



The  
Federal Government

INITIATIVE FOR AN  
INTERNATIONAL  
RENEWABLE  
ENERGY AGENCY **IRENA**

# Founding an International Renewable Energy Agency (IRENA)

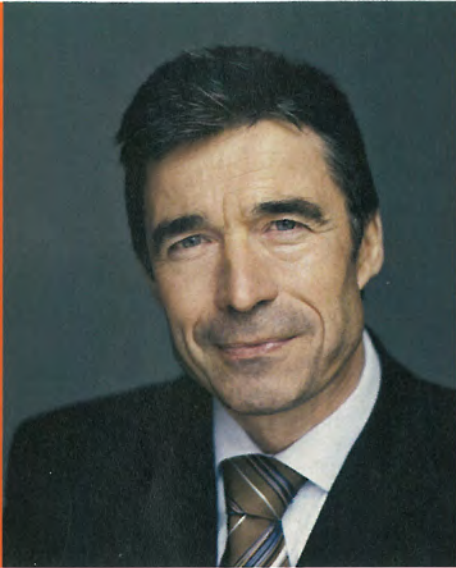
Promoting renewable energy worldwide





“Renewable energies are a key element in the supply of sustainable energy. With the foundation of an International Renewable Energy Agency we want to contribute to the sustained development of renewable energies’ vast global potential. This will also benefit those who lack access to electricity and thus are unable to use development opportunities to the same extent.”

**Chancellor  
Angela Merkel  
Germany**



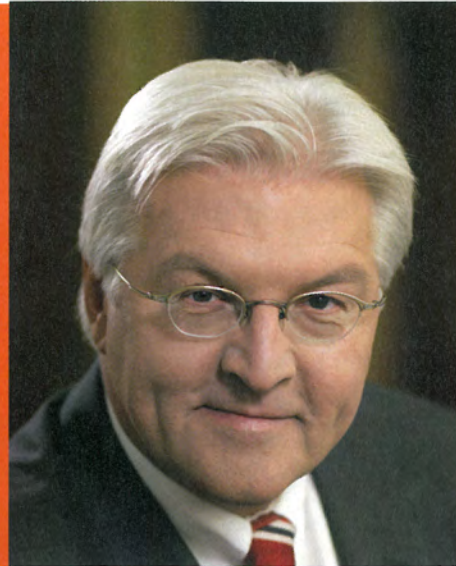
“An International Renewable Energy Agency will seriously strengthen our efforts to curb greenhouse-gas emissions and enhance security of supply. The agency will also be an important step towards facilitating the transition from oil, gas and coal to renewable energy in the industrialised countries as well as in the emerging economies.”

**Prime Minister**  
**Anders Fogh Rasmussen**  
**Denmark**



“Those countries that lead renewable energies in a few years’ time, those that lead the fight against climatic change and achieve a lesser dependence on carbon will contribute to reduce polluting emissions, to stop climatic change and they will gain economic, political and social added value. ...Spain cannot miss this chance for the future.”

**Prime Minister**  
**José Luis Rodríguez Zapatero**  
**Spain**



“Global challenges demand global solutions rather than go-it-alone efforts: energy security, climate protection and the eradication of poverty can only be effectively tackled through cooperation at the international level. Here, renewable energy plays a key role. In light of climate change and with regard to the growing scarcity of conventional resources, the use of renewable energy is an absolute must. That is why we need a platform that brings together all of the countries interested in employing renewable energy. This is where IRENA, the International Renewable Energy Agency, comes in. Currently, no comparable organization exists. IRENA will pool knowledge, specifically advise decision-makers and, in this way, I hope it will help bring about renewable energy’s global breakthrough.”

**Federal Minister for Foreign Affairs  
Frank-Walter Steinmeier  
Germany**

# Contents

<b>1. Introduction</b>	<b>6</b>
<b>2. Renewable energy – an answer to urgent challenges</b>	<b>8</b>
<b>3. IRENA contributes to overcoming obstacles</b>	<b>12</b>
<b>4. IRENA's activities</b>	<b>15</b>
<b>5. Institutional design</b>	<b>18</b>
<b>6. Join the initiative for IRENA</b>	<b>20</b>



# 1. Introduction



Energy is a basic human need and makes the world go round. Without energy, everything would come to a standstill. It is indispensable to foster human development and economic growth with a secure, affordable, reliable, clean and sustainable energy supply.

Today we are facing huge challenges: global warming, depleting natural resources, population growth, increasing energy demand, rising energy prices and unequal distribution of energy sources. All of these factors contribute to the urgent need to transform the energy sector, which primarily relies on fossil fuels, to one that uses renewable energies and energy efficient technologies.

**Renewable energy is one of the key solutions to the current challenges facing the world's energy future.** Many countries already foster the production and use of renewable energy through different approaches on a political and economic level as they recognise the urgent need to change the current energy path. The current use of renewable energy, however, is still

limited in spite of its vast potential. The obstacles are manifold: lengthy permitting procedures, import tariffs and technical barriers, insecure financing of renewable energy projects and insufficient awareness of the opportunities of renewable energy.

**This is where IRENA – the International Renewable Energy Agency – comes in. Mandated by governments worldwide, IRENA aims at becoming the main driving force in promoting a rapid transition towards the widespread and sustainable use of renewable energy on a global scale.**

Acting as the global voice for renewable energies, IRENA will provide practical advice and support for both industrialised and developing countries, help them improve their regulatory frameworks and build capacity. The agency will facilitate access to all relevant information including reliable data on the potential of renewable energy, best practices, effective financial mechanisms and state-of-the-art technological expertise.

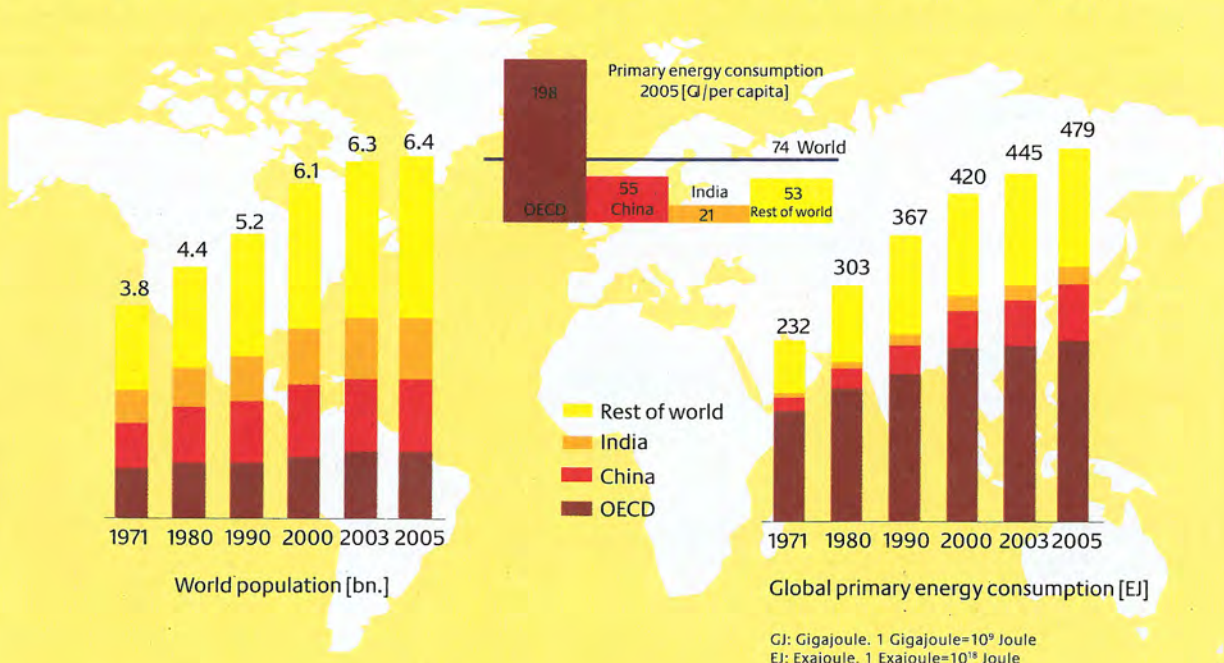
IRENA will develop comprehensive solutions, such as fostering all types of renewable energy, and consider various renewable energy policies on the local, regional, and national level. Additionally, IRENA will consider the specific environmental, economic and socio-cultural conditions. Lastly, it will involve stakeholders from the energy industry, academia, institutions and civil society.

IRENA will regularly consult and cooperate with organisations and networks already engaged in the field of renewable energy in order to complement and pool their work resources, hereby creating added value.

This brochure presents the initiative for the founding of IRENA, an ambitious initiative that Germany launched with like-minded countries, especially Denmark and Spain. We would like to invite all interested parties to join the initiative, to support IRENA and thus help pave the way towards a sustainable energy future.



### Development of world population and global primary energy consumption



Source: Staiß, F (2007): Jahrbuch Erneuerbare Energien 2007.

## 2. Renewable energy – an answer to urgent challenges

Renewable energy presents an attractive and rewarding solution to the **increasing global energy demand, global warming, and rising energy prices**. IRENA strongly promotes the use and the dissemination of renewable energies, emphasising the many advantages inherent to these energy forms.

### Increasing global energy demand

Countries worldwide are experiencing rapid economic expansion and industrialisation, while the world's population is predicted to reach 9.0 billion by 2050.<sup>1</sup> These two factors mean increased demand for energy. If governments do not change their current policies, the world's energy needs could increase by 50 percent or more by 2030.<sup>2</sup> Until now, these demands have been satisfied largely by fossil energy sources. However, the limited resources are rapidly decreasing, while their use continues to damage the environment, people's health and the Earth's climate.

Over 1.6 billion people currently have no access to electricity and more than 2 billion rely on wood and dung for their energy needs.<sup>3</sup> Traditional biomass is often used in an inefficient and non-sustainable way as an energy source, leading to severe implications for human health and the environment.<sup>4</sup> Building conventional grids to supply rural areas with electricity is often prohibitively expensive. Thus, local populations need to be supplied with energy that combines decentralised and centralised supply structures.

### Using renewable energy: guarantee of energy supply

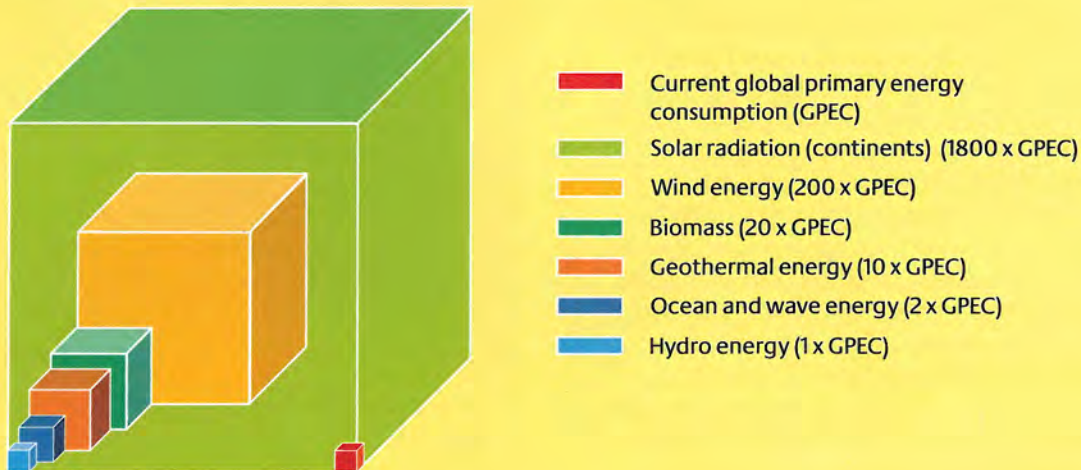
Even substantial increases in energy demand can be covered with wind, solar and other sources of renewable energy. The potential energy from solar radiation exceeds human energy needs more than a thousand times over. Technical progress has made use of these resources and considerably accelerated in recent years. Renewable energy technologies offer increasingly competitive alternatives to fossil and nuclear fuels. Sources of renewable energy are limitless, universally available and able to meet the need for stand-alone energy solutions in rural areas. Even isolated regions can receive energy supplies, and thus gain access to development, as renewable energies can be used far from centralised electricity systems. Renewable energies reduce human dependence on rapidly diminishing fossil fuel resources. Furthermore, they diversify and increase domestic supply, thereby saving costs for ever more expensive imports of conventional fuels.

Renewable energies can meet the demand for electricity, satisfy heating and cooling needs and provide propulsion for vehicles without harming the environment.





## The physical potential of renewable energies



Source: Nitsch, F. (2007): Technologische und energiewirtschaftliche Perspektiven erneuerbarer Energien. Deutsches Zentrum für Luft- und Raumfahrt.

### Global warming

If growing demands for fossil fuels continue, **greenhouse gas emissions will increase up to 60 percent by 2030**. This could lead to a completely unsustainable temperature rise of about 5°C.<sup>5</sup> The United Nations (UN) Climate Change Conference in Bali in 2007 again stressed the necessity to limit global warming to no more than 2°C. The 4<sup>th</sup> Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) concludes that in order not to exceed this ceiling, global emissions need to decrease by at least 50 percent by 2050. Action must be taken in order to change current trends. The Stern Report estimates that without swift action, economic losses due to climate change could reach 20 percent of global Gross Domestic Product (GDP) each year.<sup>6</sup>

### Using renewable energy: stabilising the climate

In addition to energy efficiency, increasing the use of renewable energy will be an essential factor in mitigating climate change. In Germany, for example, the use of renewable energy prevented 115 million tonnes of greenhouse gas emissions in 2007.<sup>7</sup> Renewable energy that is produced and used in a sustainable manner relieves the pressure on the environment and human health.

Renewable energies help mitigate the economic impact of climate change. The costs resulting from damages to humans and the environment caused by the overall use of energy are currently not included in energy prices. Costs of electricity generated by modern coal technology, for instance, are estimated to range between six and eight €-Cent/kWh<sup>(\*)</sup>, whereas they are only about 0.5 €-Cent/kWh in the case of renewable energy.<sup>8</sup> If external costs were included in the current energy prices, renewable energy would already be highly competitive.

(\*) Kilowatt hours (kWh): Measure for energy corresponding to the electrical power of one kilowatt (1000 Watts) applied for the duration of one hour (1 kW x 1 hour).

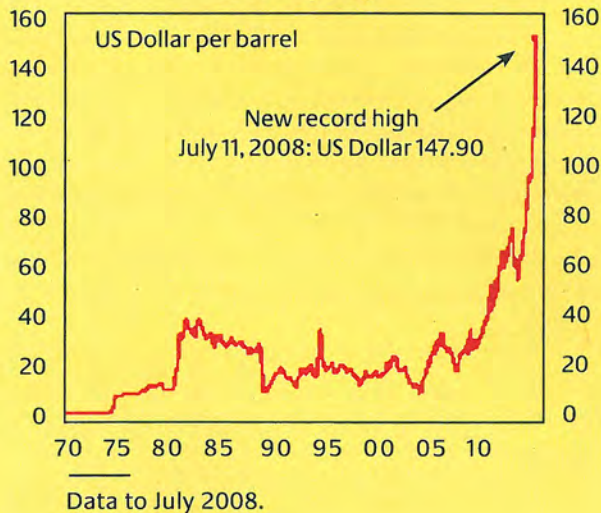
**Increasing energy prices**

Satisfying the growing demand for energy with conventional energy sources is becoming not only increasingly difficult but also increasingly costly. **Oil prices almost doubled over the last year.** For the first time the price per barrel reached USD 147 in 2008. We are shifting from cheap oil to peak oil. Prices for other conventional energy sources are also rising fast. Although oil prices are difficult to predict, clear indications show that prices will continue to grow in the future.

Increasing energy prices place consumers as well as companies under enormous pressure. Businesses rely on cheap and secure energy, whether they are energy-intensive industrial operations or small or medium-sized enterprises. Growing demand and increasing scarcity of fossil energy resources have a negative impact on the global economy.



**WTI oil jumps to new record in early July**



Source: Scotiabank (2008): Commodity Price Index.

Low-income economies that import fossil fuels are particularly vulnerable to such price increases, as they upset their balance of payments. Access to energy services is an important precondition for meeting basic needs and for developing a modern economy. A smoothly functioning energy supply system is important for a country's economic stability. Energy is thus an indispensable element to overcome poverty and to achieve the United Nations' Millennium Development Goals.

**Using renewable energy:  
providing economic opportunities**

Renewable energy technologies can lay the groundwork for a modern, affordable and sustainable energy supply in developed and developing countries. Recently, the price of generating energy from renewable sources has continued to fall as technological innovation rapidly accelerates. Many renewable energy technologies are now mature and ready for the market. For example, the costs for electricity generation of solar power decreased about 60 percent from 1991 to 2003.<sup>9</sup> The costs for generating wind power declined more than 80 percent from the early 1980s until 2007.<sup>10</sup>

Investments in renewable energy more than doubled between 2004 and 2007 and exceeded over USD 100 billion in 2007.<sup>11</sup> The indus-

try attracts major commercial and investment banks, venture capitalists, private investors and development organisations. Moreover, these new technologies create skilled jobs. Globally, renewable energy accounted for 2.4 million jobs in 2006.<sup>12</sup> Not only can the global economy benefit from the use of renewable energy, but many local and regional economies can too.

Renewable energy may allow developing countries to leapfrog directly into a clean energy scenario. Better access to sustainable energy services is necessary to foster economic growth at the macro level, and to stimulate businesses and income-generating activities at the micro-level. Renewable energies generate additional incomes and reduce expenses by preventing the emergence of pollution and alleviating the dependence on energy exporting countries.



### 3. IRENA contributes to overcoming obstacles

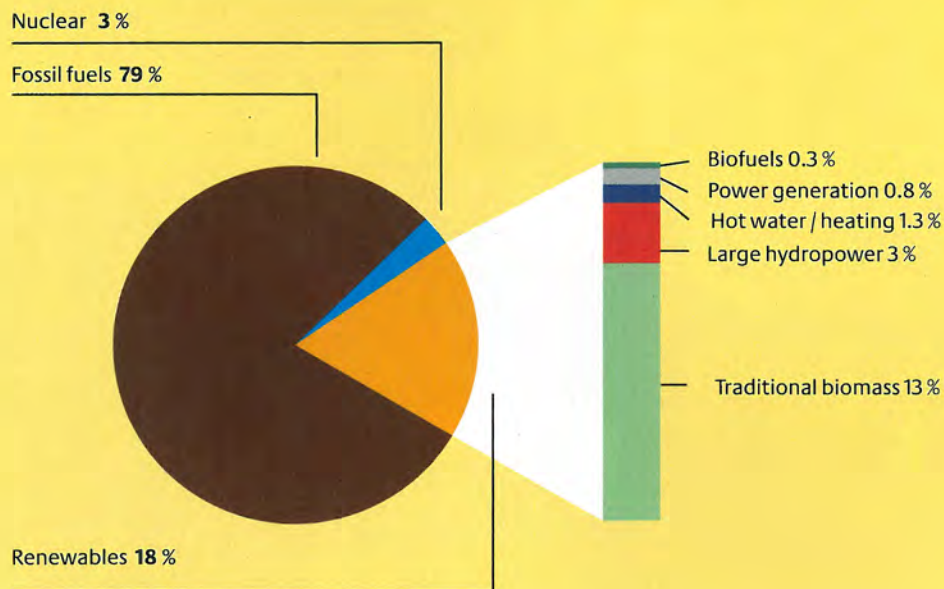
Many obstacles remain to the widespread use of renewable energy. Low public awareness, market distortions caused by governments in favour of subsidising conventional energy sources, ineffective political frameworks, inadequate technical know-how, misinformation – all these are major barriers to increasing the share of renewable energy in our total energy consumption.<sup>13</sup>

In 2006, renewable energy contributed some 18 percent to the total energy consumption (counting traditional biomass, large hydropower, and “new” renewables such as small hydro, modern biomass, wind, solar, geothermal, and biofuels). Still, the contribution of the new renewables was marginal with 2.4 percent, while traditional biomass represented 13 percent of the total energy consumption in 2006. During the five-year period 2002-2006, global renewable energy capacity grew at rates of

15-30 percent annually for many technologies, including wind power, solar hot water, geothermal heating, and off-grid solar PV.<sup>14</sup>

In spite of this dynamic development in renewable energy, the continued growth in primary energy consumption is effectively cancelling out this effect. It is therefore not surprising, but all the more alarming, that the share of renewables has not been rising relative to the total consumption during the last few years.<sup>15</sup>

**Renewable Energy Share of Global Final Energy Consumption, 2006**



Source: REN21 (2008): Renewables 2007 Global Status Report.



■ **Structural political and market barriers:** Political structures, legislation and support programmes often place renewable energy at a disadvantage compared to other energy sources. By comparison, fossil and nuclear energy currently enjoy a number of advantages – fully developed technology, established industries, strong market structures, powerful companies and considerable financial subsidies. Moreover, current market structures hinder the spread of renewable energy, because renewable energy often requires new technological, power and service structures, whose costs have to be calculated differently.

■ **Lack of information:** While many countries have shown themselves willing or able to create the necessary conditions for the spread of renewable energy, information is lacking with regard to efficient renewable energy policies (appropriate legislation, market incentives and institutional frameworks), industry requirements and research, development, education and training. Providing access to applicable and useful information related to renewable energy is of paramount importance.

■ **Lack of technical know-how:** Implementing renewable technologies in the national energy strategies requires not only the willingness but also the technical ability to use renewable energies. Achieving a high share of renewable energy in the total energy supply requires new approaches to the design and management of energy systems and grids. Developing countries, in particular, often cannot access renewable technologies with regard to buying, maintaining and repairing the equipment. Market access to these new technologies is not enough. Developing countries need to develop the capacity to produce such technologies autonomously.

Even though the potential of renewable energies is huge and their advantages are great, remaining obstacles limit their diffusion and adoption throughout the world. An international institution is needed to close the gap between what could be achieved with renewable energy and what is currently being achieved. IRENA fills this gap with its governmental mandate, which will enable the agency to handle current global, national and local barriers.

### Why a new international organisation?

In the 1950s the desire to exploit the opportunities offered by a new energy source led to the foundation of the International Atomic Energy Agency (IAEA). In the 1970s, the fear of shortages arising in fossil fuel supply prompted the foundation of another organisation – the International Energy Agency (IEA).

Today there are new challenges impacting on the global energy supply, as described in more detail in Chapter 2 above. These challenges require urgent changes in the global energy structure, and a transformation to a sustainable energy system. Key players must be present in order to change the current mindsets on the international level and promote renewable energies worldwide. IRENA is the first international organisation to solely concentrate on renewable

energy and offer support to industrialised and developing countries alike. A combination of both is needed in order to set the course for a low-carbon, sustainable, clean and safe energy use.

For the time being, the idea to make IRENA a new United Nations or United Nations-affiliated organisation does not appear as a realistic option. To ensure that the Agency can begin operating swiftly, it needs to be set up independently. However, in the long term the integration of IRENA into the United Nations should be considered. Sharing synergies with the existing international organisations related to renewable energy issues, IRENA will seek an open exchange, drawing on each other's expertise, developing shared ideas and supporting each other's work wherever possible.



## 4. IRENA's activities

IRENA strives for excellence. As an international governmental organisation working at the request of its member states, IRENA will foster the change in the global energy sector towards a sustainable economy with great reliance on renewable energy. As the overall objective of IRENA is to promote the widespread and increased adoption and sustainable use of renewable energy worldwide. IRENA will increase the contribution of renewable energy to environmental and climate protection, economic growth and social cohesion, including poverty alleviation, security of energy supply, regional development and inter-generational equity.

IRENA's overall objective needs to be broken down into a number of concrete activities, including :

- **Developing a comprehensive knowledge base:** IRENA aims at becoming the key international institution for the promotion of renewable energy. For this reason, there must be a comprehensive understanding of what activities are currently promoting renewable energies and what resources are available. For example, IRENA will research current uses and further potential of renewable energy, existing policy instruments, incentives, investment mechanisms, technology, grids, conservation, storage and efficiency issues. Furthermore, it will collect its own data by consulting with experts – both, academics and practitioners – who will systematise, review and update the data.

The comprehensive data base will not only enable IRENA to inform and advise its members, but also to disseminate information to the public and thus increase public awareness of the benefits and potential offered by renewable energy.



- **Providing policy advice:** IRENA focuses on working with national governments. Most countries currently lack an integrated perspective on their renewable energy potential and the options available to them. They also lack appropriate strategies for achieving the structural shift towards renewable energy. The most appropriate and efficient use of renewable energy depends on the specific geographical, structural, socio-economic and cultural conditions. A key task of IRENA will therefore be the provision of comprehensive advice on selecting and adapting energy sources, technology and system configurations, business models as well as organisational and regulatory frameworks. The agency will also help countries to make the best use of available funding.



IRENA can, for instance, begin by advising an initial group of member states on these issues. Members of this group might include countries that are advanced with respect to their use of renewable energy and those that are less so, as well as both developed and developing nations, in order to reflect the broad spectrum of existing energy systems and experience. This approach would also allow IRENA to develop its own consulting methods while at the same time assembling a toolbox of successful methodologies, policies, programmes and regulatory frameworks, as well as gaining useful insights.

Policy advice will not only be given on a national level, but also at local and regional levels. These activities will develop integrated approaches on the use of renewable energy in rural and urban areas.

- **Promoting technology transfer and providing advice on financing:** technology transfer will be one important cornerstone in order to rapidly reduce greenhouse gas emissions without adversely affecting economic development.

Enormous efforts are required to facilitate technology transfers and investments in developing countries. IRENA will help develop appropriate framework conditions. Furthermore, it will support the development and implementation of related funding mechanisms for technology transfer in the renewable sector.

One option for the initial period is to conduct a conference to discuss possible funding mechanisms and strategies for technology transfer. By looking specifically at solutions in the renewable field, IRENA can make a valuable contribution to the ongoing discussion on financing and technology transfer for the post-2012 period. A further possibility for IRENA is to evaluate specific technology transfer projects in different countries, the results of which could contribute to the development of an appropriate assessment methodology that takes into account cultural and socio-economic issues. It would also help improve developing countries' access to technology transfer.



- **Enhancing capacity building:** the availability of appropriately trained experts and practitioners is frequently a limiting factor in the renewable energy sector. Decentralised renewable energy systems and traditional centralised systems have different human resource requirements. Local planning, installation and maintenance need well-trained personnel. The spread of renewable energy depends on the availability of trained and motivated contractors and technicians at the regional level.

Training might encompass a wide range of qualifications and involve educational institutions at all levels. Identifying specific training needs and opportunities requires cooperation between numerous partners. IRENA can facilitate the international exchange of experience and the development of coherent methodologies. Different sources of renewable energy have different markets, different technical structures and require different qualifications. Here, IRENA can help develop differentiated approaches, contributing to a shared pool of knowledge and methods.

- **Stimulating research:** IRENA requires a solid scientific basis for its work. The research sector will play an important role in providing the organisation with information on the latest scientific developments. Consultations with experts from academia and industry will enable IRENA to develop practical approaches and to encourage and stimulate research activities in the field of renewable energy. In addition, IRENA can foster the dissemination of research results.

- **Networking - Cooperating with other organisations, institutions and networks:** there are several organisations that share IRENA's aim to promote the use of renewable energy. Amongst these organisations are the following: the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), the United Nations Industrial Development Organisation (UNIDO), international organisations like the International Energy Agency (IEA) linked to

the OECD, the World Bank, networks like the Renewable Energy Policy Network for the 21st Century (REN21), the Renewable Energy and Energy Efficiency Partnership (REEEP), the Global Bioenergy Partnership (GBEP), and a number of non-governmental organisations. These organisations, however, operate in different ways, on different levels (local, regional, global) and from different perspectives. One of IRENA's main goals will be to establish a close cooperation with existing organisations and initiatives. This should lead to enhanced synergy effects. IRENA could therefore initiate a variety of exchanges with these organisations, while simultaneously identifying potential cooperation for the future.



## 5. Institutional design

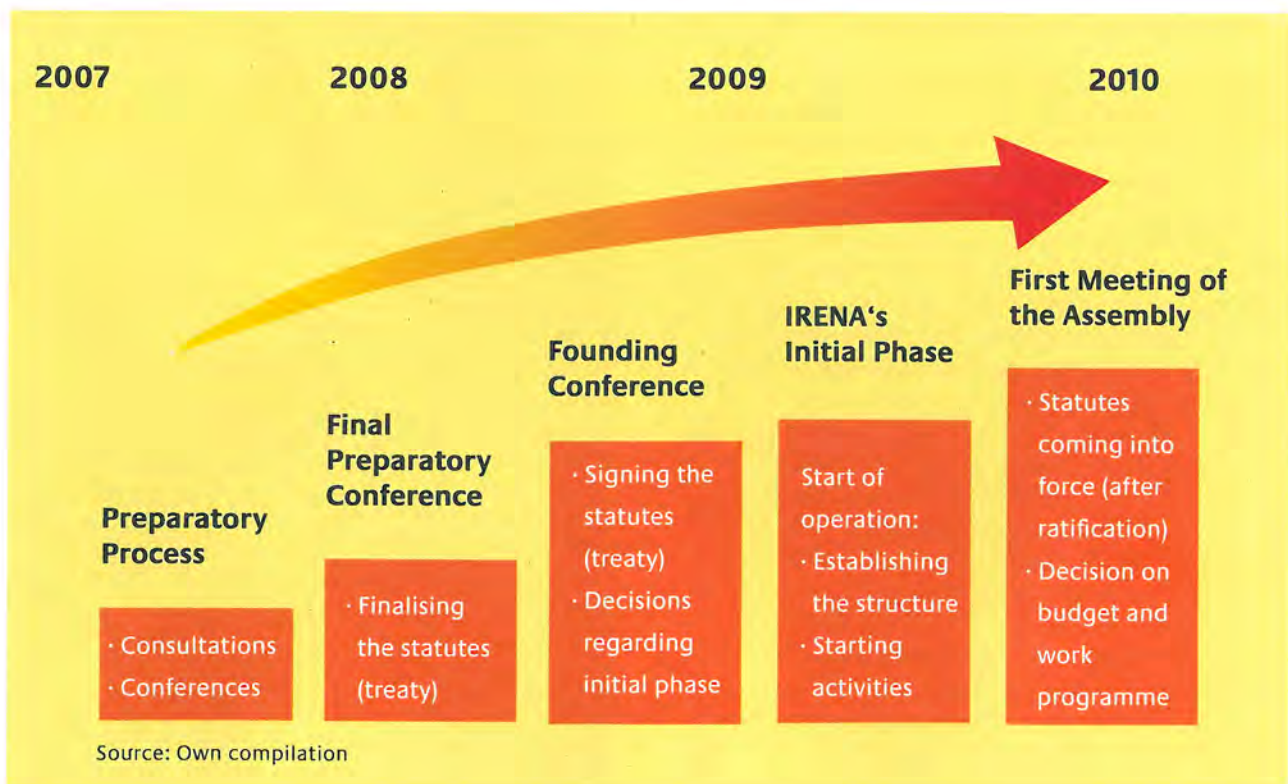
In order for IRENA to successfully pursue its tasks and objectives, the structure of the organisation demands thoughtful design. IRENA needs to operate effectively and to support its member states in the best way possible.

IRENA is to be an international governmental organisation working closely together with all stakeholder groups whose work is related to that of the agency. Observer status may be granted to, amongst others, inter-governmental and non-governmental organisations active in the field of renewable energy sources. The aim is to build a broad-based membership structure: large and small, industrialised and developing countries alike are to be represented in the organisation.

The agency is to consist of three main organs: the Assembly, the Council and the Secretariat. The Assembly is the supreme organ of IRENA and will be composed of all member countries. Amongst its tasks are the yearly adoption of the

budget and the work programme of the agency. The Assembly elects representatives from member states into the Council. The Council will convene semi-annually. Its main responsibilities are to facilitate consultations and cooperation among members at their request. The Council will also substantiate the work programme as adopted by the Assembly. The Secretariat will be headed by a Director-General who is appointed by the Assembly. His/her main task, together with the staff of renowned international experts, will require implementing the work programme.

The statutes and work programme are being designed in such a way as to make IRENA an effective and efficient agency that can operate as soon as possible. IRENA's budgetary needs are closely linked to the work programme. The budget will be financed mainly by membership contributions. The amount of mandatory contributions will be calculated using the UN scale of assessment.



### The road towards IRENA

The idea to promote renewable energy by establishing an international organisation was originally presented by EUROSOLAR and the World Council for Renewable Energy and has been extensively discussed for several years at various international level forums. The number of parties supporting this idea has consistently grown. Finally, the International Conference for Renewable Energies in Bonn, 2004, supported by the International Parliamentary Forum on Renewable Energies, paved the way towards a breakthrough for the promotion of renewables worldwide.

The German establishment of IRENA has received positive feedback. Consultations with representatives from countries worldwide in 2007 gave clear evidence of a high level of interest for the proposed initiative. Strongly supported by Spain and Denmark, the German government organised two international meetings in 2008 with the goal of enhancing the preparation process for the founding of IRENA. More than 50 countries supported this idea. During the preparatory conference in April 2008 the first activities for the agency were developed along with the first conceptions on the possible structure of IRENA. In June/July 2008 the statutes, the financing and the initial activities of IRENA were intensely discussed within two parallel workshops.

At the invitation of the Spanish government 51 states attended the **Final Preparatory Conference** on the 23<sup>rd</sup> and 24<sup>th</sup> of October, in Madrid, Spain and finalised discussions on IRENA's Statute. Furthermore, documents and procedures aiming at an effective and quick start of IRENA were discussed.

At the **Founding Conference** on 26<sup>th</sup> and 27<sup>th</sup> January, 2009, in Bonn, Germany, the statutes will be signed. Decisions on the processes of the initial phase will be made to ensure that IRENA can begin its operations on time. Countries that signed will agree on a procedure and substantial criteria for applications for the preliminary seat of the Secretariat and the agency's preliminary Director-General. This ensures that a transparent application and selection process will occur.



### IRENA's initial phase

The initial phase starts with the Founding Conference where IRENA's statutes will be signed and lasts until the statutes enter into force after being ratified by member countries according to their respective national constitutions. Considering the magnitude and urgency of the tasks ahead for IRENA, it is indispensable that the agency commences with its activities as quickly as possible. Effective working structures will be established to start operations. In June 2009, those countries that have signed the treaty will decide on the preliminary seat of the Secretariat and the agency's preliminary Director-General. The Director-General will then begin to build up the agency without delay, to ensure its visibility on the international level.

After the entry into force of IRENA's statutes the organs of IRENA will begin to operate officially. During the first meeting of the Assembly, the Council will be elected, a formal decision on the work programme, on the budget and on the seat of the agency will be taken and the Director-General formally appointed.

## 6. Join the initiative for IRENA

The truly global challenges related to energy issues – global warming, depleting natural resources, increasing energy demand, rising energy prices and unequal distribution of energy sources – urgently require action:

Countries worldwide must take a firm stand and cooperate in order to facilitate the necessary transformation of today's deficient energy system towards a world relying on a secure, affordable, clean and sustainable energy supply based on the two cornerstones of renewable energy and energy efficiency.

IRENA is a decisive step towards the extensive and sustainable use of renewable energy on a global scale. All interested UN member states are invited to join IRENA. A broad-based membership structure is strongly desired.

Though IRENA will be an international governmental organisation, industry, academia, NGOs and civil society will be actively involved as well. IRENA will seek an open exchange with all organisations and interested groups working towards the rapid promotion of renewable energy, developing shared ideas and supporting each other's work wherever possible. Countries are most welcome to join the organisation, while organisations and interested groups are encouraged to become cooperation partners.

IRENA's founding members will benefit from participating in shaping the agency from the initial stages according to their national conceptions and global needs.

We invite all interested parties to join us and to take action in shaping IRENA, for the benefit of all inhabitants of planet Earth and for the future of generations still to come.





**The challenges are immense.  
We must solve them together!  
Take action now –  
join the initiative for IRENA**

We kindly invite interested parties to visit our website, both for further information on IRENA and for sharing ideas with us (by using our contact form): [www.irena.org](http://www.irena.org)

**To contact us directly:**

**Monika Frieling**  
Federal Ministry for the Environment,  
Nature Conservation and Nuclear Safety

**Hein Winnubst**  
Federal Ministry for Economic Cooperation  
and Development

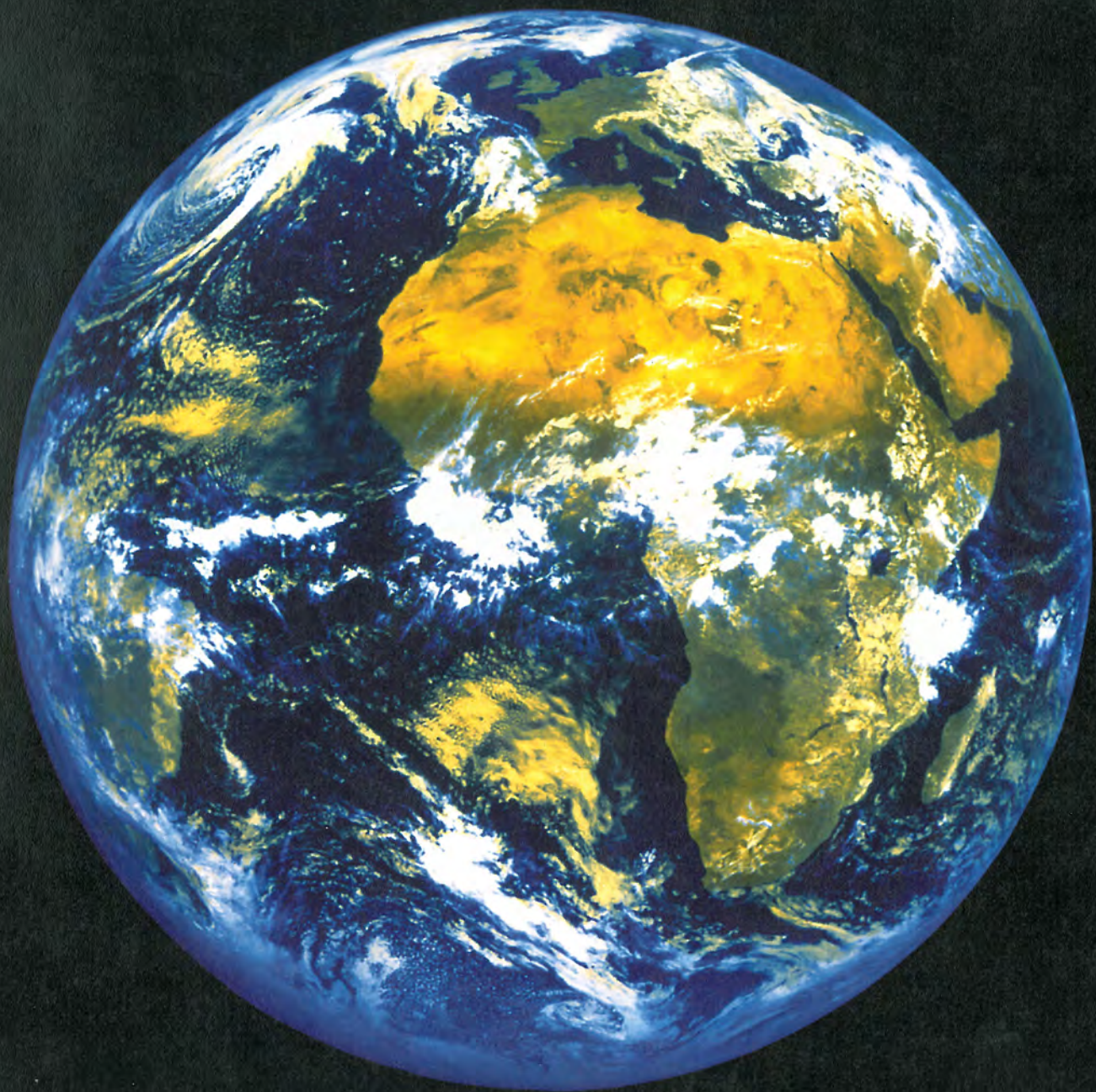
[info@irena.org](mailto:info@irena.org)

## Sources

- 1 Deutsche Stiftung Weltbevölkerung (2007): Weltbevölkerungsprojektionen für 2059, [http://www.weltbevoelkerung.de/pdf/WPP2007\\_Grafiken.pdf](http://www.weltbevoelkerung.de/pdf/WPP2007_Grafiken.pdf)
- 2 IEA (2007): The World Energy Outlook. Executive Summary 2007, Paris, p. 4; IEA (2006): World Energy Outlook 2006, Paris, pp. 46-47
- 3 IEA (2007): The World Energy Outlook. Executive Summary 2007, Paris, p. 4; IEA (2006): World Energy Outlook 2006, Paris, pp. 46-47
- 4 IEA (2006): The World Energy Outlook. Executive Summary 2006. Paris, pp. 4, 11
- 5 IEA (2007): The World Energy Outlook. Executive Summary 2007. Paris, pp. 4, 201
- 6 Nicholas Stern (2006): The Economics of Climate Change. The Stern Review, New York
- 7 BMU (2007): Renewable energy sources in figures – national and international development. Status: June 2007, Berlin, p. 5
- 8 BMU (2007): Renewable energy sources in figures – national and international development. Status: June 2007, Berlin, p. 36
- 9 BMU (2007): Erfahrungsbericht 2007 zum Erneuerbare-Energien-Gesetz, Berlin
- 10 Goodstein, E.S. (2008): Economics and the Environment, New Jersey. p. 361f.
- 11 UNEP and SEFI (2007): Global Trends in Sustainable Energy Investment 2007, p. 8
- 12 REN21 (2008): Renewables 2007 Global Status Report, Paris, p. 6
- 13 Steiner, A. et. al. (eds.) (2006): International Institutional Arrangements in Support of Renewable Energy. In: Renewable Energy – A global review of technologies, policies and markets, London; Ren21 (2004): Renewables 2004: Policy Recommendations for RE, Paris, p. 10
- 14 REN21 (2008): Renewables 2007 Global Status Report, Paris, p. 9
- 15 IEA (2007): Renewables Information (2007 edition), Paris, pp. 3-5

### Photographs

Paul Langrock | G. Bramsiepe | dpa/Picture-Alliance (Titel 1. Reihe); dpa/Picture-Alliance | H.-G. Oed | Rosseforp/Voller Ernst (Titel 2. Reihe); Rainer Jahns (2); Thomas Köhler/Photothek (5); REA/Laif (6); Brigitte Hiss/BMU (7); Agentur für Erneuerbare Energien (8); Harald Theissen/Voller Ernst (10); Siemens (11); Raupach/argus (13); Oberhäuser/BMU (14); Franz Waldhaeusl/Alimdi.net (15); Nordex (16); Xinhua/Das Fotoarchiv (17); IRENA.org (19); GTZ (20); Jan Oelker (21); Helga Lade Fotoagentur (23)





**Imprint**

**Publisher**

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety  
Public Relations Division - 11055 Berlin  
Email: [service@bmu.bund.de](mailto:service@bmu.bund.de) · Internet: [www.bmu.de](http://www.bmu.de) – [www.erneuerbare-energien.de](http://www.erneuerbare-energien.de)

**Editors**

Adelphi Consult  
Environmental Policy Research Centre (FFU), Freie Universität Berlin  
Division KI I 4, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety  
Division 313, Federal Ministry for Economic Cooperation and Development  
Division 410, Federal Foreign Office

**Design**

design\_idee, buero\_fuer\_gestaltung, Erfurt

**Date**

October 2008

**Print run**

Silber Druck oHG, Niestetal