EUROPEAN RENEWABLE ENERGY EXPORT STRATEGY

- Bioenergy
- Photovoltaic
- Small Hydropower
- Solar Thermal
- Wind Energy
European renewable energy technologies play a leading role on the world market. However, the export of European technologies to markets outside the European Union does not always reflect this leading technological position.

Renewable energy technology (RET) export in this report is understood as export of goods and services from the EU, including hardware on the one side but also transfer of know how and training on the other.

EU export activity has increased significantly over the last 10 years. Analysis of EU trade data indicates that extra-EU exports of a range of environmental products have risen by 10% per year between 1988 and 1997. According to a study on the EU Eco-industry’s export potential by DG Environment of the European Commission, the increase in EU environmental exports appears to have been driven by a combination of factors, including:

- EU suppliers seeking to increase exports in the face of increased competition in the home market.
- A possible slow down in some of the more mature EU national markets.
- A considerable expansion of international market opportunities, particularly in developing countries.

There is a lack of data on EU exports by size of companies. However it is likely that the majority of extra-EU export activity is undertaken by the larger suppliers. However, the RES sector is mainly dominated by SMEs.

Smaller firms are often more constrained by availability of resources, lack of export experience and certain drawbacks when bidding for larger overseas contracts, therefore the need to develop an export strategy to support the activities outside of Europe of the renewable energy industry.

“Increase in EU environmental exports were enabled by a combination of the European industry turning towards the outside and emerging opportunities on international markets”
In order to get an idea of the needs of the EU Renewable Energy Technology (RET) industry, a questionnaire was developed and sent out to the industry members of the different renewable energy associations. Based on the feedback received from the questionnaires and in-depth industry consultations with selected industrial actors, a list of areas where the industry could need some assistance to prepare the ground for future export activities was identified. Apart from the general assistance requested by the industry, specific export markets (both existing export markets with high future potential as well as future export markets) were identified. A background document to the RET export strategy containing information on the following elements is available from EREC (www.erec-renewables.org):

- Current status of RES technologies
- Directory for international finance
- Target countries for EU RET exports

The large potential for RET exports requires appropriate support

The EU industry is the technology leader in most RET fields. Over the past decade, the EU has provided significant research and development support to renewable energy, and has put in place important legislation for its promotion.

In 2000, renewable energy accounted for 86.5 Mtoe out of the total of 1.455 Mtoe of gross inland energy consumption. Of this, hydropower contributed 27.6 Mtoe, wind energy 1.9 Mtoe, geothermal 3.3 Mtoe, solar energy 0.4 Mtoe and biomass made the largest contribution with 53.3 Mtoe.

The majority of the resources the EU devotes to energy is directed toward applied R&D, technology demonstrations, and pilot projects rather than to basic research or long-term technology development programmes. The EU’s total expenditure on research and development has grown rapidly since the mid–1980s. For example, in the period between the EU’s First Framework Programme for research and technological development (1982 – 1986) and the Fourth Framework Programme (1994-1998), R&D investments under the Framework Programme grew in real terms by more than 120%, from €6.4 billion to €14.5 billion. Besides European funding, EU Member States also spend considerable amounts on developing renewable energy technologies.

European companies have pioneered much of the recent technical development for nearly all renewable energy technologies. With these extensive technological developments and increases in production capacities, significant cost reduction is being achieved, making several technologies even more attractive and, under certain circumstances, even competitive with conventional energy sources.

The production cost of a kilowatt-hour generated by wind power, for example, is one fifth of what it was 20 years ago. Over the past 5 years alone, costs have been reduced by 20%. The cost of delivering a kWh of electricity from a “state of the art” wind turbine in optimal wind conditions is 3.7 eurocents (source: Wind Force 12, EWEA 2002). Unlike most conventional energy sources, the cost of producing energy from renewable energy sources will decrease dramatically in the future, given the right conditions.

Favourable framework conditions created for RES with the help of various policy instruments strengthen the position of the EU renewable energy industry in their home markets, which can serve as a good basis for export activities.

“A strong position of RET in the home markets in Europe as a basis for successful exports”
Bioenergy — Diversified systems to convert biomass resources into heat, power and transportation fuels

The global resource potential for biomass is very large and evenly distributed in most of the continental areas. It is estimated that at present the biomass contribution to the total world energy needs is around 14 % (50 EJ/y out of a total energy demand of 406 EJ/y), essentially based on agro-forestry residues and exploitation of natural forests. In future, a large contribution may be made by dedicated crops (Short Rotation Forestry plantation, herbaceous crops, aquatic crops) grown on marginal lands.

As far as the utilisation of biomass in developing countries is concerned, at present it is mostly used in an very inefficient way for heating and cooking needs. There is a need to make modern and efficient technologies and bioenergy systems more widely available. Increasing their use will further help to improve the techno-economic efficiency in the utilisation of biomass resources.

European companies offer a wide range of efficient bioenergy technologies, which are fully able to compete on the world market.

The following bioenergy technologies are currently available, offering a high export potential:

- Heat-market technologies (mainly residues from forestry operation and from wood processing such as log-wood, wood chips, pellets, etc.). In the very near future, all types of agriculture residues will be able to be pelletised.
- District heating technologies
- Co-generation of heat and power based on solid, gaseous and liquid biomass
- Trigeneration (heating, cooling, power)
- Bioethanol technologies (alcohol mainly produced by fermentation from sugar-starch crops such as sugar cane, sugar beet, corn, millet, etc. for use in the transport sector)
- Biodiesel technologies (use in the transport sector)
- Charcoal production

The threat of global climate change is growing; hence reducing greenhouse gas emissions has become imperative. The United Nations and European Union have adopted concrete positions on this emerging urgent issue. The European Commission has set a target to double the contribution made by renewable energy sources by 2010 in the 15 Member States. This strong position in the home market can serve as an excellent platform to further develop export markets.

Joint-ventures are considered the most relevant export initiative, and for this reason it is strategically important to have good contacts with local market actors. The critical factors that will have an impact upon export activities include: stable political and monetary conditions in the export country, and the existence of national/international support programmes. At an EU level, open and fair access to all markets, as well as a harmonised taxation system over the whole market area, are considered essential to help facilitate exports, as well as EU specific support programmes on export initiatives. CDM and JI financial mechanisms will soon provide a large trade possibility to increase the sales of European renewable energy technologies.

In its 1997 White Paper “Energy for the future: renewable sources of energy” the Commission states that European industry in the field of renewable energy sources will see significant business opportunities for export and possibilities for expansion. A € 17 billion annual export business is projected for 2010, creating potentially as many as 350,000 additional jobs.

Following is an overview of the different renewable energy technologies, describing both their state-of-the-art and their export potential, parts of which were developed in collaboration with IT Power:

Bioenergy contribution in the European Union

EU TOTAL ENERGY NEEDS:
Year 2000: 1.380 MTOE/y Year 2030: 2.138 MTOE/y
Source: EUBIA
Biohydrogen, Bio-syngas, Bio-methanol (via CO₂-H₂ synthesis)

The advantage of bioenergy is that it is a renewable fuel that is often abundantly available and does not have to be imported. A high market demand for biomass conversion and utilisation technologies can be expected in the short-term in both industrialised and developing countries, with very likely opportunities for export of technologies, know-how and services, particularly for small-medium capacity plants. An important issue is that on a small-scale, several of these technologies are not yet commercially available (performance, life-time guarantee, etc.). A wide choice of full scale larger-capacity systems and configurations is however already commercially available, with technologies for the pre-treatment, conversion, upgrading and utilisation of different biomass resources.

The factors affecting the choice of target markets for the EU-bioenergy technology sector are related, first of all, to the level of exploitation of available biomass resources and to the dimension of the agricultural-forestal sector in a selected country. Also, factors such as water availability, road networks for the logistics of supply, storage facilities, grid availability and the level of economic development play an important role. According to these criteria, China, India, Brazil and some Eastern European countries (e.g.: Poland) have been identified as target countries for short-term export in the bioenergy sector, while it is expected that in the medium-term export activities in Asian Countries (e.g.: Indonesia), Central and South America and the Caribbean could also grow significantly.

The European bioenergy technology sector is presently characterised by a very restricted number of multinational companies, which operate primarily in the field of large-scale power generation, and a number of smaller companies providing technologies/services in other sectors (e.g.: small-scale co-generation, heat production, biogas plants). The establishment of international trade in biomass (i.e. of biomass resources and commodities such as biofuels) is expected to provide a strong push to enlarge export opportunities and create a stable world market.

**PV — Building on a decade of industrial and political commitment**

The solar electricity market is a promising one, with good prospects for substantial growth. In the year 2002 the cumulative installed capacity of all solar photovoltaic (PV) systems around the world passed the landmark figure of 1,200 Megawatt peak (MWp). At the same time global shipments of PV cells and modules have been growing at an average annual rate of 33% since 1996. Annual sales have already reached € 1 billion in the solar electricity industry. In parallel, the world wide photovoltaic industry, particularly in Europe and Japan, is investing in new production facilities and technologies. The political commitment for the development of solar electricity is becoming better defined especially in certain countries such as Germany and Japan.

All these elements testify that the expansion of PV industry is just the start of a massive transformation and expansion which is expected to accelerate over the coming decades.

The target is the realisation of a common goal of sustainability increasing the penetration of solar electricity into the global energy mix while cutting greenhouse gas emissions.

As far as the market growth rate is concerned, the average annual growth rate worldwide up to 2009 is projected to be 27%, then rising to 34% between 2010 and 2020, with significant openings in developing countries. A similar development can be expected for Europe.

A recent study undertaken by EPIA in collaboration with Greenpeace concerning the solar electricity market predicts that by the year 2020 the global production of electricity from solar technologies could be sufficient to meet 10% of Europe’s demand at that time. The report predicts that there will be 35 million grid-connected customers in Europe and 82 million worldwide generating their own electricity using solar technologies. The technology also offers the potential to supply 1 billion off-grid customers with access to a clean and efficient electricity supply. According to the EPIA scenario, the global solar electricity industry will be characterised by an annual investment of € 75 billion. By 2020, the cost of modules will have dropped to 1 US $ per Wp, 2,3 million people being employed in the solar electricity sector, many in developing countries. However, concrete actions by industry and governments will be needed if these targets are to be achieved.

Concrete action by the industry and governments must be taken in order to achieve the goals and market opportunities that have been outlined above.
Small Hydropower — A promising technology with significant export potential

The EU small hydro industry has been in recession for the last 15-20 years due to a contraction in the home market for hydropower equipment. This process was accelerated by deregulation in the electricity market, which forced down buy-back rates.

With the passing of the Renewable Energy Directive and the growth in national incentives for green energy production the home market for small hydro may now begin to recover. In particular there is expected to be a growing market for refurbishment of the EU’s 13.000 existing plants.

EU SHP turbine manufacturers have a long tradition and offer high quality products. Additionally to the strong competences of the EU industry, there is a long tradition of turbine design and manufacture in Central & Eastern Europe, in particular in the Czech Republic, Hungary and Slovenia.

European companies have pioneered much of the technical development and have a reputation for supplying equipment of the highest quality; the larger EU companies have tended to dominate international contracts for SHP equipment and installations, but many now have limited export activities. However, there is an urgent need to build up the export market if the EU small hydro industry is to return to strength and capitalise on the much larger markets outside the EU.

North America and Europe have developed the majority of their economic potential, whilst huge resources remain in Asia, Africa and South America.

Solar Thermal — Improved competitiveness opens significant opportunities in new markets

Solar thermal energy has been used for a number of decades for a variety of applications. By far the most widely used as well as the most mature application is the use of solar thermal energy for water heating. Other applications include space heating, solar drying, industrial process heat, solar air conditioning, solar desalination and solar thermal electricity generation.

The European solar thermal market varies significantly between different countries, with Germany, Greece and Austria leading the field both in terms of cumulative total collector area and with respect to annual installation figures. In 2001, 900.000 m² of collector area were installed in Germany, 169.000 m² in Austria and 160.000 m² in Greece. Together, these represent over 80% of the EU total of 1.470.000 m². The annual growth rate in Germany was approximately 45% for the last two years. Worldwide, China dominates the market, with an estimated 5.500.000 m² of collector area installed during 2001, which represents nearly two thirds of the world total of 8.600.000 m². Other countries with large installation rates are Israel, Japan and Turkey.

South-East Asia offers by far the best potential market for small hydro developments in the near-term. The most serious threat in the Asian markets is now coming from China, which can offer equipment of reasonable quality but at exceptionally low prices. In large hydro, there have been some successful EU-China joint ventures, but this has not yet been repeated for small hydro.
Within the European Union, some 16,000 full-time jobs are provided by the solar thermal industry. More than 90% of these are in Germany, Greece and Austria. Imports of systems into Europe are small and represent less than 5% of sales. Similarly, exports from EU countries are limited.

Investment into automated production facilities has improved competitiveness of the European industry and put it into a good position to expand export activities.

The European Commission’s renewable energy ‘Campaign for take-off’ states the aim of 100 million m² of collector area to be installed in the EU by 2010, which represents a very large potential market for the industry. Today, solar thermal energy still depends on government support in many countries. The challenge for the industry is to reach a degree of autonomy, which will in time be able to rely purely on commercial activities without any government assistance.

In the short-term, the market for solar water heating and space heating will increase, and new applications like solar cooling will be developed further. The larger European markets in Germany, Austria and Greece could be further developed, and the small and medium sized markets in other EU countries could be built up. Outside the EU, new markets are seen in Central Europe (e.g.: Poland, Hungary), North and South America (e.g.: US, Canada, Brazil), Asia (e.g.: China, India, Thailand) and Africa (e.g.: Morocco, Tunisia, South Africa).

Medium-term market prospects are seen in the development of solar air conditioning and cooling, solar desalination and high-temperature applications. Once solutions have been developed for some remaining technical issues, there are huge untapped potential markets for these applications. Geographically, the largest part of these future markets will be in countries with higher solar radiation levels, for example solar desalination for arid areas in the Middle East.

In the long-term, the use of solar thermal power plants for electricity generation could become economically viable and will present new prospects for expansion of the solar thermal market. This will depend to a large extent on external factors such as the price of carbon fuels, energy taxes and incentives.

**Wind – A mature and increasingly cheap solution for exports**

Land based grid connected wind turbines are now the cheapest of the new renewable energy sources for large-scale power generation. On-shore wind power is now a “mature” technology, with tremendous international export potential. State of the art turbines in good wind regimes can be more competitive than many conventional power sources.

Offshore wind power is breaking new ground in terms of scale, technological, logistical and legal aspects. Rapid expansion in offshore wind power generation is expected in the coming years.

Europe continues to lead the way in the world wind energy league. During 2001, around 4.500 MW of wind power capacity was added to the European electricity grids, bringing the total capacity in Europe to more than 17.000 MW, an increase of more than 35%.

### Annual wind energy installed capacity

![Annual wind energy installed capacity chart](image)

**Source:** EWEA
Target countries for future export initiatives

Based on the feedback received from the industry, a list of target countries for export activities was identified. When selecting these countries, the following criteria were applied:

**SELECTION CRITERIA**

**A. Funding**
- Availability of project finance (World Bank, ADB Bank, Aid Agencies, etc.)
- Local financial incentives towards the specific technology (e.g.: no import duties)
- Availability of export credit guarantees
- Reasonable average income per capita

**B. Government**
- Politically and economically stable
- Government committed to develop the specific technology
- Economically strong enough to support the development of the technology (e.g.: the ability to pay energy tariffs above a minimum level)
- Supportive legal and regulatory framework in place
- Open to foreign investment and imports
- Reliable licensing and patent protection laws

**C. Market size**
- Plentiful resource of a specific technology
- Strong demand for the power
- Limited local resources and skills to provide renewable energy equipment/services
- Limited international competition within the country

Reasons for choosing these countries mainly lie in the fact that they offer considerable RES potential but also favourable market conditions in terms of political commitment to RES development and stable economic conditions.

In addition to these criteria, target countries should have access to labour and suppliers as well as limited in-country competition. Selection criteria for target countries depend to some extent on the nature of the business activities.

In general, these criteria have been grouped in order of importance. Most exporters will want to know first whether there is a good chance that they can be paid, secondly whether they are allowed to export with the minimum of non-technical barriers, thirdly whether there is likely to be a long-term demand for their equipment or services.

**Classification of target countries**

In developing a list of target countries showing favourable conditions for one or several RES technologies, the following regions were considered:

- Latin America
- Africa
- Central and Eastern European Countries
- Asia (excluding India and China)
- India
- China
- Russia
- Caribbean & Pacific

In the scope of this project, it was not possible to undertake fundamental research on the potential of all the countries in the above regions. Opinions were gathered from the questionnaires received, and from previous reviews on promising markets for renewable energy technologies. The suggestions made below do not mean that other countries are not also important.

It is necessary to note that the market for renewable energy can change very quickly if national governments introduce incentives. Changes in electricity trading arrangements can also have great effect on markets.

A differentiation was made between existing export markets with high future potential and future export markets where up to now little export activity has taken place. This differentiation was made because it was considered that the measures to promote exports in these markets are different. The main difference when looking at the two different categories of export countries lies in the fact that the countries figuring in the first category already have favourable RES policies in place, whereas in the countries stated under section two, these framework conditions still have to be created to a large extent.
Current export markets for RET with proactive RES policies in place

The following existing markets show a promising export potential:

**Brazil**
- 54 million of Brazil’s total population of 171.8 million inhabitants live in rural areas, in approximately 9.8 million homes, of which approximately 48% have no access to electricity.
- Brazil is a market with very high potential for all renewables, with the main opportunities arising in the electrification of isolated areas.
- Brazil’s energy plan aims to reduce dependency on fuel imports and offers interesting support for RES, e.g.: Brazilian government no longer charges VAT on solar water heating equipment, resulting in an 18% saving on imported systems.

**China**
- China is the world’s most populous country and the world’s second largest energy consumer. China’s real GDP grew by 8.0% in 2000, up from 7.1% growth in 1999.
- 30 million people still do not have access to electricity.
- The price of conventional energy sources is rising steadily, giving a good opportunity for renewable energy technologies.
- There has been continuous rise in household income.
- Joint ventures and the export of technology, rather than hardware sales are the most appropriate way forward due to high taxation of imported goods.
- In 1995, the State Council approved the New and Renewable Energy Development Programme (1996-2010) that outlines the Chinese government’s commitment to promoting the development of clean energy sources.

**India**
- India is the world’s second most populous nation: With 70% of the population living in rural areas. Meeting energy requirements in a sustainable manner continues to be one of the country’s main challenges. Of the 87 million rural households, not more than 30% have access to electricity.
- India has a large potential for utilising renewable energy. According to the Ministry of Non-Conventional Energy Sources, there exists a potential resource in the order of 80.000 MW.
- India is the only country in the world with a ministry solely devoted to the promotion and support of renewable energy. The national energy policy aims to achieve a 10% share of electricity from renewables by 2012.
- In May 2001, IREDA (Indian Renewable Energy Development Agency) launched a “Non-Conventional Energy Technology Commercialisation Fund.” The scheme is to be implemented by the Ministry primarily through IREDA.
- There are numerous policy measures to promote RES such as 100% accelerated depreciation for tax purposes in the first year of the installation of projects/systems; no excise duty on manufacture of most of the finished products; low import tariffs for capital equipment and most of the materials and components; soft loans to manufacturers and users for commercial and near commercial technologies; five year tax holiday for power generation projects; remunerative price under the alternate power purchase policy by State Government for the power generated through renewable energy systems, fed to the grid by the private sector.

**Japan**
- Japan is the 3rd largest producer of electricity in the world. Conventional sectors represent approx. 89% of electrical production, 58% of which is from fossil fuel and 31% from nuclear. Japan’s dependence on imports for primary energy stands at approximately 80%. The country is attempting to consolidate its security of fuel supply.
- Various supportive policies to encourage growth in the renewables market have been introduced by the government, including significant solar research and development programmes and grant schemes providing up to 50% for domestic PV roofs (70.000 roofs programme).

**Poland**
- The Energy Law Act imposes an obligation on suppliers to purchase renewable energy to meet a pre-defined share of the total energy sales. The share will gradually increase to 7.5% by 2010.
- High potential for biomass.
- Poland has the highest potential for export in Eastern Europe, with its comparatively wealthy population of about 40 million.

**South Africa**
- South Africa’s huge land area (1,2 million km²) holds a population of 43,6 million.
- Eskom, one of the largest utilities in the world, generates nearly all (approximately 95%) of South Africa’s electricity. Eskom also owns and operates the national transmission system.
- In South Africa, close to 10% of total energy supply is based on biomass, mainly harvested from natural woodland as fuel wood, but also from commercial forestry and sugar industry waste. The Government has started to promote different initiatives for effective utilisation of biomass.
- The South African solar energy market has become very competitive with the presence of an increasing number of foreign companies.
United States

- The US is the single largest producer of electricity in the world, producing over a quarter of the World’s total.
- Although production from RES is increasing, the proportion produced from RES of total electricity production has been falling since 1996 (461 TWh).
- In March 2002, the Bush administration declared that the United States had “no interest” in implementing or ratifying the Kyoto treaty, saying it would be too harmful to the U.S. economy. However, this is not necessarily a sign that the Bush administration will dampen RES based electricity generation in the US, as is demonstrated by the extension of the production tax credit for electricity generated by wind power until the end of 2003.

Promising future RET export markets

Beside these countries, some markets were identified which offer a promising RES potential and a high potential interest for future export activities of European companies, although not many export activities are yet being carried out:

Cuba

- Cuba comprises the Cuban archipelago, a formation of about 1,600 islands and islets with a combined area of 110,861 square kilometres.
- Cuba’s energy system is in transition, moving away from fossil fuels, towards a more sustainable energy system based on biomass and other renewable options.
- The country has a large RES potential, especially in the field of biomass and solar.

Morocco/Tunisia

- In Morocco and Tunisia, fossil fuels are predominant (94.9% in Morocco, 99.4% in Tunisia), while hydro accounts for 5% in Morocco and 0.6% in Tunisia. The reason for the much higher percentage of hydro in Morocco being the mountainous topography of the latter, where water is abundant.
- Specific RES potential in the field of wind.
- Morocco’s National Office of Electricity (ONE) has undertaken a very large scale rural electrification programme to provide electricity to 80% of the people living in rural areas.

Russia

- Russia holds the world’s largest natural gas reserves, the second largest coal reserves, and the eighth largest oil reserves. Russia is also the world’s second largest energy consumer.
- Russia is by far the largest producer of electricity in the CIS region (877 TWh in 2000).
- The Russian federation is vast and has a significant bio-energy potential, which is not yet extensively exploited.
- Severe power outages in Russia’s Far East during the winter of 2000-2001 have made power sector restructuring a high priority. This could pave the way for privatisation and greater opportunity for RES export, e.g.: in the field of wind power expertise.
- There are promising opportunities for co-operation in the framework of the EU-Russia energy dialogue.

South-East Asia (Indonesia, Philippines, Thailand & Malaysia)

- As is the case with most Asian countries, Indonesia, the Philippines and Thailand suffered from serious economic slowdowns with the Asian crisis of 1997. However, there are real signs of recovery: a growth rate of 4.5% for 2002 is expected for Indonesia and Thailand and 4.2% for the Philippines.
- It seems that in the next 10-20 years, fossil fuels will continue to dominate in the Asian region and short term policy imperatives will revolve around ways to make the use of them more efficient. Finding environmentally sustainable, secure and politically sound alternatives to coal and oil (mostly used energy) can only be achieved in the medium to long term through the use of renewable energy, natural gas and a huge investment in infrastructure.
- Large-scale government programmes to promote RES are planned.

Tanzania

- Tanzania’s per capita electricity consumption is growing at a rate of 11-13 % per annum, and the Government claims to be keen to develop indigenous sources of energy, including solar thermal and wind.
- Petroleum, hydropower and coal are the major source of commercial energy in the country, while biomass, comprising fuel-wood and charcoal from both natural forest and plantations, accounts for 93% of total energy consumption.
- The Government generally supports the development of renewable energy to cope with the important needs for clean energy (rural population still mainly dependent on wood for fuel) and in order to prevent further deforestation in rural areas.
- Drawbacks for the development of renewable energy could be the poor payment record, lack of awareness and confidence in RE technologies, high investment requirements as compared to low purchasing power of the target groups and weak institutional framework and infrastructure for effective promotion and support and lack of financing mechanisms to provide credit to potential users.
Support for EU RET industry for the further promotion of export

As outlined in the previous chapters, EU renewable energy technology suppliers are the technology leaders in many areas. There is a need for a renewable energy export strategy, that can best be implemented by a “European Renewable Energy Export Council”.

There is a clear need to further provide energy services to the world’s population. At the moment, more than 2 billion people do not have access to electricity with the resulting negative consequences on living standards and economic conditions, especially in peripheral urban and isolated rural areas. Renewable energy technologies are mostly adapted to considerably improve the living conditions in these countries.

The promotion of European renewable energy technologies therefore has a two-fold benefit for the EU industry on the one side and for the developing countries on the other side. RET development clearly is a win-win strategy for all parties involved.

Experience in the past has shown that RET exports were most of the times carried out in the form of joint ventures rather than shipment of components or installations to export countries. This form of collaboration has the advantage that it creates jobs and thereby local income in the target markets. Promotion of European RES technology exports therefore shall not be seen as a form of “industrial imperialism” but as a way to increase social welfare and economic opportunities.

Through the questionnaires and in-depth consultation with selected RES industrialists, the following were identified as being areas where there is a need of assistance to further promote their export activities.

Policy support for RES in the target export countries – Create a level-playing field for RES in those countries

One of the most crucial issues for RES development is that they find favourable market conditions in terms of guaranteed access to electricity grids, stable pricing systems etc. Therefore it is most crucial for the industry to be sure that a level playing field for renewables is created in the target export markets.

Within the European Union, on both a national and an EU level, quite substantial know-how has been built up in the last decades to successfully promote renewable energy sources with various policy measures & instruments. This know-how is available and can be transferred to target export countries in order to prepare the market for renewables.

Issues such as deregulation of energy markets, support mechanisms for renewable energy (feed-in tariffs, quota system, capital grants, green certificates, etc.), internalisation of external costs and the role renewable energy sources can play related to Climate Change all need to be taken into consideration. This work needs to be performed by an independent organisation and not by the industry itself.

Information on international finance – Support programmes should better focus on RES

Renewable energy sources can make a considerable contribution to improve living conditions, especially in developing countries. However, RES projects often need assistance from international financing institutions to assist companies to bear the financial risk resulting from political and financial conditions in the target countries.

A wide range of support programmes is available on various levels (international, EU, national), which could be relevant for export activities. However, these programmes often have a very broad scope and no direct focus on renewable energy sources, which makes it very difficult for companies to investigate the different options and to check the eligibility criteria of the specific programmes and funding institutions.

Furthermore, some of these programmes are not fully adapted to supporting RES projects, which are often smaller projects of a decentralised nature. Compared to more conventional energy projects, renewable energy projects are relatively small scale. Investments are rarely larger than € 50 million and many are less than € 3 million. Nevertheless, small projects have to overcome many of the same hurdles as larger projects, e.g. : power sales and fuel supply contract negotiations, financial due diligence, permits etc.

The cost of negotiating and financing a project is not necessarily related to the size or value of the project. These costs are proportionally far larger for smaller projects. Primarily for this reason, but also because of inertia and familiarity, financiers normally prefer larger scale investments.

Therefore, it is necessary to further develop new forms of financing for renewable energy projects such as micro-credits or bundling of projects. At the moment, there are only a limited number of investors who have adapted to meet these needs.

It would be an incredible administrative effort for an individual company to investigate all of the financing possibilities under the different available programmes and institutions. The industry has a clear need for a one-stop-shop where they receive information on existing programmes as
well as guidance on the preparation of the necessary funding documents.

For this, a managing agent would be needed to liaise between industry and financing institutions and help to prepare successful projects.

**Information activities targeted at export credit agencies to support RES projects**

Export credit agencies (ECAs) are the largest group of international finance institutions in the world. ECAs are governmental agencies that help private corporations from their home country to engage in business activities abroad by underwriting projects – effectively insuring them.

Between 1990 and 1997, total financing by ECAs in OECD countries through loans, project guarantees, and investment insurance has averaged €80 billion - €100 billion per year. This was about twice the level of official development assistance during the same period, and if the leveraging effect of ECAs is considered, the reach is even greater.

The recent years have already seen substantial financing by ECAs of fossil fuel power projects mainly in developing countries. In November 2001, governments agreed at the COP 7 meeting in Marrakech that ECAs should play a key part in ensuring the transfer of climate-friendly energy technologies from developed to developing countries.

The reason why ECAs do not finance RES projects to a larger extent lies in the fact that these financing bodies are often difficult to access for SMEs where the renewable energy industry is largely concentrated in. Furthermore, the peculiarities of renewables project financing such as higher up-front costs, or their longer-term payback time are not taken into account. Renewable energy projects tend also to be smaller and, as such, have smaller financing requirements. This means that they can be affected by the minimum cash down-payment requirements of ECAs. Additionally, they often suffer from the fact that they often incur higher transaction costs and greater risks.

**Increased effort is needed to inform ECAs about the advantages and functioning of renewable energy projects on the one hand and on the other hand assistance would be needed for RET industry to prepare suitable projects, e.g.: by bundling several initiatives together.**

The US ECA, for example, has established a 5% RES target and has set up a renewables taskforce to encourage the transfer of renewable energy technologies. A European body informing Export Credit Agencies about the characteristics of renewable energy projects would be a powerful instrument.

**Market research — Continuous monitoring on market conditions**

A large number of European companies active in the field of renewable energy sources are small and medium sized companies. These companies often do not have the personnel and financial resources to carry out targeted market research on potential export markets themselves.

However, for export initiatives to be successful, different market parameters (e.g.: RES potential, availability of specific support programmes, key actors (potential partners, clients, competitors, etc.), conditions for capital investments, political and economic conditions, cultural particularies, etc.) need to be well known before it is possible to take the strategic decision to invest in these markets. In order to get started, it would therefore be very helpful for these companies to receive assistance in obtaining information about potential future markets. As the renewable energy sector is a very dynamic one, conditions and market circumstances need to be monitored on a continuous basis, as they can change very quickly.

Experience has shown that RET companies would like to see an agent perform these services for them. Currently they are only making limited use of available external market research services (e.g.: from Chambers of Commerce) as these are often too general in nature. They consider that the offered services are not specific enough for their products. However, there is a strong need for renewable energy specific services in monitoring on market conditions for EU RET companies.

**Organisation of joint trade missions & identification of partners**

Once a company has carried out sufficient research on a market and has identified a promising market for export, the establishment of direct contacts with potential clients and partners is necessary. But of course this is a very costly and labour-intensive job for companies if they have to start from scratch. Without contacts in the market, the identification of key players and the development of individual contacts are nearly impossible.

In that respect, profile-raising actions are needed to provide platforms for the industry to develop these contacts. This could be done in the form of the following:

- **Organisation of trade missions and study tours that introduce companies to clients**
- **Participation in trade fairs and exhibitions to promote European companies and their products to establish and maintain the EU renewable energy profile in the market**

In conclusion, as policy support, information on international finance and export credits agencies, market research and organisation of joint trade missions and opportunities to identify partners are ALL necessary elements for the EU RES industry before exporting to target export countries, there should be an agent co-ordinating all actions. A European Renewable Energy Export Council will best fulfill this formulation and the implementation of an export strategy.
In order to harmonise the existing efforts at the EU level, the needed renewable energy export strategy will aim at:

- Increasing the export of EU renewable energy equipment and services
- Strengthening the position of the EU industry in the global market
- Assisting EU industry in exploring new export markets
- Increasing the share of RES on a global level, thereby contributing to sustainable development, improvement of living conditions in developing countries and environmental protection
- Securing energy supply

The need of a body such as the European Renewable Energy Export Council was already expressed in 1998 in a report done by the European Parliament (prepared by rapporteur MEP Dietrich Eichelpp) on “New prospects of the European Union in exporting technology and services for the use of renewable energy”.

Currently, there are many initiatives being taken by different parties to promote the export of EU RET technologies, but unfortunately little co-ordination is established between the various players. Especially in view of the competition and the export initiatives already being undertaken by the US and Japan in this area, there is a need for co-ordinated export support at the European level. Co-ordination between various national initiatives is needed to create synergies and to be able to face competition from outside Europe.

Organisations such as the US Export Council for Renewables or the Australian Renewable Energy Export Network provide support and assistance to companies in exporting their technologies including:

- International information requests, e.g.: on appropriate applications and funding sources, contacts (acting as a broker, facilitating links between customers and suppliers), organisation of meetings, workshops and conferences worldwide, case studies of successful projects, production of information material
- Procurement Announcements - a weekly summary of host country and international organisation procurement notices and project opportunities overseas
- Country profiles and trade missions
- Technical Assistance Training, including training programmes organised through member associations
- Policy support
- Project facilitation, financing, and follow-up
- Regional specific programmes and initiatives

There is an absence of a comparable structure for co-ordinating export support at EU level. However, in order to guarantee optimum success on the worldwide market and to strengthen the EU industry, a common approach at EU level is needed, being ideally implemented by one single agent such as a European Renewable Energy Export Council.
A European export agent with the objective to actively promote European RES technologies (thereby not only contributing to strengthening the EU RET industry and to creating jobs within Europe, but also to contribute to environmental, social and economic development outside the EU) could carry out the following activities:

■ POLICY DEVELOPMENT SUPPORT
Creating a level playing field for renewables by transferring experience gained within the EU

■ DISSEMINATION OF INFORMATION ON EU RENEWABLE ENERGY TECHNOLOGIES
- Production of an export catalogue of EU technologies and services
- Website with links to suppliers of technologies and services
- Newsletter
- International workshops and conferences
- Case studies of successful projects developed by EU companies
- Methodology for technology and know-how transfer

■ COLLECTING OF INFORMATION ON EXPORT MARKETS AND FACILITATING CONTACTS
- Development of country profiles
- Organisation of trade missions
- Market Monitoring
- Education and training programmes

■ IDENTIFYING MARKET OPPORTUNITIES OUTSIDE THE EU
- Development of contacts to key market actors in target export countries
- Procurement Announcements (summaries of host country and international organisation procurement notices and project opportunities overseas)

■ CONTACTS WITH INTERNATIONAL FINANCING INSTITUTIONS AND EXPORT CREDIT AGENCIES REGARDING RET PROJECTS

■ IDENTIFICATION OF APPROPRIATE FUNDING SOURCES AND ASSISTANCE IN THE PREPARATION OF FUNDING APPLICATIONS
- Project facilitation
- Development of application documents

■ TECHNICAL ASSISTANCE AND TRAINING

■ MONITORING AND IMPACT ASSESSMENT
- Development and reporting of EU renewable energy export statistics
- Impact assessment for selected EU renewable energy export initiatives
CONCLUSIONS

The EU industry is the technology leader in most RES fields. The sector is mostly composed of SMEs who are interested to position their products and services on the international markets. However, they often do not have the resources to get started on this task without external support.

Currently, there are many initiatives being taken by different parties to promote the export of EU RET technologies, but unfortunately little co-ordination is established between the various players. Especially in view of the competition and the export initiatives already being undertaken by the US and Japan in this area, there is a need for co-ordinated export support at the European level. Co-ordination between various national initiatives is needed to create synergies and to be able to face competition from outside Europe.

There is an absence of a comparable structure for coordinating export support at EU level. However, in order to guarantee optimum success and to strengthen the EU industry, a common approach at EU level is needed, being ideally implemented by one single agent such as a European Renewable Energy Export Council.

Already in 1996, the leading EU industry associations with the support of the European Commission founded EREEC, the European Renewable Energy Export Council. However, this organisation did not get appropriate finance to play the role of implementing a comprehensive RES export promotion strategy. Despite this lack of finance, the associations continued their joint efforts and renamed EREEC into EREC, keeping the clear intention to promote RET exports and to work for dedicated funding for this.

One first result of this work was that the European Commission, within its ALTENER programme, funded this study to define an export strategy, which once again clearly expresses the need for an implementing agent with a dedicated budget. This is completely in-line with the 1998 Elschlepp report which “calls for an active and effective “European Export Council for Renewable Energies”, on the lines of the US Export Council on Renewable Energies, to be given funding commensurate with the future role of renewable energies”. It also fully supports the call for “action to ensure that there is separate budgetary provision for renewable energies in the European Union’s energy support programmes, in Structural and ACP aid and in the PHARE, TACIS and MEDA support programmes”.

A European Renewable Energy Export Council would be a powerful tool to actively promote European RES technologies, thereby not only contributing to strengthening the EU RET industry and to creating jobs within Europe, but also to contribute to environmental, social and economic development outside the EU.

The promotion of European renewable energy technologies has a two-fold benefit for the EU industry on the one side and for the target export countries on the other side where RES can significantly improve living conditions and social welfare and is therefore a win-win strategy for all parties involved.
“Coordinated action to support exports at EU level will ensure the leading position of the European renewable energy industry on the world market.”