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DRAFT REPORT

on the share of renewable energy in the EU and proposals for concrete actions
(2004/2153(INI))

Committee on Industry, Research and Energy

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MOTION FOR A EUROPEAN PARLIAMENT RESOLUTION

on the share of renewable energy in the EU and proposals for concrete actions (2004/2153(INI))

The European Parliament,

- having regard to the communication from the Commission on the share of renewable energy in the EU (COM(2004)0366)
- having regard to Directive 2001/77/EC of the European Parliament and the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market¹
- having regard to Rule 45 of its Rules of Procedure,
- having regard to the report of the Committee on Industry, Research and Energy and the opinions of the Committee on the Environment, Public Health and Food Safety and the Committee on Agriculture and Rural Development (A6-0000/2005),

21 renewable energies for the XXI century

1. Recognises the potential from a wide diversity of more than 21 different renewable energy technologies which cover not only all geographical areas but also all relevant energy uses;
2. Recognises that renewable energies are the fastest growing sector of EU energy industry in Europe and even worldwide with a growth rate above 20% a year in wind and solar PV and that the development of renewable energy technologies has created more than 300 000 jobs;
3. Recognises that impressive price reductions have been achieved in the different renewable energy technologies;
4. Welcomes that the EU is a world leader in most renewable energy technologies as a result of the effort in some Member States and calls on new EU wide initiatives and directives;

30% for 2020: pave the way for EU as a world market leader for renewable energies

5. Stresses the importance of setting mandatory 2020 targets to give a clear signal to market actors, like large scale energy companies and the financial community, as well as to national policy makers, that renewable energies are the EU energy future and part of its environment and industrial strategy;
6. Welcomes the resolution of the Parliament from April 2004 where an overwhelming majority of the House called for a 20% target renewable energy target of overall energy EU consumption in 2020;
7. Notes that with a more systemic approach to energy policies integrating and speeding up

¹ OJ L 283, 27.10.2001, p. 33

the large scale potentials of energy conservation, energy efficiency and renewables, a share as high as 30% of the overall energy consumption of the EU could be fostered by renewable energies in 2020;

8. That in order to have the necessary signals for such highly differentiated energy markets like electricity, transport fuels and the heating and cooling sector the EU target must to be broken down to both sector and national targets;

Heating and cooling: a major market for low temperature renewable energies

9. Welcomes the progress made in the energy design of new buildings where the integration of solar architecture, insulation and renewable energies are leading to low energy, passive energy and even plus energy houses - which produce more energy over a year than they consume;
10. Highlights the enormous productivity gains which could result from an enhanced integration of energy conservation and renewable energies into prefabricated building materials like roofs and facades;
11. Highlights the market potential of renewable energies like biomass and geothermal energy for the growing central district heating and district-cooling sector by producing green electricity and using the low temperature "waste" energy to heat or cool buildings;
12. Asks the EU Commission to broaden the existing building directive to all commercial buildings of more than 250 m²; and to come forward with a Directive for renewable energies in heating and cooling;
13. Asks Commission to work together with Member States to introduce by at the latest 2012, minimum building standards for all private homes based on passive energy (below 10 kW/m²) standards;
14. Asks EU Commission and the ECOFIN to take rapid and effective measures to eliminate environmental harmful subsidies in the area of heating and cooling;

Electricity: get fair market conditions for renewable electricity production

15. Recalls the target of 21% of renewable energies in the overall electricity mix of the EU as provided by the RES-E directive;
16. Remembers that this target is a percentage of the overall electricity consumption and asks all EU Institutions not to forget the enormous potential to reduce electricity consumption by active policies on electric appliances and office equipment;
17. Notes that the EU Commission welcomes that certain member states notably Germany and Spain have introduced an adequate policy framework to fulfill their national targets and that other Governments are not forecast to meet the national targets that they committed to and urges the EU Commission to use the possibilities in the RES-E directive to introduce binding national targets;
18. Notes that wind energy development in a few European countries has been impressive

with more than 34,600 MW installed at the end of 2004 thus outperforming all predictions and regrets that the full potential of biomass electricity production has not developed as foreseen and welcomes in this respect the Commission's announcement of a biomass action plan;

Transport: Efficiency first, renewable fuels second

19. Identifies the transport sector as causing huge import dependency on highly volatile oil, causing big health problems due to air pollution and responsible for the fastest growing CO₂ emissions;
20. Takes note that in the transport sector efficiency gains through structural measures like better urban and regional planning, modal shift in goods and persons transport and gradually raised efficiency performance standards for vehicles and airplanes are crucial and complementary to renewable fuel strategies;
21. Urges Commission to use the analyses of the overall environmental impacts of fuels - the so called well-to-wheel energy chains - as developed by the Commission Joint Research Center in their CONCAWE study;
22. Asks the Commission to include in its biomass action plan a mandatory gradually raising obligation for fuel companies of mixing biomass based fuels to their sales;

Innovation: the importance of a better coordination between the European, national and local/regional levels

23. Insists on the fact that a coherent European renewable energy and energy efficiency strategy is only achievable if a better interaction between all relevant actors takes place; stresses particularly the importance of the local and regional level in this strategy;
24. Calls for a new Intelligent Energy for Europe program under the financial perspectives 2007- 2013 with a minimum of 200 million EURO a year in order to boost networking around best practices and to stimulate 100% renewable communities;

Research and development: priority for renewable energy and energy efficiency

25. Welcomes the world-leading role of EU in renewable energy technologies, but reminds that competition for keeping the technological lead is intense;
26. Notes that in the energy field all non-mature energy technologies need a certain help in the first years of development and highlights the fact that IEA notes that between 1974 and 2001 only 8,2% of total energy R&D funds of OECD countries were allocated to renewable energies;
27. Insists that in the upcoming FP7 program a minimum of 300 million a year should be dedicated to renewable energies and 200 million a year to energy efficiency to compensate the historical bias in EU energy research programs;
28. Technology platforms should be foreseen for solar electricity production, for wind power, for Biomass and for integration of renewable energies into the building sector;

Export Strategy, Developing Policy

29. Insists on the responsibility of the EU to assist least and low developed countries in developing adapted renewable technologies;
30. Instructs its President to forward this resolution to the Council and Commission.

EXPLANATORY STATEMENT

The renewable century:

21 renewable technologies for the XXI century

This own initiative report of the Parliament follows a communication from the EU Commission (1) presented prior to the Bonn world renewable energies conference in 2004. This initiative report gives a general strategic overview on where renewable policies stand in Europe.

The XXI century will be the renewable energies - **renewableS** - century. RenewableS will play an ever-increasing role in the next decades. Their advantages for reducing environmental and health impacts for society, their contribution to reduce the dependency on and conflicts for highly volatile oil without creating new problems like nuclear waste or nuclear proliferation and the job creation (2) and local economic added value potential are recognised; however, what is often forgotten is the diversity of their use (3).

RenewableS have the potential to cover over 80% of all energy needs at the end of this century (4). How quick this will happen is depending on the right mix of policy instruments efficiently applied at the relevant levels, EU, national, regional and local.

It will also heavily depend on our ability to move from supply orientated and single technology dominated energy discussions to **a systemic approach to energy policies** based on three pillars:

- **energy intelligence:** supply side (renewable) energies should always be part of a policy mix in which demand side (energy conservation and energy efficiency) measures play an important role.

- **appropriate energy density:** Low temperature uses like heating and cooling should always be supplied by low density energies like the "waste" energy from electricity production (co- or tri-generation) or low temperature renewable like solar thermal collectors. Using noble energies like electricity or gas just to heat or cool houses is unsustainable.

- **as local as possible:** energy production should always be as close as possible to the place of energy use: this reduces not only transport losses and enhances the security of supply but strengthens also local and regional economies.

Green buildings: a basis for a sustainable energy system

Low temperature energy uses account in the EU to at least 40% of overall energy use. A combination of low density renewableS, best practices in energy conservation and the development of co- or trigenerated heating and cooling networks based on biomass or high temperature geothermal could bring high shares of renewables to the building sectors energy needs, reduce EU's oil dependency, unnecessary electricity consumption and diminish gas use in buildings thus freeing up gas for the electricity market.

i) Every new building a potential renewable energy power generator

Near Freiburg in Germany houses that are producing more energy (5) over a year's time than they use have been built. The standards for new buildings have been reduced over the last 20 years from above 150 W/m² to 10 W/m² (passive energy standards) (6). Individual renewable energy based heating (7) based on biomass are available.

The development of industrial scale solutions like prefabricated roof or facade elements combining high insulation standards with integrated solar thermal or PV elements could speed up such practice while raising the productivity in the building industry and cut costs.

The Commission should work with EU governments to progressively upgrade building standards and create a technology platform to integrate PV and other renewables in building components.

ii) Greening the existing EU building stock: a CO₂ reduction and a job gold mine

The renovation of the German Bundestag (8) - a Norman Forster combination of energy conservation with an oil rape seed fuelled co-generation shows that modern architecture and renewable energy go together.

A big opportunity ahead for EU's climate policy lies in the existing building stock. New studies from EU building industries (9) show that a 20% cut in emissions from this sector is possible while creating jobs. Parallel to reduction in demand, new biomass based tri-generation - combining electricity production with the use of the waste heat (10a) from this production to heat or cooling - has a large commercial potential. In Eastern Europe most big cities already have large-scale district heating systems (10b), but many need to be modernized and to switch from coal to biomass.

Furthermore, the ongoing miniaturisation of engines combined with the development of software for intelligent grid systems will also enhance the opportunities for CHP schemes for smaller buildings and be the first potential market for **green hydrogen based fuel cells** (11).

Because reduced energy bills have to be pre-financed by new invest, a European Investment Bank global loan which allows local and regional financial institutes to offer cheaper credits and the development of an EU market for Energy Saving Companies (ESCOs) are the solutions.

iii) Solar heating ... and cooling: the challenge ahead

Greece and Austria show the enormous commercial potential for solar thermal (12). The most effective solar thermal collectors are today able to generate enough heat to be converted in cooling energy (13).

Replacing electricity powered cooling by a combination of climate zone adapted architecture and solar cooling is one of the big EU energy challenges.

Additional policy measures needed at EU Level for the building sector should focus on a new directive for renewables in the heating and cooling sector, strengthening and broadening

of the existing EU building directive.

Green electricity: Aiming for a European wide 100% renewable electricity system

The directive for renewables in the field of electricity foresees a growth from 15% in 2000 to more than 20% in 2010.

The EU is leading the world. Renewables are today the fastest growing source for electricity in the EU with growth rates higher than 20% for both wind and solar (14). The cost of renewable energy is falling rapidly (15).

The technical potential for renewables is large. Biomass, wind and geothermal will be widely deployed in the next 10 to 15 years, solar PV but also solar thermal electricity and marine renewables like energy from sea currents, energy from tidal, energy from waves are developing rapidly (16).

High shares of renewables in the electricity field is less a technological than a political problem. Therefore we will concentrate here on the **necessary policy instruments**:

1) The importance of demand side in electricity

The share of renewable electricity in the total electricity consumption will depend on future demand side policies. There are no cheaper CO2 reduction measures and no quicker measures to enhance Europe's security of supply than sound demand side policies for electricity.

2) Put the market right. Stop environmentally harmful subsidies

Renewables electricity are today largely penalised by decades old unfair advantages given to electricity producing technologies like coal and nuclear.

R&D. IEA notes that between 1974 and 2001 only 8.2% of total energy R&D funds of OECD countries were allocated to renewable energies, whereas nuclear received more than 80%, a similar balance is seen in the past FP budgets.

Direct State aid. In the case of the coal sector over the last decade France, Germany, Spain and UK granted approximately €70 billion in aid and Poland €3.8 billion for 2003 alone (17).

Non-Internalisation of Externalities. In the current electricity market coal and nuclear have several advantages. First of all nearly all existing nuclear and coal power plants were financed during monopolistic times their capital costs have been broadly written off. Secondly, coal power production does not pay for their full CO2 costs. Thirdly, there is little transparency about the real and full costs of nuclear-based electricity production. The British government (and tax payers) recently assigned 6 Billion Euro to save the privatised nuclear operator British energy from bankruptcy and 70 Billion Euro to take care of UK's radioactive waste.

3) Fair access to the grid for renewables

Fair access to both distribution and transportation grid and fair pricing of balancing energy

have been together with complex authorisation schemes identified by EU Commission as main hurdles to a quicker renewables penetration.

With the market success of wind a huge discussion has started on the "non reliability" of renewables. There are a lot of myths in this discussion:

- renewables are more than wind. Large hydro, geothermal and biomass have a positive impact on grid stability

- in the next years gas will largely enter the power market with units close ranging from some kW in residential houses to mid size units of 350 to 500 MW, freeing up transport space in Eu grid system. Gas power stations are easily to be switched on and off thus enhancing the balancing capacities of the grid.

- recent detailed studies in Germany (18) show that even large scale development of onshore and off-shore wind does not put grid operators to unsolvable problems: **in order to absorb the more than 80.000 MW new wind capacity Germany needs until 2015 to reinforce its existing 180.000 km of high voltage grid by 2 lines of 8 KM and three lines of 80 KM!** More innovative solutions like connecting parts of German offshore in the North sea to cables with Norway to equalize fluctuating wind with hydro or to produce form part of the huge wind potential green hydrogen have not even been considered in these scenarios.

Political Priorities in the Power Market

Almost 50% of the today existing overall electricity production in the EU will have to be replaced because of end of their life cycle. This opens a window of opportunity to put the EU power policy right.

- A minimum 2020 target for green electricity consumption of at least 35% percent should be set to keep EUs leadership. In order to protect renewables against the existing market distortions, the actual support schemes should be allowed to continue until 2020.

- a biomass action plan (19) and a coordinated large scale North Sea wind (20) energy project to boost rapid extension of these renewables

- In the R&D FP7 program a maximum of money should be earmarked for renewables and energy efficiency (21). 300 million for renewables and 200 million for efficiency seem adequate to boost technical development of non-mature renewable technologies and to accelerate the cost cuts for those close to the markets.

- A third directive on electricity and gas market is needed with measures like full ownership unbundling, fair access to storage both, reduction of market power of the dominating companies and fully segregated decommissioning funds

Transport: Efficiency first, renewable fuels second, hydrogen third

Today's transport policies are causing a huge import dependency of highly volatile oil, create dramatic health problems and are responsible for fast rising CO₂ emissions. Without

significant reforms in the very structure of transport schemes (system efficiency) and a substantial increase in efficiency a higher share of renewable fuels will be difficult to obtain.

1. Increase the efficiency of the system

Sustainability in transport policy depends on a coherent system approach. Efficiency gains are needed through structural measures like better urban and regional planning (22), shift in goods and persons transport from air and road to train, buses and the development of bicycle and pedestrian mobility in urban cities

2. Lighter cars and enhanced engine efficiency

Gradually raised efficiency performance standards for cars, busses, trains and airplanes are a second priority. Energy savings like weight reductions and a trend to smaller cars combined with an introduction of hybrid drive systems are short-term reduction possibilities that are cost effective.

Mandatory performance targets for cars like the newly introduced Californian model are important to give the car manufacturer a clear and stable framework for their future investments.

3. Well-to-Wheel energy chance as a basis for technology and fuel choices

Before engaging into a policy for alternative fuels, EU and governments should carefully analyse the total environmental impact of different fuel sources and conversion technologies. The well-to-wheel energy chain analysis - developed by the Commission Joint Research Center in their CONCAWE study (23) - must be undertaken for different fuels.

Notes & Web links:

(1) Web Link - COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT - The share of renewable energy in the EU

http://europa.eu.int/comm/energy/res/legislation/country_profiles/com_2004_366_en.pdf

(2) See Annex I - The proportion of labour force supporting the renewable energy sector in 2010

(3) See Annex II - 21 renewable energy - renewableS - technologies for the XXI century & **Annex III** - pictures of the different technologies

(4) Web link - Final report of the German Bundestag Enquete-Commission regarding 'Sustainable energy supply under conditions of globalisation and liberalisation' (Drucksache 14/9400 - 07.07.2002) Chapter 5 - scenario 5.1.2

<http://www.bundestag.de/parlament/kommissionen/archiv/ener/schlussbericht/>

; also check the **web link** the Greens / European Free Alliance - <http://www.greens-efa.org>

(5) Web link - See projects by the solar architecture office of Rolf Disch in Germany

<http://www.rolfdisch.de/>

(6) See Annex IV - Building trends in Upper Austria - Energy efficiency standards for housing

(7) Web link - Various information on energy efficient homes.

<http://www.esv.or.at/esv/index.php?id=11&L=1>

(8) Web link - Latest technologies and concepts in the German Bundestag and Reichstag allow to cut down energy consumption and emissions of CO₂ in particular.

http://www.bundestag.de/htdocs_e/info/099berlin/energy.html

(9) Web link - See studies by EURIMA - The European Association of Insulation Manufacturers

http://www.eurima.org/index_en.cfm

(10a) & (10b) Web link - Different associations are active in the field of cogeneration

<http://www.cogen.org/Links/Associations.htm>

<http://www.euroheat.org/>

(11) Web link - See information on green based hydrogen fuel cells at the website of the Greens / European Free Alliance - <http://www.greens-efa.org>

(12) See Annex V - The average installed solar thermal capacity in EU-15

(13) Web link - Information on Solar Cooling / Solar Assisted Air conditioning can be found on the website of the Research Task 25 of the IEA's Solar Heating and Cooling Programme:

<http://www.iea-shc-task25.org/>. A collection of existing solar cooling installations can be found on the website of the SACE project: <http://www.ocp.tudelft.nl/ev/res/sace.htm>. This

project was financed largely by the EC's 5th Framework Program.

(14) See Annex VI - Cumulative wind energy installed capacity & **Annex VII** - Cumulative photovoltaic installed capacity

(15) See Annex VIII - Falling cost of photovoltaic & **Annex IX** - Prices for different generation technologies

(16) See Annexes X & XI - exemplary detailed scenario for electricity

(17) Web link - Visit the European Commission website and see the information under 'State Aid' http://europa.eu.int/comm/competition/state_aid

(18) Web link - Research paper "Integration into the national grid of onshore and offshore wind energy generated in Germany" by the German energy agency <http://www.deutsche-energie-agentur.de/page/index.php?dena>

(19) Web link - See the study on 'How to increase the use of biomass in an enlarged Europe' by Dr. Ludger Eltrop - available on the Greens/EFA website <http://www.greens-efa.org>

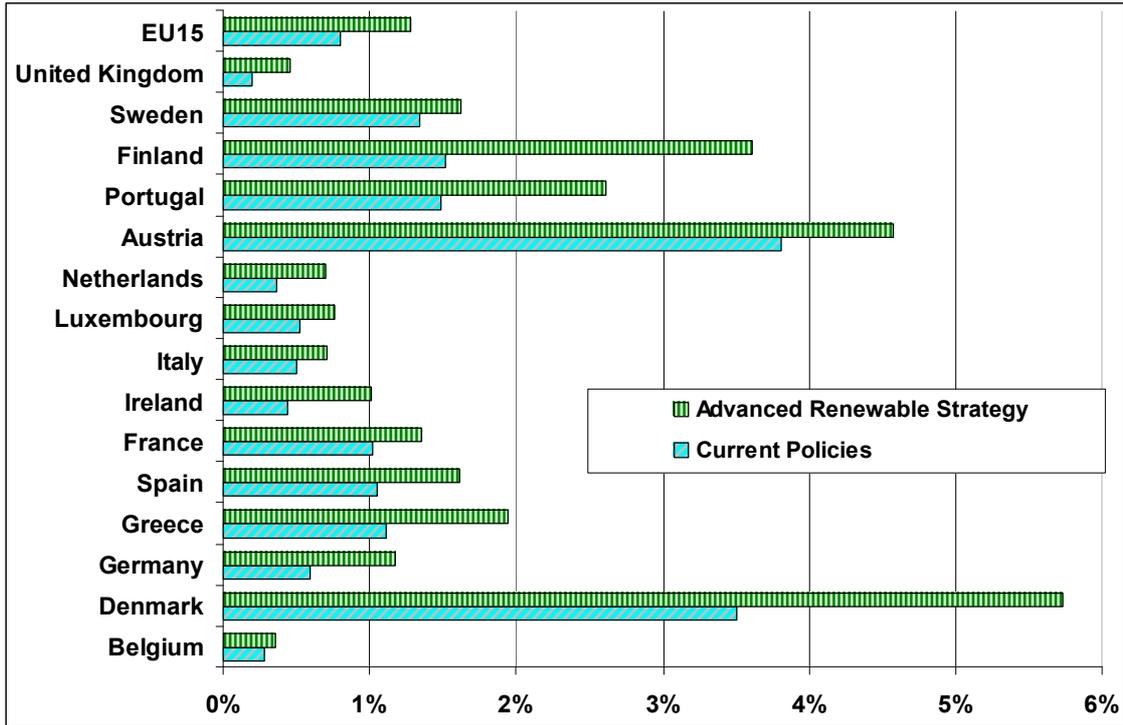
(20) Web link - Information about a coordinated large scale North Sea wind project available at the Greens/EFA website <http://www.greens-efa.org>

(21) Web link - Information on the 7 RFP available at the Greens/EFA website <http://www.greens-efa.org>

(22) See Annexes XII - Impact of urban densities on transport energy demand

(23) Web link - [CONCAWE 2004] Well-to-Wheels analysis of future automotive fuels and powertrains in the European context; EUCAR, CONCAWE, European Commission Joint Research Centre - IES with scientific support by L-B-Systemtechnik GmbH (Well-to-Tank) and Institut Français du Pétrole (Tank-to-Wheel), Januar 2004, <http://ies.jrc.cec.eu.int/Download/eh/31>

Proportion of labour force supporting renewable energy sector in 2010



Source: EC Mitre study, (<http://mitre.energyprojects.net/>)

21 'RenewableS' renewable energy technologies for the 21st century

Electricity production

1. Hydro power
2. Biomass (solid, gas, liquid)
3. Wind
4. Geothermal (High temperature)
5. Solar photovoltaic (PVs)
6. Solar thermal electricity
7. Energy from waves
8. Energy from sea currents (tidal energy)
9. Energy from osmoses (difference of pressure between river and salt water)
10. Upwind power stations (power plants which play on the fact that warm air is lighter than cold air and creates a flow of air from the soil to the sky)

Heating and cooling

11. Passive solar architecture
12. Surplus low temperature energy from co- or trigeneration plants (based on biomass or geothermal)
13. Solar collectors for heating, cooling and drying (industrial use)
14. Geothermal (low temperature)
15. Wood pellets / wood chips
16. Dried and pressed biomass from energy crops

Fuel production

17. Plant oil
18. Biodiesel RME
19. Ethanol
20. Synthetic fuels from biomass

Hydrogen

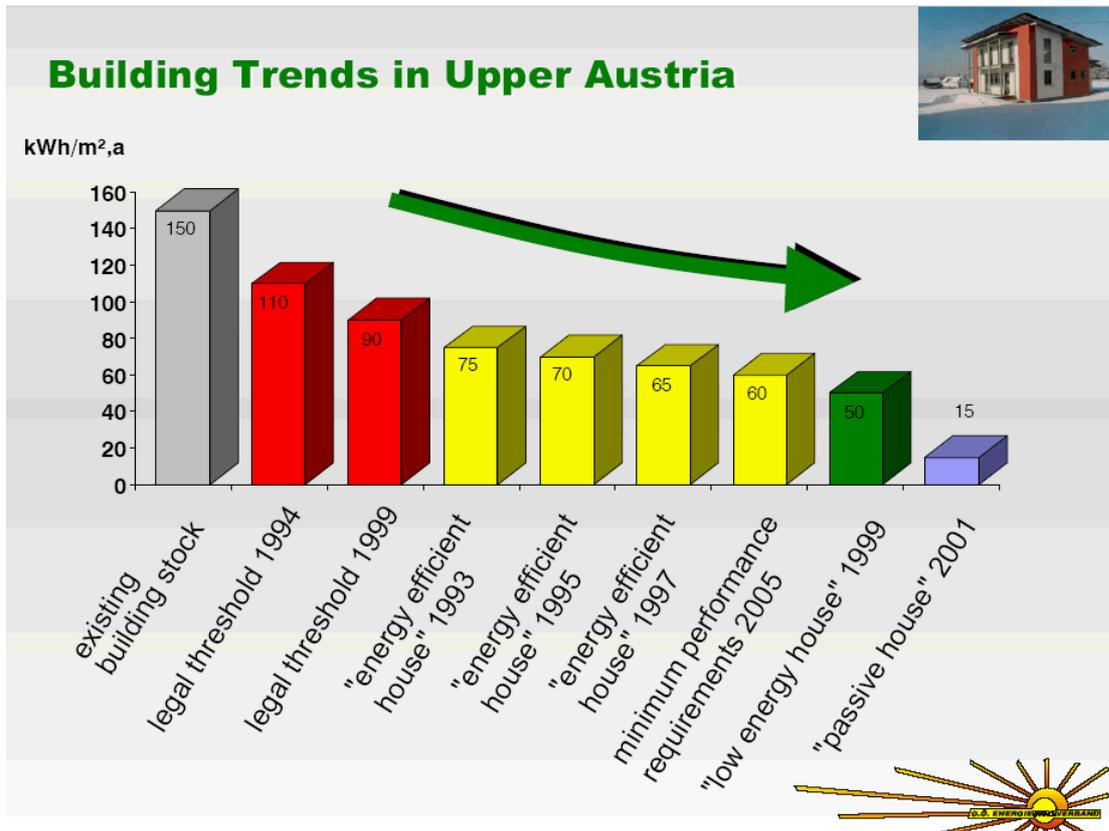
21. Hydrogen from renewable energy sources

- ANNEX III -

Pictures of different technologies

- not available-

Building trends in Upper Austria



Source: O.Ö. Energiesparverband (<http://www.esv.or.at>)

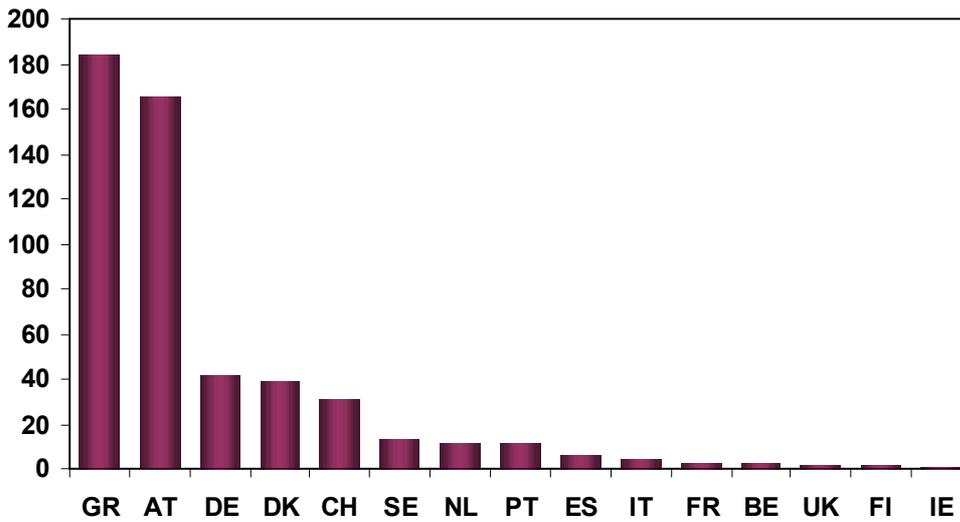
ANNEX V

The average installed solar thermal capacity per capita in the EU-15

	Collector area in operation kWth/1.000 capita
GR	184
AT	166
DE	42
DK	39
CH	31
SE	14
NL	12
PT	11
ES	6
IT	5
FR	3
BE	2
UK	2
FI	1
IE	1

Solar Thermal Capacity per 1.000 capita in 2003

kW_{th}/1.000
capita

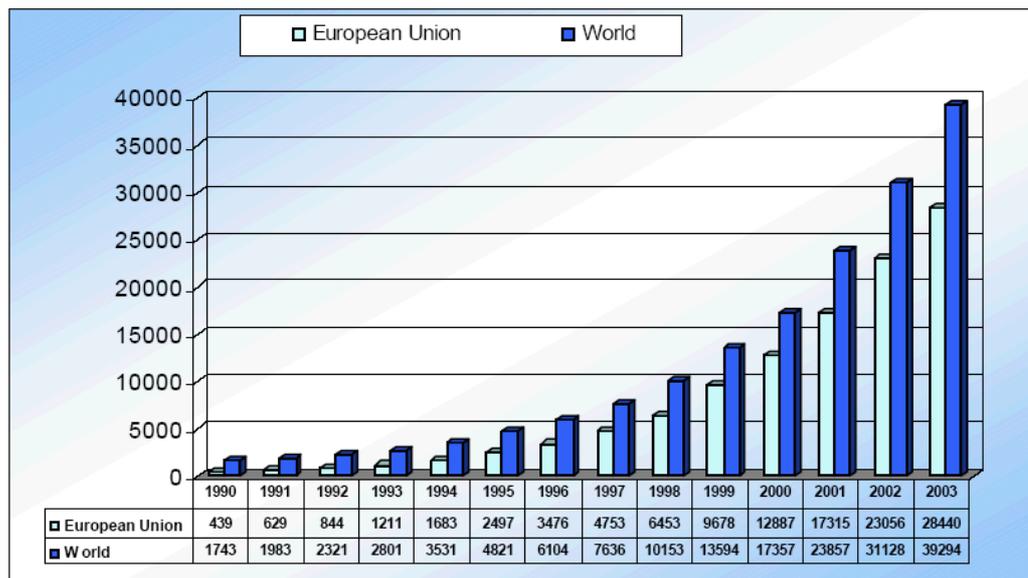


The average installed solar thermal capacity per capita in EU-15 is 21,7 kW_{th}/1000 capita (End of 2003)

Unfortunately - because of complete lack of data - Luxembourg is not included; on the other hand the diagram shows a column for Switzerland;

Source: ESTIF - European Solar Thermal Industry Federation (<http://www.estif.org>)

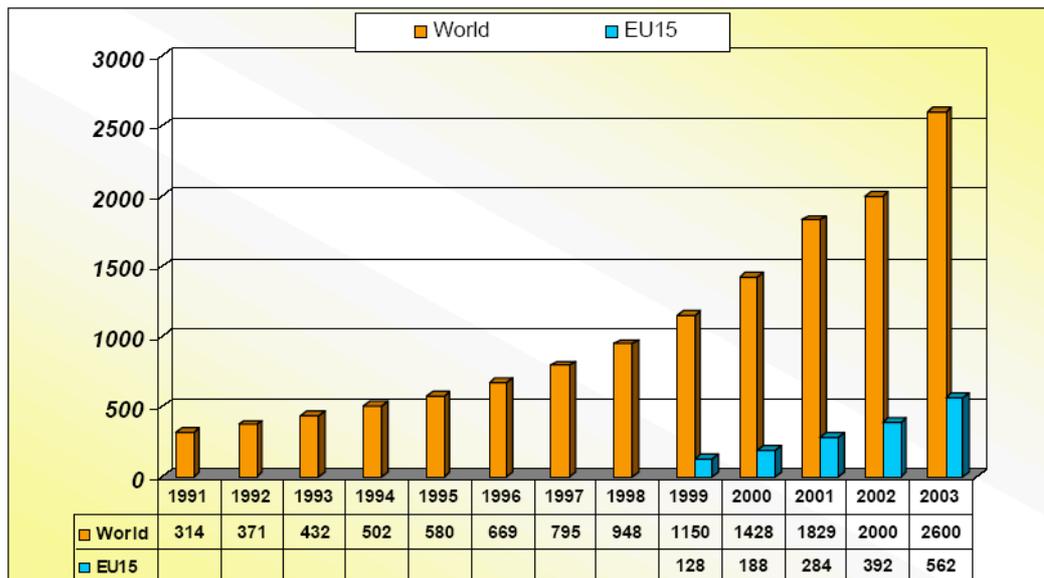
Cumulative wind energy installed capacity (MW)



Source: EWEA

Source: European Wind Energy Association (<http://www.ewea.org/>)

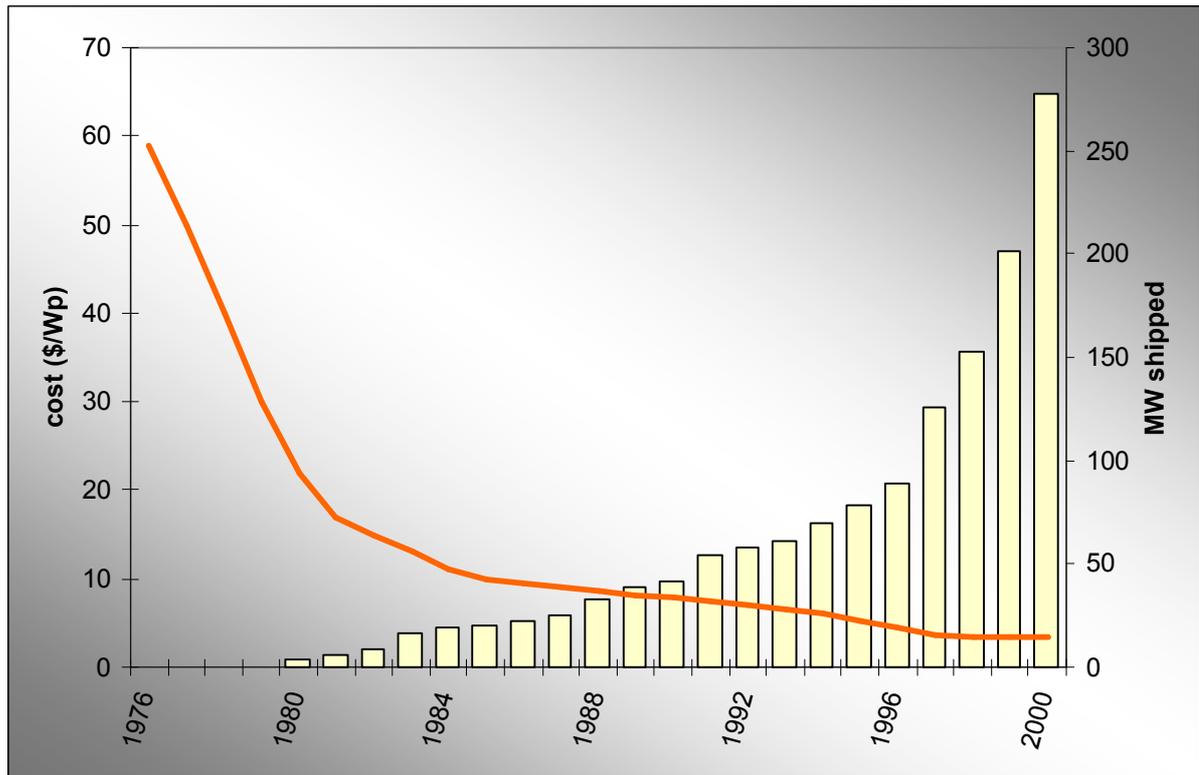
Cumulative photovoltaic installed capacity (MWp)



Source: Eurec Agency, EPIA, Observ'ER

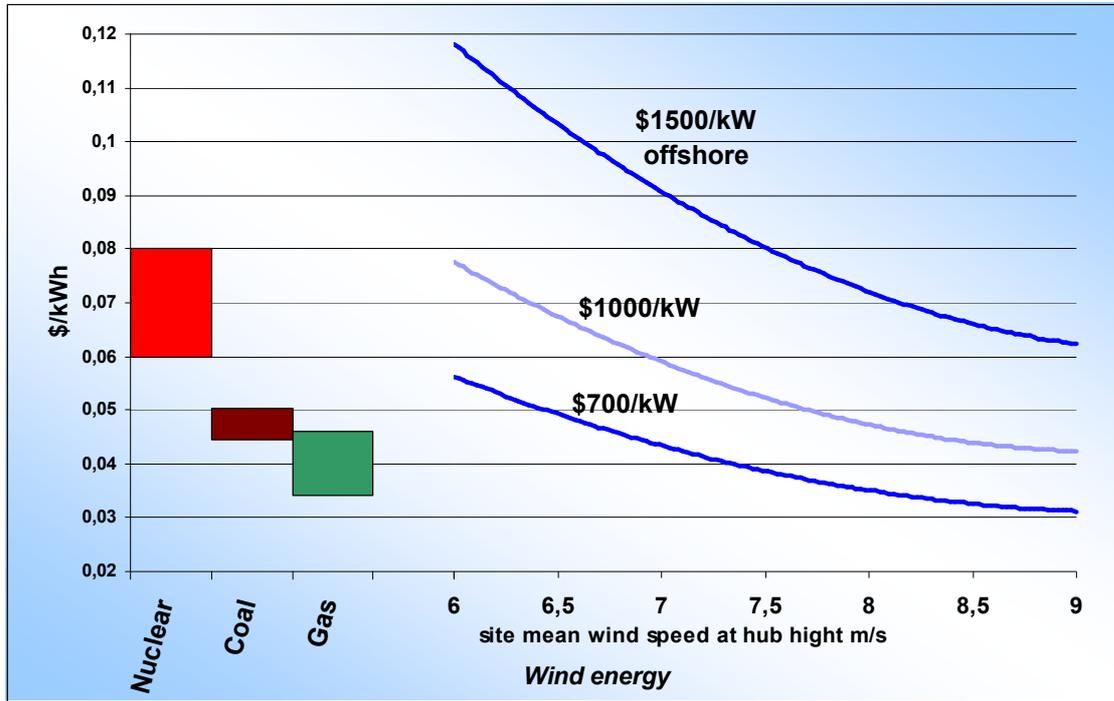
Source: EUREC - European Renewable Energy Centres Agency (<http://www.eurec.be/>)

The falling cost of PV as Shipments increase



Source: Solar Generation (Greenpeace – EPIA)

Prices for Different Generation Technologies



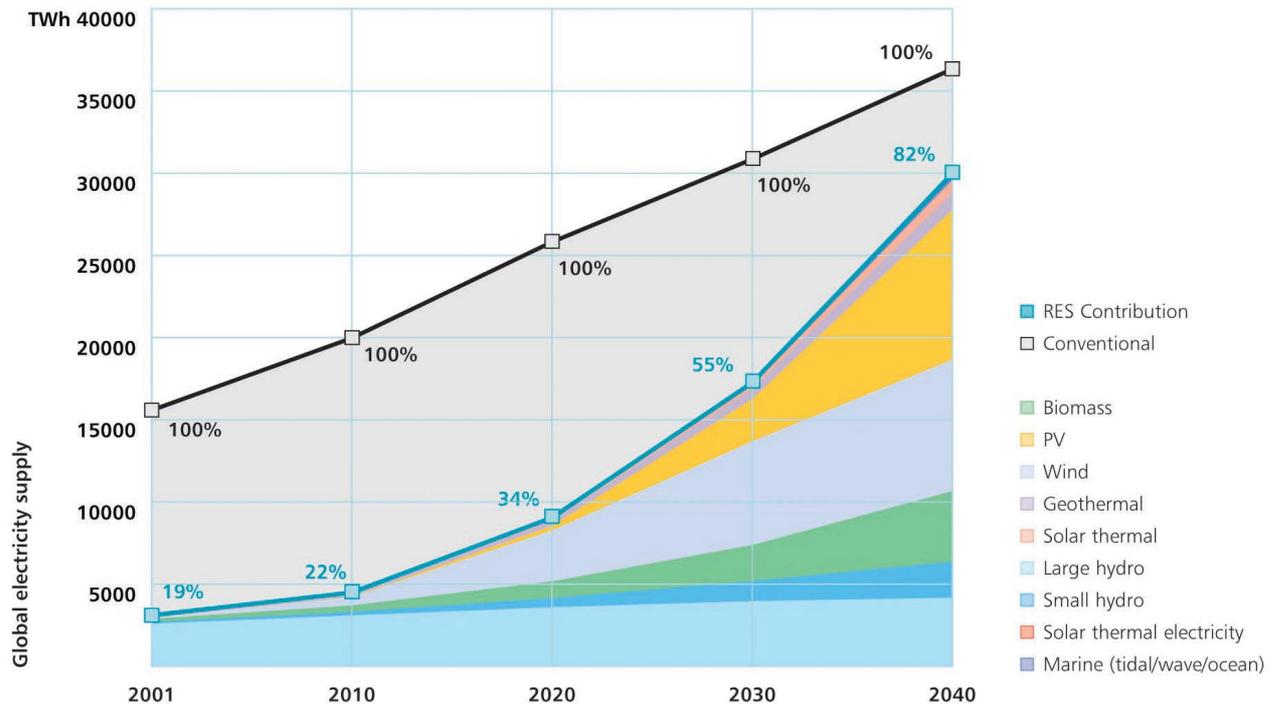
Source: EREC, 2005 - European Renewable Energy Council
(<http://www.erec-renewables.org/>)

**Exemplary detailed scenario for electricity
– Advanced International Policy (AIP) scenario -**

	2001	2010	2020	2030	2040
Total Consumption in TWh (IEA)	15578	19973	25818	30855	36346
Biomass	180	390	1010	2180	4290
Large Hydro	2590	3095	3590	3965	4165
Small Hydro	110	220	570	1230	2200
Wind	54,5	512	3093	6307	8000
PV	2,2	20	276	2570	9113
Solar Thermal	1	5	40	195	790
Geothermal	50	134	318	625	1020
Marine	0,5	1	4	37	230
Total RES	2988,2	4377	8901	17109	29808
RES Contribution	19,2%	21,9%	34,5%	55,4%	82,0%

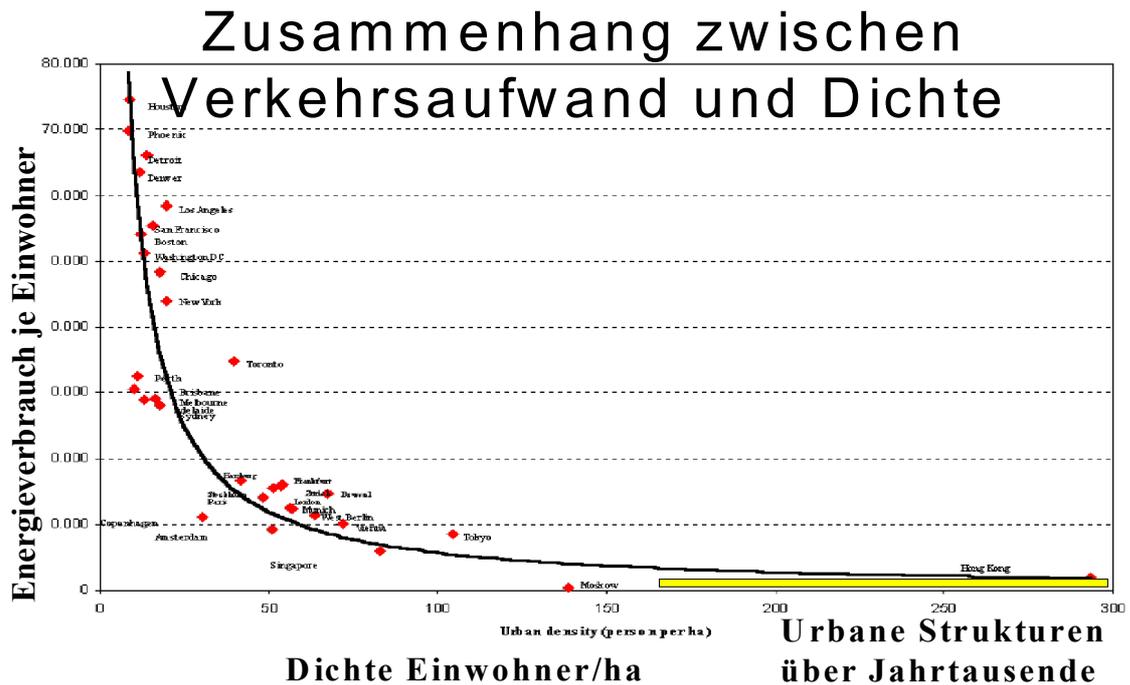
Source: EREC, 2005 - European Renewable Energy Council
(http://www.erec-renewables.org/publications/scenario_2040.htm)

Exemplary detailed scenario for electricity – Advanced International Policy (AIP) scenario -



Source: EREC, 2005 - European Renewable Energy Council
(http://www.erec-renewables.org/publications/scenario_2040.htm)

Impact of urban densities on transport energy demand



Source: Prof. Dr. Hermann Knoflacher - Institut für Verkehrsplanung und Verkehrstechnik, Technische Universität Wien