first viewed with skepticism by the rural community. Even if 100 units of a RE technology are successfully demonstrated, failure of even one could create negative impact within a radius of 30–50 KMs, and its shortcomings are

spread like a wild fire. The appropriate technology demonstration backed by systematic capacity building of different stakeholders/actors/players (i.e. Energy Producers, Energy Service Providers and the Energy End Users) is a must for the acceptance and large-scale adoption of RETs in rural areas of the developing countries. The programme funds for the promotion and implementation of RETs should have good percentage earmarked for the capacity building as well as supporting infrastructure for awareness, motivation, promotional and post installation services activities by local field level organizations and NGOs on a long term basis.

To sum-up and conclude- instead of following a purely commercial approach, there is a need for following 'PROCESS ORIENTED DEVELOPMENT APPROACH', which could be called as 'EXTENSION-CUM-SEMI-MARKET APPROACH' for the promotion of renewable energy programmes in the rural areas of the developing countries. The "EXTENSION-CUM-SEMI-COMMERCIAL APPROACH" would treat renewable energy technology (RET) as the 'MEANS' for 'EMPOWERING' the 'local people' and the 'community', rather than as an 'END' in itself. The new approach should also be location specific, which as far as possible, should also look in to improving the socio-economic conditions as well as the quality of life of the local rural people. This new strategy, in the long run, will automatically help in developing a 'SUSTAINABLE RET MARKET'.

IV. Joy Clancy, Technology and Development Group, University of Twente,
The Netherlands:

Strengthening the Institutional Capacity of the South in Renewable Energy Technologies

I. Introduction

Renewable Energy technologies are seen as playing an important role in providing sustainable energy services to many people in the South who do not have sufficient energy to meet basic needs (see for example, World Bank, 1996). However, many of these energy technologies are manufactured in the North and have to be imported into the South. Technology transfer is always a risky business and needs specific levels of capabilities in the receiving country to ensure that the technology is absorbed and utilised to its design capabilities. It is not only engineering skills that are needed to ensure that the technology works successfully, but also the same sort of institutional framework found in the country where the technology is designed and produced. Technology is more than hardware. It is a complete system of laws, regulations, technical support services, management practices, information systems etc. forming a framework at the heart of which is the hardware. Without the complete system, the hardware will function imperfectly. This system also reflects the culture in which the technology is developed and it is the non-hardware components that often do not get transferred. Institutional development is part of creating an environment that will ensure effective and sustainable technology transfer. It is not only the institutions themselves but also the capacity of their people, that is their skills and capabilities, which are important components for any technology to embed itself in society. This paper looks at how institutional capacity in the South can be built up to ensure the successful transfer of renewable energies.

II. Institutional Development

It should not be forgotten that the governments of the South are not only interested in renewable energy technologies for their end-applications, they also want to develop their own industrial capabilities to eventually replace imports by locally produced technologies which in the longer term can be exported. Technology transfer is part of an industrialisation strategy that also helps to create jobs. Part of that process is the development of institutional capabilities linked to renewable energy technologies which can import, use, develop for local markets and eventually export the technologies.

The institutional framework includes:

- Legislation – for example, environmental standards, which need to be enacted and enforced.

- Standards – countries need to develop standards that can be applied in their own situation, for example Botswana recently developed its own standards for photovoltaic systems which reflect the local operating conditions.
- Research – local institutions need to improve their performance and have good outreach to local entrepreneurs so that they can work together to develop technologies for the local market
- Market – there are a number of components that needs to be developed; for example, the financial sector needs to be able to access consultants with knowledge about renewable energy technologies, the consumer needs to be able to assess and make sensible choices about renewable energy technologies.
- Management – skills need upgrading to understand Northern management approaches; for example, the need to train staff, and the willingness to invest in a culture of maintenance and after sales service.
- Education and training – renewable energies need to be in the curriculum at all levels, renewable energy technology technician courses, and management courses for entrepreneurs, need to be established.

The development of this type of framework, based on an assessment of local needs and circumstances, has been supported by the UNDP, for example, in the United Republic of Tanzania. Within the framework, there are two broad areas in which institutional capabilities need to be improved :

- technical information and skills
- non-technical information and skills

Whilst the first area is probably not surprising, the second might need further explanation. Two important non-technical skills are technology assessment and proposal writing. Technology assessment is more than cost benefit analysis and looks at the complete energy system, not only at the hardware. It involves the systematic assessment of the technical and non-technical options available in terms of their economic, social, cultural, environmental and political implications. The analysis also examines the policy framework in which the technology is intended to operate. For example, import/export regulations and taxes, price and tax structure of petroleum fuels, technology dissemination methods, and rural electrification policies. At the government level, energy technology assessment requires a multi-disciplinary team approach. The South needs its own skilled professionals to staff these teams. Amongst their skills, they need to be able write good project proposals to enable the South to access cleaner technologies, for example, through the funding opportunities created by international responses to Climate Change. The Technology and Development Group of the University of Twente offers a short training course in this area and there has been significant interest in participation. In addition, entrepreneurs need to be able to write business plans if they are to obtain financing from formal lending sources.

Consumers also need to be able to carry out technology assessments. They need to be able to make informed choices about the benefits, limitations, requirements and costs of renewable energy systems. The Government, the media and NGOs can play an important role in consumer education. Children can also play a valuable part in educating

their parents, underlining the need for schools to include renewable energies in their curricula.

III. The Form of Training

Training is the key to developing institutional capabilities. The form of this training is defined by the answers to the questions: Who? What? Where? How?

1. Who needs training?

The answer to the question “Who needs training?” determines the nature of that training. Institutional capacity building requires various stakeholders to acquire new skills and capabilities. Some examples include:

- Decision makers need to be aware of the options and their implications for the economy
- Users need to be aware of the options and their costs as well as financing opportunities
- Entrepreneurs need to assess different technologies and understand government policies which promote the use of renewable energy technologies.
- Researchers need scientific skills to adapt the technologies to local circumstances.
- Teachers need to understand the way the technologies work and how they can best meet local circumstances
- Technicians need to have the technical skills to install and maintain the technologies.

2. What needs to be included in training programmes?

They need to:

Reflect a Southern perspective. Training should reflect the local conditions encountered in the South, for example, materials availability, weather conditions.

Recognise the dual nature of energy use in the South. There is a mixture of energy sources used in different sectors of the economy: modern fuels, such as electricity and LPG, and traditional fuels such as biomass. Energy courses need to reflect this as well as promoting energy management.

Recognise that energy technologies are part of a system. There have to be skilled people who can install and maintain renewable energy technologies. A pool of local consultants needs to be developed who can be called upon to advise governments, banks and end-users.

Technical education in the North also needs to change its nature. Many renewable energy engineers from OECD countries will work in the South or design equipment to be used there. Their education needs to reflect this so that they are sensitised to differences and able to develop technologies that are adaptable and sustainable in a variety of operating conditions.

3. Where should the training take place?

Should training in renewable energy technologies take place in the North or in the South? There are advantages and disadvantages to both locations. When Southerners

are trained in the North, they are exposed to the latest developments in the technology, make contact with suppliers and learn from the experiences of users of the technology. This latter aspect is not well recognised as being an important mechanism for reassuring Southerners that they are not getting a “second class” technology.

Training courses in the South are also important. This is the appropriate location for more hands-on type of training and mini (one or two day) intensive or specific training courses. Courses run in the South enable more people to be trained due to lower costs. The establishment of such courses is also part of institutional capacity building. SADC TAU has set up a regional training programme on various subjects related to rural energy planning and these courses are held in a number of institutions throughout Southern Africa. Training of trainer courses are valuable as these enable the establishment of training programmes that reflect local circumstances. The Asian Institute of Technology in Bangkok has for many years been running training courses and producing journals and newsletters which are tailored to the SE Asian region’s needs.

4. How should the training be organised?

Apart from the obvious classroom type training, there are exciting new possibilities opening up through the Internet. However, it is all too easy to become over focussed on this modern approach and forget that not everyone has access to electricity, or good access to quality telecommunications where there is a power supply. The Internet is also very much orientated to a literate target group and many people who need training do not have sufficient levels of literacy. There are some exciting challenges in this area of electronic media.

Capacity building can also be achieved informally, for example, through networking. Exposing people to the latest developments through professional meetings and attendance at exhibitions. Professional institutes in the North can play an important role in networking; for example, the UK’s Institute of Energy allows access to its material through overseas membership, enabling professionals to keep in touch with the latest developments in the sector. Journals can be prohibitively expensive for Southerners. However, there are opportunities to acquire good quality information at low cost; for example, the publishers James and James supply their magazine “Renewable Energy World” without charge.

Southerners also respond to challenges and establish their own professional organisations which can provide informal capacity building through organising workshops and meetings. For example, the Indian Association for the Advancement of Science has organised workshops on biomass energy, and in Tanzania a Solar Energy Association is being established which aims amongst its objectives to provide a group of accredited consultants that can provide professional advice on renewable energy technologies.

Although many people talk and write about the need for capacity building and its important role in renewable energy technology dissemination, funding for such initiatives seems to be less forthcoming. From our own experience, the Technology and Development Group has seen that while the interest in its training programmes shows no sign of diminishing, the number of people receiving funding has fallen dramatically since the beginning of the 1990s. Northern funding agencies need to be more flexible and be prepared to fund participants for training in other Northern countries; the Carl-Duisberg

Foundation is a good example of an agency that considers the appropriateness of the training, rather than its location, as a criteria for funding support.

IV. Women: The Forgotten Factor

When it comes to capacity building, women are often the forgotten factor in the efforts to disseminate renewable energy technologies. This is strange when one looks at the role of women in both the supply and demand sides of the energy equation. Women are strategic energy decision makers at the household level – it is their responsibility to provide energy for their families needs. Women are energy suppliers, they collect and purchase biomass, kerosene and candles. They balance budgets to pay for electricity. However, when it comes to installing solar home systems, it is the man of the house who gets the training on how to use the system and what to do when the “little red warning light” flashes – irrespective of whether or not he is likely to be at home when it flashes.

It is surprising that the energy sector has not taken on board the lessons from the water sector: train women to maintain the equipment and the job gets done. This is not to say that men are lazy or technically incompetent -far from it. However, train a man and he is more than likely to head off to town to use his newly acquired skills to get a better-paid job. Women stay in rural areas. Energy provision is a women’s responsibility – just as with providing water for the household, women have a vested interest in ensuring energy equipment keeps working.

Opening up rural markets for renewable energy technologies could also make good use of women’s skills; women are good business entrepreneurs. Women are capable of running Energy Service Companies (ESCOs). However, their capabilities need to be assessed to see if they need special forms of training. Selection criteria can sometimes inadvertently discriminate against them, for example requiring a background in electrical engineering for access to training in establishing ESCOs. Few women have such qualifications, but with limited appropriate training they could be brought up to a sufficient level of familiarity with the technologies that they could make good use of their business acumen. After all, women can hire in the technical expertise if need be. The arguments about women’s role in energy provision set out above also hold good here; in addition women may find it easier than men to make contact with women in rural areas.

It is not only at the technical level that skills are needed. At the policy level, women are needed who can make sound assessments of the potential for renewable energy technologies. In this context, the training course by UNEP for women leaders from the South held in Australia in June 2001 is to be welcomed. Women are still in a minority in the renewable energy field and it is important that they can from time to time be given a supportive environment in which to exchange experiences and to network. Women are serious about renewable energy. Evidence of this can be seen in any issue of ENERGIA News produced by ENERGIA , the international network on gender and energy.

Conclusions

To summarise, building institutional capacity needs to take a more holistic approach. Capacity building is more than formal training courses. Within this context there are two important issues that need to be addressed:

- Sustainable financing for capacity building; development agencies that fund renewable energy technologies should assess whether or not they include training in their portfolio.
- Including women in the provision of renewable technologies.
- Women's response to capacity building might very well be: "Give us the tools and we'll do the job!"

International Parliamentary Forum, Bonn, 2 June 2004

At the International Parliamentary Forum, hosted by the German Bundestag, and chaired by Hermann Scheer, 310 members of parliament from 67 countries attended. This Forum was convened in parallel to the “renewables 2004”, the international governmental conference, hosted by the German government between 2 – 4 June 2004. The most important recommendation of the Forum was the call to establish IRENA.

The following documents have been published in the conference’s report “The Challenge of the Century”, which has been published by the German Bundestag.

Conference report

The International Parliamentary Forum on Renewable Energies, hosted by the German Bundestag in association with the International Conference for Renewable Energies (renewables 2004) and supported by the international organization of parliaments, the Inter-Parliamentary Union (IPU), was held in the »Wasserwerk« (the former waterworks) in Bonn on 2 June 2004 (for Programme, refer to page 13). In all, more than 300 delegates from 70 countries attended the Forum, which was formally opened by Dr Norbert Lammer, Vice-President of the German Bundestag. Chaired by Dr Hermann Scheer (SPD), the Forum focussed on parliamentary initiatives to promote renewable energies in industrialized and developing countries, North-South cooperation, and joint initiatives by international institutions. At the Forum, the developing countries urged others to help them develop their potential by continuing to provide know-how and financial assistance. There was a clear consensus that as conventional energy sources become depleted and more expensive, renewable energies are the only feasible way for many countries to satisfy their energy needs. There was agreement that the share of renewables in global energy supplies must increase substantially in the years to come. Governments were called upon to define minimum standards and set fixed rates of increase. In particular, parliamentarians from around the world voiced their support for the establishment of an International Renewable Energy Agency (IRENA), whose task would be to promote the international transfer of technology and knowledge. The parliamentarians agreed to view this Forum as the start of cooperation among parliaments and to continue it on a regular basis with a view to developing joint strategies. Throughout the Forum, they underlined the importance of parliamentary initiatives in helping to achieve a breakthrough in renewables use. The resolution of the International Parliamentary Forum on Renewable Energies was adopted by a large majority.

Speeches on IRENA:

I. Dr. Rudolf Rechsteiner (Switzerland):

Mr Chairman, Ladies and Gentlemen. I am a member of the Swiss Parliament and the Energy Committee, and I would like to talk about big changes that are ahead of us in fossil and nuclear fuels. Taking as an example the price development for natural gas in the United States and the prices for oil in the last twelve months, you can see that our oil sources are depleting, the U.S. natural gas reserves are collapsing - and this is very good news for renewable energy. There is one percent reduction of production every quarter year; every three months production is reduced by 1 %. This means that many nations have to look for new energies very quickly. You have a depletion curve for the United States - and Norway too will reduce its production by half within the next ten years. Indonesia will become an importer next year, and the United Kingdom is an importer already. So things are moving very fast.

So what can we do as a parliament. First get rid of wrong consultants. The international energy agency has been making wrong prognoses for the past thirty years. They have been saying we will have \$20 oil for another thirty years with a price increase of 1.6 % every year. So I ask you where are the six Saudi Arabias that have to fill the gap of declining nations with reduced oil exports. These six Saudi Arabias are not there. We will see very soon, that the barrel of oil will cost \$60 or maybe even \$100.

So, the first step is to abolish IEA, because IEA is misleading. It is consistently ignoring renewables and the cost reductions which renewable energy offers. We have to organize a new energy future. And this energy future has to be organized locally because there are physical differences to renewables on every continent. The solutions will be different for Africa than for Europe or for China or for the United States, but there are certain similarities such as a high percentage of local production. You need technologies that have a high energy return on energy investments and you need local construction companies and local businesses not only for production, but also for maintenance.

So, do the right thing and start with things that are not sexy. Start with cooking, start with heating, start with maybe hybrid solutions like the combination of solar energy and natural gas if it is not possible to do it differently. Let's do something international that is efficient. Nobody has done their homework, so let's organize efficiency contests and let's make compulsory products that have no standby losses at all, not even one watt. One watt is eight kilowatt hours a year. So make zero watts losses for appliances that are not in use, and adopt renewable standards for every house, not only for a nation.

Let us go the renewables path. We need targets. There have to be targets in a small percentage of overall consumption, and not just targets for something like 1000 or 5000 gigawatt hours. We need mass production of these products, so research and development are not enough. We need market introduction and I congratulate my German friends for the EEG (the renewable energy legislation) which is a revolution in electricity production with renewables.

Then of course we have to have alternatives for IEA. This is the IRENA; what could it do? We have not explored the renewable potentials in total. There are no good wind maps anywhere. Those that exist are flawed because they don't have the newest data and they don't have the newest technology in measuring. We do need these maps and have to create them from scratch. Then we need regional management of electrical

grids. Most renewables are electricity or heat, and electricity you can transport for free. You don't need tankers, you just need a good grid. We need standards for technology and for certifications. We don't need more money; there is enough money in the system. We just have to get it from the coal and nuclear lobbies. There is enough money for research and for market introduction. Stop funding the nuclear industry and stop subsidies for non-renewable infrastructure.

Then we need better frameworks. We have rebates for electricity in almost every electricity system. When you consume more, it gets cheaper. That is very wrong. We need an ecological tax reform instead of certificates. We need minimum standards for fossil fuel taxation in every country. That is much simpler than trading, than joint implementation and simpler than certificates. We need feed-in tariffs. We need realtime tariffs. In any of the 15 European Union countries electricity can be produced, which can be used by everyone. Of course you would never produce electricity in one place, this can be done everywhere. This is why it is possible to have 100 % renewables. We swim in an ocean of unused renewables.

In Morocco and in Russia there are places with lots of wind. So, the renewable resources are rarely in industrialised centres. What we need are roads for clean electricity. This could be a high voltage electricity grid. We need an international, a continental grid management, and we need, of course, backup systems. You need for example, in Switzerland or Norway, a storage system for hydro power. We need to combine this with the areas that have no backup systems for clean electricity sources. The German feed-in tariffs must allow electricity imports. Clean electricity from Russia could be imported. This has a big dissemination effect of technology, and of course electricity from Russian wind is cheaper than electricity from wind from Baden-Württemberg. You can save money. You could set up an international network with a low-cost alternative for wind and for other renewables.

A final word on the »International Atomic Energy Agency«, the IAEA. There are now 2.5 million people living in close vicinity to the atomic reactors of Chernobyl and they are eating radioactive food every day. You have many school classes where 80 % of the children are sick. And there is an old treaty between the WHO and IAEA. The WHO has agreed not say what is happening in Chernobyl. The treaty was written to keep important data confidential. So just stop lying about Chernobyl, reveal the damage that is done by fossil and nuclear fuels, and just change the tasks of the IAEA. Turn them to new tasks, just phase out nuclear power and stop proliferation of plutonium and other dangerous materials. Once we have achieved this, we will have achieved much.

II. Hans-Josef Fell (Germany, Alliance 90/The Greens):

Mr. Chairman, ladies and gentlemen, parliamentary initiatives for international institutions aimed at the joint promotion of renewables are urgently required; indeed, they are essential for a number of reasons. I would like to raise two points which are rarely presented with the necessary clarity, but which show that renewables must be introduced as a matter of urgency around the world.

We often talk about global warming and say that this must be tackled by reducing emissions of climate-relevant gases. However, we frequently ignore the fact that we are already in a situation of global warming today, and this is caused by excessive carbon in the atmosphere. Even a lower level of carbon emissions will increase, not reduce, this

amount. This means that immediately halting, not reducing, climate-relevant gas emissions must be the key priority if we are serious in our intention to combat climate change.

My second argument is this: the world has reached a turning point in its energy security. Last week, I attended an international conference of geologists who analyse oil and gas fields precisely from a scientific and geological perspective. Their firm conclusion is this: we cannot continue to depend on increasing our oil and natural production worldwide to any significant extent, even in Saudi Arabia, Russia or in any other country, in order to meet current global demand, especially as these commodities are becoming increasingly scarce in other regions of the world. To put it bluntly, the world is facing a massive energy supply problem which is likely to inflict substantial damage on the global economy unless the widening energy supply gap can be bridged by renewable energies, starting in the coming weeks and months.

Renewables are also the key solution to the climate problem which I have described, for they are emissions-free and, in the case of biomass, emissions-neutral. However, there is a general lack of awareness of the solutions afforded by renewables around the world and their radical nature is rarely mentioned. This is due to one fundamental problem: the opportunities offered by renewables are virtually unknown around the world. We have a massive information and knowledge deficit, not only among the general public but also in governments, parliaments and even in major scientific organizations, universities, and research bodies. Raising awareness worldwide of the opportunities afforded by renewables is therefore an urgent necessity. I would like to cite a number of examples demonstrating how these knowledge deficits operate around the world, and where they exist. Our parliamentary colleague from Australia has just cited one very good example.

Firstly, fossil and nuclear energies cannot meet global energy demand. For the last hundred years, the major energy companies have failed to supply the world with enough energy. The lack of development in major parts of the world is due to the fact that these areas do not have enough power. For a hundred years, pledges have been made to supply this energy using oil, gas, coal and uranium – but to no avail. And in future, this is even less likely to succeed, as the quantities of conventional energy required to provide adequate power to the under-developed regions of the world simply do not exist. Yet there is enough energy available in the form of solar energy and its derived energy forms, such as wind, hydropower, bioenergies and marine energies, and also in the form of geothermal energy, which is not derived from solar energy but is a renewable energy in its own right. Solar radiation provides 15,000 times more energy than we currently need to meet global energy needs, so it seems an obvious solution to harness this particular energy source, firstly in order to provide the under-developed regions of the world with adequate energy and, secondly, to replace fossil and nuclear energies across the full range of energy needs, in the industrialized countries and elsewhere. This is viable, and it is one of the largest knowledge gaps – if not to say lies – to claim that renewables in particular could not meet this need. In fact, it is the fossil and nuclear systems which cannot satisfy the global demand for energy.

Let's talk about the second gap in our knowledge and the second lie. The key point here is that it is the decentralized forms of energy which could satisfy the energy needs of people living in under-developed regions. When I hear that in Australia, renewables are not being made available to people in certain locations because they are sparsely

populated regions, I fail to understand the logic – because renewables are a decentralized form of energy. The sun shines on every house in Australia. The energy is right there! You don't have to bring it in with pipelines or heavy goods vehicles; it is already there. It is the easiest thing in the world to supply renewables on a decentralized basis to sparsely populated area so that these homes and these people can benefit very quickly from electrification, heating and refrigeration etc. The third problem is the pace at which these energies are being introduced into the market. There is still a wealth of scientific studies which aim to persuade us that it will be a hundred years before we can produce significant amounts of renewable energies.

However, Germany, Spain and other countries have shown that the opposite is true. Provided that the political framework is in place, the renewables sector – working with industry and companies, especially SMEs – can develop these technologies and bring them to market very rapidly. In Germany alone, the annual share of newly installed photovoltaic-generated electricity has increased tenfold over just four years, resulting in cost reductions of 25 % over the same period. This is an astonishing achievement, and no scientific institution in the world had predicted, in any study, that this progress in renewables expansion could be achieved so quickly. So one thing is clear: the academics must come into line with the new framework conditions and, just for once, accept that there are successes in various regions of the world, reappraise them in scientific terms, and rewrite their scenarios. This will show the truth to the world and demonstrate just how quickly progress can be achieved. I am convinced that as long as the political conditions are in place, a complete conversion of global energy supplies to renewables will be possible in a matter of decades. And this will be the only chance to supply the world with cost-effective energy, for as we have seen in recent days, the increasing scarcity of fossil and nuclear fuels is driving up prices, making them more and more expensive; indeed, they are already unaffordable in many regions of the world. By contrast, the prices for renewables will fall as they become more widely used and are introduced more extensively into the market. This fundamental truth is being concealed in many parts of the world. There is an enormous lack of knowledge about these opportunities to supply energy cost effectively.

I do not want to publicize these knowledge deficits even further. There are a great many of them. I would just like to underline one key aspect. There is, above all, a gap in our knowledge of the key political instruments and framework conditions required to bring renewables to market. It is certainly worth learning from successful countries – and nowadays, this does not only mean Germany. We could also have learned from the USA in the 1970s, when Jimmy Carter achieved initial successes before they were all reversed through the policies pursued by his successor, Ronald Reagan. We could learn from Denmark, which launched very successful projects before these too were wrecked by a change of government. And we can learn from other regions of the world, which can show us how to adopt these policy instruments. And one of the key tasks for us as parliamentarians is to transmit this knowledge around the world in a process of know-how transfer.

All of us sitting here today have a wealth of knowledge in this area. However, this knowledge is not available to many people. That is why knowledge transfer must be organized. This is nothing new: we have an organized transfer of knowledge on nuclear energy, for example, and on its use and technological development. This is coordinated

by a massive organization, the International Atomic Energy Agency. In this way, knowledge is transferred around the world. But where is there an equivalent organization for knowledge transfer in the renewables field? We do not have an adequate solution anywhere in the world. An agency which fully organizes this knowledge transfer around the world must be established as a matter of urgency at last. I am very pleased that the parliamentarians attending this meeting have already signed the resolution, which calls for the establishment of an International Renewable Energy Agency (IRENA) as the key point in the expansion of renewables. This is a major success of this conference. We should promote this vigorously outside this Forum so that the world's governments heed our call and finally take action.

There are other opportunities to organize knowledge transfer around the world. Let me cite just one example: the Non-Proliferation Treaty calls upon all the Parties to facilitate the fullest possible exchange of scientific and technological information for the peaceful use of nuclear energy. By the way, I do not believe that there is any such thing as »the peaceful use of nuclear energy«; it is a fallacy. But the support is there. We should campaign at last for the inclusion, in Article IV of the Non-Proliferation Treaty, of a reference to support for renewables, as they are the most important peaceful form of energy in the world. They protect us from wars over oil, from the devastation caused by radioactive contamination, and other things. There is a lesson to be learned from Australia here.

It is important to organize this know-how transfer via the world's universities. I am pleased to report that yesterday, the first tangible outcome was achieved at the International Conference. In the Scientific Forum, the participants managed to reach agreement on the launch of an initiative to establish the world's first international university for renewables. It will initially be set up as an Internet university, and will operate as a real university at a later stage. The German Government has pledged to provide the start-up funding. I urge you to encourage your governments to provide funding for this international university for renewable energies so that it can expand quickly and achieve major successes. We need this university in order to train our engineers, develop vocational education, and, most importantly, restructure research.

It is crucially important to set international research on a new footing at last. Finally, let me say that for fifty years, we have allocated 80 % of all our energy research funding to nuclear power. The outcomes are shamefully inadequate: just 5 % of the world's energy needs are met by the nuclear industry. There is no greater research failure anywhere in the world than the decision to support nuclear energy research.

That is why we must learn to restructure our funding, the major share of which is still primarily dedicated to nuclear energy around the world. If we allocated just 10 % of this funding to renewables, the outcome would be rapid development and much healthier public budgets. That is the challenge facing us today, and which we must address outside this Forum. I am very confident that today's conference will give a major impetus to this process. I would therefore like to thank everyone who has contributed to it.

III. Konimba Dembele (Mali):

I am a member of the Parliament of Mali. The international community has gradually formulated global programmes and objectives for development of the energy sector in the wake of a number of concerted actions and top-level negotiations in Johannesburg as well as in Dohar and on the occasion of the Millennium Summit. In view of the obviously insufficient funds that have been mobilized for the attainment of these objectives and in view of the inequality in the distribution of these funds and their comparative weakness, there is unanimous recognition today of the need to do more and to do it better or even to do it entirely differently.

With this in mind I strongly welcome the initiative undertaken by the German Chancellor, who called upon governments to take part in an International Conference for Renewable Energies given the task of formulating ambitious policy strategies for the promotion of these energies. On this occasion the German Parliament decided, together with the conference, to organize an International Forum on Renewable Energies for Parliamentarians. I accepted your invitation and participated in the work that was done. I would like to tell you in all modesty that our Assembly attaches considerable importance to the promotion of renewable energies. This is logical enough, given that everything in Mali speaks in favour of it: the geographic location, the status of the energy supply, the burden created for the economy by the import of oil products, the potential for renewable energy resources and the important role these energies could play in finally making the situation in Mali bearable again with regard to the burden the energy problem constitutes for the country's economy.

Allow me to briefly outline the current state of affairs in this regard. This will be our vision, one specifically tailored to Mali's needs, but I can assure you that more than one country south of the Sahara will be able to relate to what I am saying, and doubtless numerous other developing countries in the South as well. Around 80 % of Africans do not have access to electricity. In West Africa only 20 % of the population is supplied with electric power. This constitutes a danger to all the development efforts being undertaken.

Today 41 % of modern energy production in the African countries is based on oil products. This situation constitutes an enormous burden for our economies, which are weak anyway. Let me give you an example. In 2003 the import of petroleum products cost Mali 185 million dollars, compared with 75 million dollars in 1998, and this situation has not done a lot to help improve the access of our population to modern energy services. Since independence the African governments have undertaken enormous efforts, in particular with regard to creating special structures aimed at promoting new and renewable energies, such as the Regional Centre for Solar Energy in Mali, CRES. There have been encouraging results, but also failures. These failures have had a very bad effect on the good name renewable energies had. However, they continue to be the only alternative Mali and other developing countries have to be able to finally become autonomous with regard to their energy supplies.

How is this objective to be achieved? I would like to show you the kind of potential Mali has with regard to renewable energies. We have a potential of more than 1000 megawatts of hydroelectric power in the northern part of Mali, we have 2500 hours of sunshine with a potential of around 5.7 KWh/sqm per day, we have large quantities of biomass, etc.

What would it mean for Mali and for the developing countries if 5 % of their energy came from renewable sources? It would mean environmental protection, preservation of the country's foreign exchange reserves, expansion of income-generating activities, the creation of new jobs, and with it a reduction of poverty.

In summary I would like to say the following: The technology is available. As politicians we strongly advocate promoting the use of renewable energies. We need an international framework to enable us to move forward with renewable energies. We need to begin working on the creation of this international framework without further delay, a framework dedicated specifically to the renewable energies, something on the order of an International Agency for Renewable Energies (IRENA). In addition, we need to work towards the establishment of a centre for top-level research in the field of renewable energies on every continent. Mali would be happy to place the Regional Centre for Solar Energy, CRES, at Africa's disposal for this purpose.

Before I close, kindly allow me to commend the initiatives of parliaments in support of renewable energies and energy efficiencies.

IV. Dr. Hermann Scheer (Germany, SPD), Chairperson of the International Parliamentary Forum on Renewable Energies:

We now have ten hours of the International Parliamentary Forum behind us. Around sixty parliamentarians have taken the floor, and we have heard speeches from colleagues from every continent.

Ten years ago, there were virtually no energy policy strategies or energy studies featuring renewables. Renewables were totally underestimated. Indeed, in some cases, they were completely dismissed as a non-option.

Even the international organizations failed in this respect. Although the United Nations held a conference on renewables in Nairobi in 1981, it was prompted by the oil crisis of 1973-1982 and the North-South report produced by the Brandt Commission. It was at this point that the call for an International Renewable Energy Agency (IRENA) was voiced for the first time. In Nairobi, the Third World countries called for more intensive efforts in this area; even at this early stage, they were pressing for the establishment of IRENA as well. However, the industrialized countries rejected these demands. They promised that the existing institutions would take on these tasks. As a result, there was even less debate about renewables ten years later than in the 1970s. Then the United Nations Conference on Environment and Development – the Rio Summit – took place, which adopted the famous Agenda 21. Although there was some debate about the climate issue there, the cause of the climate problem was barely touched upon; nor was there any discussion of the fact that during the oil crisis, Third World debt climbed to 1.2 billion dollars. This should have made it clear, even at this early stage in Rio, how important it is to end the dependency on energy imports and focus instead on domestic energy sources, which are always renewable energies. Today, many countries have to pay more for their imports of oil than they generate in export revenue. If all the revenue generated by an economy is spent on energy imports, there is no prospect of any development.

However, countries with a current per capita GNP of 10 % of the industrialized countries' average still have to pay the same for their energy imports as the developed countries! As a result, the burden on their economies is ten times greater!

We must recognize that renewables do not impose a burden on the economy. In fact, they offer a unique opportunity for the development of all our societies – from North to South, and from East to West. This opportunity is sustainable. It prevents more and more countries from falling into the trap of dependency on increasingly scarce and expensive fossil fuels. Once they have fallen into this trap, the economic dilemma is almost impossible to resolve. It makes energy increasingly unaffordable for more and more people, even those living in wealthy countries, and for entire economies. Indeed, energy is already unaffordable in many countries. These economic factors are, in themselves, sufficient to justify a change in course, even disregarding the environmental problems caused by conventional energies. As all the costs are invested in appropriate technologies, renewable energies – with the exception of bioenergy – are becoming increasingly affordable, whereas the fossil energies are becoming more and more expensive, quite apart from the damage they cause.

The conversion to renewables must be a priority for global economic and political reasons. We should bear in mind that the wars in the Persian Gulf over the last twenty years – the Iran-Iraq war, the 1991 Gulf war, or the Iraq war – would not have happened if the region had contained date plantations instead of oil.

It is essential to overcome the mental block which prevents us from accepting renewables due to their supposed lack of economic viability. From a macroeconomic perspective, major advantages can already be identified in renewables. However, this itself does not substantially benefit the individual investors. Funding programmes must therefore be established at political level. These programmes must transform the macroeconomic benefits into incentives for microeconomic initiatives. This is the most important guideline for strategies to promote renewables.

The developing countries have an urgent need for energy. They are facing a rural-urban exodus. Their rural regions are becoming increasingly marginalized as they have no access to modern energy systems, whereas their cities are expanding. In many cases, ten million people survive in an infrastructure designed for perhaps one million people, with the result that slums are expanding at a rapid pace. The task is to bring an energy supply to remote rural regions without having to invest heavily in infrastructure or build the necessary systems for conventional energy use. This can only be achieved with renewables: through a decentralized energy supply which links the areas where energy is consumed to the areas in which it is produced. This will revitalize agriculture around the world and kick-start the economic recovery of rural regions.

In this way, an alternative model for the future will be introduced, different from the model in place over the last 200 years.

In most of the speeches made at our Forum today, there was a broad consensus in favour of establishing an International Renewable Energy Agency (IRENA) as a means of ending the institutional discrimination against renewables. There is the International Atomic Energy Agency, and the International Energy Agency, the latter being an institution established by the OECD countries to safeguard fossil fuel security. But at present, there is a great gap where the institutional base for renewables should be. Renewables need an institutional base at international level. They need a point of reference – an agency which provides no-cost advice to the governments and helps them draw up strategies to mobilize renewables. Anyone who considers the existing agencies necessary can no longer seriously deny the need for a renewables agency. It would be a valuable

source of support for everyone – especially for non-commercial technology transfer to the countries which are still known as the developing countries today.

Non-commercial technology transfer is the key. Renewables open up opportunities for the developing countries to save their currency reserves, and also offer them the prospect of starting up production of these technologies themselves. This will be encouraged by the new agency. I believe that this will be achieved, even though there is still some degree of resistance to overcome. I am delighted that there is a major consensus on this key issue. I would like to conclude with a quotation from a Polish writer, which may be very relevant to our current situation. He said: »Most people begin far too early to start the important things in life too late.« When it comes to supplying renewables for the continued development of our global civilization, we must not start too late.

Our Brazilian colleague, Mr Fernando Paulo Gabeira, has already proposed that we hold a second Parliamentary Forum on Renewables in Brazil. The process that we have started today can be relayed around the continents. So I look forward to our next meeting.

Resolution

The International Parliamentary Forum on Renewable Energies in Bonn on 2 June 2004, hosted by the German Bundestag in association with the International Conference for Renewable Energies (Renewables 2004), held in Bonn from 1-4 June 2004,

has, with the participation of 310 parliamentarians from 67 countries, adopted the following resolution:

Noting that

- A secure and adequate energy supply is vital for all human persons and their societies,
- The development of the industrial societies is due inter alia to the availability of cost-effective energy capacities and productive energy conversion technologies,
- The energy supply for the world's growing population is currently achieved primarily through the use of fossil energies,
- More than one-third of humankind currently has no access to flexible secondary energy, i.e. electricity, inter alia because they do not have an adequate grid infrastructure,
- The use of non-commercial biomass, which is not based on constant recultivation, leads to the erosion of vegetation areas and increases the threats to the climate,
- There are highly divergent and conflicting views on the use of nuclear energy, with some sides emphasizing the benefits of CO₂-free electricity generation, whereas others highlight the risks of nuclear accidents, the long-lasting problems associated with the disposal of nuclear waste, and the threats posed by nuclear weapons proliferation,

- The burning of fossil energies has produced far-reaching negative impacts on global climate, with profound social and economic consequences in addition to the associated risks to human health,
- Conventional fossil energy sources are becoming depleted in the 21st century, while the exploitation of non-conventional fossil energy sources such as oil sands would result in significant cost increases as well as major additional environmental pollution,
- The energy-import dependence of countries without adequate conventional energy resources of their own is increasing, and may be a source of international tension and conflicts in the future,
- The high water consumption associated with conventional energy systems and the ensuing water pollution exacerbate water supply problems in many regions of the world,
- As regards the utilization of the potential afforded by renewables, only hydropower – combined with the construction of reservoirs and dams – and biomass, which is generally not used sustainably, currently make a substantial contribution to the world's energy supply,
- The task of providing political support for research into and the development and market launch of renewables has so far been neglected worldwide, – In the countries and regions in which two billion people survive without a connection to an electricity grid, the off-grid opportunities afforded by renewables already enable electricity to be supplied at the same or lower costs compared with conventional energies,
- In view of the anticipated shortages and ensuing price increases in the oil markets, the mobilization of bio-fuels in the transport sector is of urgent and key importance for a growing number of countries,
- The opportunities afforded by energy-saving and increased energy efficiency are complementary to the mobilization of renewables and radically reduce the need for replacement through renewables use,

In view of the opportunities afforded by renewables (in the form of solar radiation, biomass, wind power, hydropower, marine energies and geothermal energy), which

- offer a comprehensive and inexhaustible energy potential which could satisfy all of humankind's energy needs in the long term, whereby it is necessary to reduce the costs of renewables substantially,
- are emission-free or, in the case of sustainable biomass use, are emission neutral, enabling the climate and environmental problems associated with conventional energy to be overcome on a permanent basis;
- can be used in a way which makes sparing and responsible use of water resources;
- offer a domestic energy potential for every country around the globe, thereby overcoming import dependence and guaranteeing energy security on a permanent basis;
- offer opportunities for decentralized applications, thus opening up new regional, communal and local scope for economic development, autonomous environmental

protection and conservation of natural resources, and facilitate the development of an energy supply without extensive and costly grid infrastructures;

- Due to the potential of biomass, can revitalize the agriculture and forestry sectors in all countries and create new opportunities for rural development,
- And, for these reasons, can make a major contribution to overcoming economic disparities in many countries and in the global economy,

Considering that

- the natural potential of renewables around the globe is inexhaustible, exceeding annual fossil and nuclear energy consumption many thousand-fold,
- that the current technological potential for renewables use would allow conventional energies to be replaced in full across the entire range of energy needs;
- that the economic potential of renewables will steadily become more cost effective and therefore more widely available in the wake of further technological development and the shift to the mass production of application technologies, while the costs of conventional energies will increase due to their ongoing depletion and the environmental pollution they cause, and that already, especially in regions with no grid-based supply, renewables can be used without generating additional costs, thus improving the scope to replace conventional energies with renewables;
- that measures to introduce renewables, enhance efficiency and save energy must take place within a political, strategic and economic framework;
- that a sustainable, i.e. permanent, energy supply which conserves resources and protects the environment and the earth's atmosphere requires a fundamental policy shift towards renewables;
- that the technical potential for renewables use can be expanded substantially through research into and development of conversion, application and storage technologies and materials,
- that there is a major discrepancy between the genuine potential of renewables and the process leading to its realization,
- that in policy strategies directed towards the introduction of renewables, not only the actual investment costs but also the macropolitical and macroeconomic benefits and the avoided damage to environment and health must be considered as key factors,
- that there are now successful examples of the market launch of technologies for renewables use, based on political initiatives,
- that successful steps to mobilize new renewable energies at national and communal level have been initiated by parliaments,
- that renewables are the bearers of hope for a long-term, sustainable, secure and environmentally compatible energy supply for everyone,
- that in every country of the world, there is a mix of different energy carriers, and that progress towards the expansion of renewables must be achieved through a steady increase in their share of the energy supply,
- that strategies geared towards the mobilization of renewables and the replacement of conventional energies cannot follow a uniform pattern due to the divergent

starting conditions and energy supply priorities, as well as the divergent natural potential for renewables use, in every country of the world,

The International Parliamentary Forum on Renewable Energies makes the following recommendations:

- Governments are called upon to work within the framework of the negotiations on the 1992 United Nations Framework Convention on Climate Change and the 1997 Kyoto Protocol to ensure that full account is taken of CO₂ emission values along the entire energy supply chain. Measures to promote renewables are an important element in the framework of the use of all the instruments of both the implementation of the Kyoto Protocol and long-term climate protection policy, in order to stabilize greenhouse gas concentrations at a non-hazardous level in accordance with the objectives of the Framework Convention.
- Governments are urged to stop using the Kyoto Protocol target as a pretext to expand nuclear power, and are urged to set gradually increasing renewable energies targets for the future.
- The policy shift towards renewables and increased energy efficiency must be a key political priority in the interests of environmental protection and the conservation of natural resources, the associated opportunities for economic development, energy security, poverty reduction worldwide, and the avoidance of economic crises and resource conflicts. Achieving this priority will require numerous legislative initiatives in order to develop renewable energies to their full potential. Parliaments are the democratic driving force in this process.
- The legal framework for the promotion of renewables, energy efficiency and energy-saving will encompass many policy areas and thus entail a wide range of legislative initiatives in the following fields: education, research and development, training, health, agriculture, transport, international development, and poverty reduction under decentralized authority. The IPF recommends that Governments use financial resources in the field of energy research with a priority on renewable energies.
- The key political reasons for promoting a strategy to mobilize renewable energies are their numerous benefits for future economic, environmental and social development in all countries of the world: the avoidance of damage to the climate, environment and health, overcoming energy dependence, the positive impact on national economies' balance of payments, creation of permanent jobs at local level, especially in the trades, agriculture, aquaculture and forestry, and opening up new opportunities for industrial development in a wide range of sectors, notably power station technology and engineering, electrotechnology, construction and transport.
- Promoting renewables requires new institutional measures in the field of international cooperation. To facilitate technology transfer on renewables and energy efficiency and to develop and promote policy strategies, the most important institutional measure is to establish an International Renewable Energy Agency (IREA), which should be set up as an international intergovernmental organization. Membership would be voluntary, and all governments should have the opportunity to join at any time. The Agency's primary tasks would be to advise governments and

international organizations on the development of policy and funding strategies for renewables use, to promote international non-commercial technology transfer, and to provide training and development. It would also be responsible for information and communications on renewables at international level, as well as certification and standardization in the field of renewables technology. The IPF recommends a renewable energies technology transfer to promote the dissemination of noncommercial renewable energies technologies.

- Motives to promote renewables can be drawn from all the political schools of thought. This offers the opportunity to develop policy strategies which transcend traditional party-political and ideological differences. The formation of crossparty working groups in the parliaments, as is customary in some parliaments, can serve as a model here.
- The national and international development banks are called upon to reinforce and expand their credit programmes for renewables, especially in the area of microcredits. The international development banks are called upon to follow the recommendations of the »Extractive Industries Review« of Emil Salim. The governments are called upon to place the promotion of renewables at the heart of their development strategies.
- The United Nations' specialized agencies and programmes (FAO, UNESCO, UNIDO, WHO, UNDP, UNEP) are urged to focus to a greater extent on renewables and in a more comprehensive way when developing their strategies and implementing their programmes of action, and to launch appropriate initiatives.
- In the interests of promoting technology transfer and interoperability and achieving a swift increase in the productivity of renewables and efficiency technologies, we call on the governments to launch initiatives to develop global industry norms and standards. This will also assist the developing countries to develop their own industrial strategies aimed at producing the new energy technologies in their own countries in order to avoid new inequalities, thus opening up opportunities for South-North or South-South trade, alongside North-South trade.
- The governments are called upon to work within the framework of the forthcoming WTO negotiations to ensure that in the international economy, technologies for renewables use and energy efficiency can be traded with no or low tariffs.

We, the parliamentarians of this International Parliamentary Forum on Renewable Energies, commit to seek to enforce the considerations and recommendations of this resolution in our respective countries. We commit to seek the approval of this resolution in our respective parliaments in order to use the large potential of Renewables energies to tackle the challenges humankind is facing.

V. Dr. Hermann Scheer MP, Germany:

Report from the International Parliamentary Forum to Delegates of the International Governmental Conference „Renewables 2004“, June 2004

Dear fellow delegates,
Your Excellencies

Renewable energy sources are dispersed everywhere and must be technologically harnessed there. That is why the direct representatives of the people are the committed political advocates of these energy sources. This was the common denominator of the participants of the International Parliamentary Forum – with more than 300 representatives from 70 countries. The Forum’s debate and resolution underlines and states:

1. Rapid action is indispensable. The time for paying lip service to renewable energies is over. An end to the game of »talking about renewables and postponing actions « is well overdue.
2. Renewables are a common good. It is impossible to privatize wind and solar radiation. Using these energy forms leads to greater equality in the world economy.
3. Renewable energy is not a burden, but a uniquely comprehensive opportunity – economically, ecologically, socially and culturally. Above all, it has manifold macroeconomic benefits. The political aim and art is to transform the macroeconomic benefits and the benefits to society as a whole into microeconomic incentives for investors and users. Renewable energy allows new economic calculations: Savings on fuel costs, large infrastructural costs, reduced foreign currency expenditure through the replacement of imported energy by domestic energy. Only biomass has fuel costs, which will revitalize the agricultural economy. The costs of conventional fuels will rise as they near exhaustion, whilst the costs for renewables will drop as a result of further technological development and mass production. We have now reached this watershed.
4. We underline that the most obvious option to escape from the global trap of depleting oil and gas resources – which is already feasible – is the mobilization of biofuels. We should bear in mind that the wars in the gulf region since the early 80ies would probably not have happened if the region had contained banana plantations rather than a concentration of oil reserves.
5. Renewables are the only realistic option to meet the urgently growing energy needs in developing countries. The commissioning of a large conventional power station and

installation of the transmission lines requires years. Building a wind or PV installation requires less than a week or a day.

6. Renewables require non-bureaucratic financing schemes: micro-credits, low or zero interest rates, guaranteed feed-in-payments, low or zero tax on biofuels or on renewable energy technologies, tariff-free trade, the transfer of fossil and atomic energy subsidies to renewables. We urge that the recommendations of the »Extractive Industries Report«, commissioned by the World Bank and written by Emil Salim, be followed. We see this as an appeal to all international development banks.

7. The International Parliamentary Forum calls for an International Renewable Energy Agency (IRENA) as the most important institutional measure, set up as an intergovernmental organization. Membership should be voluntary, and all governments should have the opportunity to join at any time. Its aim should be to advise authorities in the policy development phase, to promote non-commercial technology transfer, to provide human capacity building, transparent certifications and standardizations.

It should be helpful to all – including the UN-Organizations, from UNESCO to UNEP and UNDP. It should overcome the double standards in the field of international energy institutions. All supporters of the International Atomic Energy Agency should rightly be in favour of an International Renewable Energy Agency.

The necessity for such an agency cannot be substituted by any network.

I therefore welcome the indication Federal Chancellor Schröder gave in this direction in his speech.

Ladies and gentlemen, often in history, politics began far too early to initiate the most important things far too late. We are faced with a challenge, unprecedented in history, and we are involved in a race against time. We must all speed up. To conclude I would like to borrow a metaphor from William Shakespeare: we must look to the course of the sun and ensure that we do not miss it!

First Preparatory Conference for the Foundation of IRENA, 10 April 2008

I. The Government of the Federal Republic of Germany: The Case for an International Renewable Energy Agency (IRENA)

This paper is an introductory document for the Preparatory Conference for the Foundation of IRENA. The purpose of the paper is to provide input for the debate at the Conference and to stimulate an open exchange of thoughts. It shall not predetermine the results of the discussions.

1. Global challenges – The broader context

The world is facing many challenges. Rarely before has the number of problems been so great or their scope so large. Key areas of concern include the following:

- The world's population is forecast to grow by 2.5 billion by 2050, reaching a total of some 9.2 billion. In addition, many economies are currently experiencing rapid expansion and industrialisation. As population grows and industry expands, so does the demand for energy. If governments around the world maintain their current policies, the world's energy needs may increase by 50 % or more by 2030. In the past, these needs have been satisfied largely by finite energy sources. These will be exhausted in the future.
- Satisfying the growing demand for energy with the help of fossil fuels and nuclear power is becoming increasingly difficult and costly. Oil prices almost doubled within the last year; exceeding USD 100 a barrel for the first time in 2008. Prices for other conventional energy sources are rising fast as well. Experience shows that it is difficult to predict oil prices; however, there are many indications that prices will remain high or increase further in future. This will have a strong adverse impact on the global economy. Low-income economies that import fossil fuels are particularly susceptible to price increases, which have a highly negative effect on their balance of payments and so increase their vulnerability.
- The 4th Assessment Report of the IPCC predicts that temperatures will rise between 1.8°C and 4°C by the end of the twenty-first century. To limit **global warming** to no more than two degrees – as agreed at the UN Climate Change Conference in Bali in 2007 – we must reduce global greenhouse gas emissions by at least 50 % compared to their 1990 level by 2050. The Stern Report estimates that, without swift action, economic losses due to climate change could amount to 20 % of global GDP each year.
- More than 1.6 billion people have no access to electricity, and over 2 billion rely on wood and dung for fuel consumption. Constructing new grids to reach these people is often prohibitively expensive, while using fossil fuels as an energy source has negative implications for health.

Today we stand at a crossroads. The task facing us is to switch to a more secure, lower-carbon energy system without undermining economic and social development. We must take the path of renewable energy and achieve a fundamental change in energy systems. In short, we need a new energy revolution.

2. Answering the challenges – Renewable energy

Renewable energy can meet the challenges ...

- Renewable energy provides **sustainable power that will never run dry**. Even substantial increases in demand can be met by the enormous energy potential of wind, solar and other renewable energy sources.
- Renewable energy **brings energy prices under control**. With declining production costs, renewable energy guarantees stable energy prices. Indeed, many renewable energy options – particularly small-scale applications – are already competitive. Examples include hot water from solar collectors and electricity from small hydro and wind power.
- Renewable energy **makes it possible to reduce greenhouse gases and air pollution**. Renewable energy mostly causes only very small amounts of greenhouse gases and helps to reduce negative health effects.
- Renewable energy **can provide energy to the poorest in the world** – with no need for expensive grid solutions renewable energy can solve the energy needs of more than a billion people around the globe.

... while also offering some more key advantages

- One of the main advantages of renewable energy is **energy security**. Renewable energy is home-grown, universally available and not reliant on an electricity grid or oil/gas pipeline infrastructure. It reduces dependency on rapidly diminishing fossil fuel resources. Renewable energy is thus an appropriate option for **diversifying supply and increasing domestic supply**.
- When applied in a sustainable manner, renewable energy can reduce the pressure on natural resources. It therefore helps to combat deforestation, desertification and the loss of biodiversity.
- Renewable energy is **multifunctional** – it can meet electricity, heating and cooling needs as well as providing fuel for vehicles. Renewable technology installations have the advantage of being flexible with regard to scale and can be up and running in a comparatively short space of time. In addition they can be integrated into either the transmission or the distribution system.
- Finally, renewable energy technologies **stimulate economic growth and job creation**. In 2007, more than USD 100 billion was invested worldwide in renewable energy plants, the manufacture of renewable energy devices and related research and development. Some 2.4 million jobs were created in 2006 alone. Renewable energy promotes economic growth and job creation particularly in the areas of industrial production, agriculture, plant construction and maintenance, and financial services. Since renewable energy installations are often less complex than conventional power facilities, they can be manufactured in many countries and so generate local

jobs. Moreover, they are relatively simple to operate and can be managed by trained members of the local workforce.

Renewable energies thus represent an adequate response to the challenges faced by the world's population. They are the key to achieving the three key global energy goals: energy security, cost efficiency and environmental protection. Their deployment and dissemination is of unrivalled significance.

3. Market development

Renewable energy offers a **huge potential**. The amount of power from renewable energy that could be accessed with current technologies supplies a total of 5.9 times the current global demand for power. Current technologies however still reach only a small fraction of the energy provided by renewable sources. In one day, the sunlight which reaches the earth produces enough energy to satisfy the world's current power demand for eight years. With future technologies a much larger size of the renewable energy potential might be tapped. The theoretical potential of renewable energy equals about 3,000 times the current world demand for power.

As time goes on, more and more of the full potential of renewable energy is being exploited. Thus in 2005, 12.7 % of the world's total primary energy supply was supplied by renewable energy sources. This was double the level of energy produced by nuclear technology. Today, **renewable energy is the third largest contributor to global electricity production**, with a share of 17.9 % of world power generation in 2005. Recent years have seen strong growth in many sectors of renewable energy. Wind power, in particular, grew at an average annual rate of 24.3 % between 1990 and 2004. Recently, grid-connected solar photovoltaics leads the renewable energies in terms of growth with an annual 50 % increase in cumulative installed capacity in both 2006 and 2007.

From a broader perspective, however, the picture is less bright for renewable energy. Since 1990, renewable energy production has grown at an average rate of 1.8 % per year. This is at the same level as the increase in the world's primary energy supply. **The contribution of solar, wind and tidal energy remains marginal**, accounting for less than 0.9 % of renewable energy and just 0.1 % of the world's primary energy supply. Renewable electricity generation, in particular, grew by an average of only 2.4 % per annum worldwide between 1990 and 2005. This is less than the growth rate of total electricity generation, which was 2.9 %. Thus the total share of renewable energy in global electricity production fell from 19.5 % to 17.9 % over that period.

There are many **reasons why renewable energy has not yet achieved its full potential**. They include a lack of public awareness, market distortions favouring existing energy structures, political framework conditions contrary to the needs of renewable energy, insufficient technical or administrative know-how and a significant lack of proper information.

We need to close the gap between the enormous potential represented by renewable energy and its relatively small current market share. Greater effort is needed, from municipal right up to international level. An international institutional framework will ensure that all stakeholders in the area of policy work together to provide transparency and exploit the existing synergies.

4. The International Renewable Energy Agency (IRENA)

The idea of an international agency for renewable energy is by no means a new one. The first proposal for such an organisation was made in 1981 at the United Nations Conference on New and Renewable Sources of Energy in Nairobi. The idea was further discussed and developed by major organisations in the field of renewable energy, in particular Eurosolar.

International cooperation over renewable energy was further strengthened following the World Summit on Sustainable Development (WSSD) in 2002. In 2004, the International Parliamentary Forum on Renewable Energy hosted by the German Parliament again raised the issue of setting up an international renewable energy agency. Institutional questions also appeared on the agenda of the renewable energy conferences in Bonn in 2004 and Beijing in 2005, in the form of Political Declarations.

Now it is time for action. The next step is to found an international governmental agency for renewable energy, to be known by its acronym IRENA. This organisation should be established by a broad group of countries, including both large and small, industrialised and developing countries.

IRENA's main objective will be to foster and promote the large-scale adoption of renewable energy worldwide. This overall objective can be broken down into a number of concrete targets: improved regulatory frameworks for renewable energy through enhanced policy advice; improvements in the transfer of renewable energy technology; progress on skills and know-how for renewable energy; a scientifically sound information basis through applied policy research; and better financing of renewable energy.

Through its objective, IRENA will help to reduce the pressure on finite energy sources, provide a sound basis for meeting future energy demand, stabilize energy prices, improve access to energy particularly for the world's poorest, combat climate change and increase energy security. At the same time, it will contribute to economic growth and job creation.

To meet these goals, IRENA must become a centre of excellence facilitating renewable energy technology transfer and providing experience for practical applications and policies. Its focus should be on the requirements of renewable energy. It should act as a facilitator and catalyst, supporting various programmes and assisting national governments as well as the private sector. Its role should be to offer support on all issues relating to renewable energy, helping countries to benefit from the transfer of knowledge and technology.

IRENA will not aim to draw up international regulations or treaties. It will provide its services as and when requested by member states or groups of member states. It will not involve itself in states' energy policies of its own accord or try to enforce policies. All its activities will be decided upon by members.

5. Rationale for IRENA

One of the major reasons for the foundation of the IAEA in the 1950s was the desire to exploit the opportunities offered by a new energy source. The foundation of the IEA, in contrast, was triggered by the perception of a major risk – that of shortages in fossil fuel. Both institutions have served their purpose successfully.

Today, the situation is to some extent similar. **Once again, the risks and opportunities on the global energy market are high.** Renewable energy offers a unique opportunity to provide the world with cheap, reliable and clean energy for the future. At the same time, the economic risks connected with the current energy supply are comparable to those of the 1970s. Indeed, they are exacerbated today by major environmental risks and dangers to society. To meet these challenges we need an international agency for renewable energy.

IRENA will act as a driver for renewable energy on an international level. Its role will be to promote political processes that give due consideration to renewable energy. There is an urgent need for renewable energy to play a stronger part in international political processes – whether they are to do with trade, investment, environment, energy or other issues. IRENA, as an independent international institution, will ensure that the activities of other bodies do not form a barrier to action in the area of renewable energy. Its aim will be to create momentum for renewable energy on an international level.

IRENA is particularly necessary as renewable energy lags behind other energy sources in all areas. IRENA will constitute an independent driving force in the political process with the goal of creating a level playing field for the development of renewable energy. There are two reasons why this is needed. First, political structures often put renewable energy at a disadvantage compared to other energy sources. Second, current market requirements and structures impede the spread of renewable energy. Renewable energy requires different technology, power and service structures. The costs of these must be calculated differently. By comparison, fossil and nuclear energy currently have clear market advantages, including fully developed technology, established industries and market structures, powerful companies and a history of high subsidies over a number of decades and well into the future.

To date, only a minority of states have shown themselves willing or able to introduce efficient renewable energy policies (including appropriate legislation and institutional frameworks), develop effective industries, assess their national potential and promote research, development, education and training. We now need to disseminate best practice and lessons learned in order to give countries wishing to profit from the many benefits of using renewable energy the support they need to exploit their vast domestic potential. Furthermore, we need to support those countries which have not yet been able to realise their potential. **IRENA will carry out a broad range of activities to meet these needs.** Whether on its own or working together with other international institutions, IRENA will provide the services required by its member countries, including concrete policy advice, technology transfer and capacity-building.

Help is also needed in implementing the ambitious quantitative and policy targets set by many countries for renewable energy. Policy targets exist for renewable energy in more than 66 countries worldwide and more are to be expected: Many of them are ambitious and have tight schedules. The EU, for example, has committed itself to an EU-wide target of 20 % of total energy being provided by renewable sources by 2020, while China is pursuing an aim of

15 % of primary energy from renewable sources by 2020. Several other developing countries also set targets during 2006/2007. IRENA can provide vital support in meeting these targets.

Furthermore, IRENA will close an institutional gap. Many individual initiatives exist at present, but they lack a focal point. What is needed is an organisation which can guide and coordinate activities in the area of renewable energy on an international level so that their impacts are maximised. With their limited mandate and capacities, current international renewable energy associations and networks cannot fill the institutional gap the way that IRENA could.

IRENA is likely to be more cost efficient than the existing consultancy processes. It will reduce costs by taking over tasks currently performed inefficiently by bilateral exchange. It will also save money for donors by helping to coordinate existing activities better and avoid reduplicated work. Moreover, it will support donors and target countries by ensuring that current initiatives are fully effective – that is to say, that they have access to the necessary data, take international best practice into account, enjoy state-of-the-art technological know-how and are integrated into a network of related initiatives.

6. Are there alternatives to IRENA?

The IEA?

For more than a decade, the International Energy Agency (IEA) has been analysing cost-effective approaches to reducing CO₂ emissions, including the promotion of renewable energy technology. Its work covers all sources of renewable energy and questions relating to technology transfer.

Since April 1982, the Working Party on Renewable Energy Technologies (REWP) has served as the principal advisory body within the IEA, with a particular focus on research and development in renewable energy. Its specific mandate is to disseminate information on renewable energy to all interested parties, to support the ten Implementing Agreements for renewable energy, to advise on the promotion of international collaborative research and development, to work towards the removal of institutional barriers and other market hurdles, and to identify and reduce damage to the environment.

Although the IEA combines comprehensive know-how and experience in the area of renewable energy, its activities are largely limited to its members, the OECD countries. In fact, it has initiated some instruments (such as the Implementing Agreements) for cooperating with non-member and developing countries, but outreach to these countries remains limited in scope. Thus one important advantage of IRENA will be its global approach and membership.

The main mandate of IEA is to deal with questions of supply security and the needs of the energy markets. This is reflected in the allocation of its votes, which is based mainly on the oil consumption of different countries. IRENA would create an environment that will allow for a more visionary leadership on renewable energy.

The IEA is mandated to advise on general energy issues. Because of this broad mandate it does not cover in enough detail economic, political and social aspects of renewable energy. Thus in its in-depth country reviews, the IEA analyses the energy policy of member states without fully reflecting the potential of renewable energy or the regulatory needs. On the supply side, the IEA focuses on large-scale energy supply, without offering advice on how to adapt energy markets towards more decentralised energy sources such as renewable energy. IRENA will have in-depth know how and

broad expertise on all relevant aspects relevant for a strong development of renewable energy in its member states.

The IEA provides guidance on research and development priorities in the field of energy. This is of unquestionable importance. However, in the light of the current challenges to energy policy – climate change, energy security and energy poverty – a strategic energy policy needs to do more than this. Decision-makers in governments and in the private sector need a knowledgeable partner in the international energy dialogue who can provide practical policy advice on renewable energy. The IAEA provides a robust model for working in a complementary fashion alongside the IEA, demonstrating that effective cooperation is possible between a specialised agency and a broader-based agency. It is thus to be expected that **IRENA will be able to cooperate successfully with the IEA**, for example in the area of renewable energy research.

Existing networks?

A broad range of partnerships and networks already exists promoting the spread of renewable energy. This includes more than 20 type II (public-private) partnerships, such as the Renewable Energy and Energy Efficiency Partnership (REEEP), the Global Bioenergy Partnership (GBEP), and the Renewable Energy Policy Network (REN21) – an important global policy network which serves as a forum for a wide circle of stakeholders. These networks have raised the level of cooperation between different players in the renewable energy sector and have made a major contribution to building capacity and setting agendas, driving the global discourse forward.

However, these networks generally have no mandate to advise governments in drafting strategic concepts for promoting renewable energy. Their advantage lies in their ability to adjust quickly and flexibly to changes in the international context. Yet there remains great demand for consultancy services for governments, for expertise in administrative and legal questions (such as emission trading systems, WTO, etc.), for human capacity-building and technology transfer, including detailed technical information. Existing networks are unable to offer this kind of operational support – a gap that could be filled by an international governmental organisation such as IRENA.

A UN organisation?

Making IRENA a **new United Nations** or United Nations-affiliated organisation **does not appear to be a realistic option** for the time being. States that are sceptical about the rapid expansion of renewable energy would not support such a move, and the rule of consensus within the UN would therefore make it impossible.

A more valid alternative would be to **expand the activities of an existing UN or UN-affiliated organisation**. In fact, various such institutions currently deal with renewable energy, including UNDESA, UNEP, UNDP, UNIFEM and others. However, renewable energy generally plays only a minor role in their activities, and the initiatives undertaken by them are rather limited in scope. For example, UNIFEM focuses on the clean use of biomass as an energy source in the domestic environment and as an alternative to firewood. UNDP is involved in renewable energy in various activities, but its focus is on providing development assistance.

UNEP initially appears to be compatible with the activities of the envisaged organisation in terms of its mission and current activities. However, on closer inspection it

is clear that renewable energy involves many other areas apart from the environment. Indeed, renewable energy is as much part of energy, development and economic policy as it is of environment policy. The best solution would therefore appear to be to create an independent governmental organisation incorporating all interested and like-minded countries. Such an organisation – IRENA – would be able to move the debate forward. Potential later affiliation with the UN could be a matter for further discussion.

II. Keynote speech by Hermann Scheer:

Benefit Sharing instead of Burden Sharing – The Political, Economic and Ecological Reasons for Establishing IRENA (International Renewable Energy Agency)

In a global perspective, it becomes increasingly clear that the future of energy supply lies with renewable energies. The limits of conventional energy supply – I am talking here about fossil and nuclear energy – are more than obvious. Today, world civilisation stands at a turning point.

Resources are limited. Nearly everyone by now recognises the finiteness of oil, gas, coal and uranium reserves. At the same time, energy demand of a growing world population is increasing at a faster pace than are the gains in energy efficiency and energy saving. On a global scale, the curve of reserves is declining whereas the curve of demand is rising due to the growth of the world's population and the developing countries' thirst for energy. This results in rising energy prices, shortages in national economies and social problems for an increasing number of countries and their citizens. Access to energy sources has become a global political issue. The direct costs of conventional energies can only rise whereas costs for renewable energies can only fall. Renewable energies are infinite and, with the exemption of biomass, their primary energy is free. Costs for the production of energy deriving from renewable sources have to be paid for the required technologies and not for fuels. Alone energy coming from biomass leads to fuel costs because work in the agricultural and forest sector is necessary and has to be paid for. Expenses for technologies will fall due to economies of scale and the predicted rise in productivity of the deployed technologies, which are still comparatively young. Today's additional costs for renewable energies, if still existent, are the prerequisite for cost-effective energy in the future, which will be available everywhere on the globe, and for everyone. This promising future is closer than most people who have ignored or underestimated the potential of renewable energies think – like some governments, scientists or the conventional energy sector.

The second limit of the conventional system of energy supply is an ecological one. Even if new vast oil, gas or coal reserves were to be found somewhere under the earth's surface, world civilisation could not afford to secure and use them. The ecosphere's capacity to mitigate damages has already been reached. That means that we have to realise the switch to renewable energies now – even before the known reserves of fossil fuels are depleted. A window of maybe four decades is at our disposition. That means that we are in a race against time.

We are facing the biggest challenge for the economy and society since the beginning of industrialisation. It is not climate change alone, which is challenging us. Even if the growing problem of global warming, caused by the past heavy deployment of fossil resources, did not exist, the global energy system would neither be intact. The problem of the ever-increasing scarcity of energy resources together with various environmental problems would remain. From an economic point of view, these are indirect

and extern costs of the conventional energy supply system. Current energy prices do not reflect these costs - but they will have to be paid nevertheless. Only with renewables will we be able to avoid them and free societies from them. Answering this challenge is considered, for the most part, to be an economic burden. This assumption is leaving a large imprint on the current energy discussion. To me this assumption appears to be highly shortsighted. The switch to renewable energy leads to several meaningful political, economic, social and ecologic benefits. These tend to be overlooked if one only takes account of the microeconomic level and if only isolated cost-comparisons of energy investments serve as benchmark. Using macroeconomic and holistic observations leads to different results.

The macroeconomic benefits are evident. A macroeconomic benefit however cannot be at the same time a microeconomic benefit for every participant in the national economy. Smart, informed and far-sighted political measures and instruments are mandatory to translate macroeconomic benefits into microeconomic incentives. A very positive example for this kind of approach in the field of renewable energy is the German renewable energy sources law, also known as feed-in-tariff law. Since it was recognised that renewables have macroeconomic benefits that address society as a whole, they have been privileged by law in Germany - initially in the field of electricity production. Guaranteed grid-access for electricity produced from renewable sources, a guaranteed feed-in-tariff and no cap on production give producers of renewable energy high investment security. This law has abolished market barriers so that incentives for investments are stimulated effectively.

Today it is clear and it becomes clearer from day to day: renewable energies are the future. However, most countries are not very well prepared for the necessary transition towards renewables. Only a few years ago governments worldwide started to realise that renewable energies have to be focused on and promoted. That is why practical implementation is lagging behind. Many countries already foster the production and use of renewable energy through different approaches on a political and economic level but only few have drafted and implemented substantial and ambitious policies so far and have the necessary scientific, technological and industrial prerequisites at their disposition. Since renewables have been underestimated for years and did not play an important role in the global energy discussion this is no small wonder.

In the 50ies, the focus lay on nuclear energy. The attitude towards nuclear energy was then the opposite of how renewables are treated today: possibilities were overestimated and the risks accompanying its use were underestimated. However, almost all countries oriented their national energy strategies towards nuclear. To support this development, two international institutions have been established in 1957: EURATOM in Western Europe and the International Atomic Energy Agency (IAEA) with a global focus. The establishment of the latter has been welcomed by the UN but has not been founded as UN-organisation. Not all UN member states became founding members of IAEA.

IAEA's task did not only consist in preventing the abuse of fissile material. The IAEA is also mandated to help governments develop nuclear energy programmes, to facilitate technology transfer and build human resource capacities. The existence of IAEA with roughly 2.000 staff and an annual budget of more than \$250 Mio. is in itself a valuable motive for establishing a balance with renewable energies and to set up IRENA.

IAEA exists since half a century. The call to establish an International Renewable Energy Agency has been raised for the first time 28 years ago – in the framework of the North-South Commission's Report chaired by the former German Chancellor Willy Brandt. The establishment of such an agency has been recommended in the final resolution of the first UN conference on renewable energy in Nairobi in 1981 (Conference on New and Renewable Sources of Energy). Nevertheless, these recommendations remained largely unheard. It was argued frequently that it would be sufficient to mandate existing UN-organisations with the promotion of renewable energy.

However, importance grew steadily to lay the focus on promoting renewables internationally. The oil crisis in 1973 displayed plainly, that the oil age would not last forever. To ensure security of supply with fossil resources, the OECD countries established the International Energy Agency (IEA). The IEA is not a UN Agency either – it was called "Club of the Rich". A third international organisation covering energy matters had thus been established – and all three of them contributed to underestimating renewable energy.

Even though most industrialised nations have stated initial research and development programmes for renewable energy after the oil crisis, priority of research and development still lay elsewhere. When oil prices reached a lower level in the early 80ies, most countries scaled down their still young programmes for renewables.

On the other hand, the eighties and nineties witnessed a growing unease in many societies concerning nuclear and fossil energies. Whereas the eighties were characterised – after the catastrophe in Chernobyl – by strong scepticism concerning nuclear energy, the nineties – with the climate reports growing increasingly alarming – took a critical look at fossil energies. But since many thought that there would not be a realistic alternative to conventional energies, these controversies reached the international energy discussion rather late.

On the other hand various scientific reports were published that demonstrated that a complete energy supply with renewables would be feasible (for example a study of the Union of Concerned Scientists in the US in 1979, a study of the Club de Bellevue, an initiative of scientists from leading French research institutes or a study focussing on Europe published by the Institute of Applied Systems Analysis in Laxenburg). These examples show that the lack of an international agency for renewable energy helps to explain, why these energies have been neglected for so long.

In 1990, the European Association for Renewable Energies, EUROSOLAR, of which I am the president besides my capacity as member of parliament, drafted the first comprehensive memorandum on establishing IRENA and published it widely. At the invitation of Ahmedou Ould-Abdallah, the former energy commissioner of the UN Secretary General, I presented this memorandum at the UN headquarter in New York. Consequently, former UN Secretary General Perez de Cuellar established a task force, the UNSEGED, United Nations Solar Energy Group on Environment and Development. UNSEGED, chaired by Prof. Thomas Johansson, concluded that the establishment of an International Renewable Energy Agency was necessary. This proposal was aiming at the Rio-Conference of 1992 – it was expected that this conference would establish the agency. At the invitation of the US senate, the Interparliamentary Conference on the Global Environment took place in Washington in 1991, chaired by Al Gore. At this

conference, I proposed that the Conference's resolution should also speak in favour of the establishment of an IRENA. This proposal was adopted unanimously.

However, not all of these efforts have been successful due to opposition that has been motivated by different reasons. Existing UN organisations that were partly active in the field of renewables, but with much less capacities than IRENA, spoke against the establishment of the agency. OPEC states that identified IRENA as potential rival opposed its establishment. Those that did not consider renewable energy sources to be relevant enough to supply the world's energy needs opposed the agency. The conventional energy agencies disapproved of the agencies existence.

However, no one of the above can explain how the global spread of renewables will be supported to the necessary extent if not through an agency like IRENA. Therefore you always have to counter questions like: „Why is IRENA necessary?“ or „What is the added-value of IRENA?“ with a counter question: „Why should IRENA not be necessary if one considers the existence of an International Atomic Energy Agency or an International Energy Agency to be necessary?“. Alternatively: „What will we risk if we do not switch to renewables fast enough? “.

For many years, in many speeches at international conferences in numerous countries, I have always been advocating the establishment of IRENA. Prerequisite for the founding has always been that one or more governments would take the initiative and build a coalition of like-minded countries that push the establishment of the agency forward. One important milestone on the way towards establishing IRENA has been the 2004 International Parliamentary Forum on Renewable Energies, which was hosted by the German Parliament, taking place in parallel to the governmental conference „renewables2004“. 300 members of parliament from 70 countries took part in the conference that I was happy to chair. The Final Resolution states:

“Promoting renewables requires new institutional measures in the field of international cooperation. To facilitate technology transfer on renewables and energy efficiency and to develop and promote policy strategies, the most important institutional measure is to establish an International Renewable Energy Agency (IREA), which should be set up as an international intergovernmental organization. Membership would be voluntary, and all governments should have the opportunity to join at any time. The Agency's primary tasks would be to advise governments and international organizations on the development of policy and funding strategies for renewables use, to promote international non-commercial technology transfer, and to provide training and development.”

This initiative has contributed to having the German Government adopt the establishment of IRENA as one of its policy projects. Today, we are starting with the Preparatory Conference that will lead us to the establishment of IRENA next year. I am positive that the number of member states will increase swiftly once IRENA is established and has started its activities. IRENA will shorten the way to a global deployment of renewables and will accelerate its pace. We can already be sure today: the Founding Conference of IRENA will be a historic date.

III. Bianca Jagger, Chair of the Executive Committee of the World Future Council:

The Creation of IRENA is Necessary and Urgent

As many of you will know, Hermann Scheer has been the driving force behind the creation of IRENA. Please join me in recognising that without his vision and unwavering commitment to the establishment of IRENA, we would not be here today.

Today we stand at a crossroads in history. Most climate scientists have sounded urgent alarms, warning us about the imminent threat of climate change, and the impending tipping point. David Wasdell, Director of the Meridian programme, in a book he co-authored called *Planet Earth, We Have A Problem*, describes the tipping point like this:

"If we go beyond the point where human intervention can no longer stabilise the system, then we precipitate unstoppable runaway climate change. That will set in motion a major extinction event comparable to the five other extinction crises that the earth has previously experienced."

As climate change kicks in, the tropical and subtropical countries of Africa, South Asia and Latin America will heat up more and more, with temperatures becoming increasingly intolerable. Droughts will affect large parts of Africa, Asia and Latin America. Melting glaciers will flood river valleys and then, when they have disappeared, unprecedented droughts will occur. Poor, lowlying countries such as Bangladesh will find it much harder to cope with sea level rise than Holland or Florida.

If current trends are allowed to continue, hundreds of millions of people in the poorer countries will lose their homes, as well as the land on which they grow their crops. And then there is the threat of diseases: By the end of the century 182 million people in sub-Saharan Africa alone could die of diseases directly attributable to climate change, according to Christian Aid. Given the scale of this impending disaster, we have no choice but to embark upon a global renewable energy revolution, by replacing our carbon-driven economy with a renewable energy economy. The challenge we are facing now is how to switch to a more secure, lower-carbon energy system that does not undermine economic and social development, and addresses the threats of climate change and global inequality.

Climate change is no longer just an environmental issue: it touches every part of our lives: peace, security, human rights, poverty, hunger, health, mass migration and economics. IRENA is a necessary condition for preventing climate disaster and ensuring global energy security and stability. I will be frank with you. Before now, I was sceptical whether the international community had the resolve to do what is necessary to prevent global climate disaster. However, the establishment of IRENA is more than the establishment of just another agency. In addition to its visionary goals, it will benefit from Hermann Scheer's twenty years of expertise and dedication to the creation of this organisation.

There have been indications that various governments have taken notice of the threat posed by climate change: the World Summit for Sustainable Development in 2002, the

International Renewable Energy Conference in Bonn in 2004, and the Beijing International Renewable Energy Conference in 2005 are three examples. By taking the initiative in hosting this conference, the German government have proposed concrete steps where previously there was mostly talk. I hope you will join me in applauding their courage and foresight. Milton Friedman said, "In a crisis, the actions that are taken depend on the ideas that are lying around. That... is our basic function: to develop alternatives to existing policies, to keep them alive and available until the politically impossible becomes the politically inevitable."

Never before has humanity been so overwhelmed by such massive and urgent concerns. We are experiencing explosive population growth: the world's population is forecast to reach 9.2 billion by 2050. Since 1992, there has been a 50 % rise in world energy consumption. Another 50 % rise is expected in the next fifteen years. We now know that if we remain locked into an inefficient, polluting, fossil-fuel based global economy, we will exhaust the Earth's natural resources and we will accelerate climate change.

So we have reached both an environmental and an economic tipping point. Which direction we choose to take will decide the fate of our planet. What is certain is that we must bring about fundamental change in our energy systems, with a renewed focus on energy security and lower, if not zero, carbon emissions. But we should be wary of using phrases like "the carbon-free economy". So far, this expression has been used in relation to two technologies that fail to provide acceptable solutions to the energy crisis. The first is "carbon capture and storage", or CCS technology. Not only is this technology still speculative, though it is projected for 2020, it is already clear that insufficient space exists to capture all the CO₂ released. We can also say that implementing CCS will be much more expensive than providing energy from renewable sources.

The second technology is nuclear power. The nuclear industry has attempted to "green-wash" itself by trumpeting its carbon neutrality, yet the deployment of nuclear power comes with tremendous – and, to my mind, unacceptable – risks, including large-scale nuclear accidents, the problem of waste, uranium storage, nuclear proliferation in general, and last but not least the high water consumption of nuclear power plants. As some of you may know, France was forced to shut down some of its nuclear reactors a few years ago, thanks to a shortage in cooling water. As we continue to experience worldwide water shortages, and as we look to a future in which these shortages are set to worsen, this is a significant risk factor in relying on nuclear power. Nuclear power is not a panacea to cure us of our energy worries. Quite apart from the safety concerns it poses, the substantial costs involved and the irresponsibility of burdening future generations with the problems of waste management, it is estimated that our usable uranium reserves will run out within five decades – and that is only if no new power plants are built.

Attempts to "stretch" current reserves with various technologies carry incalculable cost. Similarly, proposals that have been made to extend the life of the fossil fuel energy system not only risk the ecosphere but also represent a mammoth financial burden to future generations. Renewable energies, on the other hand, avoid many of these problems, and even create a plethora of opportunities – economic, environmental and social.

Renewable solutions are affordable, available and a moral imperative. With the benefits to poorer countries of decentralized, indigenous energy sources, and the afforda-

bility of implementation that has been demonstrated by the latest research, we will be working toward solving the two great threats to our continued survival: environmental degradation and global inequality. Renewable energies provide a realistic solution to both. And, as the example of Germany shows, the employment benefits are staggering: Germany has created some 250,000 new jobs by its accelerated introduction of renewable energy in less than ten years.

The advantages of renewable energy

Traditional sources of energy, which account for 60 % of the current commercial energy supply, are becoming scarce. But renewable energy provides sustainable, safe, affordable power that does not run out and does not pose a risk to ourselves or to the environment. For these reasons, the creation of IRENA is necessary and urgent.

The arguments that renewable energy does not provide sufficient or affordable alternatives to traditional energy sources have been exposed as flawed and false. Furthermore, the cost of finite conventional energies will continue to rise as the sources dry up. But, as we will all have read in Hermann Scheer's books, *The Solar Economy* and *The Solar Manifesto*, renewable energy costs will generally go down, as they consist almost exclusively of technology costs. Mass production and technological innovation will bring dramatic decreases in cost. So we should not see the promotion of renewables as a burden: we should see it as a unique economic opportunity – one that will reward those who get on board early. IRENA will be instrumental in encouraging research and development to facilitate its affordability and implementation, and for this reason, the creation of IRENA is necessary and urgent.

As we have heard today, countries in the Global South enjoy little or no energy security. But a renewable energy revolution will have crucial economic and social benefits for the poorest countries in the world. Home-grown renewable sources provide developing countries with the means by which to insulate themselves against rising energy prices elsewhere in the world. And with a decentralised renewable network there would be no need for expensive grid solutions.

In promoting these decentralised energy systems, we will be helping to prevent political and military conflicts sparked by scarcity of resources. We will be giving the developing world true and lasting energy security. For this reason, the creation of IRENA is necessary and urgent. Renewable energy stimulates economic growth and local job creation. In 2007, more than \$100bn was invested worldwide in renewable energy technology. By 2006, 2.4 million jobs were created. Since renewable energy installations are less complex to operate than conventional facilities, plants can be managed by local workforces as part of a decentralised system. Only renewable energy offers the possibility of true energy efficiency. Whilst in the global supply chains of conventional energies, from mines and wells to customers, there are large energy losses, the short supply chains that are possible in the renewable model will lead to a drastic reduction in wastage. To make short energy chains feasible will require investment in research and development of storage technologies, and this is an area in which IRENA will be of vital importance. So for this reason, too, the creation of IRENA is necessary and urgent. In addition to reducing the burden on the Earth's natural resources, renewable energies reduce pollution, because renewables mostly result in only very small greenhouse gas emissions.

So whilst conventional fossil and atomic energies continue to endanger the health of the planet, risk sparking conflict over declining resources, and require high water consumption and ever-increasing costs, renewable energy sources do not bring with them these negative effects. The representative from Senegal today spoke of “ridding ourselves of the tyranny of oil”.

Renewables are the only solution to the three key global energy challenges: energy security, cost efficiency and environmental protection. The task now is to create policies that make investment in renewable energies an attractive proposition at national and international levels. For this, the creation of IRENA, as you may have guessed by now, is necessary and urgent.

Moving forward with renewable energy

Notwithstanding all these advantages, there is still unjustifiable political prejudice against renewable energy. While conventional energies enjoy political privilege, including large amounts of public money for research and development, military protection of the supply chain and \$300 billion in global annual subsidies, renewable energies are discriminated against. Though intergovernmental institutions exist to promote atomic energy – for example the IAEA and EURATOM – not one exists for the promotion of renewables. Renewables need an institutional base at international level to provide a reference point – an intergovernmental agency to advise governments in drawing up policies and strategies – to address the current imbalance between traditional and renewable sources.

To date, the International Energy Agency, the IEA, despite its significant expertise, is seen by the developing countries as a “club for the rich”, and their influence and activity is limited to the OECD countries. The IEA only recently showed interest in renewable energy sources. Other existing networks have no mandate to advise governments on the accelerated introduction of renewable energy.

It is not as if this is a sudden or unexpected crisis. We have known the limitations and damaging consequences of conventional energies for over thirty years. As Hermann Scheer puts it, the result so far has been “talking globally, postponing nationally”, with the effect that the introduction of renewable energies has not been nearly fast enough. Despite clear indications that renewable energy was the inevitable way forward, we have not met the challenges set at Rio in 1992.

Paying lip service to renewable energy is no longer sufficient. We now require concrete action. The delays in investment and adoption of renewable energies have been environmentally and economically inexcusable. We have the tools to expose the fossil fuel industry’s claims that renewables are expensive and inadequate as false. Promoting renewables must now become a global and universal priority, and IRENA is a necessary condition for that goal. If we intend to embark on the renewable energy revolution, we cannot do it without IRENA.

IRENA will work toward improved regulatory frameworks for renewable energy through enhanced policy advice, improvements in the transfer of renewable energy technology; progress on skills and know-how for renewable energy; it will be able to offer a scientifically sound information basis through applied policy research; and better financing of renewable energy. Germany has shown great leadership and vision in

spearheading the renewable energy revolution. We must grasp firmly the hand that is being offered to us and embark upon this revolution to prevent global climate disaster. I thank the German government for this opportunity, and Hermann Scheer for his outstanding work. Also on behalf of the World Future Council, of which I am the Chair, I urge each of you support the establishment of IRENA as heralding a new world order, in which we can look forward to safe, affordable, secure and stable energy sources for all.

I was delighted today to see the discussions quickly focus on substantive and practical issues. It seems as though many countries are keen to begin working. I would like to finish by quoting Dr. Scheer:

“To be able to discuss energy as a separate matter is an intellectual illusion. The CO₂ emissions are not the only problem of fossil energy. The radioactive contamination is not the only problem of atomic power. Many other dangers are caused by using atomic and fossil energies: From the polluted cities to the erosion of rural areas; from water pollution to desertification; from mass migration to overcrowded settlements and the declining security of individuals and states. Because the present energy system lies at the root of these problems, renewables are the solution to these problems. That means: Nothing is macro-economically better and cheaper than the total substitution of conventional energies by renewables. We need a hardline strategy for soft energies.”

Hermann’s words show that this is the over-riding moral imperative of the century: the time has come for decision-makers in politics and economics to embrace this opportunity.

There is no time for further excuses, postponement, or procrastination. This is a time for courage and leadership, and for positive and immediate action. We have an obligation to future generations upon which we must not renege.

For their sake, I urge you to take full advantage of the current political momentum and give your full support to the creation of IRENA.

Founding Conference of IRENA, 26 January 2009, Bonn, Germany

I. Sigmar Gabriel, Minister for the Environment, Nature Conservation and Nuclear Safety, Federal Government of Germany:

IRENA: A pillar of clean energy supply

The time has now come, with the founding of the International Renewable Energy Agency (IRENA), to press ahead with the expansion of renewable energies in an even more comprehensive and targeted way. IRENA is therefore:

- An expression of our conviction that in future we can cover the main share of our energy consumption with renewable energies.
- An expression of our awareness that renewable energies offer huge potential and that the technologies for their use are available. But also of our recognition that there are obstacles blocking the rapid expansion of renewable energies and that we have to join forces to overcome them.
- An expression of our common commitment to international cooperation and our firm intention to develop and steer processes together.

In November 2008 the International Energy Agency once again warned that we are on course for disaster with our current wasteful use of energy. If we carry on this way, the Earth's temperature will increase by 5 or 6°C as a result of greenhouse gases from fossil fuels. Such a temperature increase would destroy the Earth as we know it. The IPCC has outlined the impacts we can expect: droughts will lead to further food shortages, extreme weather events such as more frequent hurricanes will leave trails of destruction, and rising sea levels will be a threat to almost 700 million people living less than one metre above sea level.

But merely being aware of the threat to the environment, economy and peace is not enough.

The foundation of IRENA aims to promote the expansion of renewable energies internationally. By being here today you are demonstrating your willingness, and for some your determination, to be involved - and together we are stronger and quicker. I would like to warmly thank you for your trust and support in the founding of IRENA. IRENA will help to remove the many obstacles which up to now have delayed the rapid expansion of renewables. The market is still distorted by subsidies for conventional energies; technological know-how is inadequate, information is not always correct. IRENA will give concrete advice to both industrialised and developing countries to aid their introduction of political and legal frameworks. The goal is to create the right incentives and securities for investment. This needs to be steered by governments, since a distorted market is not capable of initiating the transformation of energy systems. IRENA will act

as a catalyst to facilitate technology and knowledge transfer, and to support capacity building. Using positive examples, the Agency will clear away deep-rooted concerns.

IRENA will be an international platform for renewable energies. It will focus more resources on renewable energies than any other organisation to date. But others need not worry - there is more than enough work for everyone. IRENA will cooperate with other organisations and institutions to exploit synergies.

With IRENA we are laying the foundation for an energy supply which takes equal account of the three principles of sustainability – social, ecological and economic aspects. Today we are concluding the preparatory process and commencing the establishment of the Agency. Today, we will found IRENA!

II. Connie Hedegaard, Minister for Environment, Denmark:

Today, we celebrate the creation of a catalyst for change

Today, we reaffirm our commitment to global energy security and united action to mitigate climate change.

Today, we light a beacon that will guide us on our way to a low-carbon future. Denmark has long been an advocate for renewable energy and energy efficiency. For many years we have held that this vital agenda was homeless in the international family. That is why we introduced the idea of an international institution for renewable energy at the Johannesburg Summit back in 2002. And that is why I am so very pleased to stand here today.

Seven years after Joburg, WE are now establishing that home. TOGETHER, we will create a much needed platform for sharing of best practices and sustain momentum around one of the most crucial agendas of our time. I commend you for your leadership and for your commitment to the International Renewable Energy Agency.

In the years to come this institution will be a lighthouse for all of us – developing as well as developed countries. It will guide us as we go on to investment in renewable energy and energy efficient solutions. It will provide ideas and solutions as we move from the era of climate talks to an era of climate action. And it will bring clarity as we realise that the challenges of the 21st century are inherently interlinked.

Amid the current global financial crisis, true international leaders have reaffirmed their commitment to renewable energy. They understand that sustained economic growth goes hand in hand with energy, water and food security. They realise that only by addressing the climate challenge can we afford growth and through that increase our global security and wealth. And true international leader know that investing in research and development of new renewable energy technologies will help us through the financial crisis.

Just last week I visited Saudi Arabia and the United Arab Emirates – taking part in the World Future Energy Summit in Abu Dhabi. Both countries as we all know are rich in oil

and natural gas – BUT ALSO committed to a low-carbon future. Abu Dhabi last Monday announced a goal of 7 percent renewable energy in 2020, whereas Saudi Arabia this fall will open a new 100 percent solar driven university.

As Bob Dylan sang, the times they are a changing. Why? Because still more people understand that renewable energy is good business, its new jobs, and its a growth opportunity.

I say this with confidence. Denmark has proved it to be true. Since 1980 our economy has grown by 78 percent. Our economy is one of the strongest in Europe. Our unemployment rate one of the lowest - below 2 percent. Meanwhile, our intake of renewable energy has grown from almost nothing in 1980 to now 17 percent of total energy consumption – based on wind and biomass. In 2011 it will be 20 percent. In 2020 it will be 30 percent. Renewable energy technology is one of our fastest growing export areas. And the renewable industry has created thousands and thousands of jobs – by the way primarily in rural areas of the country – areas that earlier on were hard hit by outsourcing. Denmark's track record shows very clearly that it pays off to invest in renewable energy. And our long term vision is to become completely independent of fossil fuels – replacing it with renewable energy.

As we progress towards this goal we will need to tap into the knowledge base of others. IRENA makes this much easier. We look forward to sharing our experiences with you along the way. TOGETHER, we know the challenges. And jointly we hold most of the answers to creating the low-carbon economies of the future. IRENA will help us share, implement, progress and reap the benefits of renewable energy. Today, we have seized a great opportunity for change – for the benefit of all of us – and generations to come. We should congratulate the world with the establishment of this new home for one the most important energy sources of the future: Renewable energy.

III. Hermann Scheer, Member of the German Parliament, Chair, World Council for Renewable Energies (WCRE):

Overcoming the mental barriers against renewables: One of the most important incentives of IRENA

Today we inaugurated the milestone for the global move to renewable energy – a move made in a higher speed than ever before. The famous cosmopolitan scientist Leonardo da Vinci once said: “The sun has never seen a shadow.” Today the world's civilization is shadowed by numerous existential energy crises, which cumulate at the same time. You all know the key-words: declining reserves, increasing energy demand – and therefore running exhaustion, rising prices, economic restrictions, social tensions within societies and international tensions between countries. And besides and above all that: climate change, air and water pollution, dying forests and desertification.

People and their governments are aware of all this. but people do not like to hear those ticking time bombs; they have a desire for solutions. The most basic and widespread solution is the change to renewable energy.

It is time for this change because the world civilization is in a race against time in order to leave the shadows of the various energy crises. As an old African wisdom says, “turn your face to the sun and you will leave the shadow behind you.” One of the most important incentives by IRENA will be to overcome mental barriers. This is the prerequisite for overcoming the physical, economic and political barriers against renewable energy. For too many years the potential of renewable energy was denounced and underestimated, and too many responsible authorities were misinformed rather than informed about its real potential. Like a captain on a ship that was sailing on the open sea without orientation and when all their water was consumed the captain cried, “water everywhere but no drop to drink.” - Everywhere is renewable energy but no technology to harvest. We have to activate the natural, the technical, the economic and above all the human potential.

Fertilized with insufficient information too many remained unable to see the light of renewable energy including the unique chance for renewing our economies, for cleaning over polluted cities, and for all the other benefits of a new energy security for all nations. For too many years the perception that the change to renewable energies would be an uncarryable burden dominated talks. But nowadays more and more people and their governments have recognized that the future of world energy supply and demand comes with renewable energy. This creates new perspectives which are inspiration for human action.

IRENA becomes the anchor and facilitator for the activation of common international action towards renewable energy. Nothing is more powerful than an idea whose time has come. The new US president Barack Obama said in his inauguration speech six days ago, “we will harness the sun and the winds and the soil to fuel our cars and run our factories. All this we can do.” And he added to this, “now, there are some who question the scale of our ambitions, who suggest that our system cannot tolerate too many big plans. Their memories are short, for they have forgotten what can be achieved when imagination is joined to common purpose and necessity to courage. What the cynics fail to understand is that the ground has shifted beneath them, that the stale political arguments that have consumed us for so long, no longer apply”. I have a well reasoned hope that the Obama administration will join the IRENA initiative very soon. Renewable sources of energy are everywhere on our planet, and we can and should apply it everywhere.

With always updated technological information about the state of the art of renewable energy technologies and its diversities of different applications, served by IRENA, we can open the minds and encourage governments and investors for renewable energy strategies. We have learned many lessons for best policy and industry practice, and the role of IRENA will be that all can share the best practice experiences and enrich this with their own new ideas. IRENA will be the common learning and inspiring centre of renewable energy excellence.

It will empower countries to play a role in the new technological revolution. The IT revolution started 30 years ago, and now the world has joined it. We are now at the beginning of the IT revolution with renewable energies and new ways to come to energy efficiency. With IRENA we have created a unified vision and collaborative environment to implement renewable energies in all countries. No one should wait for the leadership of others, each country who wants to advance renewable energies should be enabled to do so with their own means,

I see five general guidelines for Renewable Energy policies:

1. Rapid action is indispensable. The time for paying lip service to renewable energies is over. An end to the game of “talking globally, postponing nationally” is well overdue. With IRENA we come to “common working for national acting”.
2. Renewable energies are a common good. It is impossible to privatize wind and solar radiation. Using these energy forms leads to greater equality in the world economy.
3. Renewable energy has manifold macro-economic benefits. The political aim and art is to transform the macroeconomic benefits into microeconomic incentives for investors and consumers.
4. Renewable energy allows new economic calculations : avoiding fuel costs and environmental costs.
5. The costs of conventional fuels will rise as their exhaustion draws closer, whilst the costs for renewable energies will drop as a result of further technological improvement and mass production. We have now reached this watershed. What we do now for the promotion of renewable energies will lead to cheap and abundant energy for all people today and in the future.

It was a long way to IRENA, since EUROSOLAR submitted the first proposal for it in January 1990. I have personally campaigned internationally for it in many countries and at numerous conferences and with many political initiatives. Many doubted that it could happen. Very few believed that there would be enough supporters. But if you have a goal, you should not let yourself become frustrated by the many resistances. When things do not happen the conventional way, it is necessary to take unconventional paths, like Albert Einstein said, “the methods that caused our problems are not able to solve them.”

Let's start the work together for our one world. With the message: “Yes, we can solve the energy problem.”

IV. Closing speech by Heidemarie Wieczorek-Zeul, Federal Minister for Economic Co-Operation and Development, Germany

Ladies and Gentlemen, Colleagues,

It is done. IRENA is in the world. Yes – we did it! That is good news. Together we have taken an important step towards shaping a shared, sustainable future. With IRENA we are bringing together the political and the economic aspects of issues that must be considered together: energy and development, peace and ecological justice. Although it has been a rush to put everything in place this past week, many countries have already signed. Many have said they want to sign as soon as possible. I can clearly see from here at the front the joy and relief on the faces. Now it is time to say thank you to the wonderful team that made today possible. Thank you to all those who have had only one love during the last few weeks: IRENA. Thank you to the ministries that took part. Thank you to the splendid vice-chairs from Denmark and Spain. Thank you to our host city Bonn.

And a very special thank you to Hermann Scheer. Your commitment to bringing about the necessary turn-around in energy policy is unequalled. Clearly you are yourself full of renewable energy.

We have had it impressed upon us here that we are surrounded by crises, but the way ahead is full of opportunities. Renewable energies do not bring with them the risks that fossil fuels or nuclear energy entail. Renewable energies are inexhaustible, decentralised, climate-neutral and stable. With renewable energies it is possible to pursue development without the risk of climate breakdown. Renewable energies will secure work and jobs for innovative companies and national economies. There can be no lasting peace in the 21st century without renewable energies. Renewable energies are our planet's great gift for our future.

That is why this conference has rightly received great international interest and public attention. More than 120 countries from the North and the South were represented here, we had 60 informative national statements with ambitious goals, we had high-level visits from 43 ministers. 75 countries signed the statute of IRENA!

It is wonderful that you were here and took part in the conference. We have thus been able to send a message, signalling the new, cooperative global policy that we look forward to and that we need more urgently than ever to resolve the current crises (food, fuel, finance). Together we can change the “fossilised” approach to energy policy. Renewable energies will soon move out of their niche existence to take their place at the heart of international energy policy. We can make sure that happens.

We have reached the end and are looking forward. IRENA must now quickly become a practical working entity and achieve further international visibility. We now need all emerging economies and industrialised countries to further increase their commitment to IRENA.

Now is the time for all member states to make tangible contributions to IRENA – both financial and in terms of manpower. We need your best experts for IRENA. Starting tomorrow. Now is also the time to set national goals for energy, environmental and development policy.

Most OECD countries already have the capability to increase the amount of electricity they generate using renewable energies to at least 20 %. Here in Germany we also want to take concrete steps to shoulder our share of the responsibility and, therefore, in the period up to 2014, we will be investing 2.5 billion euros for renewable energies in bilateral development cooperation. This investment will be specifically targeted at 45 countries.

Tomorrow the preparatory committee will meet for the first time. We wish them a successful start.

Today is a great day for renewable energies. I would once more like to thank you all for helping to bring this about. I hope that this day will shine on, warm and sunny, far into the century ahead of us. And now, to bring this portentous day to a ceremonial conclusion, I invite you to join us at tonight's dinner on the Petersberg.

Promoting Renewable Energy Is Focus of New Agency

By Diana S. Powers

Published: 18 May, 2009, International Herald Tribune

PARIS – In Sharm el Sheik, Egypt, delegates from 79 countries will meet next month to choose a home, a director and a preliminary work program for the International Renewable Energy Agency, which was set up this year to lead a global drive to accelerate and expand the development of renewable energy resources.

The agency grew out of a conference in Bonn on Jan. 26, which was sponsored by the German government, with support from Denmark and Spain. Of the 192 United Nations member states invited, 125 sent delegations and 75 European and emerging countries signed on to the final agreement establishing the agency, also known as Irena.

Since January, four more countries have joined, most recently Mauritania. Membership includes leading European economies like Germany and France; emerging economies like India; major energy producers like Norway and Nigeria; hostile neighbors like Eritrea and Ethiopia, or Israel and Syria; and poor states like Liberia and Burkina Faso.

The United States has not yet joined the agency because of lingering commercial concerns, but is likely to do so, Hermann Scheer, a member of the Bundestag, the lower house of the German Parliament, said during an interview. Major countries like China, Britain and Brazil have not yet joined, either.

Very few countries “have adequate and comprehensive programs for renewable energy,” Mr. Scheer said, “The others do not, and they need them urgently.”

Mr. Scheer, an economist by training and general chairman of the World Council for Renewable Energy, an advocacy group, worked for almost 20 years to establish Irena and is one of the world’s most outspoken advocates for renewable energy.

Irena, he said, will help countries evaluate their specific renewable energy resources and advise them on the best policies to adopt – preferably, for best effect, the use of price incentives rather than quantitative regulatory targets. As an example, he cited the special pricing system known as a feed-in tariff, introduced in Germany in 2000 by the Renewable Energy Act.

“This gives a privilege, a priority to renewable energies as a compensation for the avoided social costs that come from replacing conventional energies by renewables,” Mr. Scheer said.

The feed-in tariff law offers unlimited access to the electricity transmission grid to all energy producers, at a guaranteed price. “In many countries,” Mr. Scheer said, “the grid owners are the owners of the conventional power companies, and it is normal that they want to give priority to their own production and even block the entry of renewables. The feed-in tariff law is a market access privilege, so each power producer can come to the market.”

By overriding the monopoly structure of the energy supply chain, he said, “it makes the grid neutral to all producers and consumers of energy.”

Together with earlier legislation favoring renewable energy, the feed-in law supported a solar roof generation program which by 2003 had allowed 100,000 households sell surplus energy to the grid, Mr. Scheer said.

Including other energy sources such as wind, “alone in the past two years in Germany,” he said, “we introduced new renewable energy capacity with an energy production of 5 percent of total electric power.”

Seeing that example, France has introduced a feed-in tariff as part of its plan to meet the European Union target of 20 percent renewable-energy generation by 2020.

As a result of last year’s financial market meltdown, global investment in renewable energy has slowed but still remains positive, according to the Renewables Global Status Report, released last week by the Renewable Energy Policy Network for the 21st Century, or REN21 – a multilateral advocacy network set up in 2004 with funding from Germany and, latterly, the United States. The report shows that global investment in renewable energy rose to \$120 billion in 2008 from \$104 billion in 2007 and \$63 billion in 2006. Global power generating capacity from renewable energy rose to 280,000 megawatts in 2008, up 16 percent from 2007.

There is, Mr. Scheer said, “a myth of the indispensability of conventional power,” which maintains that renewable energy can only play a marginal role in generating electricity. Still, he said, an alternative model is possible, in which renewable sources could replace “commercial primary energy like oil, gas, coal and uranium, by noncommercial primary sources like the sun, solar radiation and wind.”

In that scenario, he said, “it will not be possible to continue the supply monopoly, so the conventional fuel market will disappear, step by step.”

The shift to renewable energy would entail a move “from imported energies to indigenous energies,” allowing countries to achieve more energy independence, Mr. Scheer said. This, he said, would particularly benefit the more than 40 developing economies that spent more on imported oil than their entire export earnings, even before the spike last year in oil prices.

As renewable energy develops, production costs fall: “The technology costs will come down with the mass production of these devices and with technological improvements,” Mr. Scheer said. “We are exactly at this watershed, with the prices of conventional fuels rising and the prices of renewable energy decreasing.”

The new agency is intended to play a vital role in this process, centralizing knowledge and providing a forum for technology transfer, experience sharing and the establishment of best practices.

“One of the purposes of Irena is to develop postgraduate curricula to be introduced everywhere with an adequate standard to overcome the education gap,” Mr. Scheer said. “Irena will organize training seminars for decision-makers, professors, administrators and businessmen.”

It will also fill a gap in the international spectrum of organizations, since no other intergovernmental institution is dedicated to the promotion of renewable energy, said Virginia Sonntag-O’Brien, who heads the REN21 secretariat in Paris.

“Energy has never had a home in the U.N. system,” she said, even if many U.N. agencies deal with energy-related issues.

In December, a successor to the Kyoto Protocol is on the agenda of the U.N. climate change conference in Copenhagen.

“Even if all countries had achieved the goals of the Kyoto Protocol, the carbon reductions would only have been 6 percent of what is needed,” Mr. Scheer said.

With the urgency of carbon-emission reduction and the scale of the challenge increasingly recognized, Irena will try to present to the Copenhagen conference a vision of a new carbon-free economy and a road map to get there.



NORDIC FOLKECENTER for Renewable Energy

Danish Center for Renewable Energy – Nordisk Folkecenter for Vedvarende Energi

Denmark, June 2009

Declaration on the formation of IRENA

We, as long-term supporters of renewable energy and representatives of prominent organisations working in this field bring the following letter to the attention of the delegates from IRENA signatory countries, by paying full respect to all the delegate's forthcoming decisions at the second meeting of the Preparatory Commission in Egypt on June 29 and 30 2009.

We recommend that Dr. Hermann Scheer be appointed Founding Chair for the formation period of IRENA to directly support the Director General.

It must be acknowledged that the breakthrough represented by the establishment of IRENA can be in great part credited to the work of Dr. Hermann Scheer. Together with the two non-profit international organisations under his leadership, EUROSOLAR and World Council for Renewable Energy (WCRE), he has struggled for two decades to achieve the founding of IRENA. Dr. Scheer pioneered the concept that shapes IRENA today. Numerous obstacles on the long way to IRENA have been overcome through his outstanding international leadership for the advancement of renewable energies. He first lobbied for the idea to establish an IRENA on many international conferences and succeeded in initiating the decisions that were crucial to obtain the support of Germany for launching IRENA at the government level. All these facts clearly indicate that IRENA is connected inextricably with Dr. Scheer's vision and work.

Furthermore, through his seminal books on renewable energy strategies, his ability to empower people and to form strong alliances, and as a successful legislator for renewable energy policies in his native country he has inspired a generation of decision makers, politicians, parliaments, and organisations, as well as concerned individuals, about the imperative necessity of implementing a new energy paradigm for the service of humankind.

The German government refrained from nominating Dr. Scheer for the post of IRENA's Director General because it decided to concentrate all of its efforts to ensure that Bonn becomes the headquarters of IRENA. This decision happened with the consent of Hermann Scheer who supported Bonn as seat for IRENA from the early beginning.

The broad acceptance of IRENA proves that the agency is directly linked to a worldwide hope to overcome the inherent dangers and shortcomings associated with the use of nuclear power and fossil fuels. Renewable energies offer unique opportunities to achieve a secure and independent energy supply that does not harm the environment, the climate and human health. Only renewable sources can reliably satisfy the increasing energy demand of a growing world population and their energy needs. Achieving the full potential of renewable sources swiftly and comprehensively is the central challenge of the 21st century and represents a unique chance for humanity to thrive and prosper.

Therefore, we consider the formation of IRENA unthinkable without Dr. Scheer's essential contributions and firmly believe that he should be directly involved in the early leadership of IRENA to help ensure its success.

IRENA must act as a straightforward international advocate for renewable energy. As an international governmental organisation, IRENA has the opportunity and responsibility to champion the use of renewable sources everywhere, without interference into the legislative competence of governments. IRENA must inspire the adoption of effective policies and best-practice solutions that accelerate and reinforce the rapid introduction of all renewable energy options. IRENA must proactively commit governments and the public to become aware of the advantages of adopting a new and sustainable energy future for all nations, with special attention to the needs of developing countries, which can be satisfied through the multiple economic and societal benefits related to the adoption of renewable energy strategies.

We therefore urge the signatories of IRENA who will come together for the decisions at the next meeting of IRENA in Egypt to harness Hermann Scheer's talents and potential by entrusting him with the extraordinary role of Founding Chair to thereby directly support IRENA's Director General.

We all have experienced his inspiration and achievements that are firmly based on his comprehensive view of the obstacles, practical solutions, and opportunities related to renewable energy. Therefore, we are convinced that his involvement is indispensable to ensure the success of IRENA's work.

First signatories:

Prof. Dieter Holm	President, ISES (International Solar Energy Society) Africa
Christine Hornstein	Executive Director, ISES (International Solar Energy Society)
Prof. Frede Hvelplund	Department of Development and Planning, Aalborg University, Denmark
Bianca Jagger	Chair, World Future Council, President, Bianca Jagger Human Rights Foundation
Dr. Anil Kane	President, World Wind Energy Association
Robert F. Kennedy Jr.	International Environmental Advocate, USA

Ruth N. Kiwanuka	CEO, Joint Energy and Environment Projects, Uganda
Klaus Knecht	Chair, Renewable Energy Capacity Building Program INWENT, Germany
Stefan Kohler	CEO, German Energy Agency
Andriy Konechenkov	Chairman, Ukrainian Wind Energy Association
Dr. Hans Kronberger	Former Member of the European Parliament, Austria
Jane Kruse	Program Leader, World Wind Energy Institute
Jeremy Leggett	Founder and Executive Chairman, Solar Century, UK
Zhouqing Li	President TISET, Beijing, China
Prof. Wu Libin	Secretary of Foreign Affairs, BIOMA / BRTC / China Biogas Society (CBS)
David Lorimer	Adviser, World Future Council
Amory B. Lovins	Chairman, Rocky Mountain Institute, USA
Preben Maegaard	Director, Nordic Folkecenter for Renewable Energy, Denmark
Sir James R. Mancham	Founding President fo the Republic of Seychelles
Ulla Meixner	Chair, Financial Advisory Committee German Wind Energy Association
Prof. Niels I. Meyer	Emeritus Professor of Physics, Technical University of Denmark
Christine Milne	Senator, Australian Greens Deputy Leader, Spokesperson on Climate Change
Prof. Masataka Murahara	Tokyo Institute of Technology, Japan
Raymond Myles	Secretary General cum Chief Executive INSEDA, India
Hermann Oelsner	President, African Wind Energy Association
Gunnar Boye Olesen	Coordinator, INFORSE, International Network for Sustainable Development
Leoluca Orlando	Member of the Italian Parliament, Former Mayor of Palermo, Italy
Prof. Galal Osman	President, Egyptian Wind Energy Association
Ahmedou Ould-Abdallah	Special Representative of the UN Secretary-General in West Africa
Mauro Passos	President, Instituto IDEAL, Brazil
Steen Piper	Publisher, Forlaget Hovedland, Denmark
Prof. Josep Puig	Autonomous University of Barcelona, Spain
Ermete Realacci	Member of the Italian Parliament, Honorary President, Lega Ambiente, Italy
Dr. Rudolf Rechsteiner	Member of the National Council, Switzerland
Harald N. Roestvik	Solar Pioneer, www.sunlab.no, Norway
Mechtild Rothe	Vice President European Parliament, President EUFORES
Prof. Takeo S. Saitoh	Ex-President, Japan Solar Energy Society
Ganesh Ram Shrestha	Director, Centre for Rural Technology, Nepal
Prof. Lumin Shrestha	Centre for Rural Technology, Nepal
Prof. Erico Spinadel	President, Argentinian Wind Energy Association
David Suzuki	Co-Founder, David Suzuki Foundation
Kaarin Taipale	Former Chair of ICLEI - Local Governments for Sustainability
IIDA Tetsunari	Executive Director, Institute for Sustainable Energy Policies, Japan

Volker Thomsen	President Ret., St. Lawrence College Kingston, Canada
Dr. Ibrahim Togola	Director, Mali Folkecenter for Renewable Energy
Jakob von Uexkull	Founder, World Future Council
Ole von Uexkull	Executive Director, Right Livelihood Award Foundation, Sweden
Izumi Ushiyama	President, Ashikaga Institute of Technology, Japan
Prof. Tanay Sidki Uyar	Vice President, World Wind Energy Association
Dr. Gu Weidong	Chief Scientist, Wind Power Project, National Basic Research Program, China
Dr. Marc A. Weiss	Chairman and CEO, Global Urban Development
Prof. E.U. von Weizsäcker	Former President, Wuppertal Institute, Germany
Moneef R. Zou'bi	Director General, Islamic World Academy of Sciences (IAS)

Interview by Dr. Franz Alt with Dr. Hermann Scheer on the Long Way to IRENA

How we Achieved the Breakthrough to Found IRENA

Franz Alt:

What has been your motivation to launch the idea to establish an International Renewable Energy Agency?

Hermann Scheer:

My initiative was motivated by the paradox of the existing gigantic potential of renewable energy on the one hand and its complete underestimation on the global, regional and national scale on the other. Renewables are undervalued in spite of their fundamental benefits: the fact that they are inexhaustible, that they can be produced without CO₂ emissions and that they can create energy autonomy everywhere. Conventional energy experts from the scientific, economic and therefore also from the political sphere collectively underestimated renewable energy. Faced with the dangers that the nuclear and fossil energy supply present to our natural environment together with the increasing dependence of a growing number of countries on limited reserves of oil, gas, coal and uranium, this dualism of gigantic potential and complete underestimation appeared to be life threatening to our global civilisation – from an ecologic as well as an economic point of view.

FA:

But why did you come to the conclusion to establish an international governmental organisation to overcome this conflict?

HS:

Because this question touches people all over the world. Moreover: this conflict has manifested itself in the system of international institutions. This is about the post fossil and the post nuclear age. The answer in the 50ies has been the “peaceful use of nuclear energy” and this consensus prevailed in the 50ies and 60ies. Very few took renewable energy into consideration – with the exception of large hydropower, renewables were considered to be backwardly. The International Atomic Energy Agency (IAEA) has been founded swiftly but it became apparent in the 80ies that hopes that centred on nuclear energy could never be fulfilled. Risks that come along with the deployment of nuclear energy have notoriously been underestimated. Since then it became apparent that the non-fossil alternative to nuclear energy has to be focused on: renewable energy. But this conclusion met with manifold mental barriers, also within the international institutional system. I am convinced: If renewables had been supported nationally and internationally after the oil crisis in the 70ies with as much intensity as nuclear energy since the

50ies we would not have to face many of those global problems that we find ourselves confronted with today - neither climate change, nor dwindling natural resources or rising energy prices. That is why I came to the conclusion that the global negligence of renewable energy was a failure of the century and that one important way to overcome this is the establishment of an international agency for renewable energy as an intergovernmental organisation.

FA:

Which obstacles did you have to face when you launched the idea and the concept of IRENA in January 1990 for the first time?

HS:

The start in 1990 was very promising. My initial idea has been to install the agency in the framework of the UN-system – as a new special organisation. This idea has been taken up swiftly within the UN-headquarters. Former special envoy for energy of the UN-Secretary General Pérez de Cuéllar has been Ahmedou Ould Abdallah. He invited me to present the project at the UN-headquarters. The UN-secretary general was convinced spontaneously. This led to the installation of the United Nations Solar Energy Group on Environment and Development (UNSEGED) under the chairmanship of Thomas Johansson from Sweden. The group drafted recommendations on how to further develop renewable energy internationally in preparation of the Rio Conference. Central point has been an international agency for renewable energy. Even though the UN-Secretary General forwarded these recommendations to the Preparatory Committee of the Rio Conference they were ignored and buried by this committee.

FA:

Why and by whom?

HS:

Even though states signed the UN Framework Convention on Climate Change in Rio, the connection between climate change and energy consumption has in fact not been established. Most participants at the conference did not consider renewables an option. Japan opposed the agency outright because it wanted its export industry to benefit from the production of renewable energy technology – thus it perceived a global proliferation of these technologies as contrary to its national interest. The special organisations of the UN were jealous and claimed that they were already doing the work IRENA was supposed to tackle – something they never really did. Numerous countries opposed a new UN-organisation because they were dissatisfied with the activities of the already existing institutions. I replied that this was precisely the reason for a new agency. What is more: the influence of the IAEA and the IEA (International Energy Agency) was more than obvious. Both agencies represented the factual and spiritual hegemony of nuclear and fossil energy and identified IRENA as a new competitor. To this day, they claim that nuclear and fossil energy are indispensable and at the same time denounce the real potential of renewable energy. In other words: they deny the possibility that global

civilisation can be supplied entirely with energy coming from renewable sources. They think and act within the outdated paradigm of energy supply and do not understand the new paradigm of renewable energy – or do not want to understand it.

FA:

What do you mean?

HS:

There is no system of energy supply with its infrastructures, power stations and refineries which could be neutral face to face diverse sources of energy: the particular energy source determines the technical organisational, economic and political prerequisites to make it available for the consumer. All we can do is decide which particular source of energy we want to harness – this choice then determines every subsequent step that follows thereafter: from the mines and wells to the customer. Each source of energy has its own prerequisites, determining in turn conversion technologies, infrastructures and the like. It is technologically impossible to maintain the current system, which is tailored to the needs of fossil and nuclear energy, and just exchange the energy sources. Many so-called energy-experts have not understood this till now. The transition to renewable energy is a switch from imported energy to indigenous energies, from commercial fuels to non-commercial fuels, from large power plants to small and medium production facilities and to new conversion technologies – and not just the avoidance of emissions and nuclear waste. The totality of expenses for renewable energies – except for bio fuels – results from technology costs. This is a transition from fuel business to technology business, from energy dependence to energy autonomy. I call this the techno-logic of energy sources. That is why we need a global technology market for the deployment of local and regional renewable energy resources. Many have misunderstood this concept – even advocates of renewable energy. The manifold mental barriers result from this misconception.

FA:

Is this the reason for the scarce support for IRENA in the past years?

HS:

Yes, this is obvious. Reactions to the call to establish IRENA were usually to leave the international proliferation of renewable energy to the IEA and to convince it to alter its main focus. This never happened in reality because the IEA always thought and worked along the lines of the conventional energy paradigm.

FA:

Organisations within the spectrum of international NGOs refrained from supporting the idea to establish an IRENA or have even opposed it completely. Which were their reasons?

HS:

Many of these organisations still adhere to a special political paradigm concerning renewables – often without really noticing it. There were not only governments but also NGOs, which claimed after the failure in Rio in 1992 that the establishment of IRENA was illusionary, maintaining that there would never be enough support. That is why WWF and Greenpeace argued against IRENA at the „Renewables 2004“ conference – and that is why the German federal minister for the environment Jürgen Trittin refused to support IRENA. To him, this idea was unrealistic – that is why he never tried to start the initiative even though the German parliament was in favour. His argument went: no government would be willing to take part. I have always opposed this notion: for many years I have talked to numerous countries and convinced them that the formation of IRENA was a necessity. The crucial point was to find a government that was willing and credible to take up the initiative to establish an international governmental agency. The German government possessed this special credibility due to its internationally renowned legislation supporting renewables, dating from 1998.

FA:

Has the sceptical attitude vis-à-vis IRENA not been understandable given the failed start prior to the Rio conference in 1992 and the opposition from within the UN-system or the World Bank?

HS:

The experience of 1992 had been: IRENA cannot be realised within the UN-system. The UN is guided by the principle to establish consensus, which means in practice: many states have a veto power. Thus it was clear since 1998: IRENA must be founded outside the UN-system, brought forward by a “coalition of the willing”. There does not exist a law prohibiting the establishment of an international governmental organisation independent of the UN-system. Most international governmental organisations do not work within the UN-system but cooperate with it. Since 1992 I argued strongly in favour of going into this direction.

That is why I have since focused on motivating a government to take the initiative. It is self-evident that I was primarily aiming at the German government. As member of the German parliament and council member of the Social Democratic Party – one of the two largest parties in Germany – I was in a position to directly exert my influence. I prepared for the next launch when my party, the SPD, became part of the government in 1998. I initiated several resolutions to bring IRENA forward and mobilised the international community of renewable energy protagonists in parallel. The most important event was thus the International Impulse Conference 2001 for the establishment of IRENA in Berlin, organised by EUROSOLAR with 500 participants from all continents of the world. This led to the speech of Gerhard Schröder, at that time German chancellor, at the UN-conference for sustainable development in Johannesburg in 2002 who invited governments to the international governmental conference for renewable energies – the „renewables 2004“. The plan was to launch IRENA there.

FA:

But this never happened. The „renewables 2004“ failed to cover IRENA.

HS:

In spite of the resolution in the German parliament, the German government was not in agreement concerning IRENA. Preparations of the „Renewables 2004“ conference hosted by the German government lay first and foremost with the German ministry for the environment and its minister was in opposition to this project. That is why the resolutions of the „Renewables 2004“ are lacking a decision on IRENA. Instead, support for IRENA came from the International Parliamentary Forum for Renewable Energy, which was held in parallel to the “Renewables 2004” conference and was hosted by the German parliament and chaired by me.

FA:

Do you want to say that IRENA could have been established in 2004 if the German government seized the initiative at the „renewables 2004“?

HS:

Yes, IRENA could have been established already in 2004. The broad resonance for IRENA makes this clear. It was of immense help for the success of the IRENA initiative that the Danish and Spanish governments were the main supporters of the initiative since 2008. All three countries are credible protagonists for renewable energy through their national legislation.

FA:

Which is the most important principle that should guide the work of IRENA?

HS:

First: Overcome the underestimation of renewable energy. **Second:** Demonstrate that the complete energy needs everywhere can be satisfied by renewable energy and that this is no economic burden but rather an important economic chance. **Third:** Underline that renewables will trigger a new technological revolution, which does not require international treaties.

FA:

What is your personal experience after two decades of successful agitation for IRENA?

HS:

I am happy to pass this experience on: One shall never give up to pursue a goal that one self identified as important only because it is held to be unrealistic by the „business-as-usual“.

FA:

What is your opinion on member state's decision to locate IRENA's headquarters in Abu Dhabi instead of Bonn?

HS:

Bonn was still regarded as the favourite at IRENA's founding conference on 26 January 2009. But then the United Arab Emirates started their successful campaign for Abu Dhabi. Their argument to finally locate an international governmental agency outside of Europe or the US met with great response. And what is more: they offered to augment their own financial contribution very generously which enlarged IRENA's budget considerably compared to the draft budget that was proposed by IRENA's administrative committee. This will benefit IRENA tremendously because the agency's tasks will be manifold given the current number of 136 signatories – and expectations have to be met. One thing is clear: It will not be the host country, which decides how the agency organises its work but the director general and the member states controlling her or him.

FA:

Many expected you as the driving force behind the formation of IRENA to become the agency's first director general. Why did your own government refrain from nominating you?

HS:

The German federal government applied to host the seat of IRENA in Bonn and did not want to reduce its chances by nominating me at the same time as director general. I myself wanted to avoid any situation where - at one point - it would come down to „Bonn or Scheer“. Since I have not been nominated, I was not in a position to be elected. I was primarily concerned with the establishment of IRENA – and not with a new political post for myself.

FA:

What became of the proposal, supported by many, to create the extraordinary position of a founding chair for you to support the director general in the start-up phase of the agency.

HS:

I asked those, who wanted to make this proposal public, not to proceed further with this idea. IRENA has to stand on her own two feet now. It is understood that I will provide Mrs. Pelosse with supporting advice – should she ever ask for it. I do not need a formal post for this.

FA:

Is this now the worldwide breakthrough for renewable energy?

HS:

One should not expect more from IRENA than the agency will actually be able to deliver. IRENA must not interfere with member state's policies. The agency has a service function vis-à-vis its member countries, which seek to deploy renewables more widely and at a faster pace. In addition, IRENA will have a stimulating function for renewable energies within the global energy debate with the aim of overcoming existent mental resistances and barriers. The implementation of renewable energy in member countries has to be carried out by protagonists that are active at the respective national and local level. IRENA will not be able to assume their role. Forces will be active that aim at narrowing IRENA's scope – together with forces that try to widen it. In other words: IRENA will not be active in a conflict-free sphere but rather in an environment that is dominated by the interests of conventional energies. To stand her ground and to thrive, IRENA needs the active support of all protagonists active in the field of renewable energy.

**Statute of the
International Renewable
Energy Agency
(IRENA)**

Adopted 26 January 2009, Bonn, Germany, World Conference Center

The Parties to this Statute,

desiring to promote the widespread and increased adoption and use of renewable energy with a view to sustainable development,

inspired by their firm belief in the vast opportunities offered by renewable energy for addressing and gradually alleviating problems of energy security and volatile energy prices,

convinced of the major role that renewable energy can play in reducing greenhouse gas concentrations in the atmosphere, thereby contributing to the stabilisation of the climate system, and allowing for a sustainable, secure and gentle transit to a low carbon economy,

desiring to foster the positive impact that renewable energy technologies can have on stimulating sustainable economic growth and creating employment,

motivated by the huge potential of renewable energy in providing decentralised access to energy, particularly in developing countries, and access to energy for isolated and remote regions and islands,

concerned about the serious negative implications that the use of fossil fuels and the inefficient use of traditional biomass can have on health,

convinced that renewable energy, combined with enhanced energy efficiency, can increasingly cover the anticipated steep increase in global energy needs in the coming decades,

affirming their desire to establish an international organisation for renewable energy, that facilitates the cooperation between its Members, while also establishing a close collaboration with existing organisations that promote the use of renewable energy,

have agreed as follows:

Article I Establishment of the Agency

A. The Parties to this Statute hereby establish the International Renewable Energy Agency (hereinafter referred to as „the Agency“) in accordance with the following terms and conditions.

B. The Agency is based on the principle of the equality of all its Members and shall pay due respect to the sovereign rights and competencies of its Members in performing its activities.

Article II Objectives

The Agency shall promote the widespread and increased adoption and the sustainable use of all forms of renewable energy, taking into account:

- a.) national and domestic priorities and benefits derived from a combined approach of renewable energy and energy efficiency measures, and
- b.) the contribution of renewable energy to environmental preservation, through limiting pressure on natural resources and reducing deforestation, particularly tropical deforestation, desertification and biodiversity loss; to climate protection; to economic growth and social cohesion including poverty alleviation and sustainable development; to access to and security of energy supply; to regional development and to inter-generational responsibility.

Article III Definition

In this Statute the term „renewable energy“ means all forms of energy produced from renewable sources in a sustainable manner, which include, inter alia:

1. bioenergy;
2. geothermal energy;
3. hydropower;
4. ocean energy, including inter alia tidal, wave and ocean thermal energy;
5. solar energy; and
6. wind energy.

Article IV Activities

A. As a centre of excellence for renewable energy technology and acting as a facilitator and catalyst, providing experience for practical applications and policies, offering support on all matters relating to renewable energy and helping countries to benefit from the efficient development and transfer of knowledge and technology, the Agency performs the following activities:

1. In particular for the benefit of its Members the Agency shall:

- a.) analyse, monitor and, without obligations on Members' policies, systematise current renewable energy practices, including policy instruments, incentives, investment mechanisms, best practices, available technologies, integrated systems and equipment, and success-failure factors;
- b.) initiate discussion and ensure interaction with other governmental and non-governmental organisations and networks in this and other relevant fields;
- c.) provide relevant policy advice and assistance to its Members upon their request, taking into account their respective needs, and stimulate international discussions on renewable energy policy and its framework conditions;
- d.) improve pertinent knowledge and technology transfer and promote the development of local capacity and competence in Member States including necessary interconnections;
- e.) offer capacity building including training and education to its Members;
- f.) provide to its Members upon their request advice on the financing for renewable energy and support the application of related mechanisms;
- g.) stimulate and encourage research, including on socio-economic issues, and foster research networks, joint research, development and deployment of technologies; and
- h.) provide information about the development and deployment of national and international technical standards in relation to renewable energy, based on a sound understanding through active presence in the relevant fora.

2. Furthermore, the Agency shall disseminate information and increase public awareness on the benefits and potential offered by renewable energy.

B. In the performance of its activities, the Agency shall:

1. act in accordance with the purposes and principles of the United Nations to promote peace and international cooperation, and in conformity with policies of the United Nations furthering sustainable development;
2. allocate its resources in such a way as to ensure their efficient utilisation with a view to appropriately address all its objectives and perform its activities for achieving the greatest possible benefit for its Members and in all areas of the world, bearing in mind the special needs of the developing countries, and remote and isolated regions and islands;
3. cooperate closely and strive for establishing mutually beneficial relationships with existing institutions and organisations in order to avoid unnecessary duplication of work and build upon and make efficient and effective use of resources and on-going activities by governments, other organisations and agencies, which aim to promote renewable energy.

C. The Agency shall:

1. submit an annual report on its activities to its Members;
2. inform Members about its policy advice after it was given; and
3. inform Members about consultation and cooperation with and the work of existing international organisations working in this field.

Article V Work programme and projects

A. The Agency shall perform its activities on the basis of the annual work programme, prepared by the Secretariat, considered by the Council and adopted by the Assembly.

B. The Agency may, in addition to its work programme, after consultation of its Members and, in case of disagreement, after approval by the Assembly, carry out projects initiated and financed by Members subject to the availability of non-financial resources of the Agency.

Article VI Membership

A. Membership is open to those States that are members of the United Nations and to regional intergovernmental economic integration organisations willing and able to act in accordance with the objectives and activities laid down in this Statute. To be eligible for membership to the Agency, a regional intergovernmental economic integration organisation must be constituted by sovereign States, at least one of which is a Member of the Agency, and to which its Member States have transferred competence in at least one of the matters within the purview of the Agency.

B. Such States and regional intergovernmental economic integration organisations shall become:

1. original Members of the Agency by having signed this Statute and having deposited an instrument of ratification;
2. other Members of the Agency by depositing an instrument of accession after their application for membership has been approved. Membership shall be regarded as approved if three months after the application has been sent to Members no disagreement has been expressed. In case of disagreement the application shall be decided on by the Assembly in accordance with Article IX paragraph H number 1.

C. In the case of any regional intergovernmental economic integration organisation, the organisation and its Member States shall decide on their respective responsibilities for the performance of their obligations under this Statute. The organisation and its Member States shall not be entitled to exercise rights, including voting rights, under the Statute concurrently. In their instruments of ratification or accession, the organisations referred to above shall declare the extent of their competence with respect to the matters governed by this Statute. These organisations shall also inform the Depository Government of any relevant modification in the extent of their competence. In the case

of voting on matters within their competence, regional intergovernmental economic integration organisations shall vote with the number of votes equal to the total number of votes attributable to their Member States which are also Members of this Agency.

Article VII Observers

A. Observer status may be granted by the Assembly to:

1. intergovernmental and non-governmental organisations active in the field of renewable energy;
2. Signatories that have not ratified the Statute; and
3. applicants for membership whose application for membership has been approved in accordance with Article VI paragraph B number 2.

B. Observers may participate without the right to vote in the public sessions of the *Assembly and its subsidiary organs*.

Article VIII Organs

A. There are hereby established as the principal organs of the Agency:

1. the Assembly;
2. the Council; and
3. the Secretariat.

B. The Assembly and the Council, subject to approval by the Assembly, may establish such subsidiary organs as they find necessary for the exercise of their functions in *accordance with this Statute*.

Article IX The Assembly

- A.
1. The Assembly is the supreme organ of the Agency.
 2. The Assembly may discuss any matter within the scope of this Statute or relating to the powers and functions of any organ provided for in this Statute.
 3. On any such matter the Assembly may: a.) take decisions and make recommendations to any such organ; and b.) make recommendations to the Members of the Agency, upon their request.
 4. Furthermore, the Assembly shall have the authority to propose matters for consideration by the Council and request from the Council and the Secretariat reports on any matter relating to the functioning of the Agency.

B. The Assembly shall be composed of all Members of the Agency. The Assembly shall meet in regular sessions which shall be held annually unless it decides otherwise.

C. The Assembly includes one representative of each Member. Representatives may be accompanied by alternates and advisors. The costs of a delegation's participation shall be borne by the respective Member.

D. Sessions of the Assembly shall take place at the seat of the Agency, unless the Assembly decides otherwise.

E. At the beginning of each regular session, the Assembly shall elect a President and such other officials as may be required, taking into account equitable geographic representation. They shall hold office until a new President and other officials are elected at the next regular session. The Assembly shall adopt its rules of procedure in conformity with this Statute.

F. Subject to Article VI paragraph C, each Member of the Agency shall have one vote in the Assembly. The Assembly shall take decisions on questions of procedure by a simple majority of the Members present and voting. Decisions on matters of substance shall be taken by consensus of the Members present. If no consensus can be reached, consensus shall be considered achieved if no more than 2 Members object, unless the Statute provides otherwise. When the issue arises as to whether the question is one of substance or not, that question shall be treated as a matter of substance unless the Assembly by consensus of the Members present decides otherwise, which, if no consensus can be reached, shall be considered achieved if no more than 2 Members object. A majority of the Members of the Agency shall constitute a quorum for the Assembly.

G. The Assembly shall, by consensus of the Members present:

1. elect the members of the Council;
2. adopt at its regular sessions the budget and the work programme of the Agency, submitted by the Council, and have the authority to decide on amendments of the budget and the work programme of the Agency;
3. take decisions relating to the supervision of the financial policies of the Agency, the financial rules and other financial matters and elect the auditor; approve amendments to this Statute;
5. decide on the establishment of subsidiary bodies and approve their terms of reference; and
6. decide on permission to vote in accordance with Article XVII paragraph A.

H. The Assembly shall by consensus of the Members present, which if no consensus can be reached shall be considered achieved if no more than 2 Members object:

1. decide, if necessary, on applications for membership;
2. approve the rules of procedure of the Assembly and of the Council, which shall be submitted by the latter;
3. adopt the annual report as well as other reports;
4. approve the conclusion of agreements on any questions, matters or issues within the scope of this Statute; and

5. decide in case of disagreement between its Members on additional projects in accordance with Article V paragraph B.

I. The Assembly shall designate the seat of the Agency and the Director-General of the Secretariat (hereinafter referred to as „Director-General“) by consensus of the Members present, or, if no consensus can be reached, by a majority vote of two thirds of the Members present and voting.

J. The Assembly shall consider and approve as appropriate at its first session any decisions, draft agreements, provisions and guidelines developed by the Preparatory Commission in accordance with the voting procedures for the respective issue as outlined in Article IX paragraphs F to I.

Article X The Council

A. The Council shall consist of at least 11 but not more than 21 representatives of the Members of the Agency, elected by the Assembly. The concrete number of representatives between 11 and 21 shall correspond to the rounded up equivalent of one third of the Members of the Agency to be calculated on the basis of the number of Members of the Agency at the beginning of the respective election for members of the Council. The members of the Council shall be elected on a rotating basis as laid down in the rules of procedure of the Assembly, with a view to ensuring effective participation of developing and developed countries and achieving fair and equitable geographical distribution and effectiveness of the Council's work. The members of the Council shall be elected for a term of two years.

B. The Council shall convene semi-annually and its meetings shall take place at the seat of the Agency, unless the Council decides otherwise.

C. The Council shall, at the beginning of each meeting for the duration until its next meeting, elect a Chairperson and such other officials from among its members as may be required. It shall have the right to elaborate its rules of procedure. Such rules of procedure have to be submitted to the Assembly for approval.

D. Each member of the Council shall have one vote. The Council shall take decisions on questions of procedure by a simple majority of its members. Decisions on matters of substance shall be taken by a majority of two thirds of its members. When the issue arises as to whether the question is one of substance or not, that question shall be treated as a matter of substance unless the Council, by a majority of two thirds of its members, decides otherwise.

E. The Council shall be responsible and accountable to the Assembly. The Council shall carry out the powers and functions entrusted to it under this Statute, as well as those functions delegated to it by the Assembly. In so doing, it shall act in conformity with the decisions and with due regard to the recommendations of the Assembly and assure their proper and continuous implementation.

F. The Council shall:

1. facilitate consultations and cooperation among Members;
2. consider and submit to the Assembly the draft work programme and the draft budget of the Agency;
3. approve arrangements for the sessions of the Assembly including the preparation of the draft agenda;
4. consider and submit to the Assembly the draft annual report concerning the activities of the Agency and other reports as prepared by the Secretariat according to Article XI paragraph E number 3 of this Statute;
5. prepare any other reports which the Assembly may request;
6. conclude agreements or arrangements with States, international organisations and international agencies on behalf of the Agency, subject to prior approval by the Assembly;
7. substantiate the work programme as adopted by the Assembly with a view to its implementation by the Secretariat and within the limits of the adopted budget;
8. have the authority to refer to the Assembly matters for its consideration; and
9. establish subsidiary organs, when necessary, in accordance with Article VIII paragraph B, and decide on their terms of reference and duration.

Article XI The Secretariat

A. The Secretariat shall assist the Assembly, the Council, and their subsidiary organs in the performance of their functions. It shall carry out the other functions entrusted to it under this Statute as well as those functions delegated to it by the Assembly or the Council.

B. The Secretariat shall comprise a Director-General, who shall be its head and chief administrative officer, and such staff as may be required. The Director-General shall be appointed by the Assembly upon the recommendation of the Council for a term of four years, renewable for one further term, but not thereafter.

C. The Director-General shall be responsible to the Assembly and the Council, *inter alia* for the appointment of the staff as well as the organisation and functioning of the Secretariat. The paramount consideration in the employment of the staff and in the determination of the conditions of service shall be the necessity of securing the highest standards of efficiency, competence and integrity. Due regard shall be paid to the importance of recruiting the staff primarily from Member States and on as wide a geographical basis as possible, taking particularly into account the adequate representation of developing countries and with emphasis on gender balance. In preparing the budget the proposed recruitment shall be guided by the principle that the staff shall be kept to a minimum necessary for the proper discharge of the responsibilities of the Secretariat.

D. The Director-General or a representative designated by him or her shall participate, without the right to vote, in all meetings of the Assembly and of the Council.

E. The Secretariat shall:

1. prepare and submit to the Council the draft work programme and the draft budget of the Agency;
2. implement the Agency's work programme and its decisions;
3. prepare and submit to the Council the draft annual report concerning the activities of the Agency and such other reports as the Assembly or the Council may request;
4. provide administrative and technical support to the Assembly, the Council and their subsidiary organs;
5. facilitate communication between the Agency and its Members; and
6. circulate the policy advice after it was given to the Members of the Agency in accordance with Article IV paragraph C number 2 and prepare and submit to the Assembly and the Council a report on its policy advice for each of their sessions. The report to the Council shall include also the planned policy advice in implementing the annual work programme.

F. In the performance of their duties, the Director-General and the other members of the staff shall not seek or receive instructions from any government or from any other source external to the Agency. They shall refrain from any action that might reflect on their positions as international officers responsible only to the Assembly and the Council. Each Member shall respect the exclusively international character of the responsibilities of the Director-General and the other members of the staff and shall not seek to influence them in the discharge of their responsibilities.

Article XII The Budget

A. The budget of the Agency shall be financed by:

1. mandatory contributions of its Members, which are based on the scale of assessments of the United Nations, as determined by the Assembly;
2. voluntary contributions; and
3. other possible sources in accordance with the financial rules to be adopted by the Assembly by consensus, as laid down in Article IX paragraph G of this Statute. The financial rules and the budget shall secure a solid financial basis of the Agency and shall ensure the effective and efficient implementation of the Agency's activities, as defined by the work programme. Mandatory contributions will finance core activities and administrative costs.

B. The draft budget of the Agency shall be prepared by the Secretariat and submitted to the Council for examination. The Council shall either forward it to the Assembly with a recommendation for approval or return it to the Secretariat for review and re-submission.

C. The Assembly shall appoint an external auditor who shall hold office for a period of four years and who shall be eligible for re-election. The first auditor shall hold office for a period of two years. The auditor shall examine the accounts of the Agency and shall

make such observations and recommendations as deemed necessary with respect to the efficiency of the management and the internal financial controls.

Article XIII Legal personality, privileges and immunities

A. The Agency shall have international legal personality. In the territory of each Member and subject to its national legislation, it shall enjoy such domestic legal capacity as may be necessary for the exercise of its functions and the fulfilment of its purposes.

B. Members shall decide upon a separate agreement on privileges and immunities.

Article XIV Relations with other organisations

Subject to the approval of the Assembly the Council shall be authorised to conclude agreements on behalf of the Agency establishing appropriate relations with the United Nations and any other organisations whose work is related to that of the Agency. The provisions of this Statute shall not affect the rights and obligations of any Member deriving from any existing international treaty.

Article XV Amendments and withdrawal, review

A. Amendments to this Statute may be proposed by any Member. Certified copies of the text of any amendment proposed shall be prepared by the Director-General and communicated by him to all Members at least ninety days in advance of its consideration by the Assembly.

B. Amendments shall come into force for all Members:

1. when approved by the Assembly after consideration of observations submitted by the Council on each proposed amendment; and
2. after all the Members have consented to be bound by the amendment in accordance with their respective constitutional processes. Members shall express their consent to be bound by depositing a corresponding instrument with the Depository referred to in Article XX paragraph A.

C. At any time after five years from the date when this Statute takes effect in accordance with paragraph D of Article XIX, a Member may withdraw from the Agency by notice in writing to that effect given to the Depository referred to in Article XX paragraph A, which shall promptly inform the Council and all Members.

D. Such withdrawal shall take effect at the end of the year in which it is expressed. Withdrawal by a Member from the Agency shall not affect its contractual obligation entered into pursuant to Article V paragraph B or its financial obligations for the year in which it withdraws.

Article XVI Settlement of disputes

A. Members shall settle any dispute between them concerning the interpretation or application of this Statute by peaceful means in accordance with Article 2 paragraph 3 of the Charter of the United Nations and, to this end, shall seek a solution by the means indicated in Article 33 paragraph 1 of the Charter of the United Nations.

B. The Council may contribute to the settlement of a dispute by whatever means it deems appropriate, including offering its good offices, calling upon the Members to a dispute to start the settlement process of their choice and recommending a time limit for any agreed procedure.

Article XVII Temporary suspension of rights

A. Any Member of the Agency which is in arrears with its financial contributions to the Agency shall have no right to vote if its arrears reach or exceed the amount of its contributions for the two preceding years. However, the Assembly may permit this Member to vote if it is convinced that the non-payment is due to circumstances beyond the Member's control.

B. A Member which has persistently violated the provisions of this Statute or of any agreement entered into by it pursuant to this Statute may be suspended from the exercise of the privileges and rights of membership by the Assembly acting by a two-thirds majority of the Members present and voting upon recommendation of the Council.

Article XVIII Seat of the Agency

The seat of the Agency shall be determined by the Assembly at its first session.

Article XIX Signature, ratification, entry into force and accession

A. This Statute shall be open for signature at the Founding Conference by all States that are members of the United Nations and regional intergovernmental economic integration organisations as defined in Article VI paragraph A. It shall remain open for signature until the date this Statute enters into force.

B. For States and regional intergovernmental economic integration organisations as defined in Article VI paragraph A having not signed this Statute, this Statute shall be open for accession after their membership has been approved by the Assembly in accordance with Article VI paragraph B number 2.

C. Consent to be bound by this Statute shall be expressed by depositing an instrument of ratification or accession with the Depository. Ratification of or accession to this Statute shall be effected by States in accordance with their respective constitutional processes.

D. This Statute shall enter into force on the thirtieth day after the date of deposit of the twenty-fifth instrument of ratification.

E. For States or regional intergovernmental economic integration organisations having deposited an instrument of ratification or accession after the entry into force of the Statute, this Statute shall enter into force on the thirtieth day after the date of deposit of the relevant instrument.

F. No reservations may be made to any of the provisions contained in this Statute.

Article XX Depositary, registration, authentic text

A. The Government of the Federal Republic of Germany is hereby designated as the Depositary of this Statute and any instrument of ratification or accession.

B. This Statute shall be registered by the Depositary Government pursuant to Article 102 of the Charter of the United Nations.

C. This Statute, done in English, shall be deposited in the archives of the Depositary Government.

D. Duly certified copies of this Statute shall be transmitted by the Depositary Government to the governments of States and to the executive organs of regional intergovernmental economic integration organisations which have signed or have been approved for membership according to Article VI paragraph B number 2.

E. The Depositary Government shall promptly inform all Signatories to this Statute of the date of each deposit of any instrument of ratification and the date of entry into force of the Statute.

F. The Depositary Government shall promptly inform all Signatories and Members of the dates on which States or regional intergovernmental economic integration organisations subsequently become Members thereto.

G. The Depositary Government shall promptly send new applications for membership to all Members of the Agency for consideration in accordance with Article VI paragraph B number 2.

IN WITNESS WHEREOF the undersigned, being duly authorised, have signed this Statute.

DONE at Bonn, this 26th January 2009, in a single original, in the English language.

