



RATIONAL USE OF ENERGY AND RENEWABLE ENERGY
SOURCES
– A REVIEW OF CURRENT POLICY STRATEGIES AND
PROMOTION SCHEMES –

Report of Work Phase 1
of the project



– a research project within the
Altener Program of the European Commission, DG TREN –

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CONTENT

CONTENT.....	III
FIGURES.....	V
TABLES.....	VII
1 INTRODUCTION	1
1.1 Objectives.....	1
1.2 The project Invert.....	1
1.3 Structure of the report.....	2
1.4 Summary	2
2 STATE-OF-THE-ART OF RENEWABLE ENERGY SOURCES IN EU-15 AND SELECTED ACCESSION COUNTRIES	4
2.1 Electricity	4
2.2 Heat	8
2.3 Transport	9
3 CLASSIFICATION OF PROMOTION STRATEGIES.....	11
3.1 Dimensions in the classification	11
3.2 Matrix of promotion schemes	12
3.3 Direct promotion schemes with financial incentives	13
3.4 Direct promotion schemes without financial incentives	14
3.5 Indirect schemes and framework conditions	15
4 ENERGY TAXES	17
5 PROMOTION SCHEMES FOR RUE	31
5.1 Financial Strategies	31
5.1.1 Pre-investment / Implementation	31
5.1.2 Investment/implementation.....	33
5.2 Non-financial Strategies	41
5.2.1 Regulatory schemes.....	41
5.2.2 Pre-investment schemes – energy labelling etc.	57
6 OVERVIEW ON CURRENT PROMOTION STRATEGIES FOR RES	64
6.1 Sectoral review	64
6.2 Country review.....	67
7 ELECTRICITY SECTOR – PROMOTION STRATEGIES FOR RES - E IN EUROPE .	84
7.1 Financial Strategies	84
7.1.1 Pre-investment / Implementation	84
7.1.2 Investment/ Implementation.....	90
7.1.2.1 Tax- Incentive	90
7.1.2.2 Investment Subsidies.....	98
7.1.2.3 Soft loans.....	118
7.1.3 Post-investment / Implementation	119
7.1.3.1 Feed in tariffs	119
7.1.3.2 Quota obligation (based on TGCs).....	141
7.1.3.3 Bidding system	145
7.1.3.4 Tax incentive (Energy Taxes).....	147
7.2 Non Financial Strategies	148

7.3	Indirect Schemes.....	151
8	HEAT SECTOR – PROMOTION STRATEGIES FOR RES - H IN EUROPE.....	154
8.1	Financial Strategies	154
8.1.1	Pre-investment / Implementation.....	154
8.1.2	Investment/ Implementation.....	158
8.1.2.1	<i>Tax- Incentive</i>	158
8.1.2.2	<i>Investment Subsidies</i>	164
8.1.2.3	<i>Soft loans</i>	183
8.1.3	Post-investment / Implementation	185
8.2	Non Financial Strategies	185
8.3	Indirect Schemes.....	188
9	TRANSPORT SECTOR – PROMOTION STRATEGIES FOR RES - T IN EUROPE.	191
9.1	Financial Strategies	191
9.1.1	Pre-investment / Implementation.....	191
9.1.2	Investment/ Implementation.....	194
9.1.2.1	<i>Tax- Incentive</i>	194
9.1.2.2	<i>Investment Subsidies and Soft Loans</i>	197
9.1.3	Post-investment / Implementation	198
9.2	Non Financial Strategies	198
9.3	INDIRECT SCHEMES.....	199
10	REFERENCES	201

FIGURES

Figure 2.1: Historical development of RES-E in EU-15 and selected Accession countries	4
Figure 2.2: 'New' RES-E in EU-15 countries: historical development of electricity generation from 1990 to 2001 (left-hand side) and generation breakdown for 2001 by country (right-hand side) .5	
Figure 2.3: Achieved (2001) and additional mid-term potential 2020 for RES-E in EU-15 and selected Accession countries. Source: Green-X, FORRES 2020.	6
Figure 2.4: RES-E as a share of the total achieved potential in 2001 for EU-15 and selected Accession countries. Source: Green-X, FORRES 2020.	6
Figure 2.5: RES-E as a share of the total additional realisable potential in 2020 for EU-15 and selected Accession countries. Source: Green-X, FORRES 2020.	7
Figure 2.6: Long-term marginal generation costs (for the year 2002) of different RES-E technologies	7
Figure 2.7: Achieved (2001) and additional mid-term potential 2020 for RES-H in EU-15 and selected Accession countries. Source: FORRES 2020.....	8
Figure 2.8: RES-H as a share of the total achieved potential in 2001 for EU-15 and selected Accession countries. Source: FORRES 2020.	8
Figure 2.9: RES-H as a share of the total additional realisable potential in 2020 for EU-15 and selected Accession countries. Source: FORRES 2020.....	9
Figure 2.10: Achieved (2001) and additional mid-term potential 2020 for RES-T in EU-15 and selected Accession countries. Source: FORRES 2020.....	9
Figure 7.1 Investment Subsidies for electricity from biogas in EU-15 and selected Accession countries	98
Figure 7.2 Investment Subsidies for electricity from biomass in EU-15 and selected Accession countries	99
Figure 7.3 Investment Subsidies for electricity from geothermal energy in EU-15 and selected Accession countries	100
Figure 7.4 Investment Subsidies for electricity from small hydro in EU-15 and selected Accession countries	101
Figure 7.5 Investment Subsidies for electricity from solar energy in EU-15 and selected Accession countries	102
Figure 7.6 Investment Subsidies for electricity from wind energy in EU-15 and selected Accession countries	103
Figure 7.7 Feed-in tariffs for electricity from biogas plant in EU-15 and selected Accession countries	120
Figure 7.8 Feed-in tariffs for electricity from biomass in EU-15 and selected Accession countries	121
Figure 7.9 Feed-in tariffs for electricity from geothermal energy in EU-15 and selected Accession countries	122
Figure 7.10 Feed-in tariffs for electricity from small hydro in EU-15 and selected Accession countries	123
Figure 7.11 Feed-in tariffs for electricity from large hydro in EU-15 and selected Accession countries	123
Figure 7.12 Feed-in tariff for electricity from landfill gas in EU-15 and selected Accession countries	124
Figure 7.13 Feed-in tariff for electricity from PV in EU-15 and selected Accession countries	125
Figure 7.14 Feed-in tariffs for electricity from sewage gas in EU-15 and selected Accession countries	126
Figure 7.15 Feed-in tariffs for electricity from solar thermal power plant in EU-15 and selected Accession countries.....	126
Figure 7.16 Feed-in tariffs for electricity from wave energy in EU-15 and selected Accession countries	127
Figure 7.17 Feed-in tariffs for electricity from wind on-shore in EU-15 and selected Accession countries	128

Figure 7.18 Feed-in tariff for offshore wind plants in EU-15 and selected Accession countries 129

Figure 7.19 Feed-in tariffs for MSW plant in EU-15 and selected Accession countries 130

Figure 8.1 Investment Subsidies for heat from biogas in EU-15 and selected Accession countries ..165

Figure 8.2 Investment Subsidies for heat from biomass in EU-15 and selected Accession countries 166

Figure 8.3 Investment Subsidies for heat from geothermal energy in EU-15 and selected Accession countries 167

Figure 8.4 Investment Subsidies for heat from heat pumps in EU-15 and selected Accession countries 168

Figure 8.5 Investment Subsidies for heat from solar thermal in EU-15 and selected Accession countries 169

TABLES

Table 3.1 Matrix summarising the main dimensions of promotion schemes used in this project as well as examples of schemes	12
Table 4.1 A comparison of taxes on light fuel oil in the EU-15 and 4 selected accession countries.....	18
Table 4.2 A comparison of taxes on heavy fuel oil in the EU-15 and 4 selected accession countries..	19
Table 4.3 A comparison of taxes on natural gas for stationary applications in the EU-15 and 4 selected accession countries	20
Table 4.4 A comparison of taxes on coal in the EU-15 and 4 selected accession countries	20
Table 4.5 A comparison of taxes on transportation fuels in the EU-15 and 4 selected accession countries	21
Table 4.6 A comparison of taxes on electricity in the EU-15 and 4 selected accession countries.....	22
Table 4.7. Typical consumer prices for energy (households) distributed on pre-tax part, energy tax and VAT as of 2002. €-cent/kWh energy content in fuels and €-cent/kWh electricity.....	24
Table 4.8 - Current energy tax rates in €/kWh.....	25
Table 5.1 Efficiency requirements, in round off figures, for boilers operated at rated power (P _n) and at partial load (30% of rated power).....	42
Table 5.2 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Burgenland.....	43
Table 5.3 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Carinthia.....	43
Table 5.4 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Lower Austria.....	43
Table 5.5 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Upper Austria.....	44
Table 5.6 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Salzburg.....	44
Table 5.7 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Styria.....	45
Table 5.8 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Tyrol.....	45
Table 5.9 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Vorarlberg.....	45
Table 5.10 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Vienna.....	46
Table 5.11 - Heat loss requirements to building fabric elements according to the Federal cap to the provincial Building Regulations.....	46
Table 5.12 - Heat loss requirements to building fabric elements according to Building Codes of the Belgium region of Wallonia.....	47
Table 5.13 - Heat loss requirements to building fabric elements according to Building Codes of the Belgium region of Flanders.....	47
Table 5.14 - Heat loss requirements to building fabric elements according to Building Codes of the Belgium region of Brussels.....	47
Table 5.15 Requirements in the 1998 Building Regulations.....	48
Table 5.16 Heat loss requirements to elements of the building fabric of fully heated rooms (>17C°) ..	49
Table 5.17- Typical heat loss characteristics of building fabric elements to meet the building regulations of France.....	50
Table 5.18- Typical heat loss characteristics of building fabric elements to meet the building regulations of Germany.....	50
Table 5.19 - Heat loss requirements to building fabric elements according to the buildings regulations of Ireland.....	52

Table 5.20- Typical heat loss characteristics of building fabric elements to meet the building regulations of Italy.....	52
Table 5.21- Typical heat loss characteristics of building fabric elements to meet the building regulations of the Netherlands.....	53
Table 5.22 Maximum U-values for new single-family houses in Poland.....	54
Table 5.23- Typical heat loss characteristics of building fabric elements to meet the building regulations of Portugal.....	55
Table 5.24- Typical heat loss characteristics of building fabric elements to meet the building regulations of Spain.....	56
Table 5.25- Typical heat loss characteristics of building fabric elements to meet the building regulations of Sweden.....	56
Table 6.1 Current promotion strategies for RES-E in EU-15 and selected Accession countries	65
Table 6.2 Current promotion strategies for RES-H in EU-15 and selected Accession countries	66
Table 6.3 Current promotion strategies for RES-T in EU-15 and selected Accession countries	67
Table 6.4 Typology of current promotion strategies for RES in Austria.....	68
Table 6.5 Typology of current promotion strategies for RES in Belgium.....	69
Table 6.6 Typology of current promotion strategies for RES in the Czech Republic	70
Table 6.7 Typology of current promotion strategies for RES in Germany.....	71
Table 6.8 Typology of current promotion strategies for RES in Denmark	72
Table 6.9 Typology of current promotion strategies for RES in Spain.....	73
Table 6.10 Typology of current promotion strategies for RES in Finland.....	74
Table 6.11 Typology of current promotion strategies for RES in France.....	74
Table 6.12 Typology of current promotion strategies for RES in Greece.....	75
Table 6.13 Typology of current promotion strategies for RES in Hungary	75
Table 6.14 Typology of current promotion strategies for RES in Ireland.....	76
Table 6.15 Typology of current promotion strategies for RES in Italy	77
Table 6.16 Typology of current promotion strategies for RES in Luxembourg.....	78
Table 6.17 Typology of current promotion strategies for RES in the Netherlands	79
Table 6.18 Typology of current promotion strategies for RES in Poland.....	80
Table 6.19 Typology of current promotion strategies for RES in Portugal	81
Table 6.20 Typology of current promotion strategies for RES in Sweden.....	82
Table 6.21 Typology of current promotion strategies for RES in Slovenia.....	82
Table 6.22 Typology of current promotion strategies for RES in the United Kingdom.....	83

1 INTRODUCTION

1.1 Objectives

The objective of the report is to provide an overview of and basis for analysis of promotion schemes for RES and RUE. There is a particular focus on the financial aspects and on the regulatory aspects. It covers the fifteen EU Member States as well as four accession countries (Poland, Hungary, Czech Republic and Slovenia).

1.2 The project Invert

Currently, EU-wide vast sums of public money are wasted subsidising different types of energy technologies. The major reasons for this waste are:

- money spent is not targeted;
- rebates are too high;
- money is spent without any performance requirement of the technology.

The **objective of this project** is to change fundamentally these inefficient financial support systems for renewable energy sources (RES) and energy efficiency (RUE) towards more efficient incentive-based ones. These new promotion systems are targeted using a least-cost approach and a rigorous benchmarking system. This ensures that a higher share of RES as well as substantial efficiency improvements are brought about with less public money. Financial support systems for fossil fuels are also considered. In order to identify the optimum solution for a region or a country by means of minimising public expenses a computer simulation tool is developed.

The **work of this project** will be broken down in the following work phases:

- Review of current financial support systems for energy technologies in EU countries;
- Technology evaluation: analysis of the efficiency, degree of maturity, and likely technological progress of technologies;
- Development of a database of costs and potentials (“Cost curves”) of RES and RUE technologies;
- Stakeholder behaviour: analysis of the groups involved (consumers, retailers, politicians) and their behaviour related to the type of promotion scheme;
- Development of a computer model to simulate the links between technologies, energy consumption, CO₂ emissions, financial incentives and other energy policies;
- Assembly of case studies for important regions with many subsidies;
- Derivation of action plans for changing the current promotion scheme on an EU level as well as for single European countries and regions;
- A comprehensive dissemination campaign that completes the project.

The **major result** will be a simple and transparent incentive-based approach to promote RES and RUE with minimum public costs. It takes into account the typical features of single regions and technologies and ensures that location-tailored support systems are implemented. The main products/deliverables from this work will be:

- A computer-based simulation model applicable for EU countries as well as for associate Member States together with energy policy strategies.
- A comprehensive database with cost curves for technologies (e.g. PV, fuel cells, small CHP, heat pumps, wind turbines, building insulation, biomass boilers).
- A detailed action plan describing step-by-step how to approach the optimum portfolio of instruments for successful simultaneous implementation of RES and RUE technologies in different EU countries.

- A comprehensive dissemination package by Internet, WebPages, CD-ROMs, and dissemination workshops in Brussels, Vienna and Lisbon.

1.3 Structure of the report

The core of the report is a country study of the 19 countries included in the analysis. This is divided according to the subject of the promotion schemes: rational use of energy (RUE), renewable energy sources (RES) for electricity, heat and transport. Energy tax systems have a crucial influence on both RUE and RES and are therefore treated in a separate chapter.

At the beginning of the report in chapter 2 an overview about the current state of the art of RES in EU-15 and selected accession countries is given. Chapter 3 provides a typology of promotion schemes for RUE and RES. The following core chapters about promotion schemes for RUE, RES-E, RES-H and RES-T are structured according to this typology. Hence, a distinction will be made in financial and non-financial schemes. A further differentiation will be made with respect to the stage of the process, which is addressed by the policy (pre-investment, investment and post-investment).

While the chapter about promotion schemes for RUE covers both electricity and heat, transport has not been included. Energy efficiency with respect to transport would have included the promotion of public transport systems as well as regional planning, consumer behaviour etc. Because this would have gone far beyond the scope of the project **Invert**, these issues have been excluded.

It should be noted that the investigation refers to the status of the end of 2003. Promotion schemes that were implemented before this date, but were invalidated, are not included in this report. Promotion schemes that will be implemented after this date are only to the extent included as information was available and relevance to the project **Invert** is given.

1.4 Summary

This report provides an overview about current promotion schemes for RUE and RES in EU-15 and selected accession countries (Czech Republic, Hungary, Poland, Slovenia).

At the beginning a typology for policies is developed. This typology firstly distinguishes between financial and non-financial schemes. Secondly it differentiates between push and pull approaches. Push approaches are supposed to prevent actors from unfavourable behaviour like the excessive use of fossil fuels or non-efficient technologies e.g. by energy taxes. Pull approaches try to get actors to demand RES or RUE technologies by e.g. granting subsidies or feed-in-tariffs. Furthermore a distinction is made according to the stage of the process at which the promotion scheme becomes effective. Pre-investment schemes support RUE or RES before the actual implementation takes place. For example this can be done by the support of R&D and demonstration projects. Investment schemes support RUE and RES right at the stage of the implementation by granting subsidies or soft loans for easing the investment burden for the investor or consumer. Post-investment schemes are designed in order to keep up the production of energy or to guarantee the efficiency of the plants and applications e.g. by FIT, quotas or exemptions from energy taxes. Furthermore indirect schemes like campaigns and educational activities have to be considered.

It turns out that for each of the considered sectors electricity, heat and transport there are quite typical kind of policies in EU-15 and the selected accession countries according to this typology though of course there are also many country-specific specialities.

Energy taxes as a financial post-investment push approach have a strong impact on both RUE and – because of broad exemptions for renewables – also for RES. Therefore this instrument cannot be classified clearly to one kind of technology. All considered countries have at least some kind of energy taxes. The most important ones are taxes on transportation fuels, heating oil and electricity with quite high variations among countries.

With respect to RUE non-financial strategies are dominating. The emphasis in the field of electricity currently is put mainly on labelling and in the field of heat on regulatory schemes (building regulations). As can be expected building regulations depend to a large extent on the climate conditions in the countries. Promotion schemes for the RUE in the area of transport are not analysed in this project.

Compared to RUE in general there is much more focus on financial incentives when it comes to RES. In the field of electricity generation from RES post-investment schemes - first of all feed-in-tariffs - strongly dominate and are partly combined with subsidies. Some countries have implemented quotas based on tradable green certificates. In the field of heat generation from RES strong emphasis is given to investment subsidies which often are combined with tax incentive schemes – especially reduction of VAT and income tax. Promotion schemes in the field of transport are heavily dominated by post-investment tax incentives, above all tax exemptions of biofuels and relatively high taxation of fossil fuels.

2 STATE-OF-THE-ART OF RENEWABLE ENERGY SOURCES IN EU-15 AND SELECTED ACCESSION COUNTRIES

Aim of this chapter is to give an overview on the state-of-the-art of Renewable Energy Sources (RES) in the considered EU-15 and Accession countries. Thereby, according to the sectoral distinction, electricity, heat and transport will be treated separately. Besides current penetration, future potentials will be also discussed shortly. Potentials are in this context based on a recent assessment undertaken within the EU research project **Green-X**¹ and FORRES 2020².

2.1 Electricity

In absolute terms electricity produced by renewable energy sources (RES-E) in the EU-15 countries amounted to roughly 415 TWh in 2001, corresponding to a share of 15.5% of gross electricity consumption. For the selected Accession countries corresponding figures are about 4 TWh and 3.7%, respectively.

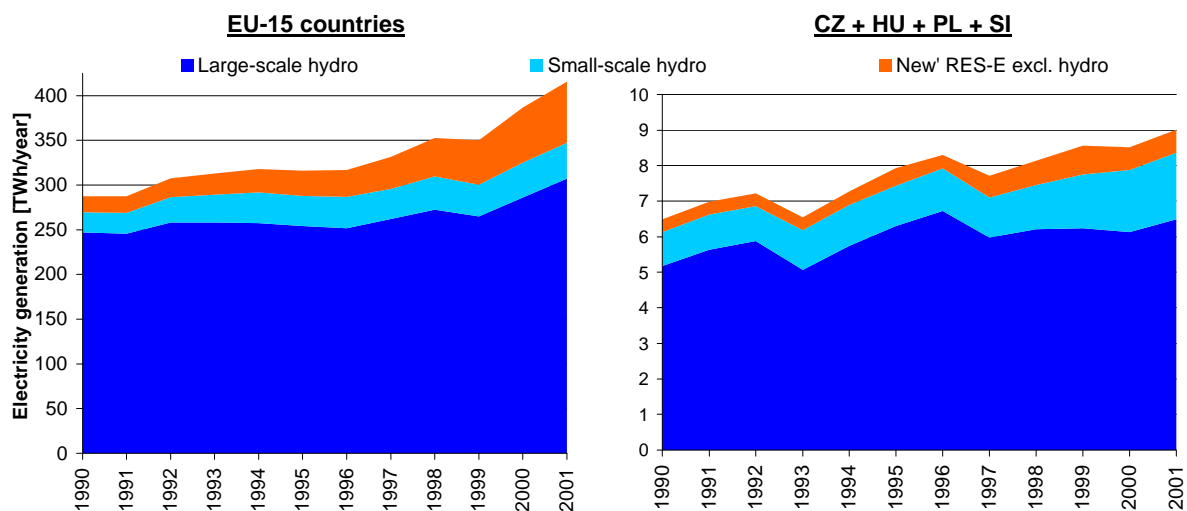


Figure 2.1: Historical development of RES-E in EU-15 and selected Accession countries.

Figure 2.1 illustrates the historical development of RES-E³ for both EU-15 as well as the selected Accession countries. As can be seen, hydropower is the dominant source, but 'new' RES-E⁴ such as

¹ The research project **Green-X** is an ongoing joint European research project funded within the 5th framework program of the European Commission, DG RESEARCH – for details please visit www.green-x.at.

² The FORRES 2020 study was initiated and financed by the European Commission, DG TREN. Aim of the ongoing project, carried out by an international consortium of research and consultancy partners, is to provide an in-depth analysis of current RES policies and to provide forecasts of the future development for all EU-27 countries. For details please contact the project coordinator Mario Ragwitz (Fraunhofer-ISI, Germany - E-mail: Mario.Ragwitz@isi.fhg.de).

³ Based on EUROSTAT data, which are only up-to-date until 2001. For many RES, e.g. wind-onshore and PV, more recent data from sector organisations and national statistics have been used. Generally EUROSTAT data were modified, where alternative data proved to be more accurate.

biomass or wind are well on track. Figure 2.2 provides some insights for these technologies with respect to their historical development (left-hand side) as well as a breakdown of their production by country for 2001 – both for EU-15 countries only. Wind energy represents the RES-E source with the highest growth rates of about 38% in electricity production over the last ten years. No such figure was included for the considered Accession countries as hydropower accounts for 92% of the RES-E production and, of the other RES-E options, only biomass and wind were of relevance.

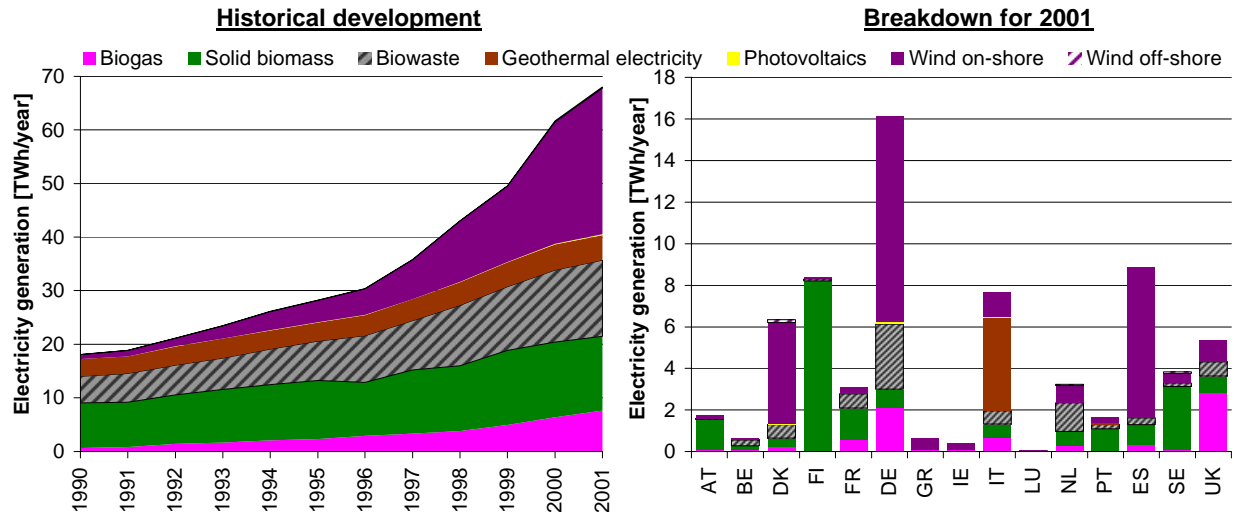


Figure 2.2: 'New' RES-E in EU-15 countries: historical development of electricity generation from 1990 to 2001 (left-hand side) and generation breakdown for 2001 by country (right-hand side)

As can be seen in figure 2.2, RES-E such as hydropower or wind energy represent energy sources characterised by a natural volatility. Hence, in order to provide an accurate formal description, historical data for RES-E had to be translated into electricity generation potentials – the achieved potential. In addition, future potentials were assessed taking into account the country-specific situation as well as realisation constraints. Figure 2.3 depicts the achieved and additional mid-term potential for RES-E by country – for both EU-15 and selected Accession countries. For EU-15 countries, the already achieved potential for RES-E equals 386 TWh⁵, whereas the additional realisable potential up to 2020 amounts to 1078 TWh. Corresponding figures for the Accession countries are 9 TWh for the achieved potential and 87 TWh for the additional mid-term potential.

⁴ In general, definitions of RES-E sources are made in accordance with the Directive for the promotion of electricity produced from renewable energy sources in the internal electricity market, 2001/77/EC. The assessed technologies include hydropower (large and small), photovoltaic, solar thermal electricity, wind energy (onshore, offshore), biogas, solid biomass, biodegradable fraction of municipal waste, geothermal electricity, tidal and wave energy.

⁵ The electricity generation potential represents the output potential of all plants installed up to the end of each year. Of course, figures for actual generation and generation potentials differ in most cases – due to the fact that in contrast to the actual data, potential figures represent, e.g. in case of hydropower, the normal hydrological conditions, and furthermore, not all plants are installed at the beginning of each year.

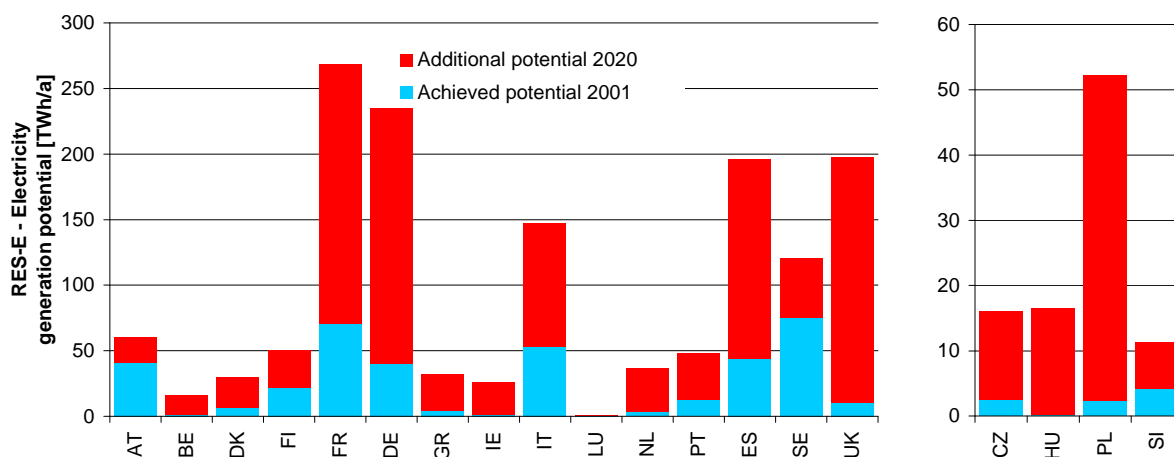


Figure 2.3: Achieved (2001) and additional mid-term potential 2020 for RES-E in EU-15 and selected Accession countries. Source: Green-X, FORRES 2020.

The country-specific situation with respect to available RES-E options is shown in more detail below. Figure 2.4 depicts the share of the various RES-E in the *achieved* potential by country. As already mentioned, (large-scale) hydropower dominates current RES-E generation in most EU-15 countries. However, for countries like Belgium, Denmark or the Netherlands – all characterised by rather poor hydro resources – wind, biomass or biowaste are in a leading position. Within the Accession countries, hydropower accounts for 92% of the RES-E production and, among the other RES-E options, only biomass and wind were of relevance – e.g. in the Czech Republic biomass electricity accounts for roughly 15%.

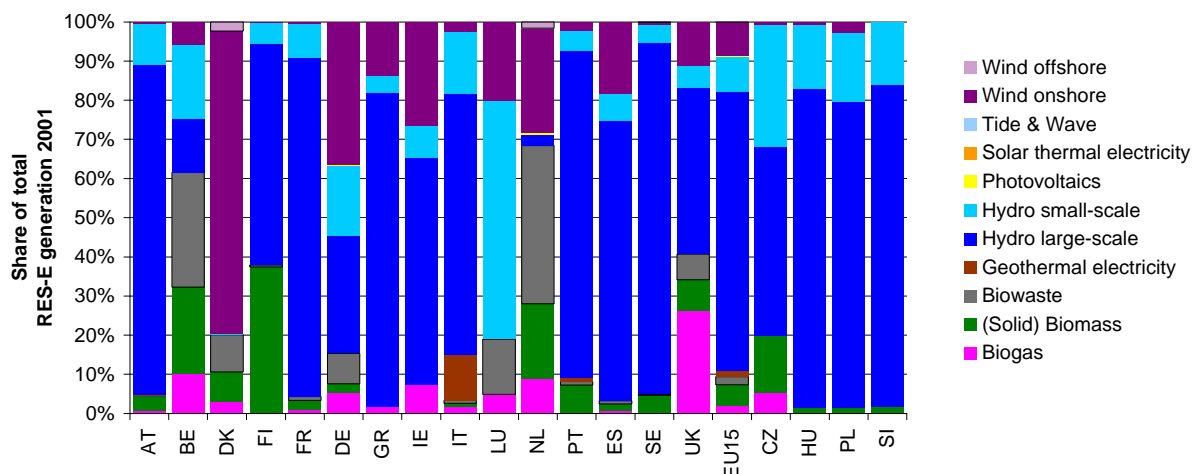


Figure 2.4: RES-E as a share of the total achieved potential in 2001 for EU-15 and selected Accession countries. Source: Green-X, FORRES 2020.

Figure 2.5 illustrates the share of different energy sources in the *additional* RES-E mid-term potential by country for the time horizon up to 2020. Within EU-15, the largest potential occurs in the sector of wind energy followed by solid biomass and biogas – but promising future options also include tidal and wave or solar thermal energy. Within the considered Accession countries the largest potentials exist in the sectors of solid biomass and biogas followed by wind energy. Unlike the situation in the EU-15, the refurbishment and construction of large hydro plants holds significant potentials.

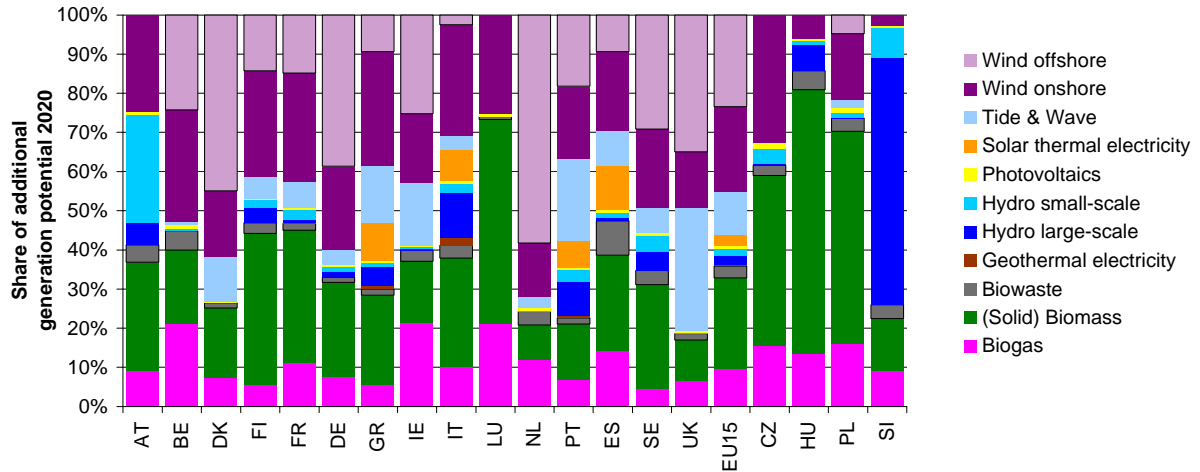


Figure 2.5: RES-E as a share of the total additional realisable potential in 2020 for EU-15 and selected Accession countries. Source: Green-X, FORRES 2020.

Finally, in order to give a better illustration of the current economic conditions of the various RES-E options, exemplary marginal electricity generation costs are depicted in figure 2.5.

Generation costs⁶ refer to the year 2002 and, hence, are expressed in €₂₀₀₂. The broad range of costs for several RES-E reflects both resource-specific conditions (such as are relevant, e.g. in the case of photovoltaics or wind, which appear between and also within countries) and the availability of technological options – compare, e.g. co-firing and small-scale CHP plants for biomass.

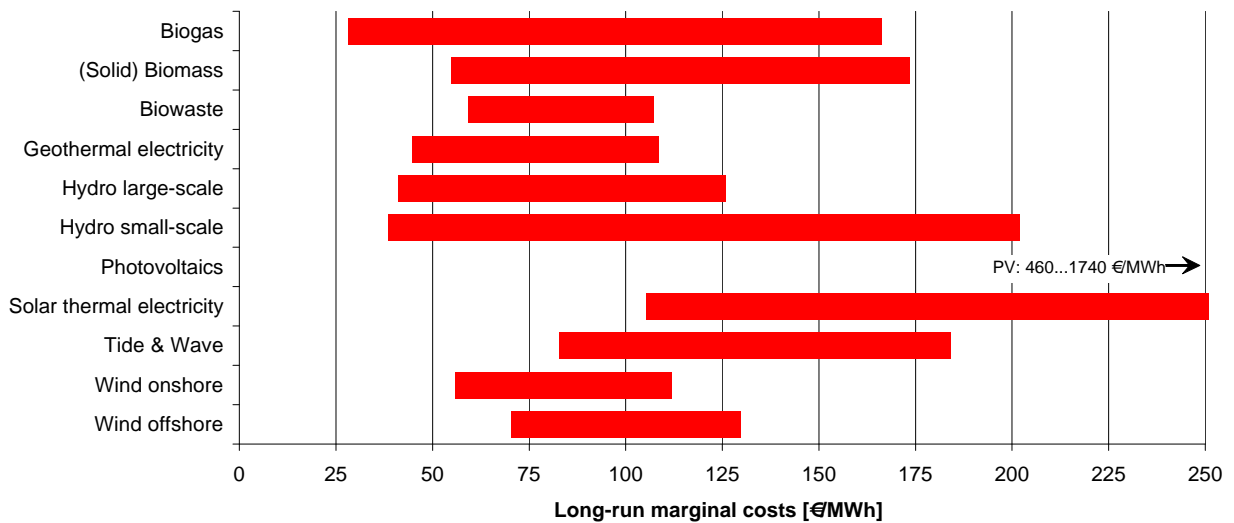


Figure 2.6: Long-term marginal generation costs (for the year 2002) of different RES-E technologies

⁶ Thereby, for long-term marginal generation costs (as applied to new plants), a default capital recovery factor is used – based on the following settings: interest rate $z = 6.5\%$; payback time $PT = 15$ years.

2.2 Heat

Figure 2.7 to Figure 2.9 illustrate the current (2001) situation as well as possible future potentials (2020) of RES production in the heat sector (RES-H) for both EU-15 and selected Accession countries. Currently the use of biomass (mainly combustion of wood) dominates the RES-H sector both in the EU-15 and Accession countries. The mid-term potential for the EU-15 shows a more balanced split between the three renewable sources considered: biomass heat (grid connected and households), geothermal heat (grid connected and heat pumps) and solar thermal installations.

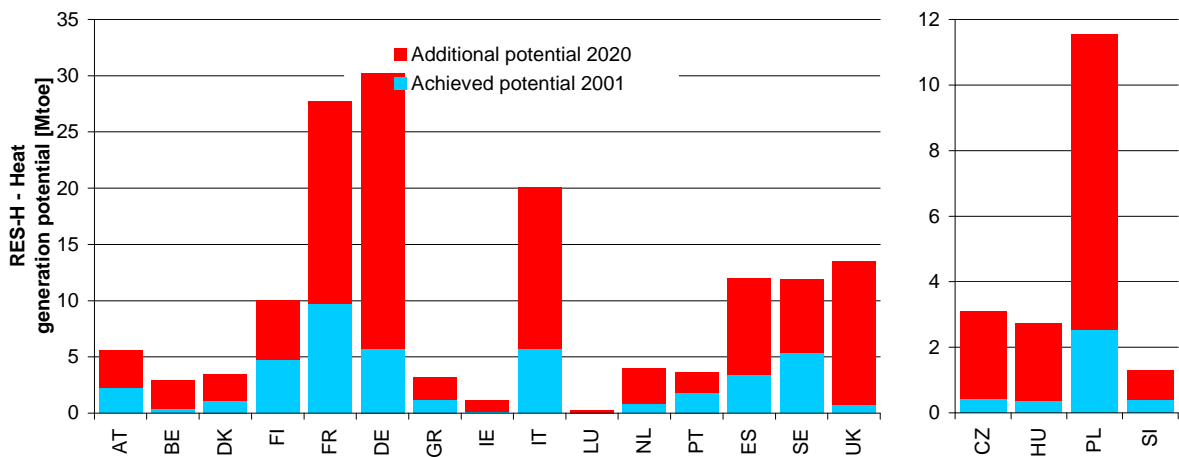


Figure 2.7: Achieved (2001) and additional mid-term potential 2020 for RES-H in EU-15 and selected Accession countries. Source: FORRES 2020

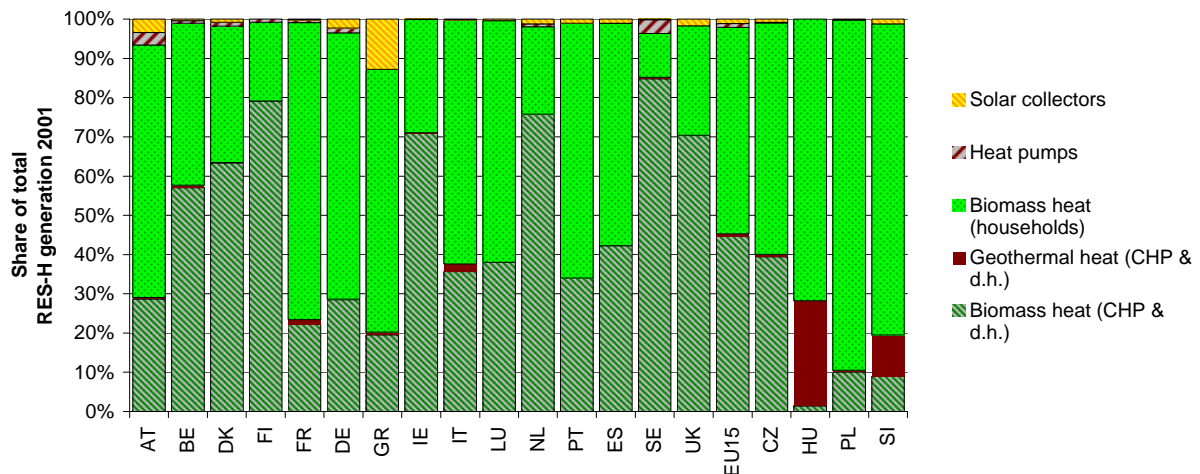


Figure 2.8: RES-H as a share of the total achieved potential in 2001 for EU-15 and selected Accession countries. Source: FORRES 2020.

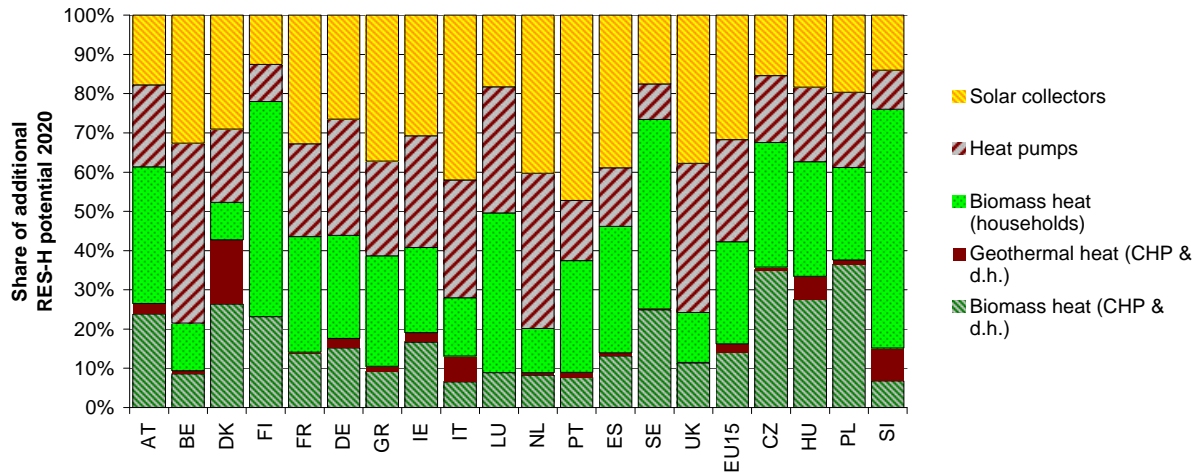


Figure 2.9: RES-H as a share of the total additional realisable potential in 2020 for EU-15 and selected Accession countries. Source: FORRES 2020.

2.3 Transport

In the transport sector, the achieved potentials for 2001 showed 994 ktoe for the EU-15, and 88 ktoe for the considered Accession countries. Major production capacities have been set up in Germany and France followed by Italy, Spain and the Czech Republic. For the additional mid-term potential up to 2020, EU-15, led by France, Germany and Spain, accounts for 21,732 ktoe. Considered Accession countries contribute 4,365 ktoe. As observed in figure 2.10, the major players among them are Poland, Hungary and the Czech Republic.

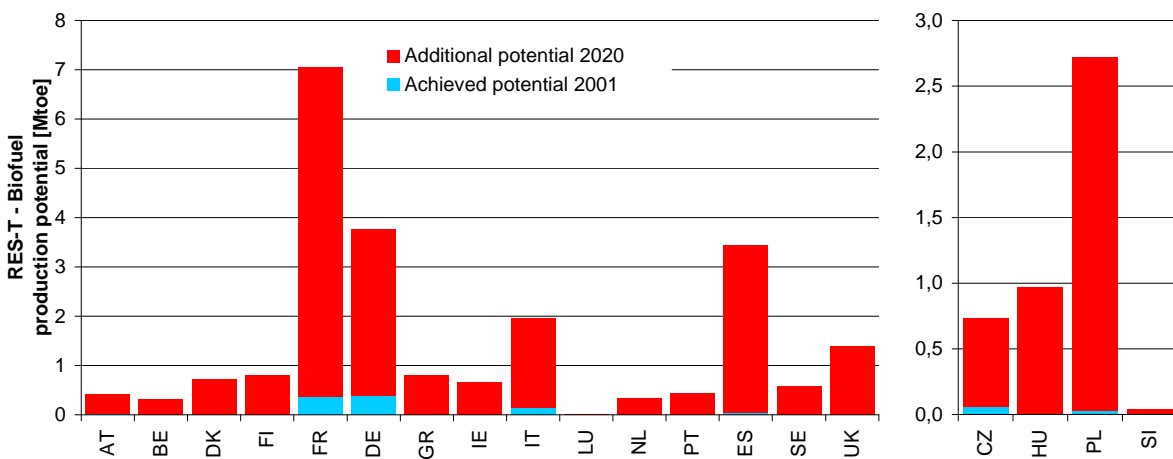


Figure 2.10: Achieved (2001) and additional mid-term potential 2020 for RES-T in EU-15 and selected Accession countries. Source: FORRES 2020

The mid-term potentials shown above are based on the assumption of 15% of the arable land being used for the production of biofuels. The split between biodiesel (rapeseed and sunflower) and bioethanol (wheat and sugar beet) depends on the quality of soil, climatic conditions and the historically observed share of these crops. Additionally, secondary biofuels were considered. Presently the production of biofuels from solid biomass (lignocellulose) is still characterised by high production costs and is therefore not considered as a relevant option before the year 2010. Furthermore this feedstock shows strong competition to biomass use in the sectors of heat and electricity production.

The liquid biofuels sector is influenced by different community-level policies such as the Common Agricultural Policy for the supply of raw materials. It is therefore important to note that the additional mid-term potential forecasts are based on the actual and future land available for growing the different crops for the production of biofuels, as well as the average crop yields for each particular country. In Accession countries, a gradual increase of the agricultural production efficiency is assumed in the future.

3 CLASSIFICATION OF PROMOTION STRATEGIES

3.1 Dimensions in the classification

Financial incentives or not. Given that financial aspects will be central to the project, it has been decided to use the distinction between schemes with and without significant elements of financial incentives (subsidising, taxation etc.) as the major line of division. This naturally implies a specific judgement in each case to establish the significance, and moreover it is not necessarily clear-cut what financial incentives are. Generally, they are means that involve explicit use of economical resources to further the process. On the other hand, most promotion schemes have economical implications and the distinction between “active” incentives and “passive” implications is not always clear. However, in this project the distinction is just applied as a working tool and it is not crucial to identify the “correct” dividing line, whatever this is.

The schemes with significant financial incentives are envisaged, as a general rule, to have the heaviest financial impacts in *absolute* terms. This does not mean that the non-financial and indirect schemes can be very costly in *relative* terms, i.e. seen in relation to their impacts. Indeed they frequently are, due to very small and uncertain impacts.

Subsidising is any financial input, including tax relief, to lower the costs of RES or RUE projects, be it prior to, under or after the investment phase. Examples of subsidies before the investment phase are R&D-support for RES/RUE-technologies, subsidising of the manufacturing of these and demonstrations and pilot projects.

Subsidies in direct connection with the investments may be direct grants or tax relief schemes. Also, the subsidies may be in the form of more attractive financing opportunities than can be obtained in the market. Post-investment subsidies (during the operation of the RES/RUE-schemes) may be assured feed-in tariffs or bonus schemes per kWh of electricity generated.

Stages of the process. A further central characteristic is the timing of the promotion schemes in relation to the implementation: before, during or after. Pre-implementation schemes are aiming to prepare the ground for the initiatives, either targeted specifically at the measure in question (e.g. by demonstration projects) or in a broader sense (for instance by furthering the technological development in the field). RD&D form a crucial part of this stage, to the extent that the two can be seen as almost equivalent, especially if demonstration is not perceived too narrowly as demonstration projects.

Schemes applied during (or targeted at) the implementation are aiming directly at promoting the investment/implementation whereas post-implementation schemes aim to maintain the benefits (e.g. by ensuring good maintenance or low energy consumption). The implementation may have the form of investments in technologies/systems or activities.

Indirect promotion schemes do not address the specific RES/RUE technologies but influence their development and application indirectly through their impact on the framework of the technologies. There are two differences with respect to this project’s treatment of the indirect schemes. Given that it includes RUE technologies in addition to RES technologies, the range of technologies and initiatives addressed directly is wider, and consequently there is less left for indirect measures. Moreover, energy taxation is given a special treatment and therefore e.g. ecotaxes on fossil fuel consumption are not included under the indirect schemes.

In addition to the above direct measures - targeted directly at the promotion of RES and RUE - various indirect schemes exist generally representing pull approaches. These may include education and information efforts as well as R&D policies and support schemes in generic terms.

Push and pull approaches. For both financial and non-financial schemes, a distinction can be made between push and pull approaches. The *push* approach is aiming to make it less attractive not to comply with the desired development. In the field of financial promotion schemes, the primary push instruments are taxation, e.g. of fossil fuels. The non-financial push approaches are usually called regulatory (or normative) schemes and may be prohibitions, mandates, standards, codes and the like. The *pull* schemes, on the other hand, are aiming to make the desired choices more attractive and can be termed incentives-based or voluntary approaches⁷. The major financial pull promotion schemes are subsidies in various forms, whereas non-financial pull schemes can be education, information and provision of guidance, test centres. An important contribution to the pull approach may come from removal of existing counter-productive schemes (i.e. schemes pushing or pulling in the wrong direction) and contexts, for instance so-called “perverse subsidies”, currently serving as obstacles to the development and application of RES and RUE technologies and systems.

Actors, stakeholders and organisation. Often the initiative for new promotion schemes or changes in existing schemes comes from national, regional or local public sector bodies but this is not necessarily the case. Also changes in the promotion schemes may be delivered through other different organisations that may have different status. It is significant in this context whether existing organisations may be used for this (with or without changes of the organisation) or whether organisations must be set up.

3.2 Matrix of promotion schemes

Table 3.1 illustrates the overall matrix summarising the main dimensions of the categorisation of promotion schemes.

Table 3.1 Matrix summarising the main dimensions of promotion schemes used in this project as well as examples of schemes

	Financial		Non-financial	
	Push	Pull	Push	Pull
Pre-investment/ implementation	energy taxes	support of R&D, manufacturing, demos	Prohibition, mandates, quotas, building codes, standards	voluntary agreements, labelling, grid access regulation
Investment/ implementation	energy taxes	investment grants, financing or tax relief		
Post-investment/ implementation	energy taxes	feed-in tariffs, energy tax, Quota obligation (TGC)		
Indirect schemes	(energy tax)			education, campaigns, project framework conditions

In the following, the main dividing line is between financial and non-financial schemes, and secondly between the different phases. Regarding the push/pull dimensions, the main push promotion schemes are taxation and the regulatory instruments.

⁷ Indeed, the financial push instruments to some extent are voluntary, too, but with a penalty on non-compliance.

In the following chapters of this report the rough matrix of table 3.1 is applied on promotion schemes for RES and RUE with respect to electricity, heat and transport.

In practice, the picture is less clean-cut than indicated by table 3.1. Many promotion schemes may be viewed from different angles, and by different actors, thereby ending up in different parts of the categorisation. Moreover, clusters of promotion schemes are often applied, e.g. combining the push of taxes with the pull of subsidies or the push of regulation with the pull of subsidies. Another frequent combination is to make subsidies conditional on the compliance with certain energy standards.

3.3 Direct promotion schemes with financial incentives

Under this heading are promotion schemes with significant contents of financial instruments. First taxation is given a special treatment since this typically is operating across the different phases of the process.

Energy and carbon taxes. Taxes on energy provide the most significant push instrument with financial elements that may be applied before, during and after the investment phase. They may serve different objectives, even at the same time, and consequently can be designed in different ways.

First, they may serve other objectives than environmental or energy concerns, typically fiscal, as sources of revenue or to influence behaviour from other concerns than environmental (e.g. with a general view to reduce imports).

Secondly, even within the framework of environmental concern there are different approaches: to reduce energy use as such, to reduce fossil or nuclear energy use, to reduce CO₂-emissions (carbon tax) or to reduce other forms of negative environmental impacts. These different approaches may or may not be in conflict with each other.

Energy taxes may be applied at the end-user energy consumption, for instance of electricity, or it may be directly proportional to the use of fossil fuels or the emissions of CO₂ or other pollutants. In the latter case, there is an inherent twisting in favour of RES, though such forms of energy taxes may also serve to promote RUE initiatives, and typically will. In contrast, energy taxes applied at the end-user level do not favour RES technologies unless they are exempted from the energy tax. At the same time, energy tax improves the viability of investments into energy projects, including RES, by making energy more costly.

parts of the energy consumption may be exempted from energy taxes. This can be based on energy concerns - e.g. to promote RES technologies - but also to meet a variety of other reasons, for instance commercial or social considerations. Such exemptions may have a substantial influence on the overall impact of the energy taxation schemes.

Pre-investment schemes. Except for energy and carbon taxes, most schemes under this heading represent pull approaches. During this part of the process a key issue is to promote the development of technologies and systems for RES and RUE projects through R&D support, subsidising of manufacturing, demonstration and pilot projects etc. It should be noted that the development could address not only the technologies as such but also the organisation around these and the general conditions for their widespread implementation. For example, the objectives of demonstration projects may be on the one hand to test new technologies and on the other to increase awareness and to initiate changes in society to facilitate their introduction.

During the investment phase. Under this heading are subsidies linked to the investment as such or the capacity of the technologies/systems while subsidies linked to the generation of energy belong under the post-investment heading. Again most schemes besides energy and carbon taxes represent pull approaches, through remedies such as direct grants, tax relief and access to low-interest financing sources (possibly by means of government security). These may be more or less general. They may be restricted to RES/RUE investments or general opportunities that may be also be utilised

for RES/RUE investments. In contrast, they may be limited even further than to RES/RUE projects, to specific types of technology and/or to approved technologies.

An important type of subsidy, not only under the investment heading, is the provision of loans with low (or zero) interest or other favourable conditions. Often the subsidy may have the form of government security, enabling the project developer to attract financing at lower interest rates (but transferring the risks to the government). This is particularly relevant in conjunction with heavy financial burdens, i.e. during the implementation phase. Further subsidies may be provided either towards a given project or through tendering or bidding processes.

Post-investment schemes. Here the objective generally is to ensure good economics of the projects after the implementation has been carried out. This is assessed in comparison with references in the surroundings of the project and hence can be furthered by increasing the substituted costs (e.g. through taxation or by introducing stronger and more expensive regulatory demands).

Apart from energy and carbon taxes, the post-investment promotion schemes are most of the pull approach type. Examples of this type include feed-in tariffs, partial or total exemption from energy tax for energy consumption covered by renewable energy or tax alleviation/exemption for buildings or vehicles that are particularly energy efficient or based on RES. Also tradable green certificates should be mentioned here. Obviously the according quota obligation occurs to be in principle non-financial.

Feed-in tariffs are probably the most significant instrument in this category - or at least have the potential to be so. So far they have been confined to RES-E projects and this most likely will continue to be the case in the future. However, it may also become a relevant issue in conjunction with district heating schemes and natural gas networks.

3.4 Direct promotion schemes without financial incentives

This section treats schemes without financial incentives. Here the implementation and the post-implementation phases have been combined since it is considered not to be convenient to distinguish. Thus, these schemes have been divided into two main categories - pre-implementation schemes that are generic tools for promoting the RES/RUE technologies and schemes that are linked to the implementation and operation of the projects in case. First, however, the various regulatory instruments are treated since these operate as a general background for the activities before, during and after the implementation.

Regulatory instruments. Under the heading “regulatory promotion schemes” instruments aiming to push the development of RES/RUE by means of e.g. prohibitions, obligations, mandates, standards and codes are collected. They can be targeted both towards the energy demand side and the supply side.

This may be by prohibiting certain energy supplies (e.g. coal, nuclear power) or by mandating certain quotas of renewable energy or clean fuels. Further, building codes have been one of the most significant factors in improving the energy performance of buildings, particularly related to heating, but also to some extent influencing electricity demand. In line with this, standards could be an important factor in promoting energy efficiency and low CO₂-emissions of vehicles if they were to include requirements to fuel economy and CO₂-emissions (which they are not today). Even the present emission standards serve as a vital technology driver in vehicle technology (which may or may not contradict fuel economy and low-CO₂ objectives).

Quotas or mandates requiring certain sectors or actors to meet specified targets as to the establishment of RES and the like, may become an instrument of increased significance in the future. It is usually used for energy supply side measures (RES or co-generation) because this is most convenient with respect to specification of requirements, but it may also be used for RUE activities. For instance, the voluntary agreement between the EU Commission and the European car manufacturing industry about the development of new passenger cars' CO₂-emission could in principle

have been applied as a mandate. The quotas/mandates may be specified in both relative and absolute terms, although RUE mandates will probably typically be in relative terms.

It deserves notice that this regulation may be more or less powerful in the sense that the consequences of non-compliance differ considerably.

The above regulatory schemes are representing push approaches but also there can be regulatory schemes based on pull approaches. The latter type regulates the behaviour of the surroundings of the RES/RUE-projects, by restricting the barriers that these surroundings can impose on RES/RUE-projects. An example of this is assured grid access or assured access to streets and parking space for certain clean vehicles.

Pre-implementation schemes. The pre-implementation promotion schemes are characterised on the one hand by being targeted at the specific RES or RUE solutions concerned and on the other hand by not being directed directly at the specific project/investment. The former distinguishes them from the indirect schemes, which are generic instruments aimed at improving the conditions for RES/RUE-initiatives whereas the latter separates them from the project-related instruments during and after implementation-related (covered in next section).

Under this heading are promotion schemes that are not based on subsidies or taxes, for instance negotiated agreements between utilities and the government or renewable energy certificates. They typically address the framework of projects (e.g. investment or capacity totals) rather than specific projects and in this form can be perceived as pre-implementation schemes. In principle, though, they may also be about specific projects but this is disregarded.

Quota obligations not established through voluntary agreements are a regulatory instrument (treated above).

Other examples of direct pre-implementation promotion schemes include type approval or energy labelling schemes of the RES/RUE technologies/systems concerned.

Promotion schemes of the specific project - during and after implementation. The objective of these promotion schemes is to promote and/or facilitate the implementation of the RES/RUE project and later the operation of it. Schemes with significant financial elements are treated in a previous chapter.

Some of the instruments treated in the previous section may also be useful during and after the implementation of the project. This applies in particular to items such as guides, training and various functions serving as knowledge back up. These may be made generally available to reduce the (perceived) risks and uncertainties linked to new technologies. But in addition they may be directed at the concrete project implementation situation among other things to ensure the quality of the work.

A different set of promotion schemes may aim to give special advantages linked to energy efficiency and/or utilisation of RES. In addition to tax alleviation (treated previously in the document), for example offering access to certain parts of the traffic infrastructure could be mentioned here.

3.5 Indirect schemes and framework conditions

The common feature of the indirect promotion schemes is that they are aiming to improve the framework conditions for promotion of RES/RUE rather than being directed at the specific technologies/systems/activities concerned. Examples of such schemes are education, training, awareness and the general framework of RES/RUE projects (in the form e.g. planning procedures, installation permits, grid access regulation and general environmental regulation).

Planning procedures, installation permits etc. have a particular influence on supply side projects, including co-generation and district heating networks. However, they may also have a significant influence on the opportunities for RUE initiatives e.g. through urban renewal activities or through

requirements to buildings. Likewise regulation of the access to energy networks such as the power grid, district heating and natural gas systems is particularly important for RES technologies (not least RES-E systems).

A crucial part of the framework for RUE and RES projects is formed by the way energy tariffs are designed. For instance, the share of the tariffs that is proportional to the energy consumption has a substantial impact on the incentives to save energy or to shift to RES technologies. In contrast, increased incentives to save energy may be provided by means of measures such as progressive tariffs (i.e. tariffs increasing with increased consumption).

Promotion instruments directed towards conventional energy supply technologies (fossil/nuclear) constitute another important part of the framework. In particular “perverse subsidies” - i.e. counter-productive subsidising from the viewpoint of the project (of fossil fuels or nuclear energy) - may deteriorate the framework conditions for RUE/RES initiatives. But other instruments may be applied as well. The background for such priorities may be energy and environmental strategies based on different elements than RUE/RES (e.g. natural gas instead of coal or domestic resources instead of imported). Alternatively, it may be based on different priorities, e.g. employment or regional development concerns.

4 ENERGY TAXES

One of the most important indirect promotion schemes is the use of energy tax to provide disincentives for the non-renewable solutions or solutions based on high-energy consumption. However, this is a key instrument in this project, with its focus on the financial aspects, and therefore it is treated separately. Moreover it strongly affects the use of RES as well as RUE and therefore this issue is treated in this separated chapter. Hence, in the following main relevant energy taxes are listed for all countries considered in this report.

The following tables show a cross-country comparison of the most important energy taxes.

The following table compares the energy tax for light fuel oil products – excluding kerosene – for stationary applications in the 19 countries. Column two in the table identifies specific applications of the tax (e.g. for specific fuel qualities, application groups) – to the extent no limitations are given, the tax can be assumed to be universally applicable with the type of energy carrier covered. Some minor variations are left out of the table. They are explained in the text below.

Table 4.1 A comparison of taxes on light fuel oil in the EU-15 and 4 selected accession countries

Light fuel oil	Specific description	€Cent per kWh
Austria	Normal quality	0.30
	Extra light fuel	0.69
Belgium	Heating	0.08
	Industrial applications	0.19
Czech Republic		---
Denmark	Light fuel oil generally	2.3
	Gas oil/diesel for non-transport	2.5
Finland		0.68
France		0.57
Germany		0.62
Greece	Industrial, commercial	2.6
Hungary	Diesel for non-transport	2.7
Ireland		---
Italy	Gas oil	4.0
	Orimulsion	0.02
Luxembourg	Industrial, commercial	0.19
	Heating	0.05
Netherlands	Aggregation of taxes	2.0
Poland		0.36
Portugal		0.23
	High-sulphur quality	0.11
Slovenia		0.24
Spain		0.85
Sweden	Heating	2.7
UK	heating	4.4

Table 4.2 A comparison of taxes on heavy fuel oil in the EU-15 and 4 selected accession countries

Heavy fuel oil	Specific description	€Cent per kWh
Austria		---
Belgium	< 1% S	0.05
	> 1 % S	0.16
Czech Republic		---
Denmark		---
Finland		---
France		0.16
Germany		0.15
Greece		0.34
Hungary		---
Ireland	Marked gas	0.11
Italy	Heating, <1%S	0.51
	Heating, >1%S	1.1
	Industrial, <1%S	0.26
	Industrial, >1% S	0.51
Luxembourg	<1% S	0.05
	>1%S	0.16
Netherlands		---
Poland		---
Portugal		---

Slovenia		0.12
Spain		0.12
Sweden		---
UK		---

The following table compares energy taxes on natural gas for stationary applications. The intervals reflect among other factors the size of the user and the applications.

Table 4.3 A comparison of taxes on natural gas for stationary applications in the EU-15 and 4 selected accession countries

Natural gas for stationary applications	€Cent per kWh
Austria	0.40
Belgium	---
Czech Republic	---
Denmark	2.45
Finland	0.23
France	---
Germany	0.03
Greece	---
Ireland	---
Italy	0.1-1.5
Luxembourg	---
Netherlands	0.1-1.1
Poland	---
Portugal	---
Slovenia	---
Spain	---
Sweden	
UK	0.05-0.24

The table below compares energy taxes levied on coal. As can be seen, it is only a few countries where there is an energy tax on coal.

Table 4.4 A comparison of taxes on coal in the EU-15 and 4 selected accession countries

Coal	Comments	€Cent per kWh
Denmark	Pit coal, including CO ₂ duty	2.46
	Lignite, including CO ₂ duty	2.80
Finland		0.60
Netherlands		0.16
UK		0.31

As can be seen in the following table all EU countries have taxes on petrol and diesel as transportation fuels. Certain special examples of are left out of the table. With respect to petrol, only unleaded petrol is included.

Table 4.5 A comparison of taxes on transportation fuels in the EU-15 and 4 selected accession countries

Transportation fuels (petrol and diesel)	Specifics	Petrol, unleaded €cent per kWh	Diesel €cent per kWh
Austria		4.49	3.19
Belgium		5.60	3.28
Czech Republic		3.51	2.71
Denmark	Stations with vapour return	6.10	---
	Stations without vapour ret.	6.05	---
	Standard	---	4.60
	Low-sulphur	---	4.18
Finland	Normal quality	6.26	3.72
	Reformulated or low-S	6.17	3.44
France	Standard	6.50	4.64
	Low-sulphur		2.98
Germany		6.2	4.28
Greece		3.32	2.88
Hungary		3.41	3.07
Ireland	Standard	4.43	3.42
	Heavy-S diesel	---	4.00
Italy		6.0	---
Luxembourg		4.11	2.86
Netherlands	Standard	6.9	---
	Low-S	6.8	3.75
Poland	standard	4.29	3.32
	0.05-0.2%S	---	3.28
	0.005-0.05%S	---	3.09
	<0.005%S	---	3.07
Portugal		3.19	2.78
Slovenia		4.05	3.27
Spain		4.71	3.33
Sweden	Environmental class 1	5.51	3.82
	Environmental class 2	5.54	4.10
	Other	6.32	4.48
UK	Standard	8.7	8.35
	Low-S	8.1	9.45

The final table contains electricity taxes at end-user level - i.e. levied at the net electricity use.

Table 4.6 A comparison of taxes on electricity in the EU-15 and 4 selected accession countries

Electricity	Comments	€Cent per kWh electricity
Austria		1.5
Belgium		0.14
Czech Republic		---
Denmark	Electricity for heating of dwellings etc.	6.73
	Remaining electricity use	7.6
Finland	Manufacturing sector	0.42
	Remaining economy	0.69
France		---
Germany		1.28
Greece		---
Hungary		---
Ireland		---
Italy	households	0.21
	Industrial use	0.30
Luxembourg		---
Netherlands	< 10 MWh/a	6.01
	10-50 MWh/a	2.00
	50 MWh/a - 10 GWh/a	0.61
Poland		---
Portugal		---
Slovenia		---
Spain		4.86% (not an absolute figure)
Sweden	households	2.14
	manufacturing, commercial	0
	other sectors	1.51
UK	ordinary rate	0.69
	reduced rate	0.14

Austria

In Austria the following energy taxes exist:

light fuel oil for heating: 3.6 €-cent per kg

extra light fuel oil for heating: 6.9 €-cent per litre

natural gas: 4.4 €-cent per m³

petrol: 40.7 €-cent per litre

diesel (transport fuel): 28.2 €-cent per litre

It deserves notice that the tax on diesel as transportation fuel is 4-8 times higher than that levied on the same product applied as heating fuel. This difference is due to social considerations.

There is an electricity tax at end-user level of 1.5 €-cent/kWh electricity.

Goods-producing companies have their electricity and natural gas taxes refunded to the extent that it makes more than 0.35% of value added.

Generation of electricity for own requirements less than 5,000 kWh/year and deliveries from e.g. photovoltaic plants to utilities are exempted from electricity tax.

On top of all energy taxes there is a 20% VAT.

Belgium

In Belgium the following energy taxes exist:

light fuel oil for heating: 0.84 €-cent per litre

light fuel oil for industrial purposes: 1.9 €-cent per litre

heavy fuel oil less than 1% sulphur: 6.2 € per tonne

heavy fuel oil more than 1% sulphur: 18.6 € per tonne

natural gas: 0.03 €-cent per MJ

LPG: 37.2 € per tonne

petrol: 0.5 € per litre

diesel as transport fuel: 0.61 € per litre

There is an electricity tax at end-user level (off the low-voltage grid) of 1.4 € per MWh.

There are a number of exemption schemes, including for use in commercial companies.

Czech Republic

In line with the development in other countries of the former Eastern Bloc, consumer prices on energy, particularly to private households, have increased considerably in the Czech Republic during the 1990s. This should be seen on the background of the very low prices that were in force before this time.

The Czech Republic has the following energy taxes on fuels:

heavy fuel oil: 0.24 € per litre

petrol: 0.32 € per litre

diesel as transportation fuel: 0.24 € per litre

Tax on LPG: 92,7 €/t

There is no energy tax on light fuel oil used for non-transportation applications.

There is no electricity tax at end-user level but a energy tax on electricity production based on nuclear power: 1.5 € per MWh. The revenue of this nuclear levy is used for nuclear waste deposit and management.

There is a tax on emissions of nitrogen oxides of 23.5 € per tonne.

Denmark

In Denmark energy taxes are levied on the primary energy consumption of gasoline, diesel oil, heating oil, coal and natural gas. In addition, there is a tax on electricity consumption at end-user level. On top of the energy tax, there is a VAT-rate of 25% added to the prices, including tax.

Table 4.7. Typical consumer prices for energy (households) distributed on pre-tax part, energy tax and VAT as of 2002. €-cent/kWh energy content in fuels and €-cent/kWh electricity.

	Pre-tax	Energy taxes	VAT	Total
Gasoline	3.8	6.0	2.4	12.2
Diesel oil	4.0	3.6	1.9	9.5
Heating oil	3.5	2.8	1.6	7.9
Coal	0.8	0.2	0.2	1.2
Natural gas	7.8	2.5	2.6	12.8
Electricity	7.5	8.8	4.1	20.4

Generally companies can reclaim energy taxes paid, except for gasoline and diesel oil consumption for transportation applications. In terms of revenue, the gasoline and diesel consumption accounts roughly for between a third and half of the total energy taxes. Roughly a quarter is electricity taxes.

In 1998 a carbon tax scheme for energy products was introduced. Generally, the carbon tax is around DKK 100 (13-14 €) per tonne CO₂. The scheme has very complicated rules for businesses' possibilities to reclaim the carbon tax. Together these possibilities mean that typically businesses will pay up to 90% of the carbon tax. The revenue from it has been used for RD&D activities promoting CO₂-reductions.

In addition there is a SO₂-tax of 0,126 c/kWh.

Finland

The present system in Finland was introduced in 1997 and consists of two parts. First, the basic tax only is applicable to oil products and depending on the type and quality of the fuel, including on its environmental properties. This tax is mainly motivated by fiscal considerations. Secondly, the additional tax which is applied to all fossil fuel types and depends on the carbon content of the fuel. At

present the additional tax is 19,05 Euro per tonne CO₂, except for a 50% reduction of the additional tax on natural gas.

In Finland there are these energy tax rates:

light fuel oil for commercial, industrial and domestic: 6.4 €-cent per litre

heavy fuel oil: 57 € per tonne

coal: 42 € per tonne

natural gas: 2.6 €-cent per Nm³

petrol: 0.56 € per litre

diesel as transport fuel: 0.33 € per litre

There are electricity taxes applied at the end-user level:

4.2 € per MWh in the manufacturing sector

6.9 € per MWh in the remainder of the society

France

There are the following energy taxes for fuels in France:

light fuel oil for domestic applications: 0.0566 € per litre

heavy fuel oil: 0.0185 € per kg

natural gas: 1.19 € per MWh

petrol: 0.59-0.64 € per litre

diesel: 0.65 € per litre

There is no electricity tax.

Germany

In Germany an Ecological Tax Reform was introduced in 1999 with the objective of providing increased incentives for energy savings and utilisation of renewable energy. As the name implies, the reform was seen in the context of a more comprehensive reform of the German tax system. The table illustrates the present tax rates. The electricity tax is added at end-user level while the three others are linked to the gross energy content.

Table 4.8 - Current energy tax rates in €/kWh.

	Tax - €/kWh
Motor fuels, low-sulphur	0.006
Motor fuels, normal sulphur-content	0.009
Fuel oil for heating	0.002
Natural gas	0.016
Electricity	0.0125

Fuels used for electricity generation are exempted from energy tax. In other words, the only energy tax on electricity is the electricity tax. For fuel and electricity use for trains and urban transit systems the energy tax rates are halved compared to those shown in the table.

Greece

There are the following energy tax rates on fuels in Greece:

light fuel oil for industrial and commercial applications: 25 €-cent per litre

light fuel oil for heating purposes: 1.9 €-cent per litre

kerosene, all applications: 25 €-cent per litre

heavy fuel oil: 4 €-cent per kg

petrol: 30-33 €-cent per litre depending on fuel grade

diesel: 25 €-cent per litre

There is no electricity tax.

There are no exemption or refund schemes.

Hungary

In line with the development in other countries of the former Eastern Bloc, consumer prices on energy, particularly to private households, have increased considerably in Hungary during the 1990s. This should be seen on the background of the very low prices that were in force before this time.

There are the following energy taxes on fuels in Hungary:

light fuel oil for non-transportation applications: 26 €-cent per litre

petrol: 31 €-cent per litre

diesel for transportation applications: 27 €-cent per litre

There is no electricity tax in Hungary.

Ireland

There are the following energy taxes on fuels in Ireland:

kerosene: 3.2 €-cent per litre

“green diesel” for stationary applications: 4.75 €-cent per litre

heavy oil: 1.35 €-cent per litre

petrol: 40 €-cent per litre

low-sulphur diesel for transport applications: 30 €-cent per litre

high-sulphur diesel for transport applications: 35 €-cent per litre

There is no electricity tax at end-user level.

A carbon tax scheme is in the process of being gradually introduced. This started in 1999 and the tax is to be fully phased in by 2005. The tax applies to all energy products and is added on top of existing energy taxes.

Italy

There are quite detailed provisions for energy tax systems in Italy, as these examples show:

light fuel oil: 40 €-cent per litre

heavy fuel oil for heating applications, < 1% sulphur: 6 €-cent per kg

heavy fuel oil for heating applications, > 1% sulphur: 13 €-cent per kg

heavy fuel oil for industrial applications, < 1% sulphur: 3.1 €-cent per kg

heavy fuel oil for industrial applications, > 1% sulphur: 6 €-cent per kg

natural gas for household heating, Southern Italy: 3.8 €-cent per Nm³

natural gas for household heating, in the rest of Italy: 7.8 €-cent per Nm³

natural gas for household cooking and hot water, Southern Italy: 3.8 €-cent per Nm³

natural gas for household cooking and hot water, rest of Italy: 4.3 €-cent per Nm³

natural gas for industrial applications: 1.2 €-cent per Nm³

petrol: 0.54 € per litre

The Italian national state has levied electricity tax at end-user level:

private households: 0.21 €-cent per kWh

industrial customers: 0.3 €-cent per kWh

The provinces and towns in Italy can top up the electricity tax. It deserves notice that the tax is lower for private households than for industrial users (but the total price for households and industrial customers depend on the tariff structure of the electricity utilities). Both electricity and gas pre-tax prices are relatively high to domestic consumers in Italy compared with most other European countries.

There is a tax on emissions of NOx: 105 € per tonne.

Luxembourg

There are the following fuel taxes in Luxembourg:

light fuel oil, industrial and commercial applications: 1.86 €-cent per litre

light fuel oil, household use: 0.52 €-cent per litre

kerosene: 1.86 €-cent per litre

heavy fuel oil, <1% sulphur: 0.62 €-cent per kg

heavy fuel oil, >1% sulphur: 1.86 €-cent per kg

LPG, industrial and commercial uses: 3.72 €-cent per kg

petrol: 37.2 €-cent per litre

diesel: 25.3 €-cent per litre

There are no end-user electricity taxes in Luxembourg.

Netherlands

A key issue in the Netherlands is the so-called Regulating Energy Tax (RET), or ecotax, was introduced in 1996 as a contribution towards a more comprehensive reform of the taxation system shifting the taxation from incomes to environmentally damaging activities. The level of the ecotax has been increased several times since its introduction in 1996 and the present level is 0.06 €/kWh, except for large electricity users.

Electric utilities can achieve exemption from the ecotax for electricity based on renewable energy through a system based on green certificates. In addition, production subsidies based on the proceeds from the REB can be applied for electricity based on renewable energy. These two means for subsidising renewable electricity are also applicable for imported electricity based on renewable energy.

There are the following fuel taxes in the Netherlands:

light fuel oil (aggregation of all taxes): 20 €-cent per litre

heavy fuel oil (all taxes): 37.6 € per tonne

coal: 11.57 € per tonne

natural gas, large users above 10 million Nm³/a: 0.7 €-cent per Nm³;

natural gas, large users 1-10 million Nm³/a: 1.06 €-cent per Nm³;

natural gas, medium-sized users 0.17-1 million Nm³/a: 1.07 €-cent per Nm³;

natural gas, medium-sized users 5000-170000 million Nm³/a: 5.79 €-cent per Nm³;

natural gas, small users < 5000 Nm³/a: 12.4 €-cent per Nm³;

petrol: 0.63 € per litre

diesel for transportation: 33 €-cent per litre

diesel for heating purposes: 4.65 €-cent per litre

There is an electricity end-user tax depending on the size of the user:

below 10 MWh/a: 60.1 € per MWh

in the interval 10-50 MWh/a: 20 € per MWh

in the interval 50-10000 MWh/a: 6.1 € per MWh

Poland

Consumer prices on energy, particularly to private households, have increased considerably in Poland during the 1990s on the background of the very low prices that were in force before this time.

Energy taxes for fuels in Poland include:

light fuel oil for heating and other stationary applications: 4.37 €-cent per litre

petrol: 39 €-cent per litre

LPG: 101 € per tonne

diesel, depending on sulphur content: 27-29 €-cent per litre

There is an end-user electricity tax of 4.48 € per MWh in Poland.

The following environmental taxes exist in Poland:

CO₂: 0,037 c/t

SO₂: 70,14 €/t

NO_x: 9.8 €/tonne (calculated as NO₂).

CO: 19,47€/t

Dust: 46,76 €/t

Soot: 192,96€/t

Benzo apiren: 49,63 €/kg

Portugal

The energy excise duty (ISP⁸, tax on mineral oil products), is an energy tax at the end-user level. It applies to oil products such as gas oil, gasoline, low and high sulphur fuel oil, kerosene, and LPG (liquefied petroleum gases). The energy excise duty is not a green tax. It has been introduced to moderate the import dependency of Portugal on oil products. The excise duty rate is different from one oil product to another, no matter what are the pollutant characteristics of each product.

There is no carbon tax currently running in Portugal. However, the Ministerial Resolution n^o 63/2003 of 28 April 2003 refers that a carbon tax should be adopted as a measure to comply with the national target in the framework of the Kyoto protocol and the European Union burden sharing agreement.

The fuel tax rates are illustrated in the following:

fuel oil with a sulphur content above 1%: 27.5 € per tonne

fuel oil with a sulphur content below 1%: 12.5 € per tonne

natural gas used for combustion: 7.5 € per tonne

petrol: 29 €-cent per litre

diesel oil: 25 €-cent per litre

There is an exemption for less polluting oil products obtained from research and demonstration projects and for other fuels derived from renewable energy sources (Decree-Law 58/2001).

Slovenia

Energy taxes in Slovenia include the following fuels:

- light fuel oil: 2.41 Euro-cent per litre
- heavy fuel oil: 14.5 Euros per tonne
- petrol: 37 Euro-cent per litre
- diesel: 29 Euro-cent per litre

In 1996 a CO₂ tax was introduced for fossil fuels used for energy applications. Initially, the tax was equivalent to 5 Euros (1000 SIT) per tonne of CO₂ emitted but this was later increased to 15 Euros. At the same time, partial exemptions were introduced for industrial users and for generation of electricity and combined heat and power. In addition, it is possible to obtain partial exemptions from the tax by carrying through investments into energy efficiency and other measures that further reduces the CO₂ emissions.

There is no tax at end-user level on electricity consumption.

⁸ In Portuguese, “Imposto Sobre Produtos petrolíferos”.

Spain

There are the following energy tax rates on fuels in Spain:

light fuel oil: 8.5 €-cent per litre

heavy fuel oil: 1.4 €-cent per kg

petrol: 40-42 €-cent per litre depending on fuel quality

diesel as transportation fuel: 29 €-cent per litre

There is a tax on electricity of 21 €/MWh.

Sweden

Sweden is in the process of restructuring the overall taxation principles gradually shifting the target of the taxation from income to environmentally harmful activities (ecotaxes). In this context energy taxes are increased and this development is projected to continue in the coming years.

The following rates apply:

light fuel oil for heating: 27 €-cent per litre

natural gas for stationary applications: 17 €-cent per Nm³

petrol: 50-57 €-cent per litre - depending on environmental class

diesel: 34-40 €-cent per litre – depending on environmental class

There are taxes on electricity consumption at end-user level based on the following rates:

households: 2.1 €-cent per kWh

manufacturing and commercial greenhouses: zero

other sectors: 1.5 €-cent per kWh

In addition Sweden has a tax on the sulphur content of fuels for vessels as well as a tax on NO_x-emissions from power plants (4.3 € per kg emitted).

UK

The UK has the following energy taxes on fuels:

- natural gas ordinary rate (excluding gas for transport applications): 0.24 Euro-cents per kWh
- petrol standard quality: 79 Euro-cents per litre
- petrol, low sulphur content: 74 Euro-cents per litre
- diesel, standard sulphur content: 83 Euro-cents per litre
- diesel, ultra low sulphur: 74 Euro-cents per litre

There is an end-user electricity tax of 0.69 Euro-cents per kWh.

5 PROMOTION SCHEMES FOR RUE

A wide overview about promotion schemes for RUE will be given in this chapter. It is structured according to the typology of promotion schemes that has been described in chapter 3. Hence, the main distinction is made between financial strategies and non-financial strategies. It turns out that policies for fostering RUE strongly are based on non-financial strategies like regulations and labelling. With respect to financial strategies pre-investment schemes like R&D and during investment/implementation-schemes like subsidies and soft loans – especially for the improvement of building efficiency will be depicted.

5.1 Financial Strategies

5.1.1 Pre-investment / Implementation

This section covers financial, pre-investment schemes for RUE like R&D for EU-15 and selected accession countries (Czech Republic, Hungary, Poland, Slovenia). The most important policies in this category are R&D programmes as well as support of demonstration projects etc.

Providing a complete set of data for this area of promotion schemes is a huge task because in most countries energy research programmes are mostly included in overall scientific research programmes and energy specific budgets are hard to identify exactly. Hence, a cross-country comparison with respect to R&D effort is not feasible. However, this chapter shows an overview about the most important schemes in the considered countries.

EU schemes

The SAVE programme is the main European Community instrument for support in the field of energy efficiency and rational use of energy. The SAVE programme was initiated in 1991, its first phase lasting until 1995, and its successor SAVE II between 1996 and 2000. In February 2000, SAVE was temporarily integrated into the Energy Framework Programme until 2002 while preparing for a large-scale reorganisation of the EU energy research support structure.

In the present third phase - SAVE III – the SAVE programme has been integrated as one of four fields of the Intelligent Energy – Europe (EIE) adopted in 2003. Currently, the EIE programme is the main EU channel for non-technological support in the field of energy, covering besides energy efficiency, renewable energy (ALTENER), energy aspects of transport (STEER), and development of RES and RUE in developing countries (COOPENER). The SAVE programme contributes to a broad objective of achieving a 18% reduction of the EU energy consumption by the year 2010 compared to business as usual (in the same way as ALTENER contributes to objective of achieving a 12% RES share in the gross EU energy consumption).

The main focus of SAVE is energy efficiency and rational use of energy in the building and industry sectors, including preparation of legislative measures and their application. It has four vertical key actions:

- multiplying success in buildings, including tools for the introduction of the Building Directive and promotion of best practice examples of high energy performance buildings;
- retrofitting of social housing, including development of financing schemes and legal and institutional changes;
- innovative approaches in industry, including instruments for energy management;
- energy efficient equipment and products, including support for labelling and minimum energy efficiency standards.

Austria

Austria is funding RD&D in the energy conservation field. The total energy research budget in the year 2000 was some €24 million after substantial increase rates the previous years. Roughly one third of the energy research budget can be estimated to go to energy efficiency related research.

Denmark

Energy related RD&D spending has been reduced substantially since late-2001. For instance, the energy research programme was reduced by about 3/4 – to around 5 million € - with no fixed amounts for RUE activities.

The Electricity Savings Trust - established in 1997 and funded by a tax of 0.6 Danish ore per kWh electricity (approximately 0.08 €-cent/kWh) - can subsidise R&D and marketing activities in conjunction with energy efficient electrical appliances for use in private households, private companies and public sector institutions. In addition to these pre-investment subsidies, the Trust may also support purchase and operation of the equipment (cf. the subsequent sections).

Finland

Public spending for R&DD in the field of energy technologies, including in energy efficiency, is managed through the Technology Development Centre Tekes. This applies to both direct grants (for which Tekes accounts for about 80% of the total) and provision of favourable loans (with Tekes covering 70%). Besides Tekes, VTT is the main player accounting for slightly less than 20% of the total spending.

The total annual spending on R&DD in energy efficiency is in the range of 25 million € - about 40% of the total energy research funding in Finland.

France

From 1980 onwards, funds have been available for energy R&DD projects and programmes, allocated either through state agencies (e.g. ADEME) or directly by the state. Both public and private research organisations may apply for the funding.

ADEME provides funding for R&D into energy efficiency, including the public-private partnership the FIDEME Foundation. This was introduced a couple of years ago and covers other activities than RUE-related research.

Germany

Energy research is funded through a Special Programme under the Investing in the Future Programme (Zukunfts-Investitions-Programm, ZIP) currently running until the year 2005. Four of the five main topics covered are related to the energy supply side whereas the fifth is research into renovation of the energy characteristics of existing buildings. The last-mentioned has a frame of around 15 million €, about 10-15% of the total funding of the Special Programme.

Ireland

The House of Tomorrow programme is an R&DD-subsidising scheme covering the period until the year 2006. The scheme was launched in 2001 and is administered by Sustainable Energy Ireland (SEI) in line with the above-mentioned Green Paper on Sustainable Energy. The scheme aims at generating and applying technologies, products, systems, best practices etc resulting in more sustainable use of energy in residential buildings. Both new-built and rehabilitated housing are covered. The total budget for five-year period is 21 million Euros.

Netherlands

Subsidies of R&DD, including market introduction, in connection with energy efficiency (and renewable energy) are allocated through the organisations of Novem and Senter. These subsidies are allocated through the programme, Decision Subsidies of Energy Programmes.

Portugal

Existing pre-investments schemes in Portugal are concerned with R&D activities. However, under the programmes currently going on, there are no clear headings for applications in energy, energy efficiency and renewable energy technologies or CO₂ emissions control.

There are two main public research institutes involved in managing R&D programmes: FCT (Foundation for Science and Technology⁹) and AdI (Agency for Innovation¹⁰). RES and RUE research projects can apply for specific FCT programmes (although some demonstration projects can also apply). RES and RUE demonstration projects can apply for AdI programmes. AdI is currently managing the POCTI (Operational Programme for Science, Technology and Innovation), which is funded by ERDF; ESF and national budget.

Sweden

There are funding programmes addressing R&DD into improvement of the energy efficiency of the building sector and covering new-built housing, rehabilitation and maintenance.

UK

Three of the seven Research Councils, notably the Natural Environment Research Council (NERC), will be investing £28 million (around 40 million €) in research into sustainable energy during a three-year period between 2003 and 2006. RUE will be a significant part of this.

The Carbon Trust's Low Carbon Innovation Programme provides R&D grants towards innovative R&DD projects addressing the issue of reducing the emissions of greenhouse gases (including RUE). Up to £250,000 (370,000 €) can be awarded per project within an overall framework of £75 million (110 million €) during the first three years (2002-2004). The grants are repayable on successful exploitation of the outcomes of the projects.

5.1.2 Investment/implementation

Financial during-investment/implementation schemes in the field of RUE cover mainly the following types of policies:

- Subsidies and soft loans for efficiency improvement – especially of building efficiency
- Tax incentives like VAT reduction and income tax reduction.

As can be seen from the description below both types are commonly used in EU-15 countries and the selected accession countries. Often of course subsidies and soft loans are combined with regulations of energy performances and energy efficiency standards which are listed in the following chapter.

⁹ In Portuguese “Fundação para a Ciência e Tecnologia”

¹⁰ In Portuguese “Agência de Inovação”

Austria

Subsidies for energy conservation in buildings - both new-built and renovated - are provided primarily through two schemes. The allocation of the subsidies is established through provincial law within a framework provided by the federal law "Wohnbauförderungsgesetz BGBl. 1984/482".

The subsidies are a combination of direct grants and favourable financing (soft loans) and the provincial governments provide the major part though not all. The total amounts to roughly 73 Mio. Euro. The procedures used for the subsidising differ widely between the nine provinces.

Besides the above-mentioned schemes, income tax deduction schemes for general building investments can be used for energy conservation measures, too.

Belgium

Subsidies for improvement of the energy efficiency of buildings are generally provided through the three regions of Belgium. Two regions allocate subsidies to municipalities, various local public sector bodies, schools and hospitals for energy efficiency investments. The Walloon Region subsidises energy-efficiency investments in low-income households and the Brussels Regions cover 50% of the costs of energy audits.

Moreover, there is a general tax deduction scheme for investments into home improvements that may be applied to "durable" energy efficiency measures. Among the measures included is replacement of old boilers, substitution of double-glazing for single glazing, installation of thermostats and energy audits. The income tax reduction is equal to 40% of the investments except for the first-mentioned for which it equals 15%.

Czech Republic

The Czech Energy Agency (CEA) is preparing a draft legislation for a scheme offering subsidies for energy efficiency measures in blocks of flats and single-family dwellings. This scheme is to provide subsidies of up to 30% of the costs for insulation and replacement of heating installation in brick-built dwelling with poor energy efficiency provided the measures result in an energy saving of at least 45%.

The Ministry of Regional Development (MRE) is subsidising repair, reconstruction and modernisation of concrete-built tenement blocks. Preference is given to buildings located in economically depressed areas and areas with the most significant environmental problems.

Denmark

The Electricity Savings Trust mentioned in the previous section can support, including through subsidies, the purchase and operation of energy efficient electrical appliances as well as the conversion of electrically heated buildings in district heating and natural gas areas to these heating supply forms. Indeed, the latter task is the main objective of the trust. Besides its focal areas until now have been refrigerators, freezers, lighting and ventilation and not least the stand-by electricity consumption of consumer appliances.

Since 1993 a subsidy scheme for energy savings carried out by pensioners. This allows for grants covering up to 50% of the energy savings costs up to a maximum of DKK 25,000 (approximately 3,400 €). The subsidies are tax-free. The prospects of scheme are being assessed at the moment but according to an evaluation from 1999, this scheme is generally cost-effective based on its energy savings and CO₂-reductions. In addition to these benefits, the energy savings have a substantial positive impact on the comfort levels.

In its work in the past, the trust has placed much emphasis on developing subsidy schemes to minimise the risk of subsidies leading to higher prices. So-called "kick-start" campaigns offering subsidies for a limited time are an example of this.

Finland

There is a subsidy scheme for energy efficiency improvements in the housing sector and also for up to 40% of the costs of energy audits. The subsidies are managed through the so-called Housing Fund of Finland (ARA) and are channelled to the customers via the municipalities. ARA obtains its funds partly from the budget of the Finnish government and partly through loans and the like.

The subsidies are only available to blocks of flats and not to detached, semi-detached and terraced houses. Also they are confined to measures contained in an energy audit. Both insulation of the building fabric, ventilation and heating system improvements are included. Typically, subsidies account for up to 10-15% of the costs but the prescriptions vary considerably between different categories of measures.

France

Subsidising of energy projects, including RUE, generally takes the form of VAT or income tax deductions.

From 1990 onwards, tax schemes have been in force to allow income tax deductions of investments into energy efficiency improvements. It is a generic scheme targeting any type of work carried out by enterprises, which may be used for RUE investments also. It allows a 15% tax deduction up to a maximum of approximately 3-7,500 Euros depending on the size of the household.

Further, there is a VAT reduction scheme reducing VAT from 20.6% to 5.5% for expenses in conjunction with restoration, important maintenance and conversion work in dwellings. This scheme can only be utilised if the income tax deduction scheme has not been applied.

In addition, energy audits are being subsidised

Germany

The KfW CO₂ Reduction Programme was started up in 1996, initially restricted to Länder in the old Federal Republic of Germany (before 1990) but since 2001 it has been applicable all over Germany. This scheme provides low-interest, fixed-rate and long-term loans with a repayment-free start up period for CO₂-reduction measures in buildings whether these are owned by individuals, associations, companies or the public sector. The loans are provided through the Reconstruction Bank, KfW. The scheme covers both improvement of existing buildings and construction of new low-energy buildings. The new houses included are the so-called KfW Energy Saving Houses "40" or "60", characterised by having an annual energy consumption of less than 40 or 60 kWh (144 or 216 MJ) per square metre of heated area. The programme as a whole is limited to an annual lending of 5 million Euros. The loans may cover up to 100% of the investments but for new houses they are limited to 30000 Euros for "60" and 50000 Euros for "40".

The KfW CO₂ Building Rehabilitation Programme was started in 2001. It provides low-interest, fixed-rate and long-term loans with a repayment-free start up period for CO₂-reduction measures in residential buildings regardless of their ownership (individuals, associations, companies, public sector). Up to 100% of the costs may be covered within a framework of 250 Euros per square metre of heated area. The annual budget for the programme is 200 million Euros. The remedies include insulation, window replacement and improvement or replacement of heating system as well as energy auditing.

Ultimo 2003 a new scheme was introduced for support of energy efficiency work in connection with housing modernisation. This scheme was to offer loans through the Reconstruction Bank, KfW.

Greece

Two significant means for the channelling for subsidies for RUE projects among other things – Law 2364/95 and the Operational Programme on Energy (OPE) – were terminated around 2001/2002. A new programme, Operational Programme for Competitiveness (OP 'COM'), was initiated in 2000 and is to run until the year 2006. The programme is at the same time tapping into EU financial sources. In

this energy efficiency is only a minor priority among other energy and non-energy considerations, however.

Ministerial Decision 1725/320/00 (dated 18 February 2000) provides a means for subsidies in the form of low-interest rate loans for integration of RUE or RES improvements in conjunction with refurbishment of residential buildings in urban renewal areas.

A Presidential Decree entitled “Incentives for energy savings” is to be issued to follow up on the adoption of the Ministerial Decision 211475/98. The main instruments will be tax deductions and low-interest loans. Also the Action Plan “Energy 2001” aimed at reducing the emissions of greenhouse gases is envisaged to have subsidies options added.

CRES manages a programme of energy auditing. The programme provides money and technical assistance for energy auditing in buildings as well as in small and medium-sized enterprises and industrial facilities. Since November 1997, a total of 50 energy audits had been performed in the building sector (15 in hotels, 10 in hospitals and 25 in public buildings). By November 2001, a total of 119 energy audits had been performed on industrial processes. The Ministry of the Interior, Public Administration and Decentralisation brought the programme of energy auditing for energy managers in public buildings into force

Furthermore, some specific activities in this field that tend to be institutionalized are the following:

- A programme for the replacement of incandescent lamps with more energy efficient lamps mainly in the islands is in progress. The programme is co-ordinated by PPC (the Public Power Corporation) and provides fiscal incentives to customers for lamp replacements (i.e. gradual payment of the relevant investment cost through electricity bills).
- By mid-1999, all government and public sector buildings had established Energy Management Offices (EMO) in charge of planning energy saving measures. Provision had been made for a specific timetable of action; procedures and responsibilities were specified and plans of action suggested.

Hungary

The German Coal Aid Revolving Fund, GCARF - in operation since 1991 - is offering low-interest financing of energy efficiency investments in private sector and municipal buildings. The scheme is an integral part of the Hungarian Credit Bank's operations and the loans have an interest rate fixed at one third of the Central Bank's base rate plus 2.5%. Energy-efficiency in this context covers shift to renewable and waste energy in addition to energy saving measures proper. Between 1991 and 2002 the accumulated subsidies granted are in the region of 50 million Euros, covering roughly one third of the total investments. The outcome of this is an estimated annual saving of 8 PJ - with typical payback periods of between two and three years.

Two subsidising schemes are addressing the energy standard of the building stock. The National Energy Efficiency Programme (formerly the SZT-EN-1 Programme) offers grants for energy efficiency investments in residential buildings. This includes measures such as additional insulation of the building fabric, window/door replacement and improvements of the heating system. The grant is slightly less than 250 Euros per dwelling and the total amount was roughly 12 million Euros in 2003. The SZT-LA 2 Programme focuses on energy efficiency improvement of prefab buildings. Through this scheme about 8 million Euros are provided annually.

The Pilot Panel Programme, PPP is targeted at improving the thermal performance of buildings initially focusing on apartment blocks. PPP was introduced in the mid-90s and offers grants of up to around 250 Euros per dwelling to improve the insulation standard. The payback period is typically in the range of less than ten years.

Ireland

The Low Income Housing programme was initiated in 2001 and is to be terminated by 2006. The overall objective of the programme, which is administered by Sustainable Energy Ireland (SEI), is to assist in the development of a national plan of action on fuel poverty issues among low-income households.

The Energy Action programme is a subsidy scheme targeting investments in loft insulation, hot water tank insulation, draught proofing and low-electricity compact fluorescent lamps among the poor and elderly. 100% of the costs are covered by the scheme as all services are provided free of charge. Energy Action also offers energy auditing of dwellings towards a charge. Energy Action at the same time provides training and work opportunities for unemployed people by being linked to job training. The scheme is confined to the greater Dublin area.

Italy

In line with the trends in many other countries, a significant proportion of schemes subsidising the projects as such has been phased out. The most significant remaining scheme of fiscal incentives for energy savings in the household sector was introduced in 1992. It allows tax deductions corresponding to up to 25% of the expenses of energy conservation investments, provided some further conditions are met. For insulation of building fabric elements only improvements of the thermal resistance of the elements greater than a factor multiplied by the design temperature range. The factor a is 0.1 for roofs, 0.04 for ground floors and external walls.

Double-glazing is covered by the scheme in the three most northerly climatic zones of Italy.

Heat generators are covered if the efficiency is improved to more than 90% and systems for automatic control of indoor temperatures if at least 70% of the floor area is covered. In addition, conversion of electric heating systems to other systems and installation of low-electricity light bulbs are included.

Netherlands

Subsidising of RUE projects can be applied based on revenue of the Regulating Energy Tax (REB).

Poland

The Thermal Modernisation Act, introduced in 1998, established a subsidising mechanism for energy efficiency improvements (in addition to fuel switch and connection to district heating grids) based on regular commercial loans granted by banks. The support is the abolishment of 25% of the loan once the investment has been completed. The money needed to cover the 25% difference comes from a special Thermal Modernisation Fund (TMF) fed mainly by the State budget. A minimum 20% of own contribution is required. The idea behind the Act is that the loans are paid back from energy savings. Therefore, an energy audit must be presented to the bank before the loan has been granted to prove that sufficient savings are feasible. The audit is further verified by an auditor from the list of authorised energy auditors. All those procedures, no doubt, create additional transaction costs.

The first few years have revealed several essential drawbacks of the Act. Notably:

- Lack of eligibility of such building as hotels or student dormitories.

- The ceiling on the pay-back time was set at 7 years

- The 75% of the loan had to be been paid back before the 25% premium could had been granted.

The Act was modified in 2001: The ceiling for heat savings achievable by envelope improvements was lowered down to 15% from 25% provided that between 1985 and 2001 modernisation of the heating system in the building had been done (upgraded or new, more efficient boiler, temperature controls, new radiators, pipes washed etc.)

Otherwise the ceiling of 25% has been maintained. However, the savings can now be achieved jointly by heating system modernisation and envelope improvements.

For buildings with only the heating system being improved, the ceiling is now 10%.

EcoFund (Ekofundusz), a.k.a. the “debt for environment swap”, was established in 1992 by the Ministry of Finance to efficiently administer the money derived from the conversion of a part of the foreign debt of Poland into a fund intended to support environmental protection projects (within a mechanism usually referred to as “debt-for-environment swap”). To date, decisions to join the Polish-debt-for-environment-swap scheme have been taken by the USA, France, Switzerland, Italy, Sweden, and Norway. Hence, EcoFund is managing funds provided by all those countries (over USD 571 million in total to be spent in the years 1992 ÷ 2010). The aim of the EcoFund is to provide financial support for environmental protection projects that are not only important for the region or the whole country but also help to attain ecological goals recognized by the international community as all-European or even global priorities. In addition to that, the objective of the EcoFund is to facilitate transfer of the best technologies from the donor countries to the Polish market and to stimulate development of the Polish environmental protection industry. The priority fields include global climate change prevention and one of the means for this is rational use of energy. However, the topics particularly focused as are related to the energy supply side.

Portugal

MAPE grants

MAPE, which stands for Measure for the Exploitation of the Energy Potential and Rational Use of Energy¹¹, is the current scheme for promoting RES and RUE projects, during the investment phase. MAPE was set up under the POE (Operational Programme for Economy¹²), which is now renamed to PRIME, included in the third CSF (from 2000 till 2006).

The incentives in MAPE to RES and RUE projects are available for:

Production of electricity based on RES;

RUE solutions including CHP (combined heat and power);

Renovation of public bus fleet to NG (natural gas) vehicles or to electric vehicles;

Fuel switching to NG.

RES projects candidate include solar, biomass, wind and geothermal energy sources, without upper limit for power generation, and hydropower plants to a maximum of 10 MW. All those plants must deliver 100% of the electricity produced to the national grid. The financial amount of incentive is based on two parts: the first one is a grant of 40% of the eligible cost of the project, limited to 300 k€, and the second part is a loan, having no interest rate, based on 40% of the remaining eligible cost of the project. These conditions also apply to CHP projects relying on more than 50% of RES. For these projects, the maximum amount of financial support is limited to 1.5 M€.

Type b) projects include incentives for investments on energy rehabilitation of non-residential buildings including HVAC (heating, ventilation and air conditioning) systems, the general introduction of high energy-efficient systems, the installation of heating and/or cooling systems using RES and other NG hybrid systems, the implementation of energy management systems, the installation of CHP or tri-generation systems (it includes the production of electricity based on RES for self-supply), the improvement of energy efficiency of potable water network systems, waste water plants (including biogas use as an energy source) and public lighting and traffic signals systems. The incentive has also two parts, one is a grant of 20% of the eligible cost of the project, limited to 300 k€, and the second part is a loan, having no interest rate, based on 20% of the remaining eligible cost of the project. The total incentive is limited to 1.5 M€.

The incentive for type c) projects is a non-refundable grant equal to 50% of the over cost of the new solution compared to the conventional solution, having a maximum of 1.5 M€.

¹¹ In Portuguese, “Medida de Aproveitamento do Potencial Energético e Racionalização dos Consumos”

¹² In Portuguese, “Programa Operacional da Economia”

Type d) projects may be considered as RUE projects to a certain extent. However, their main objective is to enhance the consumption of natural gas in Portugal to support the national energy policy regarding diversification of resources and reduction of dependency on oil.

The following table summarises the incentives under the MAPE/POE programme

Type of projects	Type of Incentive	Upper Limits of incentive
Electricity production by RES power plants (100% delivery to the grid)	Non-refundable grant = 40% of eligible costs and Loan = 40%* of remaining eligible costs	Grant = 300 000 € Total incentive limited by technology ceiling values
CHP systems fuelled by more than 50% of RES	Non-refundable grant = 40% of eligible costs and Loan = 40%* of remaining eligible costs	Grant = 300 000 € Total incentive = 1.5 M€ Total incentive limited by technology ceiling values
CHP systems, including small-scale NG systems, small biogas or NG systems under 150 KVA, and fuel cell systems	Non-refundable grant = 20% of eligible costs and Loan = 20%** of remaining eligible costs	Grant = 300 000 € Total incentive = 1.5 M€ Total incentive limited by technology ceiling values
Electricity production by RES for self-supply	Incentive = 40% of eligible costs 50% incentive is a non-refundable grant 50% incentive is refundable grant (***)	Total incentive = 1.5 M€ Total incentive limited by technology ceiling values

* Depends on technology and on the value of the simple payback period.

** Depends on the rated power and on the rated electric performance output

*** Except public entities: 100% incentive is a non-refundable grant

VAT Reduction

There is a tax relief scheme based on the reduction of VAT rate. Reduced VAT taxation at 12% rate (compared to the normal VAT rate of 19%) applies to the purchasing of RES equipment and other type of energy conversion equipment.

Slovenia

The main channels of subsidising of energy efficiency in Slovenia are the Energy Efficiency Fund and the Environmental Development Fund of the Republic of Slovenia, Public Fund (in short the Eco-Fund). The former is based on funding of the Ministry of Economic Affairs – initially supplemented by EU funding - and managed by a commercial bank found through public tender. The Eco-Fund is financed by the Ministry of the Environment, Spatial Planning and Energy.

Both funds provide financial support of projects in the form of favourable loans and the fund is.

During the first half of the 90s the Slovenian government spent the equivalent of 2-3 million € annually on energy efficiency improvements. In the five-year period 1994-98, this amount was roughly halved, but instead EU funds were channelled into Slovenian energy efficiency projects, notably through the PHARE programme (one of the EU's three pre-accession programmes to assist applicant countries with the preparation for joining the EU).

Over the five-year period from 1997 to 2002 the total subsidies to rational energy use, renewable energy, fuel switches etc. amount to approximately 10 million Euros.

Spain

Since 1999, IDEA and ICO (the Official Institute of Credit) have offered subsidies toward investments into renewable energy and energy efficiency improvements. These subsidies have the form of access to financing at favourable conditions compared to the market conditions, particularly with respect to payback requirements. The option is only available to certain types of technology (from a positive list) and only to investments that are creating new fixed assets. The financing may cover up to 70% of the total investments. The total amount available varies from year to year but in 2001 it was at total of some 130 M€ with about 90% coming from ICO and the remainder from IDEA.

In conjunction with energy-efficiency improvements, remedial measures on the list include improvements of the thermal performance of building fabrics, shift to energy-efficient lighting of buildings and application of heat pumps for air-conditioning and cooling plants.

Sweden

Currently, direct subsidy opportunities in conjunction with energy-efficiency projects are virtually non-existent. This development away from subsidising of projects as such is in line with trends in many countries.

UK

Warm Front (England), Warm Deal (Scotland), Central Heating Programme (Scotland), Warm Homes (N Ireland), New Home Energy Efficiency Scheme, HEES (Wales); earlier HEES. These programmes provide direct, fixed grants towards investments in domestic RUE technology, with stated social aim of reducing incidence of fuel poverty.

Warm Front (England): Grants up to £1,500 to provide packages of insulation e.g. loft and/or cavity wall insulation and draught proofing and heating improvements for owner-occupier householders in receipt of certain benefits.

Grants up to £2,500 (Warm Front Plus) for owner-occupier householders over 60 in receipt of certain benefits to provide similar packages which also allow for full heating systems where appropriate

New HEES (Wales): Grants up to £1,500 (packages equivalent to Warm Front) for householders (owner-occupiers) in receipt of certain benefits.

Grants up to £2,700 (New HEES Plus; packages equivalent to Warm Front Plus) for vulnerable householders (owner-occupiers)

Warm Deal (Scotland): Grants up to £500 to provide similar packages (excluding heating improvements or systems) to householders (owner-occupier or private-rented) in receipt of certain benefits.

Grants up to £125 for householders over 60

Central Heating Programme (Scotland): Full grant for central heating systems with appropriate insulation package for householders over 60 (owner-occupier or private-rented) who have no central heating or whose central heating system is beyond repair.

Warm Homes (Northern Ireland): Grants up to £750 to provide packages of insulation and heating measures for vulnerable householders (owner-occupier or private-rented).

Grants up to £2700 (Warm Homes Plus) to provide packages of insulation and heating measures (including central heating systems) for vulnerable householders (owner-occupier or private-rented) over 60

DTI Capital Grants Programme: Clear Skies (England, Wales, Northern Ireland). Direct, fixed grants towards investments in RES technologies, targeted at householders and communities, with stated aim of contributing to sustainable development. Among others it provides direct grants directed at social housing providers and public sector buildings (such as schools, hospitals, universities, town halls etc) with the stated aims of saving energy and reducing fuel poverty.

£50m funding is budgeted until January 2005 for the installation of new, or the refurbishment or expansion of existing district heating schemes

EST Community Energy (UK-wide). Development grants of up to 50% (budget: ring-fenced £2m) are available through the scheme, and capital grants of up to 40% toward the total project cost are awarded through a competitive tendering process.

EST HECAction Programme(UK-wide). Direct grant programme directed at local authorities with stated primary aim of kick-starting schemes that encourage private householders to invest their own money in measures, fulfil Home Energy Conservation Act (HECA) responsibilities and alleviate fuel poverty

6-year programme finished in 2002/2003. £21.4m of funding was awarded to 339 local authorities involved in 227 schemes (between £20,000 and £300,000 each) which enabled 0.2 MtC savings over the lifetime of energy efficiency measures installed

EST Loan Action Scotland Scheme (Scotland). Provides interest free loans for energy efficient equipment from £5,000 to £50,000 for SMEs that want to cut their energy costs.

Reduced rate of VAT. For certain RUE technologies and energy saving materials installed by a builder there is a reduction of VAT rate. Hence, it is not applicable for self-installation (i.e. retail purchase).

5.2 Non-financial Strategies

5.2.1 Regulatory schemes

EU framework

Overall, there are two major approaches to regulation of energy standards of buildings - though, in practice, the two approaches are applied in combination in most European countries.

The conventional "U-value procedure", based on mandatory maximum values for the heat loss through each building component, was applied in most national building regulations until one or two decades ago. Secondly, the "Energy Performance procedure" based on requirement to the overall energy performance of the building has been on the increase especially over the last decade. This development has been reinforced by various activities of the European Communities since the adoption of the so-called SAVE-Directive (Council Directive 93/76/EEC of 13 September 1993). Notably in this context, the EC is in the process of implementing the "Buildings Directive", i.e. the Directive on the energy performance of buildings (Directive 2002/91/EC of 16 September 2002). Today, practically every EU Member State has developed some sort of Energy Performance calculation methodology (EP methodology). Still, most countries combine the EP procedure with U-value requirements to the building fabric components. These are normally fixed at a less strict level, not enough to meet the EP criteria but meant to safeguard other considerations (especially to indoor comfort requirements).

The overall goal of the Directive on the energy performance of buildings is to improve the energy performance of residential and non-residential buildings covering space heating, hot water provision, cooling, ventilation and lighting among other aspects and taking into consideration the contributions from internal and solar gains. This translates into a primary objective of ensuring minimum requirements to the energy performance of all new buildings and large existing buildings subjected to major renovation work. As means for this, the Directive shall promote the development of a common framework for the calculation of the integrated energy performance of the building as well as schemes for energy certification of buildings, regular inspection of boilers and air-conditioning systems and assessment of heating installations that are more than 15 years old.

The development of a calculation framework is at different levels in different European countries and moreover has had different points of departure in different countries. In an assessment carried out by the ENPER-TEBUC project under the Save Programme, Spain was the only Member State without any EP methodology - except for Luxembourg that was not covered by this study. In Belgium, only the Flemish Region have developed such a method. All other Member States had developed methodologies taking transmission and ventilation losses into consideration and compensating for the

contribution from internal and solar gains. About half of them also included influence of the heating system in methodology while about a third covered the issue of lighting.

The Buildings Directive requires from Member states that they shall introduce and harmonise schemes for energy performance certificates for buildings. The objective of the certificate is to make information on the energy performance of the building available to the owner of the building or by the owner to tenants or prospective buyers. The scheme shall be based on the EP methodology

As regards inspection schemes for boilers and air-conditioning systems, the Buildings Directive determines that Member States shall prepare the following:

establishing regular inspection schemes for boilers with a rated output in the interval 20-100 kW fired by non-renewable solid or liquid fuel (and for other fuels if so desired);

establishing inspection schemes to be carried at least every two years for solid or liquid fuel boilers with an output of more than 100 kW;

establishing inspection schemes to be carried at least every four years for large gas boilers;

establishing one-off inspection schemes for heating installations with a rated output of at least 20 kW and older than 15 years to provide advice to the users with regard to replacement or other modifications seen in the light of its energy efficiency and adaptation of its output to the loads;

establishing regular inspection schemes for air-conditioning systems with an effective rated output of at least 12 kW with a view to assessing the energy efficiency and sizing

The so-called "Boiler Efficiency Directive" (Council Directive 92/42/EEC of 21 May 1992), under the SAVE-programme, determines the energy efficiency requirements to new hot-water boilers with a rated output in the interval 4-400 kW and fired by a liquid or gaseous fuels. The Directive establishes requirements for nominal and partial load varying according to the type (standardised, low-temperature or condensing boilers) and size of the boiler. As can be seen from the table, these requirements are determined in quite great detail.

Table 5.1 Efficiency requirements, in round off figures, for boilers operated at rated power (Pn) and at partial load (30% of rated power).

Type	Rated output Pn, kW	Formula at nominal load	Minimum efficiency at nominal load, %	Formula at partial load	Minimum efficiency at nominal load, %
Standardised	4	$>84+2\log P_n$	85	$>80+3\log P_n$	82
Standardised	400	$>84+2\log P_n$	89	$>80+3\log P_n$	88
Low-temperature	4	$>87.5+1.5\log P_n$	88	$>87.5+1.5\log P_n$	88
Low-temperature	400	$>87.5+1.5\log P_n$	91	$>87.5+1.5\log P_n$	91
Condensing	4	$>91+\log P_n$	92	$>97+\log P_n$	98
Condensing	400	$>91+\log P_n$	94	$>97+\log P_n$	100

Austria

The building regulations of Austria are the responsibility of the Bundesländer (the provincial authorities). However, these are operating within the framework of an "Agreement between federal

and provincial government concerning energy consumption” establishing obligatory minimum levels in energy conservation standards.

Table 5.2 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Burgenland.

	U-values W/m ² C
External walls	0.45
Partition walls towards unheated building parts	0.70
Ground floors - different types	0.40
Ceiling and roof structures	0.25
Ceiling towards unheated building parts	0.40
Windows	1.70
External doors	1.70

Table 5.3 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Carinthia.

	U-values W/m ² C
External walls	0.40
Partition walls towards unheated building parts	0.70
Ground floors - different types	0.50
Ceiling and roof structures	0.25
Ceiling towards unheated building parts	0.40
Windows	1.80
External doors	1.80

Table 5.4 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Lower Austria.

	U-values W/m ² C
External walls	0.40
Partition walls towards unheated building parts	0.70
Ground floors - different types	0.50
Ceiling and roof structures	0.22
Ceiling towards unheated building parts	0.40
Windows	1.80
External doors	1.80

Table 5.5 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Upper Austria.

	U-values W/m ² C
External walls	0.50
Partition walls towards unheated building parts	0.70
Ground floors - different types	0.50
Ceiling and roof structures	0.25
Ceiling towards unheated building parts	0.45
Windows	1.90
External doors	1.90

Table 5.6 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Salzburg.

	U-values W/m ² C
External walls	0.47-0.56
Partition walls towards unheated building parts	0.70-0.83
Ground floors - different types	0.39-0.67
Ceiling and roof structures	0.26-0.30
Ceiling towards unheated building parts	0.37-0.43
Windows	2.50
External doors	2.50

Table 5.7 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Styria.

	U-values W/m ² C
External walls	0.40-0.50
Partition walls towards unheated building parts	0.70
Ground floors - different types	0.50
Ceiling and roof structures	0.20
Ceiling towards unheated building parts	0.40
Windows	1.90
External doors	1.70-1.90

Table 5.8 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Tyrol.

	U-values W/m ² C
External walls	0.35
Partition walls towards unheated building parts	0.50
Ground floors - different types	0.40
Ceiling and roof structures	0.20
Ceiling towards unheated building parts	0.40
Windows	1.70
External doors	1.70

Table 5.9 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Vorarlberg.

	U-values W/m ² C
External walls	0.35
Partition walls towards unheated building parts	0.50
Ground floors - different types	0.50
Ceiling and roof structures	0.25
Ceiling towards unheated building parts	0.40
Windows	1.80
External doors	1.90

Table 5.10 - Heat loss requirements to building fabric elements according to the Building Regulations of the province of Vienna.

	U-values W/m ² C
External walls	0.50-0.60
Partition walls towards unheated building parts	0.70
Ground floors - different types	0.40-0.50
Ceiling and roof structures	0.20-0.30
Ceiling towards unheated building parts	0.40-0.60
Windows	1.90-2.00
External doors	1.70-2.00

Table 5.11 - Heat loss requirements to building fabric elements according to the Federal cap to the provincial Building Regulations.

	U-values W/m ² C
External walls	0.50
Partition walls towards unheated building parts	0.70
Ground floors - different types	0.50
Ceiling and roof structures	0.25
Ceiling towards unheated building parts	0.45
Windows	1.90
External doors	--

The above-mentioned “Agreement between federal and provincial government concerning energy consumption” establishes a detailed and relatively complex framework with regard to minimum-values for the energy efficiencies of equipment for space heating, cooking and provision of hot water. These efficiencies depend on end-use application, fuel and rated power of the equipment. Likewise, there is regulation limiting the allowable energy losses in conjunction with exhaust from heating supply systems. The maximum values vary between the nine provinces of Austria and furthermore depend on fuel type and rated power of system.

Austria has developed an energy performance calculation methodology for buildings taking into account the influence from transmission and ventilation losses and from internal and solar gains – but not from the heating system and not with regard to electricity consumption for lighting.

Belgium

The thermal requirements to building fabrics vary between the three regions though not fundamentally - they are based on the same standard. As can be seen from the tables below, there are only minor differences in maximum U-values between the regions.

Table 5.12 - Heat loss requirements to building fabric elements according to Building Codes of the Belgium region of Wallonia.

	U-values W/m ² C
External walls	0.60
Partition walls towards unheated rooms	0.90
Ground floor - towards air	0.60
Ground floor - towards unheated rooms	0.90
Ground floor - towards soil	1.20
Ceiling and roof structures	0.40
Windows	3.50

Table 5.13 - Heat loss requirements to building fabric elements according to Building Codes of the Belgium region of Flanders.

	U-values W/m ² C
External walls	0.60
Partition walls towards unheated rooms	0.90
Ground floor - towards air	0.60
Ground floor - towards unheated rooms	0.90
Ground floor - towards soil	1.20
Ceiling and roof structures	0.60
Windows	3.50

Table 5.14 - Heat loss requirements to building fabric elements according to Building Codes of the Belgium region of Brussels.

	U-values W/m ² C
External walls	0.60
Partition walls towards unheated rooms	0.90
Ground floor - towards air	0.60
Ground floor - towards unheated rooms	0.90
Ground floor - towards soil	1.20
Ceiling and roof structures	0.40
Windows	2.50

Only the region of Walloon has mandatory requirements for ventilation rates.

In addition to the requirements to each part of the building shell, Belgium has overall requirements to the energy performance in the form of overall average heat loss factors expressed as W/m²K (related to the area of exposed building envelope). For dwellings, this is 0.55 W/m²K for dwellings in all three regions and 0.65 W/m²K for non-residential buildings (no requirements for the region of Flanders).

Only the Flemish region has developed an energy performance calculation methodology for buildings. This method takes into consideration the impact of transmission, ventilation and internal/solar gains as well as that of the heating systems and moreover the electricity for lighting is integrated.

OPTIMAZ is a mandatory standard - based on the EU scheme described above - for the energy efficiency of fuel boilers with a rated capacity of 4-400 kW.

Czech Republic

The Czech Republic introduced thermal standards for new buildings in 1994 but these are only mandatory for buildings based entirely or in part on central government funding. The IEA Energy Efficiency Update for the Czech Republic loosely estimates that dwellings built to the non-mandatory standard would have an energy consumption that is roughly 30% lower than that of the dwellings actually built.

Denmark

The present Buildings Regulations for detached, semi-detached, terraced housing etc. (the so-called “small building regulations”) is from 1998 whereas the larger buildings are covered by the Building Regulations from 1995. The two do not differ substantially with regard to energy performance requirements.

Table 5.15 contains the principal requirements in the form of U-values to elements of the building fabric according to the Building Regulations. In addition, the approximate average heat loss over the heating season in Denmark is shown.

Table 5.15 Requirements in the 1998 Building Regulations.

	U-values W/m ² C
External walls, weight less than 100 kg/m ³	0.20
External walls, weight more than 100 kg/m ³	0.30
Partition walls towards partially heated rooms	0.40
Ground floors - solid, ventilated crawl way and above external air	0.20
Ceiling and roof structures	0.15
Flat roofs	0.20
Windows, doors, skylights, glass walls etc	1.80

The total glazed areas are not allowed to exceed 22% of the total heated area of the building.

Within certain limits, it is permitted to exceed these limits, including the restriction on glazed areas, as long as the overall calculated heating demand (taking into account the contribution from solar gain and casual gains (persons, appliances etc.) does not increase above the so-called “heat loss frame”. This frame depends on the number of storeys and states that the total heat loss, including ventilation losses but excluding hot water provision and losses in the heating system - must not exceed:

$$160 \text{ MJ/m}^2 + 110 \text{ MJ/m}^2/e \text{ or}$$

$$45 \text{ kWh/m}^2 + 31 \text{ kWh/m}^2/e \text{ (approximately),}$$

with e being the number of storeys and m² referring to the total heated area of the building. In addition, there is an overall frame of 250 MJ/m² or 69 kWh/m² (relevant for one-storey buildings).

There are limits to the heat loss through the building fabric elements that must not be exceeded even if the heat loss frame is met. These limits are typically 30-50% above the U-values given in Table 5.15.

There are minimum requirements to ventilation rates based on indoor climate demands. These requirements differ between different parts of the building but overall a key figure is that it shall be possible to provide a minimum air change rate of 0.5 per hour. The ventilation may be provided by means of natural or mechanical ventilation.

New Building Regulations are expected by 1 January 2005.

Finland

Requirements to new buildings in Finland are established in the Finnish Building Ordinance. Part C3 and C4 addresses thermal insulation demands.

Table 5.16 Heat loss requirements to elements of the building fabric of fully heated rooms (>17C°)

	U-value (W/m ² K)
External walls	0.25
Ceiling roofs	0.16
Base floors	0.25
Windows, doors	1.4

Glazed areas are neither allowed exceeding 15% of the gross heated area of the building nor 50% of the total area of external walls.

Non-compliance with both U-values and glazing requirements are allowed if the overall average U-value do not increase in comparison with the value computed on the basis of the required U-values and the composition of the building.

In addition, the Building Regulations address issues such as indoor climate and ventilation (part D2), heating supply system (part D7) and energy management (part D3).

Part D2 contains requirements and guidelines with respect to ventilation and indoor climate in new buildings. As regards ventilation, the regulations address both the demands to air change rates from a comfort point of view and the issue of minimising the energy required to meet these comfort demands. This part of the Building Regulations is to be revised in the near future.

Part D7 of the Building Ordinance addresses the energy efficiency of the heating system, notably of boilers. It covers boilers with a rated capacity in the interval 4-400 kW using liquid or gaseous fuels and implements the EU Council Directive 92/42 in Finland. Moreover, the parts A4 and G2 of the Building Regulations establish that buildings are required to have maintenance instructions. These mandatory service books are to be carried out by the different partners during the construction period and handed over to the owner of the building. Among other objectives, this serves to ensure that maintenance activities are carried out in an energy efficient and cost-effective way.

Finally, part D3 covers energy management of new heated buildings in broader terms in the form of both requirements and guidelines.

France

The requirements to the thermal performance of buildings in the Building Regulations were increased in 2001. For residential buildings the average energy performance was improved by 20% and for commercial buildings by 40%.

The new Building Regulations, RT 2000 (“Reglementation Thermique 2000”) have substantially changed and increased the scope of the regulation. The turning point is the overall energy performance of the building rather than the specific requirements to particular elements. In line with this the constructor is allowed greater freedom in choosing the solutions, among such options as thermal insulation, use of solar heat, advanced heating systems etc. Thus the concrete practical constraints and economical considerations play an important role for the solutions chosen.

Therefore, RT 2000 extends to cover not just heat losses through the building fabric and ventilation but also heating systems, provision of hot water, air-conditioning and electricity for lighting (in non-residential buildings). The table below shows heat loss characteristics of building elements that are typically applied to meet the overall energy performance requirement.

Table 5.17- Typical heat loss characteristics of building fabric elements to meet the building regulations of France.

	U-values W/m ² K
External walls	0.45
Ground floors	0.35
Roofs	0.25
Windows	1.75-2.25

Since the mid-70s there have been limits to the allowed internal temperature of dwellings in France. The current limit is 19°C.

Germany

The energy performance of buildings in Germany is regulated through the Energy Conservation Ordinance (Energieeinsparverordnung). This came into operation in February 2002, replacing both the previous Thermal Insulation Ordinance (Wärmeschutzverordnung) and the regulation of heating installations.

The table below illustrates heat loss characteristics of building elements that are typically used to meet the overall energy performance requirements of the German building regulations.

Table 5.18- Typical heat loss characteristics of building fabric elements to meet the building regulations of Germany.

	U-values W/m ² K
External walls	0.55
Ground floors	0.45
Roofs	0.25
Windows	1.25

The introduction of the Energy Conservation Ordinance represents an estimated reduction of the energy consumption for heating and hot water provision by some 25-30% over the previous

regulations. The new requirements correspond to an estimated annual energy consumption of 70 kWh/m² heated area compared to 100 kWh/m² in the regulations introduced in 1995, about 150 kWh/m² during the period 1984-1995 and 200 kWh/m² between 1997 and 1984. In other words, the present regulations represent a reduction in the energy consumption for space heating and hot water in new buildings by about two thirds over the last 20-25 years. This does not include the fact that the energy consumption of houses in the former German Democratic republic was even higher. The estimated average energy consumption for space heating in the existing building stock in Germany is 265 kWh/m².

In addition to regulating the energy performance of new buildings the Energy Conservation Ordinance requires that boilers installed before October 1978 must be replaced in connection with modernisation and retrofit work.

Greece

Requirements to the maximum heat loss of building fabrics were introduced in 1979 in connection with the energy conservation scheme (Presidential Decree 1-6/4-7/04.07.79). These maximum heat loss coefficients vary between the three climatic zones of Greece. In addition, the scheme has established standardised procedures for computing the energy use of the buildings.

This scheme is in the process of being replaced by a new, KOXEE including stricter heat loss requirements. The framework for new energy requirements for buildings was provided by the Action Plan "Energy 2001" developed in 1995 by the Ministry of Environment, Physical Planning and Public Works. The Joint Ministerial Decision 21475/4707/98, "Reduction of CO₂ emissions by determining measures and requirements for improvement of buildings" introduces measures applicable in both existing and new buildings.

Greek legislation has been harmonised in accordance with EU Directives on minimum energy efficiency standards for non-industrial boilers (Presidential Decrees 335/1993) as well as refrigerators and freezers (Presidential Decrees 178/1998).

Hungary

Hungary has a voluntary insulation standard (MSZ 04-110-2-192) in conjunction with the building regulations of the country. The standard, introduced in 1992, was mandatory until 1994 but were not enforced due to lack of quality control. Hence, the insulation standard - which is quite strict and comparable with the leading EU Member States - was made voluntary in 1994.

Ireland

The heat loss through building fabrics in Ireland is regulated by the Building Regulation 1991 with later adjustments. The most recent updating linked to the energy requirements took effect as of 1 January 2003.

There are three alternative methods to choose between as to the calculation of the allowable energy characteristics.

According to the first method, the overall average U-value - $W/(m^2K)$ - of the building must not exceed $0.42 + 0.22 * V/A$ (V being the volume within the insulated building shell and A the heat loss area). Using this method, there are the same time maximum U-values for each of the building elements roof, walls and ground floors: 0.35, 0.55 and 0.45 $W/(m^2K)$. This is due to comfort considerations.

The second method establishes maximum U-values for each building fabric element (as shown in the table). In 2003 the permitted U-values for walls, roofs and ground floors were roughly halved resulting in calculated reductions in the energy requirement for heating by some 23-33% depending on dwelling type.

Thirdly, the maximum average U-value can be based on calculation of the "heat loss". In this solar gains are taken into account by integrating the areas of glazed and non-glazed areas into the formula.

The table below illustrates heat loss characteristics of building elements that are typically used to meet the overall energy performance requirements of the Irish building regulations.

Table 5.19 - Heat loss requirements to building fabric elements according to the buildings regulations of Ireland.

	U-values W/m ² K
External walls - exposed	0.27
External walls - partially exposed	0.60
Floors & ground floors - exposed	0.25
Floors & ground floors - partially exposed	0.60
Roofs - exposed	0.16
Roofs - partially exposed	0.35
Windows	--

There are no specific demands to the U-value of windows, but there is a requirement for a proportion of double-glazing dependent on the total area of windows and doors.

Ireland has legislation in place establishing energy efficiency requirements to certain appliances (refrigerators and freezers), hot water boilers and ballast for fluorescent lighting. This legislation implement EC Directives in an Irish context and in each case the requirements are placed on products to be marketed in Ireland.

Italy

The building regulations places energy efficiency requirements on new-built buildings, regardless of their application - residential, commercial, public sector or industrial. The requirements cover both building characteristics and equipment used for heating, provision of hot water etc.

The requirements to energy efficiency are expressed in terms of the so-called FEN-factor stating the restrictions on total energy input to the building for heating and hot water. The maximum allowable value of FEN for a given building depends on a range of features including the size and form of the building, the extent of air re-circulation, casual and solar gains and location of the building (in which climatic zone it is located).

The table below illustrates heat loss characteristics of building elements that are typically used to meet the overall energy performance requirements of the Italian building regulations.

Table 5.20- Typical heat loss characteristics of building fabric elements to meet the building regulations of Italy.

	U-values W/m ² K
External walls	0.45
Ground floors	0.45
Roofs	0.35
Windows	2.75-3.25

In the design of the building it is possible to meet the requirements through a trade off between different factors such as

insulation standard of the building fabric,

efficiency of equipment used for generation, distribution and control of the heating supply
 utilisation of heat recovery
 maximisation of solar gain by means of the size and orientation of glazing areas.

Besides the use of FEN, there is a mandatory minimum value of the efficiency of new-installed or significantly altered boilers.

Furthermore, legislation was introduced in 1993 to place restrictions on the indoor temperature of buildings during the heating season. This legislation establishes that the average indoor temperature of single rooms must not exceed 18°C in industrial and craft buildings and 20°C in all other applications (including residential) with a tolerance of 2°C. The temperature has to be maintained without waste of energy.

Luxembourg

The thermal insulation requirements in force are the Grand Ducal regulation of 22 November 1995.

Netherlands

The most recent update of the Building Decree of the Netherlands took place in 2002. Generally, the Dutch Building Decree offers relatively large freedom with respect to solutions chosen within the overall framework with respect to energy performance. This framework establishes that the calculated average heat resistance of the building as a whole should be at least equal to 2.5 m²*K/W - or conversely that the average heat loss coefficient should be less than 0.4 W/(m²*K). Here m² refers to the total area of the external building fabric and internal areas between heated and unheated building parts.

Window and door openings must not exceed a heat loss coefficient of 4.2 W/(m²*K) at any point. This is in order to achieve satisfactory comfort conditions in the building.

Furthermore, The Building Decree establishes that the air leakage of the building must not exceed 0.2 m³/sec.

The table below illustrates heat loss characteristics of building elements that are typically used to meet the overall energy performance requirements of the Dutch building regulations.

Table 5.21- Typical heat loss characteristics of building fabric elements to meet the building regulations of the Netherlands.

	U-values W/m ² K
External walls	0.25-0.35
Ground floors	0.25
Roofs	0.25-35
Windows	1.75-2.25

Poland

The thermal requirements of the Polish building codes are governed by an approach containing two elements, namely partly overall demands expressed in the form of an energy performance factor and partly minimum insulation requirements to each building component. The regulations have been revised and the requirements increased several times since the 1970s. Important stages in the development were the revisions in 1982 (PN-82/B-02020) and 1991 (PN-91/B-02020).

Table 5.22 Maximum U-values for new single-family houses in Poland

	U-values W/(m ² K)
External walls	0.3
Roofs	0.3
Basement ceiling	0.6
Windows and balcony doors	2.0-4.0

Multifamily houses based on the existing building codes are estimated to have an annual energy consumption of approximately 30-40 kWh/m².

Portugal

*RGCE*¹³ is the general regulation for energy management. It is a compulsory scheme that applies to the main economic sectors (industry, services and transport). However, only some sectors of the industry have been complying with it, while the vast majority of buildings and transport fleet have been out of reach. Each facility or entity having an yearly amount of energy consumption above 1000 toe (tons of oil equivalent) falls into the scope of this law (there are other two minor conditions enlarging the scope of the law). This facility has to carry out energy audits every five years, and implement energy efficiency plans in the time period in-between. The main goal of the energy plans is to achieve a pre-determined target reduction for the specific energy consumption according to established efficiency energy indicators.

*RCCTE*¹⁴ is the thermal regulation for buildings (sometimes also called building energy code). It applies to every new building or to large building renovation, whenever a licence for construction is required. *RCCTE* establishes the maximum allowable amount of energy needed to meet the heating and cooling requirements. Verification of conformity with the regulation can be achieved by filling out a spreadsheet in order to check whether the architectural options of the designer give rise to estimated nominal energy requirements lower than the maximum allowable threshold. The building designer may adopt any architectural solution he wishes, better or worse than reference solutions. There are, however, maximum levels of the envelope heat transfer coefficient that cannot be exceeded, as well as minimum levels of shading in summer for glazed surfaces that do not face north, independently of the need to satisfy the maximum allowable energy target.

*RSECE*¹⁵ are the regulations of HVAC systems for buildings. *RSECE* must be verified, under the licensing scheme, whenever building, or building zones, have thermal loads above a minimum threshold. *RSECE* impose size standards on the thermal power of the systems to be installed, as regards both space heating (plus hot water power, if the sanitary hot water production system is common to the heating system) and cooling. Buildings, or zones, with low space heating or cooling loads are not considered by these regulations. *RSECE* also define a number of pre-requirements

¹³ In Portuguese: “Regulamento da Gestão do Consumo de Energia”.

¹⁴ In Portuguese: “Regulamento das Características do Comportamento Térmico dos Edifícios”.

¹⁵ In Portuguese, “Regulamento dos Sistemas Energéticos de Climatização em Edifícios”

concerning the design, installation and operations of HVAC systems. For example, the regulations establish the need for free-cooling beyond a given rate of supply air flow and the heat recovery from exhaust air beyond a given power level. Intended to promote energy efficiency, these requirements apply not only to HVAC systems but also to equipment, controls, energy metering and building energy management systems.

The table below illustrates heat loss characteristics of building elements that are typically used to meet the overall energy performance requirements of the Portuguese building regulations.

Table 5.23- Typical heat loss characteristics of building fabric elements to meet the building regulations of Portugal

	U-values W/m ² C
External walls	0.45
Ground floors	0.45
Roofs	0.35
Windows	2.75-3.25

In addition, Portugal has established the following standards for energy efficiency of boilers, appliances and lights (all based on EU legislation)

- for new hot-water boilers fired with liquid or gaseous fuels; implemented in the Portuguese Decree-Law 136/94 of 20 of May 1994 (based Directive 1992/42/EEC)
- for household electric refrigerators, freezers and combinations thereof; implemented in Decree-Law 214/98 of 26 of July 1998 (based on the Directive 1996/57/EC)
- for ballasts for fluorescent lighting; implemented by Decree-Law 327/2001 of 18 of December 2001 (based on Directive 2000/55/EC)

Slovenia

The present regulation of the insulation standard of new buildings in Slovenia was introduced in 1987. It is based on the building envelope component approach establishing maximum heat loss requirements for each building component. The long time that has passed since the latest updating means that the requirements are in many ways not up to standards required today. For instance, the requirements to external walls can be met by 5 cm of insulation.

New building regulations are being planned that are to make the insulation requirements much stricter while at the same time introducing requirements to the overall energy performance of the building besides the demands to each building envelope component.

Slovenia is in the process of introducing Minimum Energy Performance Standards (MEPS) based EU Directives for refrigerators, air-conditioning plants and washing machines.

Spain

Minimum thermal requirements to building fabrics were introduced in conjunction with the building regulations of 1979, NBE-CT-79. These regulations apply to both private and public sector buildings, residential and non-residential. The federal government establishes the demands but it is the task of the 17 autonomous regions to ensure the compliance. The requirements vary between the five different climatic zones of Spain.

The requirements address the overall heat transmission of the building, the heat transmission through each building fabric element, the air change rate of the building as well as humidity characteristics. The requirements to each building fabric element are based on comfort considerations and are not alone enough to meet the overall heat loss demands.

The demands to the overall heat loss of the building are characterised by the factor K_g . This factor varies between 0.52 and 2.45 $W/(m^2\text{°C})$ depending not only on the climatic zones but also type of heating. The lowest values (i.e. the strictest requirements) apply to electric heated buildings while the buildings heated by solid or liquid fuels have values that are almost three times as high.

The table below illustrates heat loss characteristics of building elements that are typically used to meet the overall energy performance requirements of the Spanish building regulations.

Table 5.24- Typical heat loss characteristics of building fabric elements to meet the building regulations of Spain.

	U-values $W/m^2\text{°C}$
External walls	0.6
Ground floors	0.6
Roofs	0.6
Windows	2.7-3.75

Sweden

The Building Regulations 1994 (BBR 94) - i.e. the regulations in force - have a Chapter on "Energy efficiency and heat retention" establishing energy efficiency requirements to new-built buildings. The requirements address heat losses, efficient use of heat and efficient electricity use. Generally, compliance with each part of the requirements is not needed as long as the overall energy requirement meet the demands according to specified trade-off calculations. For instance, poorer insulation performance of building fabric elements may be offset by more efficient heating or hot water provision or by means of heat recovery.

The table below illustrates heat loss characteristics of building elements that are typically used to meet the overall energy performance requirements of the Swedish building regulations.

Table 5.25- Typical heat loss characteristics of building fabric elements to meet the building regulations of Sweden.

	U-values $W/m^2\text{°C}$
External walls	0.15
Ground floors	0.15
Roofs	0.15
Windows	1.25

Unlike building requirements in many other countries, the Swedish regulations have not only minimum requirements to the ventilation rates (given by indoor air quality demands) but also maximum air leakage at given pressure differentials.

UK

Building Regulations - Part L (Part J in Scotland). Controlled by Local Authorities and Approved Inspectors

Part L, on “Conservation of fuel and power”, is divided into parts L1 and L2, governing “dwellings” and “buildings other than dwellings” respectively

They specify the minimum energy efficiency standard based on either (in order of increasing flexibility):

elemental U-values (only when minimum boiler efficiency standard is met, U-values of each element of building envelope is looked at),

target U-values (can be used with any heating system and takes account of its efficiency and solar gain),

or the Carbon Index value, which is an extension of the existing SAP rating

With buildings other than dwellings, energy efficiency factors other than the thermal insulation of the building envelope play a relatively more important role in achieving the minimum standard

The Scottish minimum standard is marginally higher

Energy Efficiency Commitment (EEC, evolved from EESoP¹⁶). Administered by Ofgem and developed by EST

Defra (formally) sets suppliers’ energy efficiency target (energy saved in terms of TWh as a result of demand-side energy efficiency improvements), energy suppliers are allowed to spend defined amount of money per customer (in the region of £1) to aid them in meeting their targets by setting up schemes to promote domestic energy efficiency measures to their customers (e.g. marketing, installer accreditation, bulk discounts).

To address fuel poverty, there is a requirement for suppliers to achieve a certain proportion (which has increased over time) of take-up of measures in low-income households (known as ‘Priority Group’)

EEC (then EESoP) was introduced in 1994. By 2002, EEC had delivered energy efficiency measures equivalent to a saving of 15TWh electricity and 6TWh gas

The current EEC round (2002-2005) has an energy saving target of a 62TWh, of which 31TWh have been delivered by the end of 2003. The Priority Group is currently set to receive 50% of measures

5.2.2 Pre-investment schemes – energy labelling etc.

Labelling schemes are the most important policies when it comes to the section non-financial pre-investment strategies for RUE. According to the EU framework all EU countries have some kind of labelling for electric appliances. Candidate countries have also implemented such schemes or are on the way of preparing a corresponding legal framework. But labelling of course also exists in the field of buildings which has been strongly fostered by the EU building directive.

In addition to labelling also voluntary agreements on energy efficiency have been set up in some countries like in Finland and the Netherlands.

¹⁶ Energy Efficiency Standards of Performance

EU framework

The general background of the harmonisation of the national measures with regard to energy labelling of household appliances in the EU is Council Directive 92/75/EEC of 22 September 1992. Before this Directive, there was only an energy-labelling scheme for electric ovens - which was abandoned in conjunction with the 1992 Directive.

The overriding objective of Council Directive 92/75/EEC is to ensure that any household appliance of the appliance categories covered by the Directive - refrigerators, freezers, washing machines, dryers, dishwashers, ovens, water heaters, hot-water storages, lighting sources and air-conditioning - are provided with information on their energy consumption by means of a standardised label. This requirement applies regardless of whether the appliances are offered for sale or hire and even if they are sold to non-household users. The label is to be provided by the supplier, including the necessary technical documentation to back up the information.

Labelling schemes covering the following appliance groups have been initiated:

household electric refrigerators, freezers and their combinations - Directive 94/2/EC 21 January 1994 amended by Commission Directive 2003/66/EC of 3 July 2003

household electric ovens - Commission Directive 2002/40/EC of 8 May 2002

household air-conditioners - Commission Directive 2002/31/EC of 22 March 2002

household dishwashers - Commission Directive 1999/9/EC of 26 February 1999 amending Directive 97/17/EC

household lamps - Commission Directive 98/11/EC of 27 January 1998

household washer-dryers - Commission Directive 96/60/EC of 19 September 1996

electric household tumble dryers - Commission Directive 95/13/EC of 23 May 1995

household washing machines - Commission Directive 95/122/EC of 23 May 1995 amended by Directive 96/89/EC

The labelling schemes classify the household appliances according to a 7-step scale (from A-G) based on their estimated electricity consumption. In addition to the mandatory energy labelling schemes (notably various household appliance groups), energy labelling is applied on a voluntary basis for other products and equipment. An example of this is the so-called “Energy Arrow” scheme for office equipment and consumer electronics - in which Denmark is one of five European countries participating.

Austria

Over the last decade, Austria has implemented the energy labelling schemes of the EU Directives. The Austrian basis of this implementation is provided through the Elektrotechnikgesetz of 1992.

The following labelling schemes have been introduced in Austria:

- refrigerators/freezers – BGBl. 569/94
- washing machines - BGBl. 168/97
- tumble dryers - BGBl. 579/96
- combined washer/dryers - BGBl. 92/98
- dishwashers - BGBl. 182/99
- household lamps - BGBl. 311/99.

Belgium

There are labelling schemes for household appliances implementing the EU Directives described above covering: refrigerators, deep-freezers, dishwashers, wash-machines and dryers.

Energy audits of buildings are applied in different contexts and are to some extent subsidised by regional governments in Belgium.

Czech Republic

Energy labelling of appliances according to the guidelines of the EU Directives is in the process of being introduced. To this end the Energy Management Act has been implemented on 1 January 2001. The appliances to be covered by energy labelling are: refrigerators/freezers, washing machines/tumble dryers, dishwashers and domestic lighting.

Denmark

Labelling schemes for buildings, equipment, appliances etc. make up a considerable part of the overall RUE promotion efforts.

The Energy Labelling scheme for small buildings (less than 1500 sqm.) requires that any house sold must be provided with specifications regarding its energy performance. The objective is to enable buyers to assess its energy consumption for heating including assessments the potentials and costs for improving this.

The equivalent scheme for large buildings - the so-called ELO-scheme (Energy Management scheme for large buildings) - establishes that such assessments are to be carried out annually. The outputs of these assessments are an energy label documenting its present performance and a plan documenting potential improvements. Exempted from the ELO-scheme are buildings with very low heating demand and/or few cost-effective energy savings. The scheme was revised in 2002 and future revisions are envisaged to adopt to EU-legislation.

The EU Building Directive, which was developed during the Danish Presidency in the second half of 2002, is modelled in part on the Danish scheme for small buildings but is being developed significantly with regard to tenements among other things.

As regards appliances, the legislation introduced from 1993 onwards is based on EU Directives (see above).

The government has decided to enter into a voluntary agreement with the glazing industry on the phasing out of traditional double-glazed windows at the expense of energy-efficient double-glazing (in conjunction with window replacements). This reflects that energy-efficient double-glazing generally is very cost-effective solutions when windows are being replaced anyway.

Demand side management activities are carried out through 32 local energy savings committees covering the whole country. These committees are established in accordance with the Energy Savings Act passed in 2001. Grid and distribution companies in electricity, natural gas and district heating are statutory members of the energy savings committees but they are open to others such as local and regional authorities, business councils, green organisations etc. This local energy savings framework is envisaged to gain significance in coming years (in relative terms).

Finland

An energy audit scheme for residential buildings, which was introduced in 2002, is to be developed into an energy-labelling scheme proper for buildings from the year 2006 onwards. The scheme is still in its early stages and as yet has still to be evaluated.

The "Höyla II" programme for energy conservation in oil-heated buildings, started in 2002, is a follow-up to a programme started in 1997. It combines awareness increasing activities with voluntary agreements to repair oil-heated boilers and to ensure that boilers installed from the year 2003 onwards meet certain energy standards ("three star" rating according to an EU Directive). The

objective of the scheme is to reduce the per capita oil consumption by 10% between 1997 and 2010. Moreover 100,000 are to be repaired from 2002 to 2010.

In November 2002, a voluntary agreement on energy conservation was entered between the Ministries of Environment and Trade and Industry on the one hand and the Federation of Housing Property Owners and Developers, ASRA on the other. The objectives of the agreement are, among others, to reduce the specific heat and water consumption by 10% before the year 2008 and by 15% before 2012 and to stop the growth of electricity use among ASRA's member associations.

Energy labelling schemes exist for different categories of household appliances based on the EU legislation and covers refrigerators, freezers, washing machines, dishwashers, dryers and lamps among others.

An ongoing feasibility study is preparing the introduction of a window rating system in Finland. The feasibility study is linked to a SAVE-project, "European Window Energy Rating System" with participation from 7 EU countries and Norway.

From 1996 onwards, an initiative has been carried out through the Information Centre of Energy Efficiency and Renewable Energy Sources, Motiva to educate local "energy experts" among residents of flats and terraced houses. These energy experts then monitor energy and water use in their housing area and take appropriate actions to reduce these. Between 1996 and 2001, about 3000 experts were educated and an evaluation indicated that their work had resulted in the following reductions: heat consumption by about 5%, water consumption by 10-25% and electricity use by 1-10%.

France

Different labelling schemes in conjunction with RUE exist in France. Notably, a labelling scheme of energy saving solutions in single-family houses has been in force since 1983. This scheme contains a multi-step labelling system.

France has introduced labelling schemes for household appliances based on the EU framework described above.

Germany

As of January 1998 energy labelling were made mandatory for appliance, thereby transferring all existing EU Directives in this field to German federal law. Hence, energy labelling of refrigerators/freezers, washing machines/tumble dryers, dishwashers, and domestic lighting is mandatory today.

A study carried out in 2001 showed that Germany has a leading position with regard to both use of energy labels and the share of Class A and B household appliances (i.e. the most energy efficiency appliances).

Greece

Energy labelling schemes for domestic appliances have been introduced in accordance with the EU Directives. The general framework was established in 1994 through the Greek Presidential Decree 180/1994 based EU Directive 92/75/EC. The following categories of appliances are covered:

- refrigerators/freezers in the form of Greek Ministerial Decision 25810/1994 implementing EU Directive 94/2/EC
- washing machines and tumble dryers covered through Ministerial Decision 3972/76 based on EU Directive 95/12/EC
- combined washing machine and dryers covered by Ministerial Decision 9142/97 based on Directive 96/60/EC
- dishwashers in the form of Ministerial Decision 10200/1998 implementing Directive 97/17/EC

Provisions for energy certification of buildings are found in Greece's Joint Ministerial Decision No. 21475/2707/98, "Reduction of CO₂ emissions by determining measures and requirements for improvement of buildings". This scheme is to become mandatory.

An energy auditing scheme covering both buildings and small and medium-sized enterprises has been established. The Centre for Renewable Energy Sources (CRES), formed in 1988, manages the scheme.

Hungary

Hungary has five energy labelling schemes for domestic appliances covering refrigerators/freezers, washing machines/tumble dryers, household dishwashers and household lighting devices. In addition, there is a ministerial decree (of 2002) on labelling of fuel efficiency and CO₂-emissions of automobiles. All of these labelling schemes are implementing EU Directives in a Hungarian context.

A public awareness programme was initiated in 2002 in the framework of the Szécheni Plan and targeted mainly at the education school. Roughly, twenty Regional Energy Advice Centres have been established by the Energy Efficiency Advisory Network set up by NGOs, MVA (the Enterprise Development Agency) and MTESZ (the Hungarian Alliance of Technical and Science Association). In addition to this, different energy utilities have energy awareness activities.

Ireland

Energy Action programme of Dublin offers energy auditing of dwellings with an energy rating based on a standardised Irish computer based method, namely the Irish Home Energy Rating (IHER). Unlike the other services of Energy Action, the energy audits are not provided free of charge.

Italy

A number of energy labelling schemes for different appliances and other types of equipment are in force implementing EC Directives. These include: new boilers with a nominal capacity in the interval 4-400 kW, dishwashers, washing and drying machines, refrigerators and freezers, air-conditioners and electric ovens. For all of these, the Italian legislation simply enforces the content of the EC Directives.

Luxembourg

Luxembourg has introduced energy labelling of household appliances based on the EU legislation. This concerns the following items:

- washing machines (Grand Ducal regulation of 19 June 1996 with amendment as of 3 September 1998)
- tumble dryers (Grand Ducal regulation of 19 June 1996)
- refrigerators, freezers and their combination (Grand Ducal regulation of 19 June 1996)
- dishwashers (Grand Ducal regulation of 19 June 1996)

Netherlands

A key instrument in the Climate Policy Implementation Plan is the so-called Benchmark energy efficiency. This has the form of voluntary agreements in which large companies commit themselves to be among the best companies in the world with regard to energy efficiency.

The concept of Energy Performance Standard (EPN) of a building was introduced in December 1995. This is an energy label scheme for new buildings offering calculations of their energy use for heating, ventilation, air-conditioning and lighting and compared to typical Dutch buildings according to standardised procedures.

Portugal

Portugal has introduced the following energy labelling schemes based on EU legislation

household electric refrigerators, freezers and their combinations; implemented in Portugal by Decree-Law 41/94 of 11 of February 1994;

- household electric tumble driers; implemented in Portugal by Bill 117/96 of 15 of April 1996;
- household combined washer-driers; implemented in Portugal by Bill 1095/97 of 3 of November 1997;
- household lamps; implemented in Portugal by Decree-Law 18/2000 of 29 of February 2000;
- household washing machines; implemented in Portugal by Bill 116/96 of 13 of April 1996;
- household dishwashers; implemented in Portugal by Decree-Law 309/99 of 10 of August 1999;
- household air-conditioners; implemented in Portugal by Decree-Law 28/2003 of 12 of February 2003;
- household electric ovens; implemented in Portugal by Decree-Law 27/2003 of 12 of February 2003;

Slovenia

Slovenia has introduced energy labelling schemes for household appliances and the like in accordance with the EU Directives detailed elsewhere. Currently, there are mandatory schemes covering:

- refrigerators
- washing machines
- light bulbs

Spain

In the late 1990's, Spain introduced two schemes for energy certification and labelling of buildings: one targeted at dwellings (Calificación Energética de Viviendas, CEV) and one addressing remaining buildings (Calificación Energética de Edificios, CALENER). Both rating schemes are based on computer tools developed by IDAE.

In addition, there are schemes for energy labelling of the following appliances, all based on the European Union Directives:

- refrigerators and freezers (No. 94/2/EC)
- washing machines (Nos. No. 93/32/EC and 95/12/EC)
- tumble driers (Nos. 93/32/EC and 96/60/EC)
- dishwashers (No. 97/17/EC)
- domestic lighting (No. 97/17/EC 98/11/EC)

The labelling schemes for domestic appliances were enforced during the second half of the 1990s.

Sweden

Energy labelling is applied in different forms.

The scheme for energy declaration of detached and semi-detached houses was introduced in 1994 based on an agreement between the Swedish Consumer Agency and the National Association for Swedish Wooden House Manufacturers. It states that any detached or semi-detached house marketed as energy-efficient must have its "heat loss value" declared. The heat loss value (W/K) indicates the heat loss per degree temperature differential between in and out, calculated by means of formalised methods (with a choice between different methods).

A scheme for testing, labelling and certification of energy-intensive equipment was introduced in 1994 and revised in 1998. Examples of such equipment include electric boilers, electric radiators, control systems and oil heaters.

In the autumn of 2000 a joint eco-labelling scheme for oil burners, the so-called "Swan Label" was introduced in the Nordic countries including Sweden. The objective of the scheme is both to improve energy-efficiency of oil burners and to minimise their harmful emissions.

UK

*BREEAM*¹⁷ (known as *EcoHomes for dwellings*). The assessment method also covers energy use and incorporates a widely recognised rating system for buildings. The assessment can be carried out before, during or after investment and appropriate guidance to improve the rating given.

*Housing Corporation*¹⁸ *LED*¹⁹ *Guidance project (England and Wales)*. Free project-specific guidance and support programme for housing associations to achieve low energy dwellings.

¹⁷ Building Research Establishment (BRE) Environmental Assessment Method

¹⁸ The Housing Corporation is the regulator of Registered Social Landlords (RSLs). RSLs or housing associations are non-local authority social housing providers.

¹⁹ Low-Energy Design

6 OVERVIEW ON CURRENT PROMOTION STRATEGIES FOR RES

In this chapter there will be given a short country-wise overview about existing promotion schemes of RES. This will be done according to the structure of promotion schemes that has been developed in Chapter 3. So, the core objective of this part is to give a rough overview about the kind of promotion schemes that exist in each country. Detailed data about promotion schemes for RES in the sectors electricity, heat and transport will be given in chapters 7, 8 and 9.

6.1 Sectoral review

Differentiated between the sectors electricity, heat and transport an overview about current promotion schemes will be presented in forms of tables for each sector. It easily can be seen, that the kind of promotion schemes differ widely between these sectors.

With respect to RES-E (electricity from RES) feed-in-tariffs strongly dominate in the EU-15 and the selected accession countries. They are partly combined with subsidies. Some countries have implemented quotas based on tradable green certificates (TGC) (Belgium, Italy, Sweden, United Kingdom, for DK it is proposed to change to this scheme).

In the field of RES-H (heat from RES) strong emphasis is given to investment subsidies, often combined with tax incentives. Regulatory schemes and TGC are of minor importance.

Promotion schemes in the field of RES-T (transport fuels from RES) are heavily dominated by tax incentives, which mainly are tax exemptions from fossil fuel taxes.

Table 6.1 Current promotion strategies for RES-E in EU-15 and selected Accession countries

Country	Major strategy	RES-E TECHNOLOGIES CONSIDERED			
		Large Hydro	Small Hydro	'New' RES (Wind on- & offshore, PV, Solar thermal electricity, Biomass, Biogas, Landfill gas, Sewage gas, Geothermal)	Municipal Solid Waste
Austria	FITs	No		Renewable Energy Act 2003. (Ökostromgesetz). FITs guaranteed for 13 years for plants which get all permissions between 1 st of January 2003 and 31 st of December 2004 and, hence, start operation by the end of 2006. Investment subsidies mainly on regional level.	No
Belgium	TGC + guaranteed electricity purchase	No		Federal: The Royal Decree of 10 July 2002 (operational from 1 st of July 2003) sets minimum prices for RES-E. Except for offshore wind it will be implemented by the regional authorities: Wallonia: Quota obligation (based on TGCs) on electricity suppliers– increasing from 3% in 2003 up to 12% in 2010. Flanders: Quota obligation (based on TGCs) on electricity suppliers– increasing from 3% (no MSW) in 2004 up to 6% in 2010. Brussels region: No support scheme yet implemented.	
Czech Republic	FITs + investment subsidies			Governmental program (subsidies), State environmental fund subsidies, specific program for feed in tariffs, tax on nuclear electricity, the Energy Act (obligation to purchase RES-E)	
Denmark	current	FITs	No	Act on Payment for Green Electricity (Act 478): Fix settlement prices instead of former high FITs. Valid for 10 years. Tendering plans for offshore wind.	No
	proposed	TGC	No	Quota obligation based on TGC – planned for 2004-2005	No
Finland	Tax Exemption	No		Tax refund: 0.44 €/kWh (plant <1MW), Mix of tax refund and investment subsidies: From January 2003: Tax refund of 0.73 €/kWh for Wind and of 0.44 €/kWh for other RES-E. Investment subsidies up to 40% for Wind and up to 30 % for other RES-E, Exemption on Energy Tax for renewable energy, Green Labels	No
France	FITs	No		FITs for RES-E plant < 12 MW guaranteed for 15 years (20 years PV and Hydro). Tenders for plant >12 MW. FITs in more detail: Biomass: 4.9 €/kWh, Biogas: 4.6 €/kWh, Geothermal: 7.62 €/kWh, PV 15.25-30.50 €/kWh; Landfill gas: 4.50-5.72 €/kWh; Wind:3.05-8.38 €/kWh; Hydro: 5.49-6.10 €/kWh. Investment subsidies for PV, Biomass and Biogas (Biomass and Biogas PBEDL 2000-2006).	FIT: 2.58-4.42 €/kWh
Germany	FITs	No		German Renewable Energy Act: FITs guaranteed for 20 years. In more detail, FITs for new installations in 2003 are: Hydro: 6.65- 7.67 €/kWh; Wind: 6-8.9 €/kWh; Biomass: 5.8-10 €/kWh, Landfill gas, Sewage gas and mine Biogas: 6.65-7.67 €/kWh; solar PV and Solar thermal electricity: 45.7 €/kWh; Geothermal: 7.16-8.95 €/kWh	No
Greece	FITs + investment subsidies	No		FITs guaranteed for 10 years (at a level of 70-90% of the consumer electricity price) and a mix of other instruments: a) Law 2601/98: Up to 40% investment subsidies combined with tax measures; b) CSF III: Up to 50% investment subsidies depending on RES type	No
Hungary	FITs + investment subsidies			Technological Development Fund (R&D), Energy Saving Program and Action Plan (Subsidies), Environmental Protection Plan (Subsidies), Biomass Usage for energy production, Electricity Act (Feed in tariffs)	
Ireland	Tender + Taxes			Tendering scheme – currently AER VI with technology bands and price caps for small Wind (<3 MW), large Wind (>3 MW), small Hydro (<5 MWp), Biomass, Biomass CHP and Biogas. In addition, tax relief for investments in RES-E, CO ₂ Tax, Waste Management (Regulation), House of Tomorrow: increase energy efficiency according to PV	No
Italy	TGC			Quota obligation (based on TGCs) on electricity suppliers: 2% target, increasing annually; TGC issued for all (new) RES-E (inc. large Hydro and MSW) – with rolling redemption; unclear penalty enforcement and market distortions. Investment subsidies for PV (Italian Roof Top program).	
Luxembourg	FITs	No	No	FITs guaranteed for 10 years (PV 20 years) and investment subsidies for Wind, PV, Biomass and small Hydro. FITs for Wind, Biomass and small Hydro: 2.5 €/kWh, for PV: 50 €/kWh.	No
Poland	tax exemption + quota			State Committee for Scientific Research, Ecofund (Subsidies), NFEP, Bank of Environmental Protection, Energy Taxes, Green Power Purchase obligation (Ministry of Economy), Prohibition of investments in nuclear power plants	
Portugal	FITs + investment subsidies	No		FITs (Decree law 339-C/2001 and Decree law 168/99) and about 40% investment subsidies (Measure 2.5 (MAPE) within program for Economic Activities (POE)) for Wind, PV, Biomass, Small Hydro and Wave. FITs in 2003: Wind: 4,3€/kWh-8,3€/kWh; Wave: 22,5€/kWh; PV:22,4€/kWh-41€/kWh, Small Hydro: 7,2€/kWh, R & D Programs, MAPE Grants, VAT reduction, The Energy excise Duty (ISP)	No
Slovenia	FITs + investment subsidies			Ordinance on rules for definition of prices and purchase of electricity (feed-in tariffs), Environment Ministry Fund (subsidy, bidding), Efficient Use of Energy (soft loans)	
Spain	FITs	Depending on the plant size		FITs (Royal Decree 2818/1998): RES-E producer have the right to opt for a fixed price or for a premium tariff. Both are adjusted annually by the government according to the variation in the average electricity sale price. In more detail (only premium, valid for plant < 50 MW): Wind: 2.7 €/kWh; PV: 18-36 €/kWh, Small Hydro: 2.9€/kWh, Biomass: 2.5-3,3 €/kWh. Moreover, soft loans and tax incentives (according to "Plan de Fomento de las Energías Renovables") and investment subsidies on a regional level	FIT: 1.7 €/kWh
Sweden	TGC	No		Quota obligation (based on TGC) on consumers: Increasing from 7.4% in 2003 up to 16.9% in 2010. For Wind Investment subsidies of 15% and additional FITs ("Environmental Bonus") in size of 1.9 €/kWh are available. Favourable Taxation for RES	No
Netherlands	FITs + tax exemption			Mixed strategy: green pricing, tax exemptions and FITs. The tax exemption for green electricity amounts 2.9 €/kWh and FITs range from 2.9 €/kWh for mixed Biomass and waste streams to 6.8 €/kWh for Wind, PV, Tidal, Wave and Small Hydro, Regulation Energy Tax (REB)	No
United Kingdom	TGC	No		Quota obligation (based on TGCs) for all RES-E: Increasing from 3% in 2003 up to 10.4% by 2010 – penalty set at 3.51 £/kWh. Optional to the TGC-system, eligible RES-E are exempted from the Climate Change Levy certified by Levy Exemption Certificates (LEC's), which cannot be separately traded from physical electricity. The current levy rate is 0.43 £/kWh. Investment grants in the frame of different programs (e.g. Clear Skies Scheme, DTI's Offshore Wind Capital Grant Scheme, the Energy Crops Scheme, Major PV Demonstration Program and the Scottish Community Renewable Initiative)	No

Table 6.2 Current promotion strategies for RES-H in EU-15 and selected Accession countries

Country	Major strategy	Description of promotion schemes
Austria	Investment subsidies	The Research programs for Industry, the Fund of Scientific Research, soft loans in the frame of support of residential buildings, Kommunalkredit-Program (investment subsidies), subsidies on provincial level
Belgium	Tax Exemption+ investment subsidies	Investment subsidies schemes for RES in Walloon Region in the private sector, UREBA: Investment subsidies schemes for RES in Walloon Region in the public sector, Company tax reduction for investment (company tax code,1992), Valued added tax (V.A.T)- tax investment
Czech Republic	Tax exemption	State environmental fund subsidies, specific program for aimed at developing renewable energy production (tax incentive), energy taxes, government program for the support of Energy Savings and the Utilization of RES
Denmark	Regulation + investment subsidies	Act on Utilisation of Renewable energies (Investment subsidies), Solar heating obligation in new buildings
Finland	Tax Exemption+ investment subsidies	Investment subsidies (State Decision 29/99), Exemption on Energy Tax for renewable energy
France	Tax Exemption+ investment subsidies	Solar thermal Program Helios 2000-2006 Biomass Introduction Program PBEDL 2000-2006, Tax incentives
Germany	investment subsidies + Tax Exemption	German Renewable Energy Act: FITs guaranteed for 20 years. Support Program Resources (R&D), ERP and DtA Environment and Energy Efficiency Program (investment subsidies and soft loans), German Market incentive program, income tax exemption for pure liquid and solid fuels
Greece	Investment subsidies+ Regulation	Law 2601/98: Up to 40% investment subsidies combined with tax measures, CSF III: Up to 50% investment subsidies depending on RES type, Regulation for Rational Use of Energy in Buildings (RRUEB), Legislation for boilers and burners
Hungary	Investment subsidies	Technological Development Fund (R&D), Energy Saving Program and Action Plan (Subsidies), Environmental Protection Plan (Subsidies), Biomass Usage for energy production, Energy Loan program (Soft loans)
Ireland	Regulation+ energy tax	Waste Management (Regulation), CO ₂ Tax, House of Tomorrow: increase energy efficiency according to Solar Thermal
Italy	Tax incentives	CO ₂ Tax (energy tax), Lower VAT rates for Solar heat systems
Luxembourg	Investment subsidies	Investment subsidy: Rebate Solar thermal, Investment Subsidies for Biomass, Subsidies for dissemination
Poland	Tax exemption+ regulation	State Committee for Scientific Research, Ecofund (Subsidies), NFEP, Bank of Environmental Protection, Energy Taxes, Green Power Purchase obligation (Ministry of Economy)
Portugal	Investment subsidies + Tax Exemption	R & D Programs, MAPE Grants, VAT reduction, The Energy excise Duty (ISP), the governmental program "Água Quente Solar2"
Slovenia	Investment subsidies	Environment Ministry Fund (subsidy, bidding), Efficient Use of Energy (soft loans), The environmental development fund of the Republic Slovenia
Spain	Investment subsidies + Tax Exemption	Incentives for active solar thermal under the Plan de Fomento de las Energías renovables (investment subsidies), Soft loans and tax incentives (according to "Plan de Fomento de las Energías Renovables") and investment subsidies on a regional level
Sweden	TGC+ investment subsidies	Favourable Taxation for RES, Subsidies for small-scale producers, investment grants, environmental bonus, Quota obligation (based on TGCs)
Netherlands	Tax exemption+ subsidies	Mixed strategy: green pricing, tax exemptions and subsidies. Subsidy Energy Program (DEN), Tax deduction for RE investments (EIA), Energy Subsidy Regulation (ERP), CO ₂ Reduction Plan, Regulation Energy Tax
United Kingdom	Investment subsidies+ campaigns	Investment grants in the frame of different programs (e.g. Clear Skies Scheme, DTI's. EST Save energy campaign, Planning Policy Guidance, Government fund to promote biomass energy crps

Table 6.3 Current promotion strategies for RES-T in EU-15 and selected Accession countries

	Major strategy	RES-T TECHNOLOGIES CONSIDERED
Austria	Tax exemption	Research programs for Industry, tax reduction for pure liquid biofuels, taxes on fossil transport fuels
Belgium	Tax exemption	Company tax reduction for investment (company tax code,1992), Valued added tax (VAT) -tax exemption, taxes on fossil transport fuels
Czech Republic	Tax exemption	Energy taxes, exemption from excise tax for biodiesel fuel, government program for the support of Energy Savings and the Utilization of RES, taxes on fossil transport fuels
Denmark	Tax exemption	Taxes on fossil transport fuels
Finland	Tax exemption	Investment subsidies (State Decision 29/99), Exemption on Energy Tax for renewable energy, taxes on fossil transport fuels
France	Tax exemption	Taxes on fossil transport fuels
Germany	Tax exemption	Support Program Resources (R&D), Support for biogenic fuels and lubricants, tax exemption for pure liquid and solid biofuels , taxes on fossil transport fuels
Greece	Tax exemption	Tax incentives: Law 2364/95, Promotion Campaigns for Energy Efficiency, taxes on fossil transport fuels
Hungary	Tax exemption	Taxes on fossil transport fuel, Technological Development Fund (R&D), taxes on fossil transport fuels
Ireland	Tax exemption	Taxes on fossil transport fuels
Italy	Tax exemption	CO ₂ Tax (energy tax), Tax Exemption for Biofuels, taxes on fossil transport fuels
Luxembourg	Tax exemption	Taxes on fossil transport fuels
Poland	Tax exemption	State Committee for Scientific Research, Ecofund (Subsidies), NFEP, Bank of Environmental Protection, Biofuel Act, Energy tax
Portugal	Tax exemption	Vehicle Acquisition tax reduction, taxes on fossil transport fuels
Slovenia	Tax exemption	Taxes on fossil transport fuels
Spain	Tax exemption	Direct tax Provision for environmentally Friendly Investments, National Tax Exemptions for biofuels, taxes on fossil transport fuels
Sweden	Tax exemption	Tax Reduction for biofuels, taxes on fossil transport fuels
Netherlands	Tax exemption	Subsidy Energy Program (DEN), Tax deduction for RE investments (EIA), taxes on fossil transport fuels
United Kingdom	Tax exemption	Fuel Duty, EST Transport Initiative: Powershift, cleanup and Bestpractice, taxes on fossil transport fuels

6.2 Country review

This section provides a table for each country that shows the existing policies in the area of RES according to the typology of promotion schemes that has been developed in chapter 3. Hence, the policies for RES-E, RES-H and RES-T are listed for the sections

- financial and non-financial,
- push and pull,
- pre-investment/implementation, investment/implementation and post investment as well as indirect schemes.

Generally for most RES-technologies there is a strong focus on financial pull schemes. However, in some countries there is also put more emphasis e.g. on regulatory as well as tax-mechanisms. Of course, taxes on fossil fuels exist in all countries.

Table 6.4 Typology of current promotion strategies for RES in Austria

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation				<ul style="list-style-type: none"> Research Programmes for Industry (Forschungsförderungsfonds für die gewerbliche Wirtschaft-FFF) (F&E and demonstration projects) the Fund for Scientific Research (Fonds zur Förderung der Wissenschaftlichen Forschung - FWF) (F&E and demonstration projects) the Research Fund for Regional and Local Energy Concepts and District Heating Austrian Program on Technologies for Sustainable Development (nachhaltig Wirtschaften) 								
Investment / implementation				<ul style="list-style-type: none"> Environmental support program of the Ministry of Agriculture, Forestry, Environment and Water Management in Austria. "Kommunalkredit-Program" (Rebate) Support for solar, Biomass heating and heat pump systems in the provinces (in most cases of part of the support for residential housing)- (Rebate) Eco-electricity program of the region Upper Austria (ÖKOP) (Rebate) 								
					<ul style="list-style-type: none"> Support for solar systems by the Chamber of workers in the Burgenland (soft loans) 							
				<ul style="list-style-type: none"> Deduction of investments for RES from the income tax 								
Post-investment / implementation	<ul style="list-style-type: none"> Energy taxes 			<ul style="list-style-type: none"> Renewable energy Act (Feed in Tariff) Eco-electricity program of the region Upper Austria (ÖKOP) for wind plants (bidding) 			<ul style="list-style-type: none"> Tax reductions for pure liquid biofuels 				<ul style="list-style-type: none"> Solar Stock Exchange in Vorarlberg (Green Electricity Stock Exchange Program) 	

Table 6.5 Typology of current promotion strategies for RES in Belgium

	Financial						Non-financial							
	Push			Pull			Push			Pull				
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport		
Pre-investment / implementation													▪ The indicative Programme	
Investment / implementation	<ul style="list-style-type: none"> ▪ Company Tax – Depreciation/Amortisation of investment. Company Tax Code (1992) (tax incentive) ▪ Company Tax – Deduction for investment. Company Tax Code (1992) (tax incentive) ▪ Value added tax (V.A.T.) (tax incentive) 			<ul style="list-style-type: none"> ▪ Investments Subsidy Schemes for RES in the Walloon Region in the private sector (Investment subsidy) ▪ UREBA: Investments Subsidy Schemes for RES in the Walloon Region in the public sector (Investment subsidy) ▪ Investments Subsidy Schemes for RES in Flanders in the private sector (Investment subsidy) ▪ Subsidy Scheme for PV in Flanders 										
Post-investment / implementation	<ul style="list-style-type: none"> ▪ Energy taxes 			<ul style="list-style-type: none"> ▪ Guaranteed minimum prices for green electricity and green certificate. Royal Decree of 16 July 2002. (feed in tariff) ▪ Green certificates in Flanders ▪ Green certificates in Wallonia 										
Indirect schemes														

Table 6.6 Typology of current promotion strategies for RES in the Czech Republic

	Financial						Non-financial						
	Push			Pull			Push			Pull			
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	
Pre-investment / implementation													
Investment / implementation				<ul style="list-style-type: none"> ▪ Governmental programme (subsidies) ▪ State Environmental fund subsidies ▪ Specific programme aimed at developing renewable energy production (tax incentive) 									
Post-investment / implementation	<ul style="list-style-type: none"> ▪ Tax on nuclear electricity 			<ul style="list-style-type: none"> ▪ Specific programme aimed at developing renewable energy production (Feed in tariffs) ▪ The Energy act (obligation to purchase RES-E) 			<ul style="list-style-type: none"> ▪ Exemption from excise tax for biodiesel fuel 						
Indirect schemes				<ul style="list-style-type: none"> ▪ Government programme for the support of Energy Savings and the Utilisation of Renewable and Secondary Sources of Energy 									

Table 6.7 Typology of current promotion strategies for RES in Germany

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation				<ul style="list-style-type: none"> Support Program Resources R&D program Support Program Resources for demonstration projects of the Federal Environment Ministry 								
Investment / implementation				<ul style="list-style-type: none"> ERP and DtA Environment and Energy Efficiency Program (investment subsidy and soft loans) German Market Incentive Program (investment subsidy and soft loans) Income tax exemption 	<ul style="list-style-type: none"> Support for biogenic fuels and lubricants 							
Post-investment / implementation	<ul style="list-style-type: none"> Energy taxes 			<ul style="list-style-type: none"> Renewable Energy Act (Feed in tariff) 	<ul style="list-style-type: none"> Tax Exemption for pure liquid and solid biofuels in heat and transport 							
Indirect schemes												

Table 6.8 Typology of current promotion strategies for RES in Denmark

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation												
Investment / implementation				▪ Support for offshore wind by the agreement on offshore wind turbines	▪ Act on utilisation of renewable energies (Investment subsidies)						▪ Solar heating obligation in new buildings	
Post-investment / implementation	▪ Energy taxes ▪ CO2 taxes ▪ SO2 taxes			▪ Act on payment for green electricity (FIT) ▪ Tax incentives								
Indirect schemes												

Table 6.9 Typology of current promotion strategies for RES in Spain

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation				<ul style="list-style-type: none"> Plan de fomento de las Energías renovables (1999-2010) 								
Investment / implementation				<ul style="list-style-type: none"> Direct Tax Provisions for environmentally friendly investments Tax on business activities discount 		<ul style="list-style-type: none"> National Tax Exemptions for Biofuels 						
				<ul style="list-style-type: none"> Incentives for Active solar Thermal under the Plan de Fomento de las Energías renovables (investment subsidies) Incentives for Biomass under the Plan de Fomento de las Energías renovables (investment subsidies) 								
Post-investment / implementation	<ul style="list-style-type: none"> Energy taxes 			<ul style="list-style-type: none"> Royal Decree 2818/1998 (feed-in tariff) 								
Indirect schemes												

Table 6.10 Typology of current promotion strategies for RES in Finland

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation												
Investment / implementation				<ul style="list-style-type: none"> ▪ State decision 29/99 (Investment Subsidies) ▪ Exemption on energy tax for renewable electricity (Motion 510/98) 			<ul style="list-style-type: none"> ▪ Green labels (Ekoenergiaa) 					
Post-investment / implementation	<ul style="list-style-type: none"> ▪ Energy taxes 											
Indirect schemes												

Table 6.11 Typology of current promotion strategies for RES in France

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation					<ul style="list-style-type: none"> ▪ Solar thermal Programme Helios 2000-2006 					<ul style="list-style-type: none"> ▪ Biomass introduction programme PBEDL 2000-2006 ▪ Solar thermal Programme Helios 2000-2006 		
Investment / implementation				<ul style="list-style-type: none"> ▪ Tender for large scale biomass and biogas ▪ Biomass introduction programme PBEDL 2000-2006 ▪ Tax incentives 								
Post-investment / implementation	<ul style="list-style-type: none"> ▪ Energy taxes 			<ul style="list-style-type: none"> ▪ Feed in tariffs 								
Indirect schemes												

Table 6.12 Typology of current promotion strategies for RES in Greece

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation				<ul style="list-style-type: none"> R&D Programmes 								
Investment / implementation	<ul style="list-style-type: none"> Tax incentives: Law 2364/95 			<ul style="list-style-type: none"> National Operational Programme for Competitiveness (OPC) (Subsidies) National Development Law 2601/98(Subsidies) 						<ul style="list-style-type: none"> Regulation for Rational Use of Energy in Buildings (RRUEB) 		
Post-investment / implementation				<ul style="list-style-type: none"> Law 2773/99 (Feed-in tariffs) 								
Indirect schemes							<ul style="list-style-type: none"> Promotion campaigns for energy efficiency Legislation for Boilers and burners and electrical applications 					

Table 6.13 Typology of current promotion strategies for RES in Hungary

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation				<ul style="list-style-type: none"> Technological Development fund (R&D) 								
Investment / implementation				<ul style="list-style-type: none"> Energy saving programme and Action Plan (Subsidies) Environmental Protection Fund (Subsidies) 						<ul style="list-style-type: none"> Energy Loan Programme (soft loans) 		
				<ul style="list-style-type: none"> Biomasse usage for energy production 								
Post-investment / implementation	<ul style="list-style-type: none"> Energy taxes 			<ul style="list-style-type: none"> Electricity act (Feed in tariffs) 								
Indirect schemes												

Table 6.14 Typology of current promotion strategies for RES in Ireland

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation				<ul style="list-style-type: none"> Research Support of R&D: Renewable Energy Research, Development & Demonstration Research support of demonstration projects: Renewable Energy Research, Development & Demonstration 								
Investment / implementation												
Post-investment / implementation	<ul style="list-style-type: none"> CO₂ tax 			<ul style="list-style-type: none"> Bidding scheme for wind, hydro (small), biomass (with CHP) and waste 						<ul style="list-style-type: none"> House of tomorrow: Increase energy efficiency with respect to PV 	<ul style="list-style-type: none"> House of tomorrow: Increase energy efficiency with respect to solar thermal 	
Indirect schemes						<ul style="list-style-type: none"> Waste Management: Regulation 						

Table 6.15 Typology of current promotion strategies for RES in Italy

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation												
Investment / implementation				<ul style="list-style-type: none"> ▪ Italian national 10000 photovoltaic roofs program 	<ul style="list-style-type: none"> ▪ Lower VAT rates for solar heat systems 	<ul style="list-style-type: none"> ▪ Tax exemptions for biofuels 						
Post-investment / implementation	<ul style="list-style-type: none"> ▪ Carbon dioxide tax (Energy tax) 			<ul style="list-style-type: none"> ▪ Tender for the development of a solar thermal project ▪ System of tradable green certificates 								
Indirect schemes												

Table 6.16 Typology of current promotion strategies for RES in Luxembourg

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation												
Investment / implementation				<ul style="list-style-type: none"> ▪ Investment subsidy: Rebate Solar PV ▪ Investment subsidy: Rebate Wind energy ▪ Subsidy for grid connection 	<ul style="list-style-type: none"> ▪ Investment subsidy: Rebate Solar thermal ▪ Investment subsidies for biomass 							
Post-investment / implementation				<ul style="list-style-type: none"> ▪ Feed in tariffs ▪ Special tariffs for autoproducers (non-utility renewable electricity) 								
Indirect schemes					<ul style="list-style-type: none"> ▪ Subsidies for dissemination/technical support, Solar thermal ▪ Subsidies for dissemination/technical support, Biomass 							

Table 6.17 Typology of current promotion strategies for RES in the Netherlands

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation				Subsidy Energy Programs(DEN ²⁰)								
Investment / implementation				Tax deduction for renewable energy Investments (EIA) (tax incentive)								
				Green Funds in the Netherlands (tax incentive)								
Investment / implementation				Energy Subsidy Regulation (EPR) and energy Performance Advice (EPA) (Investment Subsidies)								
				CO ₂ Reduction Plan								
Post-investment / implementation	Regulating Energy Tax (REB) (Energy tax)			Environmental Quality of Power Generation (MEP) (Feed in Tariff)								
Indirect schemes												

²⁰ Former BSE

Table 6.18 Typology of current promotion strategies for RES in Poland

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation				<ul style="list-style-type: none"> State Committee for Scientific Research (R&D) Ecofund (Demonstration projects) 								
Investment / implementation				<ul style="list-style-type: none"> Ecofund (Subsidies) NFEP (subsidies and loans) Bank of environmental protection (favourable financing conditions for RES) 						<ul style="list-style-type: none"> Green Power Purchase Obligation, Ministry of Economy Ordinance of December 2000 		<ul style="list-style-type: none"> Biofuel act (blending obligation)
										<ul style="list-style-type: none"> Prohibition of investments in nuclear power plants 		
Post-investment / implementation	<ul style="list-style-type: none"> Energy taxes 			<ul style="list-style-type: none"> Tax incentives 								
Indirect schemes												

Table 6.19 Typology of current promotion strategies for RES in Portugal

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation				PRIME Programme								
				FCT R&D programmes AdI R&D programmes								
Investment / implementation				MAPE grants (subsidies) VAT Reduction (tax incentive)		Vehicle Acquisition Tax Reduction				RGCE (regulation of energy management) RCCTE (thermal regulation of buildings) RSECE (regulation for HVAC)		
Post-investment / implementation	The Energy Excise Duty (ISP)			Feed in tariffs IRS Reduction (tax incentive) IRC Reduction (tax incentive)								
Indirect schemes								The governmental programme “Água Quente Solar21”				Enhancement of administrative procedures

²¹ In English “Solar Hot Water”

Table 6.20 Typology of current promotion strategies for RES in Sweden

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation												
Investment / implementation	Favourable Taxation for Renewables			Subsidies for small-scale producers Investment grants Environmental bonus								
Post-investment / implementation				Tradable Green Certificate / Quota			Tax reduction of bio fuels					
Indirect schemes												

Table 6.21 Typology of current promotion strategies for RES in Slovenia

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation												
Investment / implementation					The environmental development fund of the Republic of Slovenia							
				Environment Ministry Fund (Subsidy, bidding) Efficient use of energy investment fund (soft loans)								
Post-investment / implementation	Energy taxes			Ordinance on rules for definition of prices and purchase of electricity (feed in tariff)								
Indirect schemes												

Table 6.22 Typology of current promotion strategies for RES in the United Kingdom

	Financial						Non-financial					
	Push			Pull			Push			Pull		
	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport	Electricity	Heat	Transport
Pre-investment / implementation				<ul style="list-style-type: none"> ▪ DTI Capital Grants Programme: Offshore Wind ▪ DTI Capital Grants Programme: Bio-energy 								
				<ul style="list-style-type: none"> ▪ DTI's New & Renewable Energy R&D Programme ▪ Faraday partnerships ▪ Research Councils ▪ Carbon Trust Low Carbon Innovation Programme. R&D grants from the carbon Trust 								
Investment / implementation				<ul style="list-style-type: none"> ▪ Government funds to promote biomass energy from energy crops 								
				<ul style="list-style-type: none"> ▪ Clear Skies Scheme ▪ Defra Energy Crops Scheme ▪ DTI Capital Grants Programme: Bio-energy 								
				<ul style="list-style-type: none"> ▪ Major PV Demonstration Programme ▪ Offshore Wind Capital Grants 								
Post-investment / implementation	<ul style="list-style-type: none"> ▪ The UK Climate Change Levy 			<ul style="list-style-type: none"> ▪ The UK Renewables Obligation ▪ UK Emissiontrading Scheme 								
Indirect schemes										<ul style="list-style-type: none"> • EST Community Energy • EST Save Energy campaign /Energy efficiency Advice Centres • Countryside Agency Community Renewables Initiative • EST Practical Help • Planning Policy Guidance • Major PV Demonstration Programme 	<ul style="list-style-type: none"> • EST Transport Initiative: Powershift, cleanup and BestPractice 	

7 ELECTRICITY SECTOR – PROMOTION STRATEGIES FOR RES - E IN EUROPE

An overview about existing promotion strategies for RES-E will be given in this section. It is structured according to the typology developed in chapter 3 into financial and non-financial strategies on the one hand and into schemes that are designed for the pre-investment/implementation, for the investment/implementation or the post-implementation phase on the other.

7.1 Financial Strategies

7.1.1 Pre-investment / Implementation

Financial pre-investment strategies first of all cover support mechanisms of R&D and demonstration projects. Almost all EU countries provide some kind of R&D support for RES-E. A cross-country comparison is hardly practicable in this area because the programmes in most cases are embedded into a wider range of research activities. Hence, detailed figures for the budget that is spent for RES-E R&D is hardly available. Even a complete listing of relevant programmes is almost infeasible due to a very wide range of thematic areas that are covered within research programmes.

Therefore, this chapter aims at providing an overview about the most important schemes.

Austria (AT)

There are several research programmes which offer means for energy research.

At federal Level: the most important ones are:

- the Research Programms for Industry (Forschungsförderungsfonds für die gewerbliche Wirtschaft-FFF)
- the Fund for Scientific Research (Fonds zur Förderung der Wissenschaftlichen Forschung - FWF)
- the Research Fund for Regional and Local Energy Concepts and District Heat and
- Austrian Program on Technologies for Sustainable Development (nachhaltig Wirtschaften)

At regional level most of the provinces have developed their own programs. An Example could be the Energy Technology Program (ETP) in the province of Upper Austria.

Within the framework of existing subprograms of the Austrian Program on Technologies for Sustainable Development like “Building of Tomorrow”, “Factory of Tomorrow” or recently “Energy Systems of Tomorrow” several demonstration projects in the field of new energies are planned.

Germany (DE)

Support Program Resources R&D programme

Support Program Resources R&D programme		Support of R&D programme
Involved technologies	Subsidy contribution	Available annual Budget
Biomass	Up to 100%	113 million Euro ²²

Period of the policy: 1996-2004

Support Program Resources for demonstration projects of the Federal Environment Ministry

Support Programme Resources for demonstration projects of the Federal Environment Ministry					Demonstration Projects
Involved technologies	Investment subsidy	Interest loan (%)	Years of free repayment	Repayment period (years)	Maximum eligible investment costs
All	Up to 30%	4,3	5	Up to 30	70% of total costs ts

This incentive program consists basically of soft loans. In exceptional cases investment subsidies could be considered too.

Greece (GR)

Projects in RES and/or RUE-Energy Savings research, development, demonstration and exploitation can, in principle, receive financial support from a number of specialised national programmes, not specifically targeted towards renewables, but, nonetheless, covering this thematic area, as well. These programmes are administered primarily by the Ministry of Development/General Secretariat for Research and Technology, the Ministry of Agriculture and the Ministry of Environment, Physical Planning and Public Works.

The Ministry of Development / General Secretariat for Research and Technology included several R&D-related national programmes, co-financed by the Greek 2nd Community Support Framework (CSF), including:

- i) PAVE, which is a programme supporting the development of industrial research and innovation in Greece.
- ii) PEPER, which is a programme supporting pilot/demonstration projects, provides financing in two stages: a) feasibility study; b) realisation of the pilot project.
- iii) SYN, which is a programme of R&D co-financing.
- iv) PENED, which is a programme supporting the development of the Greek research potential (academic institutions and laboratories).

The above Research and Technology (R&T) programmes of the Operational Programme for Research & Technology (OPRET II) have now been incorporated in the OPC and seven R&T Measures are administered by GSRT of the Ministry of Development in several priority axes

Sum including demonstrations projects too

Hungary (HU)

Technical Development Fund 2000 (OMFB)

Within the frame of this scheme subsidies for technological development and research up to 60% of the total investment costs (in case of SME 70%) are granted aiming at improving the efficiency of the conversion and increasing of the supply of renewable energy sources.

Ireland (IE)

Renewable Energy Research, Development & Demonstration*	Research support			
Involved Technologies	Max. budget [€M] Value	Operational period	Eligible project costs [€]	Eligible (expected) project duration [years]
All	€16.25M (for support of research)	July 2002 - 2006	50,000€ to 500,000€	0.5 years to 2 years

* Support for research, development and demonstration on renewable sources of energy.

House of tomorrow	Support of R&D and demonstration projects		
Involved Technologies	Operational period	Max. budget [€M]	Goal
PV	2000 - 2006	€21.1M (for all involved technologies)	The principle objective of this program is to generate results from funded projects which can lead to more sustainable energy practice in Irish households.

Netherlands (NL)

Subsidy Energy Programs(DEN)		Support of R&D and Demonstration Projects
Involved technologies	Subsidy contribution	Available Budget in 2003²³
All	25-60%	16 million Euro

This program offers subsidies which range between 25% and 60% of the total project costs depending mainly on the technology applied

The total available budget for 2003 was 16 million Euros. The program includes the subsidy of feasibility studies too.

²³ Budget for technologies from the heat sector is also included

Poland (PL)**Ecofund**

Among others Ecofund supports demonstration projects aiming at the “reduction of the emissions of gases that cause global climate changes”. Projects are granted with 20 % to 70% of the total costs, depending on the per capita income of applicants and the fact if it is an innovatory, non-commercial or commercial project.

Portugal (PT)

Existing pre-investments schemes in Portugal are concerned with R&D activities. However, under the programmes currently going on, there are no clear headings for applications in energy, energy efficiency and renewable energy technologies or CO₂ emissions control.

FCT and AdI R&D programmes

There are two main public research institutes involved in managing R&D programmes: FCT (Foundation for Science and Technology²⁴) and AdI (Agency for Innovation²⁵). RES and RUE research projects can apply for specific FCT programmes (although some demonstration projects can also apply). RES and RUE demonstration projects can apply for AdI programmes. AdI is currently managing the POCTI (Operational Programme for Science, Technology and Innovation), which is funded by ERDF, ESF and national budget.

The support available is directed to R&D development, for RES (both thermal and electricity) and RUE solutions. No additional support is available for manufacturing of RES and RUE solutions. Also, there is no focus under those programmes on existing barriers.

PRIME Programme

PRIME Programme	Support of R&D and Demonstration Projects
Involved technologies	Subsidy
All	40%

Under the framework of the PRIME Programme (Support Programme for Economic Modernisation²⁶), which is funded by the third CSF (Community Support Frameworks²⁷) and the national budget, it is running a support scheme for the development, upgrading and reinforcement of natural gas and electricity networks. The financial scheme is based on grants, up to 40% of the eligible costs, given to network or grid companies in order to implement investment projects. For the electric grid, these projects should contribute to improve the reliability of operation and the efficiency in the energy transport system. Such investments would allow, or optimise, the connection characteristics between the grid and the electricity generation plants, namely RES and CHP electricity generating plants. The following type of projects is supported:

- a) Construction of electrical line connections between generating plants and the electric grid
- b) Renovation or upgrading of existing plants and power transformers
- c) Implementation of tele-management systems
- d) Construction of electric line connections for improvement of the efficiency of power lines and the quality of service to consumers

²⁴ In Portuguese “Fundação para a Ciência e Tecnologia”

²⁵ In Portuguese “Agência de Inovação”

²⁶ In Portuguese, “Programa de Incentivos à Modernização Económica”

²⁷ In Portuguese, “Quadro Comunitário de Apoio”

That kind of support is important to foster the development of electricity production based on RES. The improvement of the national electric grid will allow and encourage further investments on RES projects.

Spain (ES)

Plan de fomento de las Energías renovables (1999-2010)

Technologies included	Budget (1996-2006)
All RES	2,5 Million Euro ²⁸

Target: To double the share of RES-E from 6% in 1998 to 12% in 2010.

The plan defines guidelines for the promotion of RES until 2010. Among the planned measures, basically fiscal incentives and investment subsidies for research activities and demonstrations projects are also foreseen. The plan will be reviewed in 2004 and the new guidelines for 2006-2010 will be set. The program is mostly conducted by the autonomous regions and represents the continuation of the previous Energy Saving and Efficiency Plan

United Kingdom (UK)

DTI's New & Renewable Energy R&D Programme

DTI's New & Renewable Energy R&D Programme	Support of R&D
Involved technologies	Available Budget²⁹
Fuel Cells, PV, Wind energy (primarily offshore), wave energy, tidal, small scale and micro-scale hydro	£19 Mio./year (≈30 Mio €/year)

This programme provides R&D grants for industry from the DTI with the stated aim of improving the competitiveness of the UK's renewables industry

Proposals must include innovation that offers the prospect of reduced cost and/or improved performance of RES technologies.

Faraday Partnerships

Faraday Partnerships	Support of R&D
Involved technologies	Available Budget³⁰
All	£400k/year (≈635k Euros/year)

- Faraday Partnerships aim to improve the competitiveness of UK industry through more effective interaction (knowledge and technology transfer) between the science and technology base and industry
- Funding takes the form of:

²⁸ This amount includes all foreseen activities in the Plan and not only research and demonstration projects

²⁹ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

³⁰ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

- A grant from DTI or other Government Department of up to £400k per year for at least three years to establish and operate the infrastructure of the Faraday Partnership
- A ring fenced grant of £1million from a Research Council (see directly below) or combination of Councils or from a Government Department for research projects which satisfy the twin criteria of excellent science and industrial relevance

Research Councils

Research Councils	Support of R&D
Involved technologies	Available Budget³¹ (2003-2006)
All	£28Mio (≈44 Mio Euros)

Statutory control and the bulk of funding for the Research Councils comes from the DTI

There are seven Research Councils, each covering a different area of science. They administer a wide range of R&D grants for which the charitable and academic sectors are eligible. In particular, three of them, led by the Natural Environment Research Council (NERC)³², will be investing £28m in research into sustainable energy over three years (from April 2003)

Carbon Trust Low Carbon Innovation Programme. R&D grants from the Carbon Trust

Carbon Trust Low Carbon Innovation Programme. R&D grants from the Carbon Trust	Support of R&D
Involved technologies	Available Budget³³ (2003-2006)
All	£75Mio (≈119 Mio Euros)

Innovative research, development or demonstration projects (for which all sectors are eligible) or commercial co-investments with the potential to reduce greenhouse gas emissions can apply for grant funding of up to £250,000 (repayable on successful exploitation) towards their cost. Initially up to £75m available under the Programme over three years (2002-2004)

³¹ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

³² Engineering and Physical Sciences Research Council (EPSRC) and Economic and Social Research Council (ESRC)

³³ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

DTI Capital Grants Programme: Offshore Wind (UK-wide)

DTI Capital Grants Programme: Offshore Wind (UK-wide)			Support of R&D	
Involved technologies	Value (%)	Min. size	Max. € of subsidy	Available Budget ³⁴ (2003-2006)
Offshore Wind	40	40 MW	£10 Mio (≈16 Mio Euro)	£102 Mio (≈161,9 Mio Euros)

Partial subsidisation (lower of 40% of eligible project costs or £10m) of offshore windfarm development (min. 20MW output) with stated aim of stimulating early development of a significant number of offshore wind farms in order to provide experience to increase confidence in and reduce future costs of the technology

Total budget is £102m (includes £10m lottery money) and seven projects have been awarded a total of £62m so far

DTI Capital Grants Programme: Bio-energy (UK-wide)

DTI Capital Grants Programme: Bio-energy (UK-wide)		Support of R&D	
Involved technologies	Value(%)	Min. size	Available Budget
Bioenergy	40	20 MW	n.a

Scheme provides funds to cover up to 40% of eligible cost of building complete installations of³⁵:

demonstration large-scale (min. 20MW_e) high efficiency (min. 36% electrical efficiency) electricity generation using energy crops, with significant potential for future technical development

7.1.2 Investment/ Implementation

Financial – investment/implementation schemes provide incentives for the actual investment and implementation phase of RES-E facilities. Most of the considered countries have implemented investment subsidies at least for some RES-E technologies. Also tax incentives (reduction of income tax and VAT) are commonly used, whereas soft loans and voluntary agreements are of minor importance.

7.1.2.1 Tax- Incentive

A lot of the EU-15 countries (and selected accession countries) have implemented tax incentives for the promotion of RES-E. They first of all refer to a reduction of income tax and VAT. (Tax incentives regarding exemptions from energy taxes etc. are described in the section post-investment.) A cross-country comparison is not feasible due to widely differing design of tax incentives. Moreover, the details of these policies regarding eligible costs, general legal tax regulations etc. have a strong impact and therefore would have to be considered, which was not feasible within this report. Hence, this section cannot go beyond a listing of the most important tax incentives schemes for RES-E.

³⁴ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

³⁵ See also 'Direct grants'.

Austria (AT)***Deduction of investments for RES from the income tax***

Deduction of investments for RES from the income tax			Tax incentive
Involved technologies	Type of tax incentive	Maximum deductible amount per year	Addressed to: (private, companies...)
Photovoltaics	Income tax reduction	1.825	all

Investments and repayments of loans for housing refurbishment if it includes energy efficiency measures can be deducted from the income tax. The installation of the following technologies is included:

- heat pumps
- solar energy (solar thermal collectors and photovoltaic plants)
- biomass
- heat recovery installations
- district heating

Repayments of loans of such expenses which occurred after 1980 are also included. Normal payers can deduct a maximum amount of 2.920 Euro per annum. This amount can be increased in special cases e.g. single parents (the eligible amount is increased by 2.920 Euro) and families with more than three children (the eligible amount is increased by 1.460 Euro). Furthermore only 25% of the total investments are eligible to be deducted (i.e. a maximum amount of 1.825 Euro). If the annual income is higher than 34.600 the eligible investment costs are reduced progressively from 25% until 0% if the total annual income is 50.900 Euro or higher.

Belgium (BE)***Company Tax – Depreciation/Amortisation of investment. Company Tax Code (1992)***

Company Tax – Depreciation/Amortisation of investment. Company Tax Code (1992)			Tax incentive
Involved technologies	Type of tax incentive	Maximum value of the regressive depreciation (%)	Addressed to: (private, companies...)
All	Regressive Depreciation	40	Companies

The company tax code of 1992 allows choosing between linear and regressive (accelerated) depreciation of investments. The regressive depreciation is calculated on the residual (depreciated) value of the investment, it is twice the linear, but may not exceed 40%.

Company Tax – Deduction for investment. Company Tax Code (1992)

Deduction for investment. Company Tax Code (1992)			Tax incentive	
Involved technologies	Type of tax incentive	Maximum deductible amount per year	Normal rate	Addressed to:(private, companies...)
All	Deduction for investments	13,5%	0-3,5%	Companies

Companies investing in environmental friendly technologies benefit from a 13,5 % deduction for 2001. Tax payers can spread the deduction on several years. For normal investments the normal deduction is up to 3,5%.

Value added tax (VAT)

Reduction on Value added Tax (VAT)		Tax incentive		
Involved technologies	Type of tax incentive	Value	Normal rate	Addressed to:(private, companies...)
All	Reduction on VAT	6%	12-21%	Natural persons

The legislation fixes the percentage of VAT for installations contributing to improve the energy efficiency of buildings to a reduced value set at 6% instead 12% which is set for coal and solid fuels or 21% which is set for electricity and mineral products.

Czech Republic (CZ)

Specific programme aimed at developing renewable energy production			
Involved technologies	Type of tax incentive (Income tax , depreciation tax, VAT reduction)	Value of incentive	Normal Tax
Investment in renewable energy	Income and property tax	Five year tax relief	
Small renewable facilities (hydropower 0,1 MW, wind:0,075 MW, all solar and biomass units, biomass fuel and heat)	VAT	5%	22%

In addition to the reduction of income and property tax and VAT, there exists the option of reduced import duties on renewable energy equipment.

France (FR)**Lower VAT for RES investments**

Lower VAT	Tax Incentive		
Involved Technologies	Type of tax incentive (income tax, VAT tax..)	Value of incentive	Addressed to: (private, companies...)
Every kind of renewable equipment	VAT	Only 5,5% VAT	Private consumers

The lower VAT for RES has no impact on industry or businesses, only on consumers. It has been implemented in 2001 and is expected to continue.

Deduction for investments on income tax

Deduction for investments	Tax Incentive		
Involved Technologies	Type of tax incentive (income tax, VAT tax..)	Value of incentive	Addressed to: (private, companies...)
Every kind of renewable equipment	Income tax	Deduction of 15% of the investment costs (max. 3.300 Euro/year)	Private consumers

Implemented in 2000 and expected to continue.

Germany (DE)**Income tax exemption**

Tax deduction for renewable Energy Investments (EIA)		Tax incentive
Involved technologies	Type of tax incentive	Addressed to: (private, companies...)
Wind	Deduction for investments	Private persons

Losses of investments can be deducted from the taxable income to reduce income tax. Due to the high number of wind funds existing in Germany, this measure can be a great incentive to secure the success of these projects.

Greece (GR)

Law 2364/95	Tax incentive		
Involved Technologies	Type of tax incentive (income tax, VAT tax..)	Value of incentive	Addressed to: (private, companies...)
Biomass	Income tax	75% of purchase & installation costs are tax deductible	Private
Biogas			
Geothermal			
Hydropower			
Solar energy			
Wind energy			

The only one legislative provision that was in effect until recently in the area of tax incentives for (domestic) RES installations was incorporated in Law 2364 of 1995. This law, although dealing primarily with the importation, transmission, distribution and sales of natural gas in Greece, contains an important provision regarding the purchase and installation of domestic RES appliances. According to Article 7 of the law, up to 75% of the total cost for the purchase and installation of domestic RES appliances and systems (as well as of gas appliances) can be deducted from the taxable income of natural persons. Such appliances and systems are deemed to include installations for the common use of the occupants of apartment buildings, in which case the deduction is calculated on the basis of the co-ownership percentage of each owner. It is estimated that the tax deduction of Law 2364/95 can, today, reduce the cost of domestic RES systems (e.g. of solar heaters) by up to 30%.

For legal persons and companies taxed on the basis of coefficient of profits, or on the basis of objective criteria, 75% of the total expenditure for the purchase and installation of the aforementioned appliances or systems is deductible from the total profit established by the application of the tax coefficient or the objective criteria. Legal persons and companies in the commercial or service sectors, which keep simple revenue and expenditure books, are entitled to amortise such costs at an annual rate. This provision however in the recent revision and simplification of the tax system by the Ministry of Finance has been abolished for the financial year 2003 onwards.

Following the enactment of the Ministerial Decree 21475/98, a separate Presidential Decree had been planned, entitled "Incentives for energy savings". According to the latest draft of this Decree, an integrated set of financial, administrative and other incentives is to be instituted for domestic applications of techniques and systems, including RES, which demonstrably contribute to energy savings in buildings. These planned incentives are outlined below:

- i. All expenses related to the purchase and installation of RES systems and materials in existing buildings can be deducted from the taxable income of owners / possessors / usufructuaries, up to a certain percent which will be defined, according to a specific set of criteria, in a later Ministerial Decree.
- ii. Owners of existing or new buildings (domestic/commercial/tertiary) who, within a period of six (6) years from the date of enactment of the Presidential Decree, will install RES exploitation systems in their buildings, for space heating and/or cooling, hot water production or lighting, demonstrably meeting at least 30% of their energy needs with RES, will be entitled to receiving certain subsidies or attractive, low-interest loans from State or private banks, in order to cover their RES-related costs. The maximum amount of the loan, the interest rate, the time and terms of loan repayment and all other relevant details will be set out in a separate Ministerial Decree.

- iii. In case the building owner opts for the low-interest loan, he will not be eligible for the income tax deduction of point (i) above.

In regions with autonomous electricity networks (for example, in islands), or in regions of the interconnected system where the Public Power Corporation (PPC) of Greece is unable to cover the peak load, PPC can provide relevant subsidies or financial incentives, through mass purchases of domestic RES systems (solar heaters, photovoltaics, etc.) for interested customers. The RES systems will be selected by PPC to suit the specific load characteristics of the given residential area and will be offered to its customers at attractive low prices (due to mass-purchase discounts). The system cost will be repaid to PPC by customers joining the programme through their electricity bills, in a number of equal instalments.

Netherlands (NL)

Tax deduction for renewable Energy Investments (EIA)

Tax deduction for renewable Energy Investments (EIA)			Tax incentive		
Involved technologies	Type of tax incentive	Maximum deductible amount	Maximum investment which is eligible per project	Maximum EIA per year per company	Addressed to:(private, companies...)
Most renewable energy systems (qualifying list is published yearly)	Deduction for investments	Only 55% of the invested sum is taxed	103 million euro	161 million euro	Companies

Period of the policy: 1997-2010

Budget: no official limit but the minister can close the financing if the amount of requests exceeds certain limits. In 2002 1,5 billion Euros were used.

Green Funds in the Netherlands

Green Funds in the Netherlands			Tax incentive
Involved technologies	Type of tax incentive	Minimum investment required (€)	Addressed to:(private, companies...)
Most renewable energy systems	Income tax reduction	22.689	Private investors

Period of the policy: 1995-2010

Private investors are exempted from the income tax if dividends are obtained from investments in green projects and green funds (renewable energy projects and environmental protection). A certificate issued by the Ministry of Environment is required to get the tax exemption.

Portugal (PT)***VAT Reduction***

VAT Reduction		Tax incentive		
Involved technologies	Type of tax incentive	Value	Normal rate	Addressed to:(private, companies...)
Solar, wind, geothermal	Reduction on VAT	12%	19%	Natural persons

There is a tax relief scheme based on the reduction of VAT rate. Reduced VAT taxation at 12% rate (compared to the normal VAT rate of 19%) applies to the purchasing of RES equipment and other type of energy conversion equipment:

- Equipment for solar, wind and geothermal energy conversion
- Equipment for collecting and use of other alternative energy sources
- Equipment for energy production from incineration or transforming of waste
- Equipment for prospecting and searching of oil and/or natural gas
- Equipment for measurement and control aimed at avoiding or reducing pollution

IRS Reduction

IRS Reduction			Tax incentive
Involved technologies	Type of tax incentive	Maximum deductible amount per year (%)	Addressed to: (private, companies...)
All RES	Income tax reduction	700€ (or 30% of the investment made)	private

Household investors receive tax credits on their personal income tax (IRS³⁶) for investment in renewable energy technologies. Deductions to the tax total amount are allowed to the limit of 30% of the investment made, with a maximum ceiling of 700 € per year (2003 rules). However, these deductions are not cumulative with other deductions concerning home purchasing or conservation expenses.

IRC Reduction

IRC Reduction			Tax incentive	
Involved technologies	Type of tax incentive	Maximum value of the regressive depreciation (%)	Normal rate (%)	Addressed (private, companies...)to:
All	Regressive Depreciation	25	7	Companies

³⁶ In Portuguese: "Imposto sobre os Rendimentos Singulares".

The other tax alleviation schemes on-going is the favourable taxation on corporate profit tax (IRC³⁷). This scheme improves the time scale for accounting depreciation of solar energy equipment. The current depreciation rate of durable equipment is 7.14 %, corresponding to 14 years, while for solar thermal and solar PV energy the depreciation rate is 25% per year, i.e. based on 4 years depreciation time.

Spain (ES)

Plan de fomento de las Energías renovables (1999-2010)

Technologies included	Budget (1996-2006)	Budget (1996-2006) for tax incentives
All RES	2,5 Million Euros ³⁸	0,925 Million Euros

Target: To double the share of RES-E from 6% in 1998 to 12% in 2010.

The plan includes the guidelines for the promotion of RES until 2010. Among the planned measures, basically fiscal incentives and investment subsidies incentives for research activities and demonstrations projects are also foreseen. The plan will be reviewed in 2004 and the new guidelines for 2006-2010 will be set. The program is mostly conducted by the autonomous regions and represents the continuation of the previous Energy Saving and Efficiency Plan.

Direct Tax Provisions for environmentally Friendly Investments

Technologies included	Type of tax incentive	Value of the Tax	Normal Tax
All RES	Tax deduction	10% liability deduction	35 %

The Corporate Tax Law includes since 1996 a deduction for the earnings coming from environmentally friendly technologies. The measure is funded by means of personal income taxes

Tax on business activities discount

Technologies included	Type of tax incentive	Value of the Tax	Normal Tax
All RES	Tax reduction	Up to 50%	100%

The energy use or production of energy from RES may have a discount in the municipal tax up to 50%. The exact value depends on the municipal authority.

The following programmes combine investment subsidies and tax incentives:

- Incentives for PV and solar thermoelectric under the Plan de Fomento de las Energías renovables: Financing Line ICO-IDEA
- Incentives for Biomass and Biogas under the Plan de Fomento de las Energías Renovables

They are described in the chapter investment subsidies for RES-E.

³⁷ In Portuguese: "Imposto sobre os Rendimentos Colectivos".

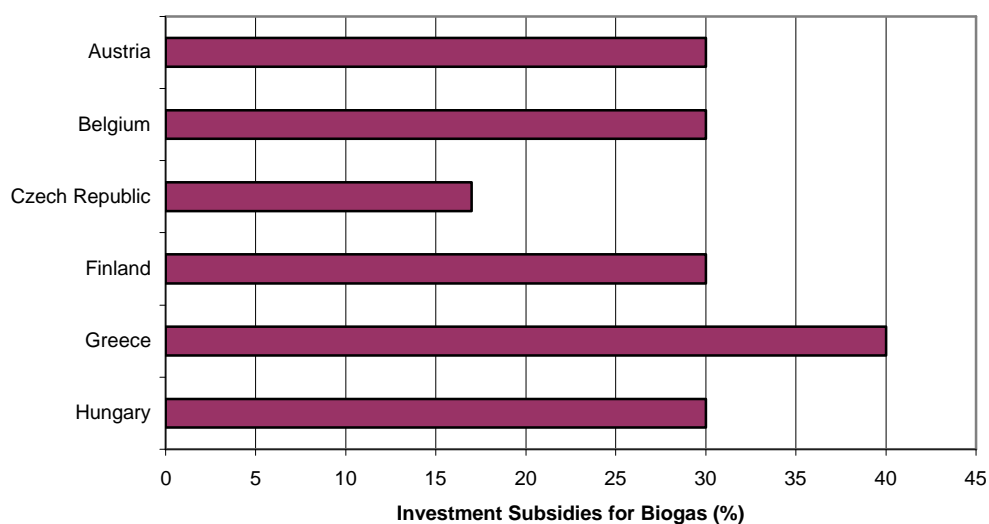
³⁸ This amount includes all foreseen activities in the Plan and not only tax incentives.

7.1.2.2 Investment Subsidies

Investment Subsidies are a common strategy to provide incentives for investment. Subsidies can be granted either per percent (%) of investment costs or per unit of electricity generated or by capacity installed. It is a fine tuned promotion program for different technologies and it can be adjusted with the respect to the kind of technology. Investment Subsidies are usually awarded only for new installations. Subsidies for new investments exist in most EU-15 countries, especially in Finland, Greece, Luxemburg and Portugal and accession countries (Czech Republic, Hungary, Slovenia).

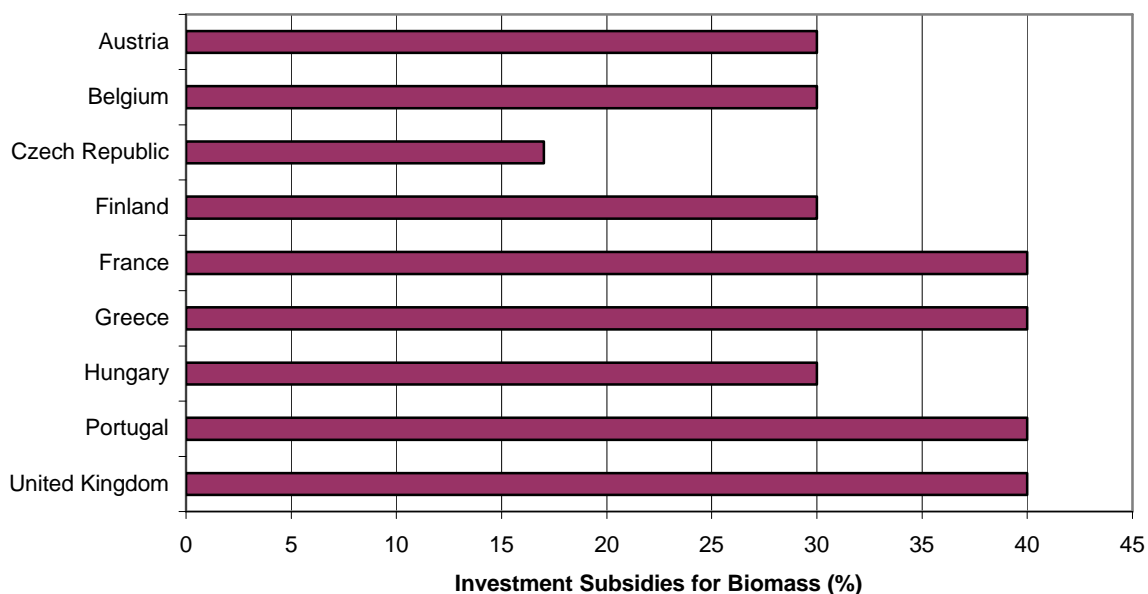
The figures below show a cross-country comparison with respect to the maximum percentage that is guaranteed for RES-E investments by technology. Hence, a detailed description of them is provided afterwards country by country. However, it should be noted that the actual efficiency of these promotion schemes often is strongly influenced by the budget that is available for these programmes. A comparison of available budgets is not possible because these amounts usually are not splitted up into single technologies, RUE and RES purposes or even energy and non-energy purposes. In addition the kind of costs that are eligible to the specific programme have a strong impact on the effects of subsidies.

As can be seen in the following figures in general most countries grant 30% of the investment costs with a maximum of 40%. Only in the field of PV some countries provide substantially higher amounts.



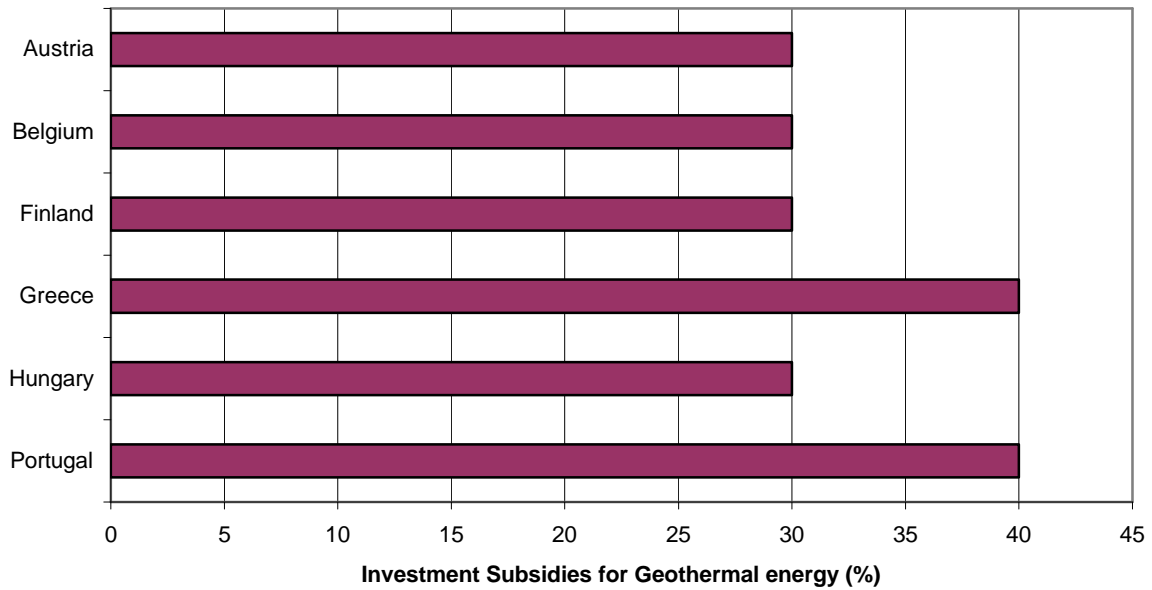
Country	Remarks
Austria	Investment subsidies mainly on regional level. Subsidies for stand alone and grid-connected plants, in force until 2005. In the region of Upper Austria ÖKOP Program: subsidy of 1200€/ KW
Belgium	Investment subsidies for public and communal building up to 30%, no restriction of the size. Rebates of 15% in Walloon region, subsidy up to 75% in Flanders, size of plant 0,8KW-2,4KW
Czech Republic	State Environmental fund grants subsidies of max. 17% for wind onshore, small hydropower, biomass and biogas
Finland	Ministry of Trade and Industry hands out subsidies up to 30% of the investment cost for RES-E. The investor is required to be a legal entity in order to receive subsidy
Greece	State support programs provide grants up to 40% of investment costs
Hungary	Subsidies awarded to private investors and companies

Figure 7.1 Investment Subsidies for electricity from biogas in EU-15 and selected Accession countries



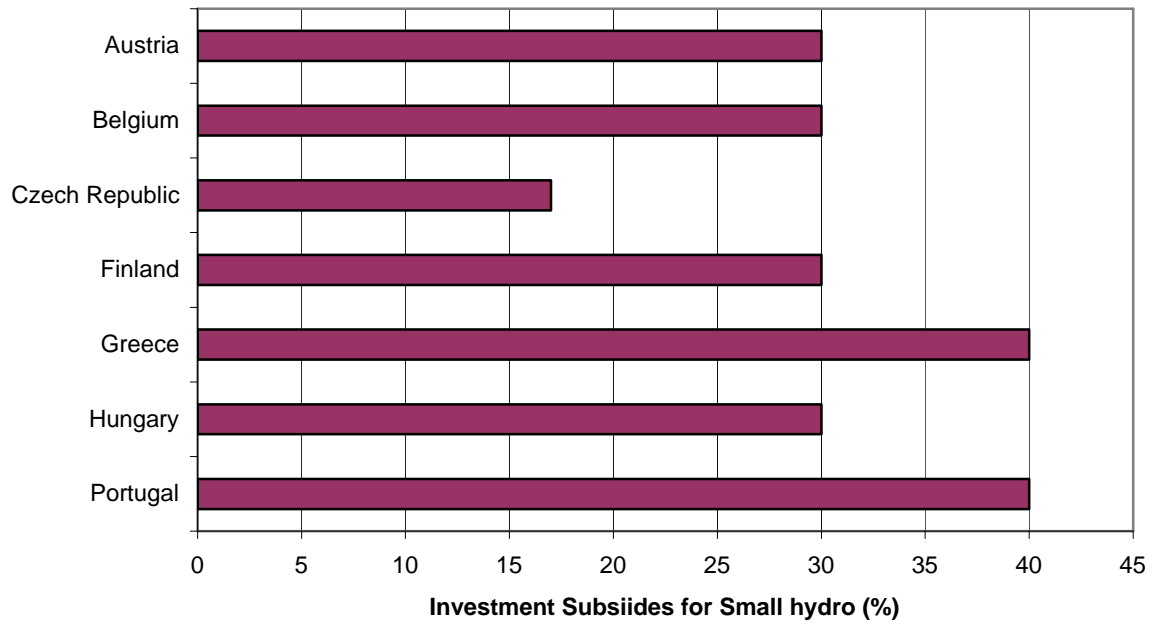
Country	Remarks
Austria	Investment subsidies mainly on regional level. Subsidies for stand alone and grid-connected plants, in force until 2005.
Belgium	Investment subsidies for public and communal building up to 30%, no restriction of the size. Rebates of 15% in Walloon region, subsidy up to 75% in Flanders, size of plant 0,8KW-2,4KW
Czech Republic	State Environmental fund grants subsidies of max. 17% for wind onshore, small hydropower, biomass and biogas
Finland	Ministry of Trade and Industry hands out subsidies up to 30% of the investment cost for RES-E. The investor is required to be a legal entity in order to receive subsidy
France	Biomass Introduction program 2000-2006, besides the subsidies the program includes certification of equipment communication campaign targeting etc.
Greece	State support programs provide grants up to 40% of investment costs
Hungary	Subsidies awarded to private investors and companies
Portugal	Subsidies up to 40% of the investment costs for RES-E, in force until 2006
United Kingdom	Large scale biomass plants using crops <20MWe, medium scale biomass plants using crops<1MWe

Figure 7.2 Investment Subsidies for electricity from biomass in EU-15 and selected Accession countries



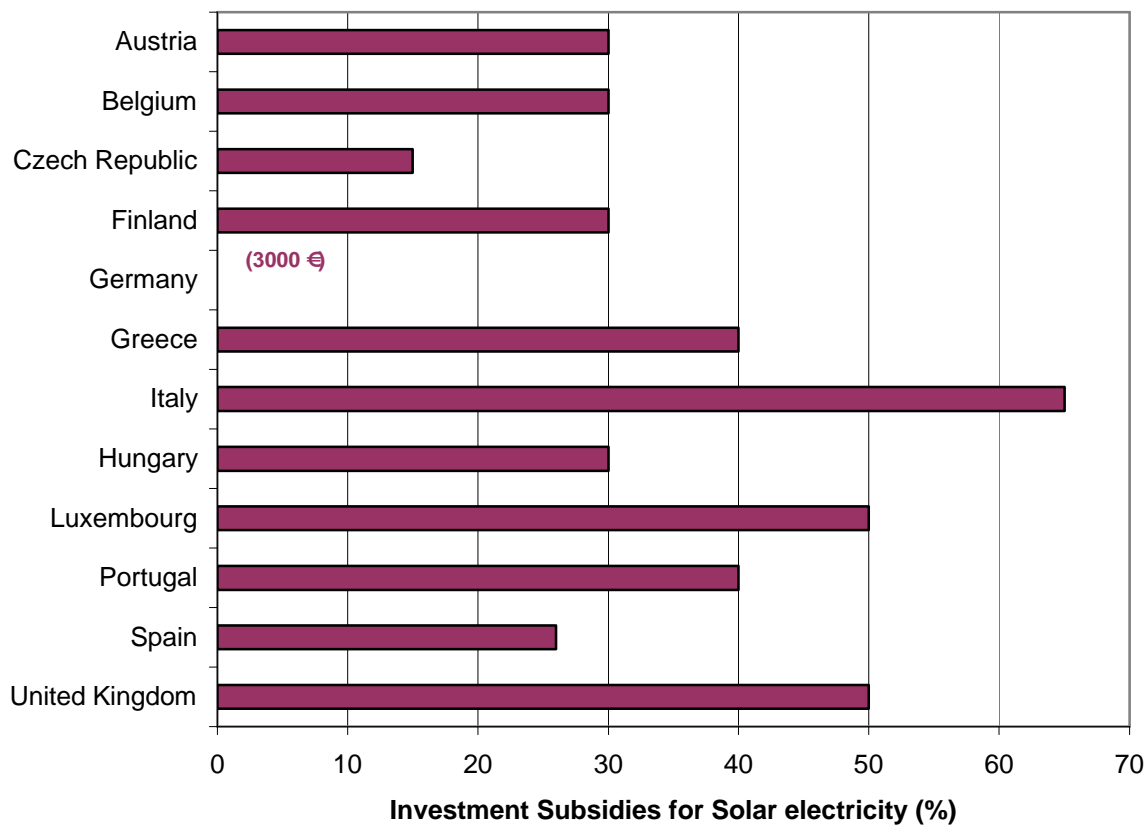
Country	Remarks
Austria	Investment subsidies mainly on regional level. Subsidies for stand alone and grid-connected plants, in force until 2005.
Belgium	Investment subsidies for public and communal building up to 30%, no restriction of the size. Rebates of 15% in Walloon region, subsidy up to 75% in Flanders, size of plant 0,8KW-2,4KW
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Greece	State support programs provide grants up to 40% of investment costs
Hungary	Subsidies awarded to private investors and companies
Portugal	Subsidies up to 40% of the investment costs for RES-E, in force until 2006

Figure 7.3 Investment Subsidies for electricity from geothermal energy in EU-15 and selected Accession countries



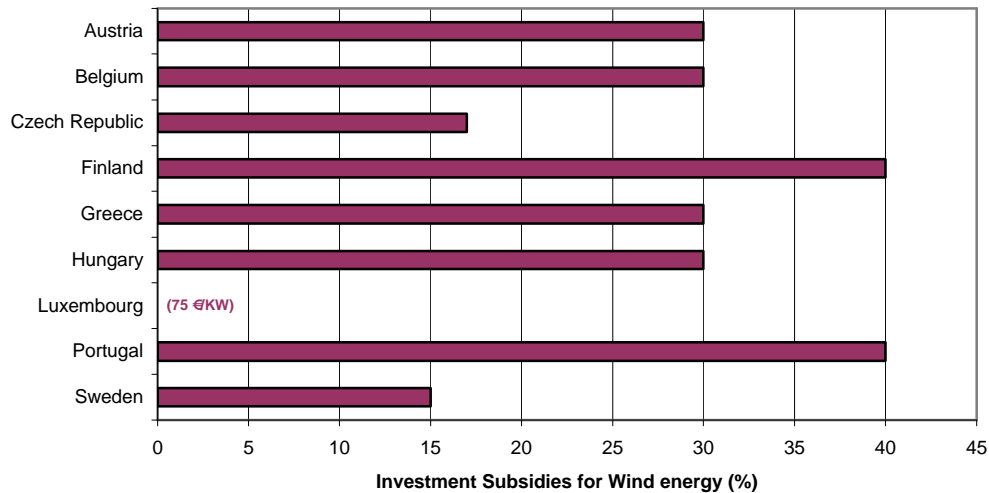
Country	Remarks
Austria	Investment subsidies mainly on regional level. Subsidies for stand alone and grid-connected plants, in force until 2005, size of plant <2MW
Belgium	Investment subsidies for public and communal building up to 30%, no restriction of the size.
Czech Republic	State Environmental fund grants subsidies of max. 17% for wind onshore, small hydropower, biomass and biogas
Finland	Ministry of Trade and Industry hands out subsidies up to 30% of the investment cost for RES-E. The investor is required to be a legal entity in order to receive subsidy
Greece	State support programs provide grants up to 40% of investment costs. Minimum required investment cost 44,000 €
Hungary	Subsidies awarded to private investors and companies
Portugal	Subsidies up to 40% of the investment costs for RES-E, in force until 2006

Figure 7.4 Investment Subsidies for electricity from small hydro in EU-15 and selected Accession countries



Country	Remarks
Austria	Investment subsidies mainly on regional level. In the region of Upper Austria ÖKOP Program: subsidy of 3000€/ KW Subsidies for stand alone and grid-connected plants, in force until 2005.
Belgium	Investment subsidies for public and communal building up to 30%, no restriction of the size. Rebates of 15% in Walloon region, subsidy up to 75% in Flanders, size of plant 0,8KW-2,4KW
Czech Republic	Subsidy of 15%, maximal 65,000€
Finland	Ministry of Trade and Industry hands out subsidies up to 30% of the investment cost for RES-E. The investor is required to be a legal entity in order to receive subsidy
Germany	German Market Incentive Program, period of policy 1999-2006, size of plant >1 kWp
Greece	State support programs provide grants up to 40% of investment costs. Level of subsidy depends on the geographical region of the country
Italy	Italian PV-Roof program, period of policy 2001-ongoing, size of plant 5-50kWp
Hungary	Subsidies awarded to private investors and companies
Luxemburg	Subsidy of 50%, size of plant 4 kWp, domestic sector: individual house up to 5,000€/ kWp
Portugal	Subsidies up to 40% of the investment costs for RES-E, in force until 2006
Spain	Incentives for PV under the Plan de Fomento de las Energias
Sweden	Support of 0,96 €/KWh (9öre/KWh), eligible plants are those with output to 1.5 MW
United Kingdom	Program directed at householders, businesses and social housing providers, grants of 40-60% toward PV intallations

Figure 7.5 Investment Subsidies for electricity from solar energy in EU-15 and selected Accession countries



Country	Remarks
Austria	Investment subsidies mainly on regional level. Subsidies for stand alone and grid-connected plants, in force until 2005.
Belgium	Investment subsidies for public and communal building up to 30%, no restriction of the size but at least an offset of 10% CO ₂ compared to classical reference installations has to be reached
Czech Republic	State Environmental fund grants subsidies of max. 17% for wind onshore, small hydropower, biomass and biogas
Finland	Ministry of Trade and Industry hands out subsidies up to 40% of the investment cost for RES-E. The investor is required to be a legal entity in order to receive subsidy
Greece	State support programs provide grants up to 30% of investment costs to private investments in RES-E. Minimum required investment cost 44,000 €
Hungary	Subsidies awarded to private investors and companies
Luxemburg	Subsidy of 75 €/ KW, Minimum installation capacity of wind power plant: 500KW
Portugal	Subsidies up to 40% of the investment costs for RES-E, in force until 2006
Sweden	Investment grants for small scale Wind generation up to 15%

Figure 7.6 Investment Subsidies for electricity from wind energy in EU-15 and selected Accession countries

Austria (AT)

Environmental support program of the Ministry of Agriculture, Forestry, Environment and Water Management in Austria. “Kommunalkredit-Program ”

Environmental support program of the Ministry of Agriculture, Forestry, Environment and Water Management in Austria. “Kommunalkredit-Program ”			Investment subsidy
Involved technologies	Minimum Investment size (Euro)	Max Value %	Size of the plants
Stand-alone (Wind, Biogas, Small Hydro, PV)	10.000	30	Small Hydro< 2MW)
Grid connected (All technologies, but only for “additional” investments)	10.000	30	

Program managed by the state owned bank “Kommunalkredit” which offers support for the investment in renewable energy technologies and energy efficiency measures. The program aims to support technologies that are not considered in the Renewable Energy Act (see section financial post-investment / implementation). The program is running since 1993 and is the result of the Environmental Promotion Law (Umweltförderungsgesetz - UFG).

It is planned to be in force until 2005. The subsidies vary between 10% and 30% of the total necessary investment and are depending on the technology and on the use. In the field of the electricity production the following technologies and aspects are eligible:

- Stand alone plants: Wind, Biogas, Small Hydro up to 2 MW, Photovoltaics
- Grid-connected plants: All technologies are eligible but only “additional” investments are subsidized (e.g. replacement of components etc...).

In both cases the maximum amount which can be received is 30% of the total environmental investments.

Support for renewable energy technologies within the framework of the support for residential housing in the provinces

Support for renewable energy technologies within the framework of the support for residential housing in the provinces					Investment subsidy
Involved technologies	Province	Value [€/m²]	Max. €	Value %	Minimum necessary investment
Photovoltaics	<i>Burgenland</i>	14			
	<i>Lower Austria</i>		2.200	30	
	<i>Styria</i>	35	2.000		
	<i>Tirol</i>		720.000	10	10.000

All provinces have special incentives for the new construction or refurbishment of residential housing. The use of renewable energy is supported in each province in different ways. The production of electricity from renewable energy sources is supported in the following provinces:

- Burgenland: There exists a subsidy for photovoltaic plants depending on the effective area of the house. This subsidy can amount up to 14€ per m² of useful effective area of the house

- Lower Austria: There exists a subsidy of 30% of the total investment costs up to 2.200 Euro for photovoltaic plants (including grid-connected and stand-alone plants)
- Styria: The Province of Styria gives a subsidy of 35 per each m² of module area for photovoltaic plants up to 2.000 Euro per housing unit
- Tirol: In Tirol there is not a special subsidy for the production of electricity in residential houses nevertheless there exists a subsidy of 10% of the total costs for the investment in renewable energy technologies (not only in the residential sector but also industry and services). A minimum amount of 10.000 Euro is necessary. Subsidies can amount up to 720.000 Euro.

Eco-electricity program of the region Upper Austria (ÖKOP)

Eco-electricity program of the region Upper Austria (ÖKOP)		Investment subsidy		
Involved technologies	Value [€/kW]	Max. €	Value %	Size of the plants
Photovoltaics	3.000			
Small Hydro		50.000	25	1-20 kW
Biogas		1200 €/kW	25	

The ÖKOP Program managed by the Energy Agency of Upper Austria consists basically in investment subsidies except for wind energy which is supported by a bidding system (see section Bidding system). The amounts of the support are:

- Small hydro: 25% of the total investment costs up to 50.000 Euro
- Photovoltaic plants between 1 and 20 MW: 3000 €/kW
- Biogas plants: 25% of the total investment costs up to 1200 €/kWp

Belgium (BE)

UREBA: Investments Subsidy Schemes for RES in the Walloon Region in the public sector

UREBA: Investments Subsidy Schemes for RES in the Walloon Region in the public sector		Investment subsidy
Involved technologies	Value %	Size of the plants
All	30	No restriction in the size but at least an offset of 10% CO ₂ compared to classical reference installations has to be reached

Investment subsidy for public and communal buildings up to 30%. Although there is no restriction for the size of the plants at least a reduction of 10% of CO₂ compared to classical reference installations has to be reached. The programs also includes subsidies up to 50% for pre-feasibility studies and energy audits

Investments Subsidy Schemes for RES in the Walloon Region in the private sector

Investments Subsidy Schemes for RES in the Walloon Region in the private sector		Investment subsidy
Involvement technologies	Value %	Size of the plants
<i>Solar energy, Wind, Hydro, Biomass and geothermal energy</i>	15	No restriction in the size but projects have to prove high quality, saving on raw materials and energy

Subsidies up to 15% of the eligible costs are available. Eligible costs are:

- Investments in new RES equipment
- Production of RES equipment outside the EU for export.

Investments Subsidy Schemes for RES in Flanders in the private sector

Investments Subsidy Schemes for RES in the Walloon Region in the private sector		Investment subsidy
Involvement technologies	Value %	Size of the plants
<i>All</i>	<i>At present:</i> <ul style="list-style-type: none"> ▪ Up to 20 (SMEs) ▪ Up to 10 (medium and large enterprises) 	No restriction in the size but projects have to prove high quality, saving on raw materials and energy
	<i>Under discussion:</i> Up to 40	Up to maximum of 3.6 M€/year per project Projects have to prove high quality, saving on raw materials and energy

Subsidy Scheme for PV in Flanders

Investments Subsidy Schemes for RES in the Walloon Region in the private sector			Investment subsidy
Involvement technologies	Value %	Size of the plants	Budget
<i>All</i>	Up to 75%	0,8kW-2,4kW	For 2004 Government: 2M€ Utilities (Electrabel group): undetermined

Program financed by the government (giving up to 50% of the investment costs) and electricity producers- Electrabel group- (giving up to 25% of the investment costs).

Term: 1998 till indeterminate

Possibility of net metering: electricity meters run backwards when putting excess of electricity into the grid.

Investments Subsidy Schemes for RES in Brussels in the private sector

Investments Subsidy Schemes for RES in the Brussels Region in the private sector		Investment subsidy
Involved technologies	Value %	Size of the plants
<i>All</i>	<i>At present:</i> <ul style="list-style-type: none"> ▪ up to 20% (SMEs) ▪ Up to 10% (medium and large enterprises) 	No restriction in the size but projects have to prove high quality, saving on raw materials and energy

Subsidies refer mainly to energy efficiency and therefore no significantly impact is expected

Czech Republic (CZ)

State Environmental Fund		
Involved technologies	Max. %	Total Budget
Wind onshore	17%	8,9 M€ (1991-1999)(*)
Small hydropwer		
Biomass		
Biogas		

(*) total budget both for electricity and heat

Gouvernement programme for the support of Energy Savings and the Utilisation of Renewable and Secondary Sources of Energy		
Involved technologies	Max. %	Max €
PV	15%	65,000 €
Wind onshore		
Small hydropwer		98,000 €

Finland (FI)

State decision 29/99: Investments Subsidies		Investment subsidy
Involved technologies	Value %	Size of the plants
<i>Wind</i>	40%	
<i>Other Renewables</i>	30%	

Ministry of Trade and Industry hands out subsidies of 30% (wind 40%) of the investment costs to renewable energy technologies. The investor is required to be a legal entity in order to receive subsidies. In the Action plan the subsidies will remain at present level the possibility of including private persons or households.

France (FR)

Biomass introduction programme PBEDL 2000-2006

Plan Bio-energie Development Local 2000-2006	Investment subsidies	
Involved Technologies	Max. Value (%)	Total budget per year [M€]
Biomass	40	16*

Target: increase the use of biomass for energy in residential and industrial setting. Objective: 1000 MW new installations in 2006. Around 600 MW should be achieved in the residential sector in collective heating. Besides the subsidies the programme includes certification of equipment, communications campaign targeting the general public etc. (mentioned in part non financial/preinvestment).

* total budget for the whole programme including subsidies for heat and electricity plants, communications campaigns etc.

Germany (DE)

German Market Incentive Program

Energy Subsidy Regulation (EPR) and Energy Performance Advice (EPA)		Investment subsidy
Involved technologies	Investment subsidy (€)	Size of the plant
PV ³⁹	3000	>1 kWp

Period of the policy: 1999-2006

Although the dominating relevance of this support measure is in the field of solar thermal energy, with the name “Sun in the school” this a very well-known program in the field of PV.

Greece (GR)

National OPC

National OPC	Investment subsidies	
Involved Technologies	Minimum investment cost required (€)	Value (%)
Biomass	44000	40
Biogas		
Geothermal		
Hydropower		40-50
Solar energy		30
Wind energy		

³⁹ PV systems for schools are the only eligible

The Measure 2.1 of Sub-programme 2 of the National Operational Programme for Competitiveness (OPC) / CSF III (2000-2006) is devoted entirely to providing State support (grants) to private investments in:

- a) renewables,
- b) rational use of energy, and
- c) small-scale (<50 MW_e) cogeneration.

The total budget of Measure 2.1, for the 2000-2006 period of CSF III, is 1.07 billion Euros, of which 35.6% or 382 million Euros is the public subsidy available to RES/RUE/CHP investments. About two-thirds of the total available subsidy (~ 260 million Euros) is foreseen to be awarded specifically to RES investment projects.

The main provisions of Measure 2.1 of the OPC, concerning public support of RES investments, are as follows:

- Level of subsidy (%) is independent of the geographical region of the country with the exception of PVs
- Required own capital: 30% (min) of the total investment cost
- Maximum investment cost subsidised: : 44 million Euro

Grants are awarded to RES projects by Measure 2.1 of OPC following rounds of public calls for RES investment proposals and subsequent competitive evaluation of the submitted proposals (per round).

A RES investment-subsidy programme, very similar to that of Measure 2.1 of OPC/ CSF III, existed also in the Second Community Support Framework (CSF II; 1994-1999) for Greece. This CSF II specific programme, the Operational Programme for Energy – OPE, granted cumulatively about 92 million Euros of public subsidies to 78 RES investment projects, having a total budget of about 213 million Euros (i.e. mean subsidy rate ~ 43%) and a total installed capacity of 161 MW_e + 102 MW_{th}. This programme was very instrumental in stirring up substantial RES activity and in materialising a large number of commercial-scale RES projects in Greece, particularly in the period 1997-2000.

Law 2601/98

Law 2601/98			
Involved Technologies	Minimum investment cost required (€)	Value (%)	Total Budget (€)
Biomass	176000	40	14,7 million
Biogas			
Geothermal			
Hydropower			
Solar energy			
Wind energy			

It is interesting to note that the issuing of the above Presidential Decree has stalled for almost three years now, mainly because it is considered that the State's financial burden, from the application of the above measures, will be excessive

This is a financial instrument-umbrella, covering all private investments in Greece, in all sectors of economic activity. It has a strong regional character, in that the level of public support depends strongly on the particular geographic region, in which the given private investment is planned to materialise. Regions with high unemployment rates and low incomes per capita receive the highest investment subsidies from the State.

Investments in RES installations (both electricity- and heat-producing ones) have a special status under **Law 2601/98**, similar to the one bestowed to other selected categories of investments, such as investments in high technology, environmental protection, etc. More specifically, the main provisions of Law 2601/98 concerning public support of RES investments are as follows:

- 40% public subsidy (grant) on the total eligible RES investment cost + 40% subsidy on the interest of loans obtained for the purpose of financing the RES investment
- Alternatively, 40% subsidy on the loan interest + 100% tax deduction on the RES investment cost
- Level of subsidy (40%) is independent of the RES technology and the geographical region of the country
- Required own capital : 40% (min) of the total investment cost
- Minimum investment cost required : 176,000 Euro
- Maximum subsidy granted : 14.7 million Euro
- Maximum investment cost subsidised : 36.7 million Euro

Proposals for private investments can be submitted to the National Development Law 2601/98 at any time and they are evaluated on their own merit, i.e. independently of other submitted proposals. Law 2601/98 does not have any total budget cup, thus there is (theoretically) no limit in the number and budget of proposals that can be funded.

Hungary (HU)

Energy Saving Programme and Action Plan

Energy Saving Programme and Action Plan				Investment subsidies
Involved technologies	Max. €	Max. %	Total Budget (M€)	Addressed to: (private, companies...)
All kinds of RES-E	824	30	1.442(*)	private
All kinds of RES-E	8,240	30		companies

(*) total budget in 2001 for electricity and heat

Environmental Protection Fund (KAC)

Environmental Protection Fund (KAC)	Investment subsidies	
Involved technologies	Max. %	Total Budget (M€)
All kinds of RES-E	30	2.5 (*)

(*) total budget from 1997-2000 for electricity and heat

Fund is collected from air polluters.

Biomass usage for energy production

Biomass usage for energy production	Investment subsidy
Involved technologies	Max. %
Biomass	30

Italy (IT)**Italian national 10000 photovoltaic roofs program**

Investments Subsidy Schemes for RES in the Walloon Region in the private sector		Investment subsidy
Involved technologies	Value %	Size of the plants
PV	At present (second phase) 65-70% of total investment costs	5-50 kWp

Target: Installation of 250 MW

Period of the policy: 2001-ongoing

The Italian PV- Roof Program "Tetti fotovoltaici" was launched by the Ministry of Environment ENEA in March 2001. The program is structured in 2 phases with a total duration of 6 years and aims at the realisation of grid connected building integrated PV systems. The first phase envisaged the realisation of 10000 PV roofs for a total capacity of 50 MWp (targeted at plants with a capacity range between 1 and 20 kWp in the first and second sub-program and with a capacity higher than 30 kWp in the third sub-program). The second phase will ensure the construction of further 40000 systems (200 MWp). The program is at present in the second phase. This second phase of the program is managed by the 19 Italian regions (like the second sub-program in the first phase) through local announcements. As a consequence each region is adopting its own amount of incentives. Some regions have adopted a 70% incentive, while others have adopted 65% with a maximum investment cost ranging from 7 to 7.5 €/W_p, depending on plant size. The maximum investment subsidy permitted is 70% of the costs.

Luxembourg (LU)

Framework Law 22.07.1994 with respect to PV projects.		Investment subsidies		
Involved Technologies	Value (%)	Operational period	Max. eligible capacity [kWp]	Maximum rebate [€]
Solar PV	50%	Jan. 2001 till Dec. 2004	4kWp	Domestic sector: Individual house up to 5,000€/kWp.
				Domestic sector: Apartment building 50% <u>times the number</u> of apartments up to 38,000€
				Non-domestic sector: up to 38,000€

Framework Law 22.07.1994 with respect to wind projects.			Investment subsidies	
Involved Technologies	Value (€/kW _{el})	Operational period	Minimum installation capacity [kW]	Maximum rebate [€]
Wind energy	75€/kW _{el}	Jan. 2001 till Dec. 2004	500kW	Up to 150,000€ per project

PEEC (Programme d'actions d'Economies d'Energies dans les Communes)		Subsidies for grid connection		
Involved Technologies*	Value (€/kW _{el})	Operational period	Maximum [€]	
Wind	148.7€/kW _{el} for grid connection costs	1996 till undetermined	Maximum of 0.148M€ per project	

*Up to 1998 no wind projects were realized under this scheme and results are not expected to be significant.

Netherlands (NL)

Energy Subsidy Regulation (EPR) and Energy Performance Advice (EPA)		Investment subsidy
Involved technologies	Value /Wp (€)	Budget in 2003 (€) ⁴⁰
PV	3,5	54 million

Period of the policy: 2001-2010

Target: Reduction of 2 Mton of CO₂-Emissions

Poland (PL)

Ecofund

Foundation for the efficient administration of the money derived from the conversion of a part of the foreign debt of Poland into a fund intended to support environmental protection projects; RES is a priority of the fund; (GHG and air pollution reduction).

Grants mainly for technical investment projects from 15% up to 70 % for innovatory projects.

This program combines all types of RES.

Minimum size for some project types are defined, e.g. 160 kW wind turbines. The total budget 2001 was 51 Million PLN; (almost one third of all expenses of the Ecofund).

National fund for Environment Protection and Water Management (NFEP)

NFEP provides grants and loans for renewable development; all types of RES.

Through subsidies and preferential loans the National Fund supports initiatives that serve the improvement of the state of our nature. Special attention is given to ecological activities adapting Poland to the European Union Standards and fuel conversion from coal to gas and biomass. The

⁴⁰ (including the subsidy for solar boilers and heat-pump boilers)

National Fund is the largest institution financing environmental protection projects in Poland. The mission of the Fund is to provide financial support for undertakings of a national or interregional scale.

Main criteria:

- Ecological effect in Mg/year, in SO₂ equivalent and in CO₂ in Mg/year)
- Cost of achievement of ecological effect: Unit cost of investment in emission reduction in kPLN/Mg*y, in SO₂ equivalent
- Investment cost per power unit (PLN/kW)

Other criteria:

- Percentage reduction of pollutant emission
- The ratio of saved energy (MWh/r) to installed power (MW)
- Job creation (Social effect)
- Localization of investment (polluted areas and protected areas)

The following boundary condition have to be fulfilled

Regional or interregional investment with

- energy savings above 300 MWh/year
- or modernization of boilers with total capacity not lower than 0,5 MW for boiler house
- or for renewable energy sources with total capacity greater than 0,3 MW,
- ecological effect at least 5 Mg /year, in SO₂ equivalent.

NFEP supports up to 2,5% of investments costs and 50% of cost of investment preparation.

Portugal (PT)

MAPE grants

MAPE	Investment subsidy		
Involved technologies	Value % of the investment subsidy	Max. inv. subsidy	Eligible costs for the loan
solar, biomass, wind, small hydro and geothermal (100% delivery to the grid)	40% of investment costs	300.000 €	40% of the not granted investment costs
solar, biomass, wind, small hydro and geothermal (self supply)	50% of investment costs	n.a	-

Period of the policy: 2000-2006

MAPE, which stands for Measure for the Exploitation of the Energy Potential and Rational Use of Energy⁴¹, is the current scheme for promoting RES and RUE projects, during the investment phase. MAPE was set up under the POE (Operational Programme for Economy⁴²), which is now renamed to PRIME, included in the third CSF (from 2000 till 2006). The Program consists basically in soft loans and investment subsidies.

⁴¹ In Portuguese, “Medida de Aproveitamento do Potencial Energético e Racionalização dos Consumos”

⁴² In Portuguese, “Programa Operacional da Economia”

Sweden (SE)

Subsidies for small-scale producers

Support for small scheme power production	Investment subsidies	
Involved Technologies	Max. Value	Total plant power (kW)
All	0,96€/kWh	1500

It is a subsidy of network expenses for small scale producers. The level of support available

Amounts to 9öre/kWh (0, 96€/kWh). Eligible plants are those with output to 1.5 MW. This support programme will be terminated when the certificate system enters into force.

Investment Grants for Wind Generation

Support for small scheme power production	Investment subsidies	
Involved Technologies	Max. Value (%)	Total plant power (kW)
Wind	15	200

The grant is administrated by the Swedish Energy Agency for investments that provide a new contribution to electricity generation. Grants are available for wind power plants with a minimum electrical effect of 200kW.

Slovenia (SL)

Environment Ministry Fund

Environment Ministry Fund	Investment subsidies
Involved technologies	Total Budget (€)
Geothermal, PV, wind	460000 (*)

(*) total budget together for geothermal (electricity and heat), PV, wind and solar thermal

Spain (ES)

Incentives for PV and solar thermoelectric under the Plan de Fomento de las Energias renovables:

Technologies included	Max. eligible costs of the systems (€/Wp)	Investment subsidy (%)	Interest rate (%) of the soft loan	Repayment period of the soft loan	Years of free repayment	Total Budget (1996-2006) for subsidies	Budget (1996-2006) for investment subsidies	Budget (1996-2006) for tax incentives
PV								
Grid connected and < 100kWp	Plants >5 kWp 7 Plants <5kWp 7,50	Max. 26 % of the max. eligible costs	Euribor minus 2,543-	7	0	345,1 Million Euros	271,7 Million euros	59 Millions euros
Grid connected and > 100kWp	7							
Stand-alone plants and <100kWp	14 for systems with storage and 9 for systems without storage							
Stand-alone plants and >100kWp								
Solar thermo-electric	2,5							

Special measure within the framework of the “Plan de Fomento de las Energías Renovables”

which basically consists of tax incentives, soft loans and investment subsidies. Within the framework of the Financing Line ICO-IDEA only PV-Projects and Solar thermal are eligible to receive investment subsidies. An IDAE discount of 3,5 points for the interest rate is applied Both investment subsidy and the IDAE discount are transferred to the investor account in order to pay the loan.

Incentives for Biomass and Biogas under the Plan de Fomento de las Energias Renovables

Technologies included	Total Budget (1996-2006) for subsidies	Budget (1996-2006) for fuel production subsidies	Budget (1996-2006) for investment subsidies	Budget (1996-2006) for tax incentives
Biomass	582,1 Million Euros	140,4 Million Euro	119,4 Million euros	59 Millions euros
Biogas	7 Million Euros			

⁴³ An IDAE discount of 3,5 points is applied

Special measure within the framework of the “Plan de Fomento de las Energías Renovables” which basically consists of tax incentives, soft loans and investment subsidies

United Kingdom (UK)

Clear Skies Scheme

Clear Skies Scheme			Investment subsidy			
Involved technologies	Value (%)	Value (£/kWe)	Max. subsidy	Size of the plants	Addressed to	Budget ⁴⁴
Wind and micro/small scale hydro	-	£1000/kWe	£5000	0,5-5 kWe	households	£10 Mio (≈16Mio Euros)
	50% of investment costs	-	£100000	-	communities	

Direct, fixed grants towards investments in RES technologies, targeted at householders and communities, with stated aim of contributing to sustainable development

Major PV Demonstration Programme

Major PV Demonstration Program		Investment subsidy		
Involved technologies	Value (%)	Size of the plant	Addressed to	Budget (2002-2005)
PV	40-60% of investment costs	0,5-100 kWp	Households, small to medium sized enterprises, Public sector organisations, community groups	£20 Mio (≈32Mio Euros)

Period of the policy: Field trials from 1999; PV roofs from 2002

Direct, fixed grant programme directed at householders, businesses and social housing providers with stated aim of preparing a secure market platform for PV

£20m budget over three year first phase (2002-2005), two thirds for medium to large-scale (up to 100 kWp), one third for small-scale applications (0.5 to 5 kWp), providing grants of 40% to 60% toward PV installations

⁴⁴ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

DTI Capital Grants Programme: Bio-energy (UK-wide)

Clear Skies Scheme			Investment subsidy	
Involved technologies	Value (%)	Size of the plants	Addressed to	Budget ⁴⁵
Large scale Biomass plants using energy crops	40%	<20 MWe	Project developers	£66 Mio (≈105 Mio Euros)
Medium scale Biomass plants using energy crops	40%	<1MWe		

Direct, fixed grant programme directed at project developers and organisations with stated aim of contributing to climate change, renewables and CHP targets, creating a market for bio-energy, encouraging rural development and alleviating fuel poverty

Defra Energy Crops Scheme (UK-wide)

Clear Skies Scheme		Investment subsidy	
Involved technologies	Value	Addressed to	Budget (2000-2006) ⁴⁶
Energy crops for electricity generation	£1.600 per hectare for short rotation coppice £1000 per hectare for willow or poplar and £920 per hectare for miscanthus	Private sector	£29 Mio (≈46 Mio Euros)

Direct, fixed grant programme directed at the private sector with stated primary aim of rural development, as well as contribution toward environmental and social objectives

- £29m available from 2000 to 2006 toward:
- establishment grants of: £1,600 or £1,000 per hectare, depending on land type, for establishing short rotation coppice (SRC) of either willow or poplar and £920 per hectare for establishing miscanthus
- grants of up to 50% of the costs of establishing producer groups (e.g. legal costs office equipment etc) for short rotation coppice

Crops must be grown for electricity, heat or co-generation within a “reasonable” radius of the growing land.

⁴⁵ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

⁴⁶ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

7.1.2.3 Soft loans

Germany (DE)

ERP and DtA Environment and Energy Efficiency Program

ERP and DtA Environment and Energy Efficiency Program				soft loans	
Involved technologies	Interest loan (%)	Repayment period	Years of free repayment	Adressed to	Max. investment costs eligible (Euro)
RES-E New provinces	4,5	15	5	Small and medium enterprises	75% of total investment costs
RES-E Old provinces	4,7	10	2		50% of total investment costs

This measure represents one of the most important instruments for large scale projects, basically in the field of wind energy

Greece (GR)

Law 2601/98 provides support in form of a combination of subsidies and soft loans. It is described in the chapter about investment subsidies for RES-E.

Poland (Pl)

National fund for Environment Protection and Water Management (NFEP)

Besides the subsidies NFEP provides also loans for RES-E technologies. The interest rate varies from 0,6% (for establishment and modernisation of sewage treatment plants) to 3% depending on income per citizen of the community, county or association of counties and voivodeships. The loans may be written off up to 15% if ecological effect is achieved and 50% of the loan is paid back. If establishment and modernisation of sewage treatment plants with ecological effect until 31 December 2005 is concerned, 50% of the loan may be written off.

The loan is granted up to 80% of the investment cost.

Portugal (Pt)

The program MAPE provides support in form of a combination of subsidies and soft loans. It is described in the chapter about investment subsidies for RES-E.

Slovenia (SL)

Efficient use of energy investment fund

Involved technologies	Interest loan
All kind of RES-E technologies	One third lower than commercial interest rates

Spain (ES)**Line IDAE-ICO for the year 2003 in the framework of the Plan de Fomento de las Energías Renovables**

Technologies included	Max. eligible costs of the systems	Interest rate (%)	Repayment period ⁴⁷	Years of free repayment ⁴⁸	Maximum Amount per beneficiary
Self consumption wind power under 4MW, Biomass, Minihydraulic under 1MW, Thermic, photovoltaic and thermoelectric solar energy, Biogas energy use, Energy valorization of waste.	Depending on the technology	Euribor minus 2,5 ⁴⁹ -	5	1	70% of the eligible costs
				0	
			7	2	
				0	
			10	2	
				0	

The funds will be facilitated through the banks that have signed the agreement. This Finance Line operates within the framework of the *Plan de Fomento de las Energías Renovables*, the aim of which is to ensure that by 2010 12% of primary energy consumption in Spain comes from renewable energy sources. The interest rate is variable fixed to the Euribor for 6 months plus one percentage point. Once the IDAE discount has been applied –which is 3.5 the final interest rate for the beneficiary is Euribor minus 2.5.

7.1.3 Post-investment / Implementation

7.1.3.1 Feed in tariffs

This promotion strategy has attracted attention since the late 1980s especially in Denmark, Germany, Italy and, in the 1990s, Spain. Nowadays it is the most popular promotion instrument for RES-E. Feed-in tariffs indicate the price per unit of electricity that a utility or supplier has to pay for renewable electricity from private generators (also called “producers”). Thus, a federal (or provincial) government regulates the tariff rate.

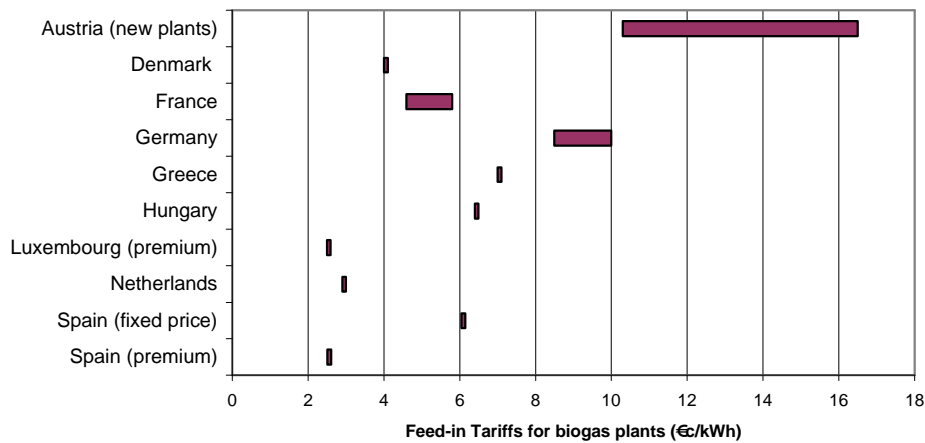
The following figures show a cross-country comparison of FIT for different technologies. In most countries FIT vary depending on technologies and the size of plants. The level of FIT varies strongly between countries. Depending on the technology the range of the FIT varies about 300 to 500 percent. Note, a detailed description of the implemented FIT-schemes is given country by country afterwards.

For a comparison of the effects of FIT of course also the availability of additional support e.g. investment subsidies or soft loans have to be considered.

⁴⁷ the repayment period can be selected by the beneficiary

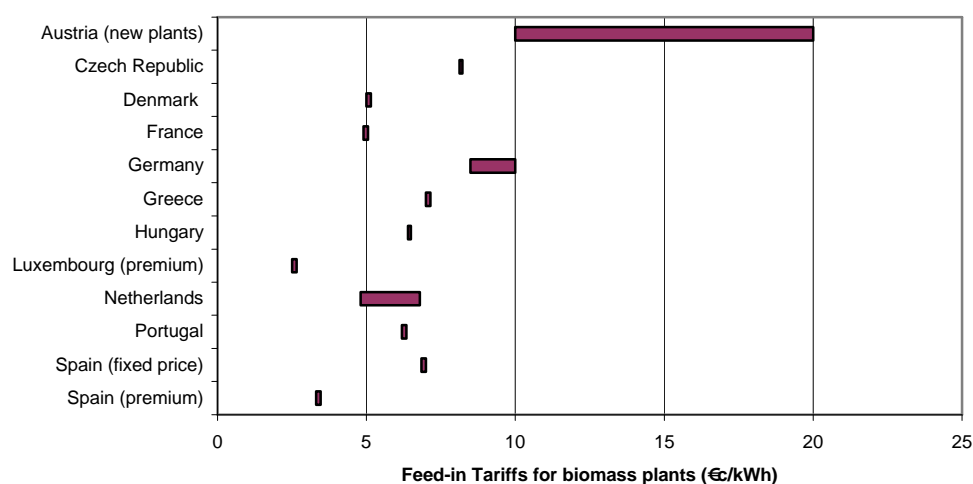
⁴⁸ depending on the repayment period

⁴⁹ An IDAE discount of 3,5 points is applied



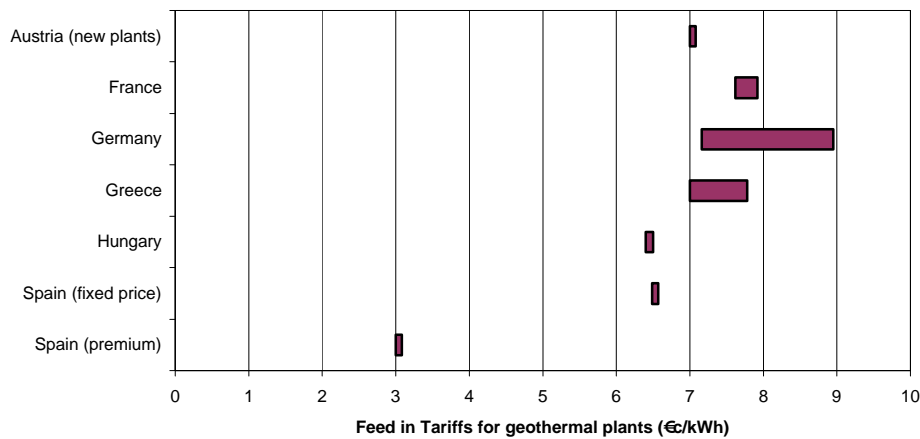
Country	Guaranteed duration (years)	Remarks
Austria	13	Feed-in tariff guaranteed for new plants i.e. plants built between January 1st and December 31st 2004 and start generating electricity by the end of 2006. The height of the payment depends on the size of the plant.
Denmark		
France	15	Tariffs only for installations smaller than 12 MW. The height of the payment depends on the size of the plant.
Germany	20	The height of the payment depends on the size of the plant. FITs decrease by 1% per year – Hence, for each producer the height of the tariff is fixed at a defined amount according to the year of contract-signature.
Greece	10	Tariffs only for installations smaller than 50 MW. Tariff rate depending on the location of the plant (interconnected system or non interconnected island)
Luxembourg	10	Only for plants <3MW. There exists a higher support for small scale projects: 7,5€/kWh for plants between 1-500 kW and 5,7 €/kWh during the day and 3 €/kWh during the night for plants between 500-1500 kW
Netherlands	10	The Tariffs are determined annually by the Ministry of Economics Affairs. For each producer the height of the tariff is fixed at a defined amount according to the year of contract-signature. From 2005 the present energy tax will be abolished and added to the feed -in tariff. Producers receives additionally an Ecotax exemption, the electricity market price and revenues from green certificates
Spain		Tariffs only for installations smaller than 50 MW. Every four years premiums are revised. For plants larger than 50 MW 0.6€/kWh are paid.

Figure 7.7 Feed-in tariffs for electricity from biogas plant in EU-15 and selected Accession countries



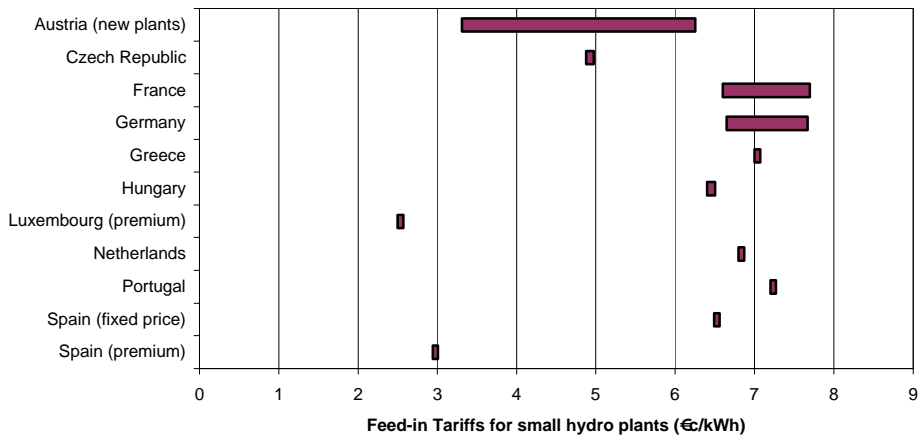
Country	Guaranteed duration (years)	Remarks
Austria	13	FITs are guaranteed for new plants – i.e. plants which receive all planning permissions between 1 January 2003 and 31 December 2004 and, furthermore, put in operation not later than the end of 2006. The height of the tariff depends on the plant-size and on the fuel type (e.g. solid or liquid biomass, further distinction by fuel fraction)
Denmark	10	
France	15	Tariffs only for installations smaller than 12 MW.
Germany	20	The height of the payment depends on the plant-size. FITs decrease by 1% per year – Hence, for each producer the height of the tariff is fixed at a defined amount according to the year of contract-signature.
Greece	10	Tariffs only for installations smaller than 50 MW. Tariff rate depending on the location of the plant (interconnected system or non interconnected island)
Luxembourg	10	Only for plant <3MW. There exists a higher support for small-scale projects: 7.5 €/kWh for plants not larger than 500 kW; and 5.7 €/kWh during day-time and 3 €/kWh during night-time for plants with a size between 500-1500 kW
Netherlands	10	The Tariffs are determined annually by the Ministry of Economics Affairs. For each producer the height of the tariff is fixed at a defined amount according to the year of contract-signature. From 2005 the present energy tax will be abolished and added to the feed-in tariff. Producers receives additionally an Ecotax exemption, the electricity market price and revenues from green certificates
Portugal		Feed-in tariffs are updated monthly according to inflation
Spain		Tariffs only for installations smaller than 50 MW. Every four years premiums are revised. For installations larger than 50 MW 0.6€/kWh are paid.

Figure 7.8 Feed-in tariffs for electricity from biomass in EU-15 and selected Accession countries



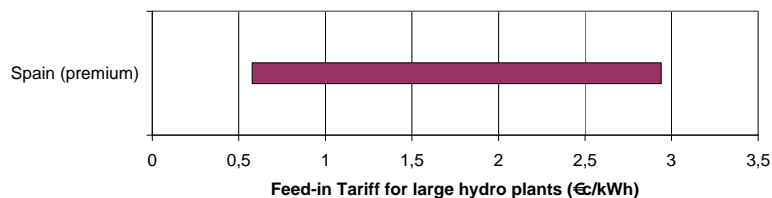
Country	Guaranteed duration (years)	Remarks
Austria	13	FITs are guaranteed for new plants – i.e. plants which receive all planning permissions between 1 January 2003 and 31 December 2004 and, furthermore, put in operation not later than the end of 2006..
France	15	Tariffs only for installations smaller than 12 MW
Germany	20	The height of the payment depends on the size of the plant.
Greece	10	Tariffs only for installations smaller than 50 MW. Tariff rate depending on the location of the plant (interconnected system or non-interconnected island)
Spain		Tariffs only for installations smaller than 50 MW. Every four years premiums are revised. For plant >50 MW 0.6€/kWh are paid.

Figure 7.9 Feed-in tariffs for electricity from geothermal energy in EU-15 and selected Accession countries



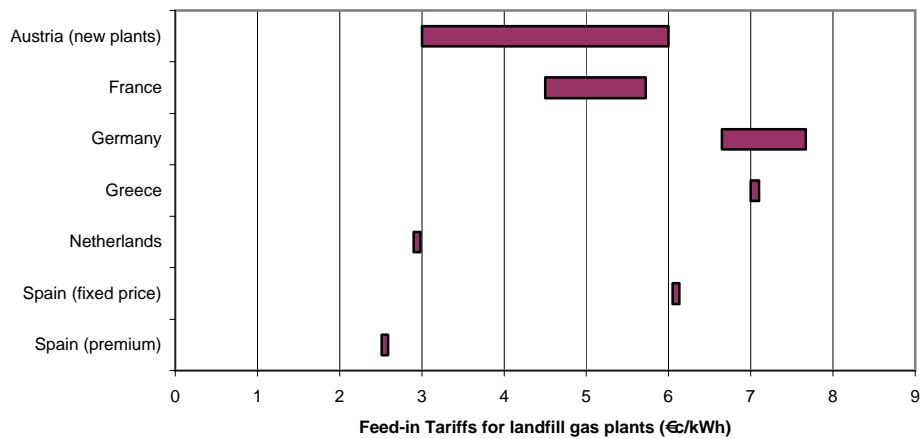
Country	Guaranteed duration (years)	Remarks
Austria	13	FITs are guaranteed for new plants – i.e. plants which receive all planning permissions between 1 January 2003 and 31 December 2004 and, furthermore, put in operation not later than the end of 2006. The height of the tariff depends on if the plant is new and on the production increase per year if being rebuilt. Moreover, old plants receive a reduced tariff.
France	20	Tariff is depending on season and on size of the plant.
Germany	unlimited	Tariff is depending on size of the plant.
Greece	10	Tariff rate depending on the location of the plant (interconnected system or non interconnected island)
Luxembourg	10	Only for plants <3MW. There exists a higher support for small scale projects: 7.5€/kWh for plants between 1-500 kW and 5,7 €/kWh during the day and 3 €/kWh during the night for plants between 500-1500 kW
Netherlands	10	The Tariffs are determined annually by the Ministry of Economics Affairs. For each producer the height of the tariff is fixed at a defined amount according to the year of contract-signature. Producers receive additionally an Ecotax exemption, the electricity market price and revenues from green certificates. From 2005 the present energy tax will be abolished and added to the feed-in tariff
Portugal	Life time	Feed-in tariffs are updated monthly according to inflation
Spain		Tariffs only for installations smaller than 50 MW. Every four years premiums are revised. For installations >50 MW 0.6 €/kWh are paid.

Figure 7.10 Feed-in tariffs for electricity from small hydro in EU-15 and selected Accession countries



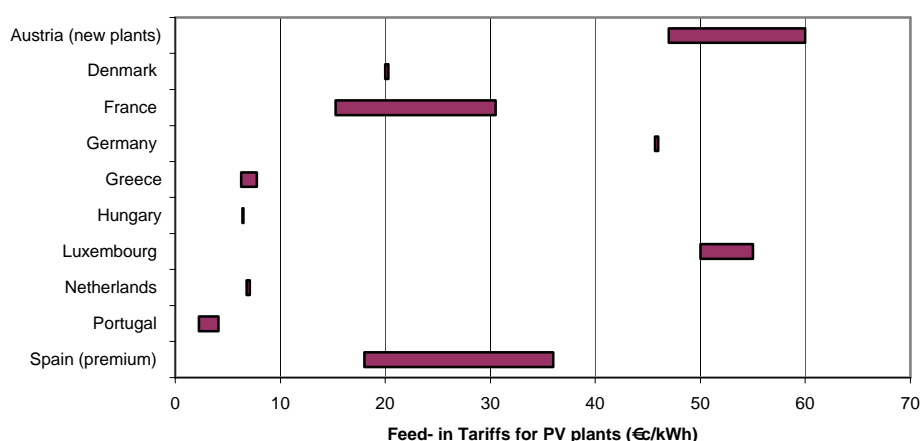
Country	Guaranteed duration (years)	Remarks
Spain		Plant with a size between 10 and 50 MW receive a premium depending on the size according to the formula: Premium (€/kWh) = 2.9 * (50-P)/40 - where: P ... plant-size in MW. For plant >50 MW 0.6 €/kWh are paid.

Figure 7.11 Feed-in tariffs for electricity from large hydro in EU-15 and selected Accession countries



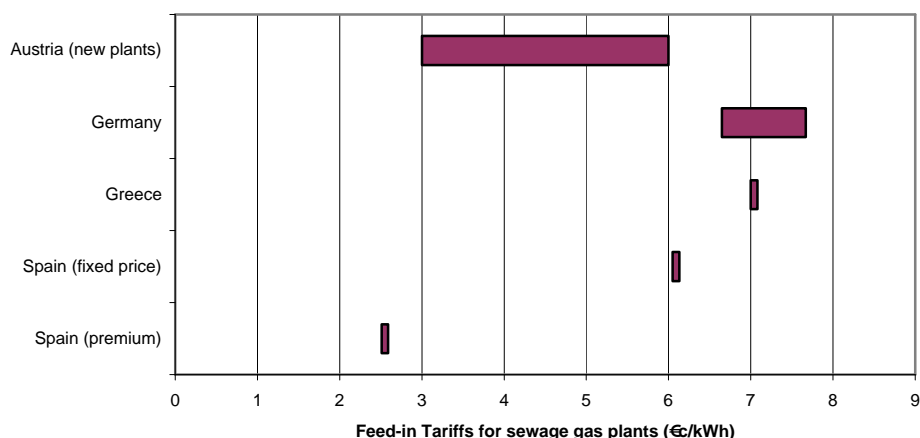
Country	Guaranteed duration (years)	Remarks
Austria	13	FITs are guaranteed for new plants – i.e. plants which receive all planning permissions between 1 January 2003 and 31 December 2004 and, furthermore, put in operation not later than the end of 2006. The height of the payment depends on the size of the plant
Denmark		
France	15	Tariffs only for installations smaller than 12 MW. Tariff is depending on the size of the plant.
Germany	20	Tariff is depending on the size of the plant.
Greece	10	Tariffs only for installations smaller than 50 MW. Tariff rate depending on the location of the plant (interconnected system or non- interconnected island)
Netherlands	10	The Tariffs are determined annually by the Ministry of Economics Affairs. – Hence, for each producer the height of the tariff is fixed at a defined amount according to the year of contract-signature. Producers receive additionally an Ecotax exemption, the electricity market price and revenues from green certificates. From 2005 the present energy tax will be abolished and added to the feed-in tariff.
Spain		Tariffs only for installations smaller than 50 MW. Every four years premiums are revised. For installations larger than 50 MW 0.6€/kWh are paid.

Figure 7.12 Feed-in tariff for electricity from landfill gas in EU-15 and selected Accession countries



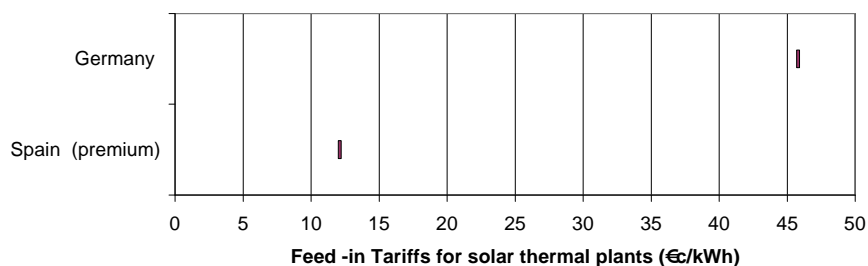
Country	Guaranteed duration (years)	Remarks
Austria	13	FITs are valid only until a cumulative capacity of 15 MW is reached. Hence, this cap has been already achieved in January 2003! Furthermore, FITs would be guaranteed for new plants – i.e. plants which receive all planning permissions between 1 January 2003 and 31 December 2004 and, furthermore, put in operation not later than the end of 2006. The height of the payment depends on the size of the plant
Denmark		
France	20	Tariff is depending on the size and location (Corsica & Overseas vs. mainland).
Germany	20	FITs are reduced by 5% annually – Hence, for each producer the height of the tariff is fixed at a defined amount according to the year of contract-signature.
Greece	10	Tariff rate depending on the location of the plant (interconnected system or non interconnected island)
Luxembourg	20	Only for plants <50 kW and if plant is commissioned in 2003. For plants commissioned in 2004 the premium will be 45 €/kWh
Netherlands	10	The Tariffs are determined annually by the Ministry of Economics Affairs – Hence, for each producer the height of the tariff is fixed at a defined amount according to the year of contract-signature. Producers receive additionally an Ecotax exemption, the electricity market price and revenues from green certificates. From 2005 the present energy tax will be abolished and added to the feed-in tariff
Portugal	Life time	Feed-in tariffs are updated monthly according to inflation. FITs are valid only until a cumulative capacity of 50 MW is reached. Feed-in tariff is depending on the size of the plant
Spain		Every four years premiums are revised. FITs are valid only until a cumulative capacity of 50 MW is reached. Tariff is depending on the size of the plant (< 5kW vs. >5kW)

Figure 7.13 Feed-in tariff for electricity from PV in EU-15 and selected Accession countries



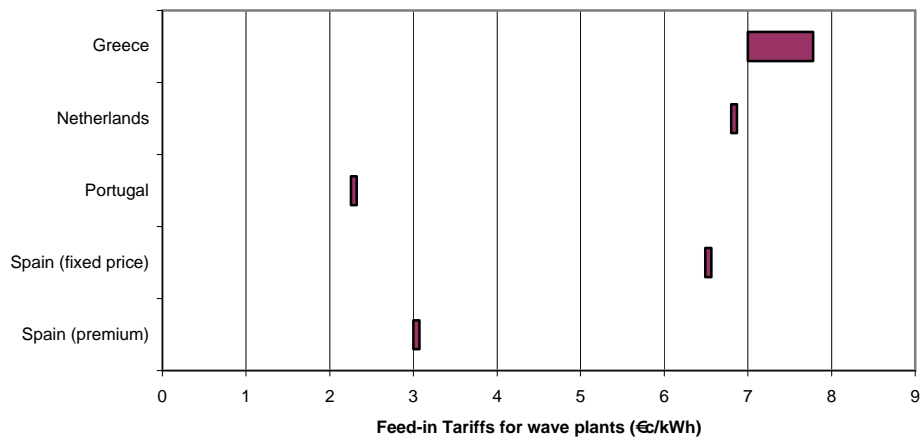
Country	Guaranteed duration (years)	Remarks
Austria	13	FITs are guaranteed for new plants – i.e. plants which receive all planning permissions between 1 January 2003 and 31 December 2004 and, furthermore, put in operation not later than the end of 2006. The height of the payment depends on the size of the plant
Germany	20	Tariff is depending on the size of the plant.
Greece	10	Tariffs only for installations smaller than 50 MW. Tariff rate depending on the location of the plant (interconnected system or non interconnected island).
Portugal	Life time	Feed-in tariffs are updated monthly according to inflation
Spain		Tariffs only for installations smaller than 50 MW. Every four years premiums are revised. For plants larger than 50 MW 0.6€/ are paid.

Figure 7.14 Feed-in tariffs for electricity from sewage gas in EU-15 and selected Accession countries



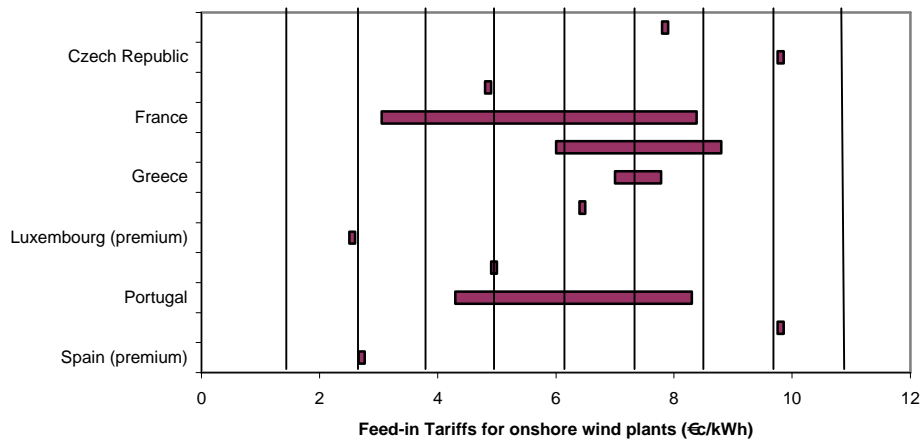
Country	Guaranteed duration	Remarks
Spain		Every four years premiums are revised
Germany	20	FITs decrease by 5% annually. – Hence, for each producer the height of the tariff is fixed at a defined amount according to the year of contract-signature.

Figure 7.15 Feed-in tariffs for electricity from solar thermal power plant in EU-15 and selected Accession countries



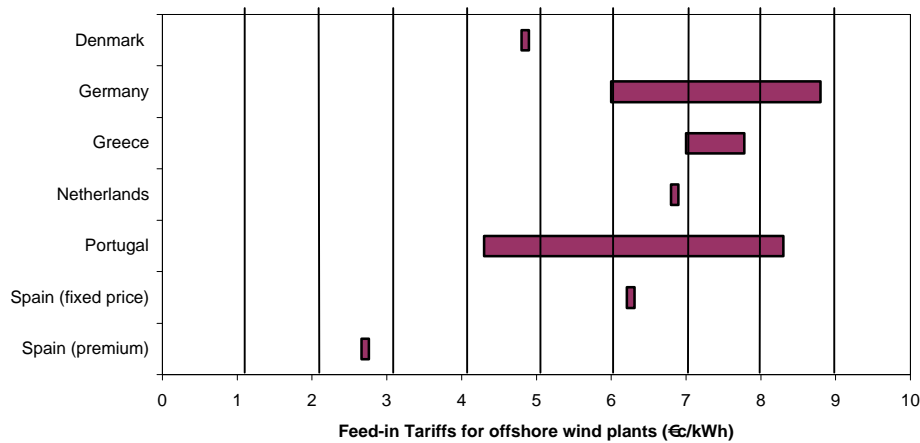
Country	Guaranteed duration (years)	Remarks
Greece	10	Tariffs only for installations smaller than 50 MW. Tariff rate depending on the location of the plant (interconnected system or non interconnected island)
Netherlands	10	The Tariffs are determined annually by the Ministry of Economics Affairs. For each producer the height of the tariff is fixed at the amount of the year of the contract. Producers receive additionally an Ecotax exemption, the electricity market price and revenues from green certificates. From 2005 the present energy tax will be abolished and added to the feed-in tariff.
Portugal	Life time	Feed-in tariffs are updated monthly according to inflation. Only until 50 MW are reached
Spain		Every four years premiums are revised

Figure 7.16 Feed-in tariffs for electricity from wave energy in EU-15 and selected Accession countries



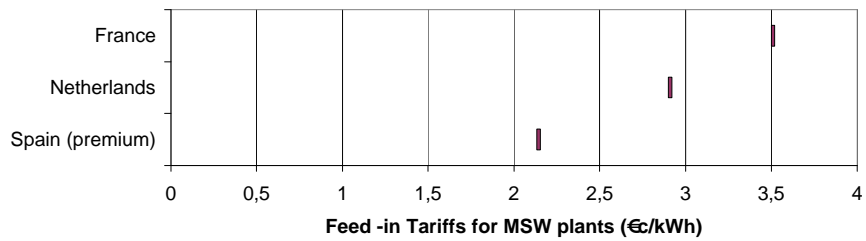
Country	Guaranteed duration (years)	Remarks
Austria	13	FITs are guaranteed for new plants – i.e. plants which receive all planning permissions between 1 January 2003 and 31 December 2004 and, furthermore, put in operation not later than the end of 2006.
Denmark	20	The payment consists of the electricity market price plus a premium of 1.33 €/kWh. If the market price is higher than a reference level (set at 3.46 €/kWh) but below 4.8 €/kWh the total revenue is limited to 4.8 €/kWh. Hence, if the market price is higher than 4.8 €/kWh, no premium will be given.
France	15	Tariffs only for installations smaller than 12 MW and for the first 1500 MW installed in France. Stepped FIT: 8.38 €/kWh for the first 5 years and in the following between 3.05 and 8.38 €/kWh depending on the quality of site
Germany	20	Stepped FIT: 8.9€/kWh for the first 5 years and then between 6 and 8,9 €/kWh depending on the quality of site. FITs are reduced by 1.5 % annually. Hence, for each producer the height of the tariff is fixed at a defined amount according to the year of contract-signature.
Greece	10	Tariffs only for installations smaller than 50 MW. Tariff rate depending on the location of the plant (interconnected system or non interconnected island)
Luxembourg	10	Only for plants <3MW. There exists a higher support for small-scale projects: 7,5€/kWh for plants between 1-500 kW and 5,7 €/kWh during the day and 3 €/kWh during the night for plants between 500-1500 kW
Netherlands	10	Feed-in Tariff up to 18.000 fully rated hours. The Tariffs are determined annually by the Ministry of Economics Affairs. For each producer the height of the tariff is fixed at a defined amount according to the year of contract-signature. Producers receive additionally an Ecotax exemption, the electricity market price and revenues from green certificates From 2005 the present energy tax will be abolished and added to the feed-in tariff.
Portugal	Life time	Feed-in tariffs are updated monthly according to inflation. Stepped FIT depending on the quality of the site
Spain		Tariffs only for installations smaller than 50 MW. Every four years premiums are revised. For installations larger than 50 MW 0.6€ are paid.

Figure 7.17 Feed-in tariffs for electricity from wind on-shore in EU-15 and selected Accession countries



Country	Guaranteed duration (years)	Remarks
Denmark	20	The payment consists of the electricity market price plus a premium of 1.33 €/kWh. If the market price is higher than a reference level (set at 3.46 €/kWh) but below 4.8 €/kWh the total revenue is limited to 4.8 €/kWh. Hence, if the market price is higher than 4.8 €/kWh, no premium will be given.
Germany	20	Only applicable for plants commissioned not later than December 2006
Greece	10	Tariffs only for installations smaller than 50 MW. Tariff rate depending on the location of the plant (interconnected system or non interconnected island)
Netherlands	10	The Tariffs are determined annually by the Ministry of Economics Affairs – Hence, for each producer the height of the tariff is fixed at a defined amount according to the year of contract-signature. Producers receive additionally an Ecotax exemption, the electricity market price and revenues from green certificates. From 2005 the present energy tax will be abolished and added to the feed-in tariff.
Portugal	Life time	Feed-in tariffs are updated monthly according to inflation. Stepped FIT depending on the quality of the site
Spain		Tariffs only for installations smaller than 50 MW. Every four years premiums are revised. For installations > 50 MW 0.6 €/kWh are paid.

Figure 7.18 Feed-in tariff for offshore wind plants in EU-15 and selected Accession countries



Country	Guaranteed duration (years)	Remarks
France		Tariffs only for installations smaller than 12 MW
Netherlands	10	The Tariffs are determined annually by the Ministry of Economics Affairs. For each producer the height of the tariff is fixed at a defined amount according to the year of contract-signature. Producers receive additionally an Ecotax exemption, the electricity market price and revenues from green certificates. From 2005 the present energy tax will be abolished and added to the feed-in tariff.
Spain		Tariffs only for installations smaller than 50 MW. Every four years premiums are revised. For installations > 50 MW 0.6€/kWh are paid.

Figure 7.19 Feed-in tariffs for MSW plant in EU-15 and selected Accession countries

In the following the FIT of EU-15 and selected accession countries will be listed. The tables which provide an overview about the most important information indicate the involved technologies, the guaranteed duration, the value of the feed-in-tariff, the size of the plant and capacity restriction. The column “Premium (yes/no)” indicates if the FIT is granted additional to the market price for electricity as a premium (yes) or independent from the market price (no).

Austria (AT)**Renewable Energy Act**

Renewable Energy Act		Feed in tariff			
Involved technologies	Premium (Yes/no)	Guaranteed duration	Value [c/kWh]	Size of the plant (MW)	Capacity restriction (MW)
Small Hydro	No	13	3,31-6,25 ⁵⁰	<10	-
PV-Systems	No	13	60	<20	15 MWp ⁵¹
			47	>20	
Wind Systems	No	13	7,8	All	-
Geothermal energy	No	13	7	All	-
Solid Biomass and waste with large biogenic fraction	No	13	16	< 2	-
			15	>2 and <5	
			13	>5 and <10	
			10,2	> 10	
Liquid Biomass	No	13	13	< 0,2	-
			10	>0,2	
Biogas	No	13	16,5	< 0,1	-
			14,5	>0,1 and <0,5	
			12,5	>0,5 and <1	
			10,3	> 1	
Sewage and landfill gas	No	13	6	<1	-
			3	>1	

On 1.1. 2003 the new Renewable Electricity Act came into force. The Renewable Electricity Act regulates green electricity and combined heat and power generation throughout the country. This law replaces the previous form of aids and charges which varied greatly among the different provinces. In the new system all end consumers and electricity dealers in Austria are contributing to the finance of the aid required in the same form. The Renewable Electricity Act is financed in two ways:

- electricity dealers must reduce their proportion of cost to an internal price of 4.5 Cent/kWh (this is greater than the sales proceeds for the electricity dealers).
- the end purchasers must pay a supplement to the network tariff (around 0.25 to 0.30 Cent/kWh). The supply tariffs for the green plant operators are the same throughout Austria.

⁵⁰ In dependence on the grade of revitalisation of the plant

⁵¹ This cap is already reached and therefore there is any Feed in Tariff for PV in Austria

Belgium (BE)

Guaranteed minimum prices for green electricity and green certificate. Royal Decree of 16 July 2002.

Renewable Energy Act		Feed in tariff			
Involved technologies	Premium (Yes/no)	Guaranteed duration	Value [c/kWh]	Size of the plant (MW)	Capacity restriction (MW)
Small Hydro	no	10	5	All	-
Wind Offshore			9		-
Wind Onshore			5		-
Solar Energy			15		-
Other RE (incl. Biomass)			2		-

This law which came into force on July 2002 guarantees minimum prices for various renewable energy sources for a period of 10 years. The Transport System Operator (TSO) is obliged to buy green electricity (through green certificates in those regions where such a regulation exists e.g. Walloon Region and Flanders - see Non Financial preinvestment Strategies). This system is implemented at regional level by green certificates quota systems. Only wind offshore plants are under responsibility of the federal government.

Czech Republic (CZ)

Involved technologies	Premium (Yes/no)	Value [€/MWh]
Small hydropower	No	48,76
Biomass	No	81,27
Wind energy (onshore)	No	97,53
Photovoltaic	No	195,06

Denmark (DK)***Act on payment for green electricity (Act 478)***

Act on payment for green electricity	Feed-in tariffs		
	Premium (Yes/No)	Guaranteed duration	Value [c/kWh]
Wind onshore new installations	Yes	10 years	1,3
Wind onshore existing installations	Yes	For first 22.000 full load hours subsequent like new installations (until green certificate market is established)	5,8
Wind offshore new installations	Yes	10 years	1,3
Wind offshore existing installations	Yes	For first 22.000 full load hours subsequent like new installations (until green certificate market is established)	6
Solid biomass	Yes	10 years	5
Biogas	Yes	10 years	4
Waste	Yes	10 years	1

Unknown how long transition to the green certificate market will still take.

Interaction with the general CO₂ tax on electricity which provides funds for the production subsidy.

France (FR)
Feed-in tariffs for renewable electricity

Feed in tariffs for renewable electricity		Feed-in tariffs					
Involved Technologies		Premium (Yes/No)	Guaranteed duration [years]	Value [c/kWh]	Efficiency premium [c/kWh]	Size of the plant (plants<x MW)	Capacity restriction (until x MW are installed)
Biomass		No	15	4,9		<12 MW	
Biogas		No	15	4,6		<12 MW	
Geothermal electricity		No	15	7,62		<12 MW	
PV		No	20	15,25		<12 MW	
PV (Corsica)		No	20	30,50		<12 MW	
Meat and bone meal	Winter	No	15	4,42		<12 MW	
	Summer	No	15	2,58		<12 MW	
Landfill gas		No	15	5,72		2	
				Interpolation		2-6	
				4,50		>6	
Municipal waste	Winter	No	15	4,42		<12 MW	
	Summer	No	15	2,58		<12 MW	
Hydro*		No	20	6,1		<0,5	
				5,49		>0,5 <12 MW	
Wind	First 5 years	No	15	8,38		<12 MW	=1500
	Next 10 years: <2000 hrs			8,38			
	2600 hrs			5,95			
	>3600 hrs			3,05			
Wind	First 5 years	No	15	8,38		<12 MW	>1500
	Next 10 years: <1900 hrs			8,38			
	2400 hrs			5,95			
	>3300 hrs			3,05			

“All tariffs apply for new installations. For existing installations, lower feed-in tariffs apply.”

*“Producers can choose between four different tariff schemes. The table shows the flat rate option. In other schemes tariffs are time dependent (day, night, season).”

Target: increase the supply for renewable electricity;

Tariffs include a price adjustment for inflation.

Germany (DE)**Renewable Energy Act**

Renewable Energy Act		Feed in tariff			
Involved technologies	Premium (Yes/no)	Guaranteed duration	Value [c/kWh]	Size of the plant (kW)	Capacity restriction (MW)
Biomass	no	20	10	≤500	
			9,1	>500 and ≤5000	
			8,6	<5000 and ≤20000	
Geothermal electricity	no	20	8,95	≤20000	-
			7,16	<20000	
Hydro			10	≤500	
			9,1	>500 and ≤5000	
Landfill gas	no	20	10	≤500	-
			9,1	>500 and ≤5000	
Sewage gas	no	20	10	≤500	-
			9,1	>500 and ≤5000	
Photovoltaic					350
integrated in Buildings	no	20	62,4	≤30	
			59,6	>30 and ≤100	
			59,3	>100	
In Buildings but not integrated			57,4	≤30	
			54,6	>30 and ≤100	
			54,3	>100	
Free areas			45,7		
Wind onshore	no	20			
First 5 years			9		
After 5 years			6 ⁵²		
Wind offshore	no	20	9		-
			6 ⁵³		

Period of the policy : 2000-no limit set yet

A reviewed amendment for the German Renewable Energy Act is supposed to come into force in 2004. The amendment is represented in the following table:

⁵² Decreasing depending on yield of the system up to 6 €/kWh

⁵³ Decreasing depending on yield of the system up to 6 €/kWh

Amendment of the Renewable Energy Act (expected to come in force mid of 2004)		Feed in tariff			
Involved technologies	Premium (Yes/no)	Guaranteed duration	Value [c/kWh]	Plant size (kW)	Capacity restriction (MW)
Biomass ⁵⁴	no	20	11,5	≤150	
			9,1	>150 and ≤500	
Geothermal electricity	no	20	15	≤5000	-
			14	>5000 and ≤10000	
			8,95	>10000 and ≤20000	
			7,16	>20000	
Hydro			7,67	≤500	
			6,65	>500 and ≤5000	
Landfill gas	no	20	7,67	≤500	-
			6,65	>500 and ≤5000	
Sewage gas	no	20	7,67	≤500	-
			6,65	>500 and ≤5000	
Photovoltaic					350
integrated in Buildings	no	20	62,4	≤30	
			59,6	>30 and ≤100	
			59,3	>100	
In Buildings but not integrated			57,4	≤30	
			54,6	>30 and ≤100	
			54,3	>100	
Free areas			45,7		
Wind onshore	no	20			
First 5 years			8,7		
After 5 years			5,5 ⁵⁵		
Wind offshore	no	20			-
First 12 years			9		
After 12 year			Depending on the distance from shore		

The explicit target of the German Renewable Energy Act is to double the share of electricity coming from renewable energy sources by the year 2010.

⁵⁴ rates increases for energy crops

⁵⁵ Decresing depending on yield of the system up to 6 €/kWh

Greece (GR)

Law 2773/99	Feed-in tariff				
Involved Technologies	Premium (Yes/no)	Guaranteed duration	Value [c/kWh]		Capacity restriction (until x MW are installed)
			(mainland)	(islands)	
Biomass	no	10	6,2	7,5	50
Biogas					50
Geothermal					50
Hydropower					10
Solar energy					50
Wind energy					50

The basic law governing RES electricity is Law 2773 of 1999, on the liberalisation of the domestic electricity market, and, specifically, its Chapter 10, Articles 35-41. This law has incorporated the majority of provisions of the earlier Law 2244 of 1994, which, unlike Law 2773, was devoted entirely to RES electricity matters. At present, there is no Greek law dealing specifically with heat production from RES.

The key provisions of Law 2773/99 concerning renewables are as follows:

- i. The Hellenic Transmission System Operator (HTSO) is obligated to grant priority access (priority in load dispatching) to RES electricity-producing installations up to 50 MW_e in power capacity (up to 10 MW_e in the case of small hydroelectric units).
- ii. The HTSO is obligated to enter into a 10-year contract (PPA) with the RES-electricity producer for the purchase of his electricity. The contract always includes a renewal option.
- iii. The RES-electricity production of an independent power producer, or the surplus electricity production of a RES auto-producer, is sold to the HTSO at a predetermined buy-back rate, which is fixed percentage of the corresponding consumer electricity rate.
- iv. Every RES-electricity producer is subject to a special reciprocity charge (annual fee), specified by a joint decision of the Ministers of Finance and Development, and equal to two-percent (2%) of the producer's electricity sales to the grid. This charge is collected by the HTSO and is given to the Local Authority, within the area of which the RES generation unit operate, for the purpose of realising local development projects.

Law 2773/99 instituted a new license, the so-called electricity generation license, which is now the first license required to be obtained by any electricity-producing station, conventional or RES-based, in a long planning / licensing procedure that also includes presiting permit, land-use permit, approval of environmental terms and conditions, installation license, operation license, etc.

Law 2941 of 2001 supplemented Law 2773/99 with certain important provisions about renewables, including: a) the definition of the general terms and conditions, under which it is allowed to install RES stations in forests and forestry lands, and b) the characterisation of all RES projects as projects of public utility status, which gives them the same rights and privileges in land expropriation procedures as those given to public works, independently of the legal status of the RES project owner (being private or public).

Hungary (HU)

Electricity act		
Involved technologies	Premium (Ja/Nein)	Value[€/MWh]
Biomass	No	64
Biogas		
Geothermal		
Small hydro power		
Wind		
PV		

Luxembourg (LU)

Feed in tariffs for renewable electricity			Feed-in tariffs			
Involved Technologies			Premium (Yes/No)	Guaranteed duration [years]	Value [€/kWh]	Size of the plant (plants<x MW)
Wind			yes	10	2,5	3
Hydro			yes	10	2,5	3
Biomass			yes	10	2,5	3
Biogas			yes	10	2,5	3
PV*	Non-municipalities	Before 31 Dec. 2002	yes*	20	55	0,05
		1 Jan. 2003 – 31 Dec. 2003			50	0,05
		1 Jan. 2004 – 31 Dec. 2004			45	0,05
	Municipalities	25			0,05	

*PV: If PV energy production reaches 1% of Luxembourg's electricity consumption before 31 Dec. 2004, no premium will be accorded under this regulation to PV installations implemented onwards from the year following that in which the PV production threshold was reached.

Special Feed in tariffs for non-utility renewable electricity (autproducers)		Feed-in tariffs	
Involved Technologies	Operational period	Value in 1997 [€/kWh] was	Size of the plant [MW]
All	1994 till undetermined	7.5€/kWh	0,5
		5.7€/kWh during the day	0.501 - 1.5
		3€/kWh during the night	0.501-1.5

Netherlands (NL)**Environmental Quality of Power Generation (MEP)**

Environmental Quality of Power Generation (MEP)		Feed in tariff	
Involved technologies	Premium (yes/no)	Guaranteed duration	Value [c/kWh]
Pure Biomass large scale	Yes	10	4,8
Pure biomass small scale			6,8
Waste			2,9
Mixed streams Bio			2,9
Wind Offshore			6,8
Wind Onshore			4,9
PV			6,8
tidal			6,8
Wave			6,8
Hydro			6,8

Period of the policy: 2003-undetermined

The subsidy is financed by a levy on all connections to the electricity grid in the Netherlands. This levy amounted to € 34 per connection in 2003 and will be increased to € 40 in 2006.

Portugal (PT)**Decree Law 339-C/2001, Decree Law no. 168/99, Decree Law no. 189/98**

Renewable Energy Act		Feed in tariff			
Involved technologies	Premium (Yes/no)	Guaranteed duration	Value [c/kWh]	Size of the plant (MW)	Capacity restriction (MW)
Small Hydro	No	12	2,9	=10	-
PV-Systems	No	12	41	<5	-
			22,4	>5	-
Wind Systems	No	12	Between 4,3 and 8,3 depending on the site	<50	-
				>50	-
wave	No	12	22,5	<50	-

The feed-in tariffs in Portugal are ruled by Decree-law 339-C/2001 (update of Decree-Law 168/99). Under this law, it is guaranteed to power producers that the public grid will buy their produced electricity during the period in which the licences are valid. The guaranteed buying period is fixed to 12 years. After this period of 12 years, the buying price calculation will be defined and the environmental benefits are accounted partially.

The feed-in tariff is calculated as the sum of three parts related to the avoided costs for the public power system and the environmental benefits from the use of renewable energy sources. The environmental part of the tariff is based on the unit valuation of the avoided CO₂ emissions of a reference plant: 370 g (CO₂) /kWh and 75 €/ton. The feed-in tariff is regularly updated based on the consumer price index. The law establishes differentiated tariffs as a function of the technology and operating regime. It also compensates local authorities in the case of installation of wind farms in their municipalities. Besides, it creates the conditions for developing projects relying on emerging technologies with high potential in the medium long term, for example PV, wave energy and biomass.

Recently, the Decree-Law 68/2002 introduced new rules for low voltage power producers, which use 50% of the electric energy for self-supply. The maximum power allowed to deliver to the grid is 150 kW. The fed-in tariffs have definitely incentive characteristics. The electricity generating technologies included in this scheme are Otto and Stirling engines, micro-turbines, PV and fuel cells.

Slovenia (SL)

Ordinance on rules for definition of prices and purchase of electricity

Involved technologies	Premium (Ja/Nein)	Guaranteed duration	Value[€/MWh]	Size of the plant (Plants < XMW)
Small Hydropower	No	10	62	1 MW
PV	No	10	285	36 kW
(Industrial cogeneration)	No	10	55	1 MW

Spain (ES)

Royal Decree 2818/1998

Renewable Energy Act		Feed in tariff			
Involved technologies	Premium (Yes/no)	Guaranteed duration	Value [c/kWh]	Size of the plant (MW)	Capacity restriction (MW)
Small Hydro	yes	4	2,9	=10	-
PV-Systems			36	<5	50 MWp
			18	>5 and <50	
			0,6	>50	
			Solar thermoelectric	12	
			0,6	>50	
			Wind Systems	2,7	<50
			0,6	>50	
			Geothermal, wave and tides	3	<50
			0,6	>50	
			Primary Biomass	3,3	<50
			0,6	>50	
			Secondary Biomass	2,5	<50
			0,6	>50	

RES-E producers have the right to opt for a fixed price or for a premium tariff. In case of a premium tariff, RES-E generators earn in addition to the (compared to fixed rate lower) premium tariff the revenues from the selling of their electricity on the power market.. Both are adjusted annually by the government according to the variation in the average electricity sale price. Most of the producers choose the premium system. The system is reviewed every four years.

Sweden (SE)

Environmental bonus for Wind	Grant (subsidy) for wind	
	Value (Eur/MWh)	Total plant power (kW)
Wind	19	

The grant is administered by the Swedish Tax Administration, and it will remain active in the year 2003 after that the Government has suggested a system for support that will gradually reduced over a transitional period. It is an environmental subsidy, equal to the rebate of the electricity tax, is granted for wind power production. This support will reduce to 2 EUR/MWh in 2007 and disappear in the following year.

7.1.3.2 Quota obligation (based on TGCs)

In contrary to FIT quota obligation based on tradable green certificates (TGC) are not very common in EU-15 and selected accession countries. They are currently implemented in Belgium, Italy, Sweden, United Kingdom and are proposed for Denmark.

Belgium (BE)***Green certificates in Flanders***

Period	Obligation	obligation on	technology bands (baskets) within overall quota	International trade allowed	price restrictions (min., max. price)	involved technologies	trading scheme	Penalty
start 2002	1,2% (2003), 2% (2004) increasing up to 6% in 2010	Suppliers	No	No	Max. price according to penalty Min defined at federal level .	all renewables, no solid municipal waste	Stock exchange	75€ per missing certificate (1000 kWh) in 2003, 100€ in 2004 and 125€ in 2005

At federal level: From July 1st 2003 onward the grid operator has the obligation to buy Green Certificates issued anywhere in Belgium for the minimum prices set in the Royal Decree of 16 July 2002 (see Feed in Tariffs).

The green certificate system runs by the regional legislation. The regional regulators are the official institutes to issue the certificates. Only the certificates generated by off shore wind energy are issued by the federal government.

Green certificates in Wallonia

Period	Obligation	obligation on	technology bands (baskets) within overall quota	International trade allowed	price restrictions (min., max. price)	involved technologies	trading scheme	Penalty
Start 2002	3% in 2003 increasing up to 12% in 2010 From september 2010 onward, the quota will be multiplied by a factor of 1,01	Supplier	No.	No	Max price defined by penalty. Min: Producers of RES-E may exchange their TGC for a subsidy at a fixed price of 65 € TGC of:.	all renewables and high quality CHP	Open, trading and direct support	certificate (100 kWh) in 2003, 100€, in 2004 and 125€ in 2005

At federal level: From July 1st 2003 onward the grid operator has the obligation to buy Green Certificates issued anywhere in Belgium for the minimum prices set in the Royal Decree of 16 July 2002 (see Feed in Tariffs).

The green certificate system runs by the regional legislation. The regional regulators are the official institutes to issue the certificates. Only the certificates generated by off shore wind energy) are issued by the federal government.

Italy (IT)

System of tradable green certificates

Period	Obligation	obligation on	technology bands (baskets) within overall quota	International trade allowed	price restrictions (min., max. price)	involved technologies	trading scheme	Penalty
start 2002	2% in 2002 and will be increased annually by 0,35% between 2004 and 2008	Producers and importers	No	yes, but only in exchange with physical electricity	n.a.	all renewables (incl. large hydro), facilities not older than 8 years	Free or in the power pool.	n.a.

The Bersani Decree clarifies the rules about the certification of the plants and Green Certificates. Actors that don't fulfil the obligation will see limited their participation in the energy market. Until now, there are no, in practice, penalties for the defaulting actors.

The Marzano Decree for the rearrangement of the energetic sector in Italy is now under discussion in the Italian Parliament: article 23 of this Decree establishes a precise penalty: the defaulting producers will have to pay a sum equal to 1.5 times the sum of money necessary to buy the Certificates corresponding to the non-fulfilled quantity. The subjects that don't present the Certificates within the established date will be considered defaulting subjects and will have to pay this fine. The reference price to calculate this fine will be the higher price between that registered on the market and that of the

Certificates issued by the GRTN (the Grid Operator). The certificates are issued for plants commissioned after April 1999 and are valid for the first 8 years of operation. With production of more than 50 MWh per year.

GRTN (Italian Transmission System Operator) influences strongly the certificates market selling its own certificates from old CIP6 plants at a regulated price namely at a price set by law as the average of the extra prices paid to acquire electricity in the CIP6 program that year.

Sweden (SE)

Electricity certificate system

Tradable Green Certificate / Quota	Electricity certificate system	
Involved Technologies	Operational period of instrument	Total plant power (kW)
Wind, solar, geothermal, biomass, wave energy, hydro	Until it enters into force (2003)	Wind: up to 1500

	Quota Number of certificates per MWh sold or consumed	Guaranteed price per MWh for allocated certificates	
2003	0.074	SEK 60	EUR 6.5
2004	0.081	SEK 50	EUR 5.4
2005	0.104	SEK 40	EUR 4.3
2006	0.126	SEK 30	EUR 3.2
2007	0.141	SEK 20	EUR 2.1
2008	0.153	SEK 0	EUR 0.0
2009	0.160		
2010	0.169		

Electricity produced from eligible renewable sources receive a certificate for every MWh. These certificates are traded and sold in the market. End users of electricity have an obligation to buy a certain amount of certificates (depending on their actual consumption). Customers can choose to buy the obligation themselves or through their supplier. End users who do not meet their obligation pay a penalty of 150% of the average trade price in a year.

United Kingdom (UK)

Renewables Obligation Certificates (ROCs)

Period	Obligation	obligation on	technology bands (baskets) within overall quota	International trade allowed	price restrictions (min., max. price)	involved technologies	trading scheme	Penalty
Start 2002	3% in 2003, 10,4 % in 2010	Supplier	No	No	not planned, max. price according to penalty.	small hydro, wind, biomass, solar -, geothermal energy, no waste	stock exchange	The Buy out price is £30,51/KWh (for 2003/2004) (~45€/kWh)

Administered by Ofgem

- Preceded by Non-Fossil Fuel Obligation (NFFO), which commenced in 1988
The 400 still operational NFFO projects will complete according to contracts and contribute to the Renewables Obligation subject to technology.
- Introduced in April 2002, the Renewables Obligation requires all licensed electricity suppliers in England and Wales to supply a specific proportion of their electricity from RES, and provides a number of paths to compliance.
- Individual suppliers are responsible for demonstrating that compliance to Ofgem through a system of Renewables Obligation Certificates (ROCs).
 - ROCs are freely tradable – suppliers who exceed the Obligation can sell them to those who do not achieve it.
 - Alternatively, suppliers unable to fulfil the Obligation can buy their way out at a cost (currently) of £30.51 per MWh. This implies that fulfilment of the Renewables Obligation is subject to the cost not being excessive as defined by Ofgem. Payments are recycled to those who do comply.
- In order to provide a stable and long-term market for RES, the Obligation will remain in place until 2027. Yearly targets have been set up to the 2010/2011 period (see ‘Broad policies and targets’ above).
- recent developments has shown that the certificate price is higher than the buy-out price. This development is due to a short market and to the fact that The buy-out revenues for non-compliances are recycled to the suppliers in proportion to the certificates they have used for complying with the obligation.

UK Emissions Trading Scheme (UK ETS)

UK Emissions Trading Scheme (UK ETS)	Quotas
Involved technologies	Budget
All	£215m (≈397 Mio Euros)

- Started April 2002
- Open to all sectors of UK economy
- Covers a basket of 6 GHGs
- Government has made available £215m in incentive monies to kick-start trading (not for participants in Climate Change / “negotiated” Agreements, see above)
- Incentive is offered in return for taking on a binding emissions reduction target over 5 years
- Three entry routes:

- *Direct participants* take on 5 year reduction target in return for incentive
 - *Companies in Climate Change Agreements* can choose to trade to meet their targets through the scheme (see above), thereby benefiting from extra flexibility and lower compliance costs
- Project participants* earn credits that can be traded through the scheme, increasing the supply for target holders that wish to buy them to meet their obligations.

7.1.3.3 Bidding system

Austria (AT)

Eco-electricity program of the region Upper Austria (ÖKOP) for wind plants

Eco-electricity program of the region Upper Austria (ÖKOP) for wind plants		Bidding system
Involved technologies	Guaranteed duration [a]	Total value (kWh/ a)
Wind onshore	13	4.000.000

A bidding system exists in the framework of the ÖKOP Program in Upper Austria. Beside the federal tariff foreseen in the Renewable Energy Act 17 Euro/kWh are paid during 13 years.

France (FR)

Tender for large scale biomass and biogas 2003-2007

Tender for large scale biomass and biogas 2003-2007			Bidding	
Involved technologies	Total tender capacity [MW]	Operational period of tender	Size of the plant [MW]	Other specifications
Biomass	500	2003-2007	>12	> 4000 full load hours < 15% non-renewable fraction
Biogas	50	2003-2007	>12	

Guaranteed price for a fixed period; to be implemented in 2003

Ireland (IE)

Alternative Energy Requirement*		Bidding scheme*		
Involved Technologies	Operational period	Goal	Purchase prices for different technologies [€/MWh]	
Wind, hydro (small), biomass (with CHP) and waste	Since 1994	Increase the supply from renewables	Wind	Up to 400MW: 52.16€/MWh
				Up to 85MW: 57.42€/MWh
				Offshore up to 50MW: 84€/MWh
			Biomass	Up to 8MW: 64.12€/MWh
				CHP up to 28MW: 70€/MWh
				Anaerobic digestion up to 2MW: 70€/MWh
Hydro	Up to 5MW: 70.18€/MWh			

Competition for investors in generation based on mentioned renewable sources or biomass CHP. Lowest bidders are offered an Electricity Supply Board Power Purchase Agreement of up to 15 years. The first four competitors were held between 1995 and 1998.

Italy (IT)

Tender for the development of a solar thermal project

Tender for the development of a solar thermal project	Bidding system	
Involved technologies	Guaranteed duration [a]	Budget (2001-2003)
Solar thermal	13	≈10 billion Euro

The measure consists on the development of a solar thermal project in two phases. In the first phase a demonstration project of 4 MWp will be constructed. In the second phase an industrial scale plant made up of several 40 MWe modules is planned.

Netherlands (NL)

CO2 Reduction Plan

CO2 Reduction Plan		Bidding system + Investment subsidy		
Involved technologies	Guaranteed duration [a]	Max price (Euro/Tonne CO ₂)	Subsidy (% of investment costs)	Total budget up to end of the program (2010) (€)
All large scale projects	13	4,59	30-40%	425 Million

Period of the policy: 1996-2010

Target: to reduce 4-5 Megatonne CO₂

The program is a combination of a bidding system and an Investment subsidy.

7.1.3.4 Tax incentive (Energy Taxes)

Because energy taxes have a strong impact both on various technologies of both RUE and RES, they are described in chapter 4 separately. Hence, in this section only some RES-E specific details are listed.

Finland (FI)

Motion 510/98: Exemption on energy tax for renewable electricity

Tax exemption - Exemption on energy tax for renewable electricity (Motion 510/98)		Tax incentive	
Involved technologies	Type of tax incentive	Specification of the instrument	Addressed to: (private, companies...)
Wind, biomass, small hydro < 1MW	exemption on energy tax	Wind: 0,69ct/KWh Hydro: 0,42ct/KWh Biomass: 0,42ct/KWh	Private, companies

Renewable electricity is exempted from the Finnish energy tax paid by end- users.

Since 1997 an exemption on energy tax for renewables has been implemented. The tax is refunded to the producers which use wood, wood based fuels, mini hydro, wind power and heat from solid fuels

Netherlands (NL)

Regulatory Energy Tax (REB)

Involved technologies	Tax for the RES (€/kWh)	Normal Tax (€/kWh)	Tax exemption for RES (€/kWh) ⁵⁶	Addressed to: (private, companies...)
Wind offshore, Wind onshore, 100% biomass, Small stand alone biomass, PV, Wave, tidal and landfill	3,49	6,39	2,9	Households and Small and Medium- sized Enterprises (SMEs)

Period of the policy: 1996-2010

At the beginning of the regulation RES were completely exempted from the Energy Tax. Since 2003 RES are only partly exempted. It is expected that this exemption is fully eliminated and that the MEP - Feed in Tariff (see the Post-investment / implementation section) is increased in the same value of the energy tax exemption. This policy originated a large demand for renewable electricity among household costumers and activated a large voluntary market for renewable electricity.

⁵⁶ In 2004 the energy Tax (REB) will be increased 10% and will lead to a higher tax exemption of 3,19 €/kWh

Poland (PL)

Involved technologies	Type of tax incentive (Income tax , depreciation tax, VAT reduction)	Value of incentive	Normal Tax
All RES-E technologies	Excise tax for energy	RES-E are exempted of this tax	0,52 c/kWh

The excise tax for energy is 0,52 c/kWh. According to the decree of the ministry of finance (22nd March 2002) electricity produced from RES is exempted.

United Kingdom (UK)

Climate Change Levy (CCL)

Climate Change Levy (CCL)			Tax incentive
Involved technologies	Type of tax incentive	Tax for RES (p/kWh)	Normal tax (p/kWh)
All	Energy tax	0	Between 0,15 pen and 1,17 p/kWh depending on fuel type

Period of the policy: 2001-ongoing

Tax on use of electricity and non-transport gas; stated objective to reduce CO₂ emissions; exemption of domestic sector for social (fuel poverty) reasons

Companies in energy-intensive sectors⁵⁷ which enter into climate change agreements with government to meet “challenging” energy efficiency or emissions targets (also known as “negotiated” agreements) receive an 80% discount on levy rate

44 agreements with 40 sectors have been negotiated so far, covering 5500 companies and 13000 facilities. Targets set by sector and subsequently sub-allocated to participating companies / facilities

- Participants within agreements are able to use emissions trading to meet their targets (see below)
- Also integral to the CCL are Enhanced Capital Allowances (ECAs); businesses can write off the whole of the capital cost of their investment in qualifying RUE and RES technologies⁵⁸ against their taxable profits of the period during which they make the investment

7.2 Non Financial Strategies

In the area of promotion schemes for RES-E there is a strong focus on financial strategies. However there exist quite a number of important non-financial strategies like regulations or agreements that are listed below. It has to be stated that a complete listing of schemes in this section would be very hard to get, so the emphasis is put on some highlights and the most important policies.

⁵⁷ I.e. those subject to IPPC requirements.

⁵⁸ Co-generation and water-saving installations are also included – see <http://www.eca.gov.uk/> for details.

Austria (AT)**Green Electricity Stock Exchange Programs**

Solar Stock Exchange in Vorarlberg	Green Electricity Stock Exchange Programs			
Involved technologies	Premium (yes/no)	Guaranteed Duration	Value [c/kWh]	Size of the plants
All	Yes	-	1	< 10MWp

The Solar Stock Exchange in Vorarlberg supports plants with less than 10 MWp. Nevertheless green electricity producers only receive the funding so long as enough funds from private consumers are available. The premium of 1€c/kWh paid by the consumers by means of the product “Ökoplus” is collected by the involved utilities: VKW, Stadtwerke Feldkirch, E-Werke Frastanz and Montanfonerbahn. The administration and the repartition is carried out by the environmental organisation Arbeitsgemeinschaft Erneuerbare Energie Vorarlberg. The funds are distributed as follows: 60% is given to plants designed by the consumer, 20% is destined to small plants in Vorarlberg and 10% is used for administration and marketing activities.

Belgium (BE)***The indicative Programme***

Voluntary agreement between the Commission de Régulation de l'électricité et du gaz (CREG), the Energy Administration of the Federal Ministry of Economic Affairs and the network operator for 10 years. The plan includes the estimation of the future evolution of the energy demand in the medium and long term in order to define the primary energy sources to be applied to meet the estimated demand. The promotion of renewable energies is an important part of the agreement.

Czech Republic (CZ)***The Energy Act (1994, 2001)***

Obligation for distribution companies to purchase electricity and heat generated from renewable.

Denmark (DK)***Support for offshore wind by the agreement on offshore wind turbines.***

In 1998 an agreement on offshore wind turbines between the government and the utilities has been signed. In this agreement the installation of 750 MW of offshore wind capacity by the year 2008 has been determined. Involved utilities are faced with favourable framework conditions and guaranteed cost recovery. Two large windparks in Horn Rev and Nysted reaching approximately half of the target have already been built or projected. Apart from these plants the at the end of 2001 newly elected Danish government announced to stop all support for offshore wind turbines. Tenders are planned for further projects.

France (FR)***Biomass introduction programme PBEDL 2000-2006***

Target: increase the use of biomass for energy in residential and industrial setting. Objective: 1000 MW new installations in 2006. Around 600 MW should be achieved in the residential sector in collective heating. The programme includes certification of equipment, communications campaign targeting the general public etc. Besides these activities also subsidies for investors are granted (mentioned in part financial/investment).

Poland (PL)

Green Power Purchase Obligation, Ministry of Economy Ordinance of 51 December 2000

Green Power Purchase Obligation		Quota						
Involved technologies	Period	Obligation	Obligation on	Technology bands (basket) within overall quota?	Inter-national trade allowed?	Price restrictions (min, max price)	Penalty	Trading scheme
All RES-E technologies	Start 2001	2001:2,4% 2002: 2,5% 2003: 2,65% 2004: 2,85% 2005: 3,1% 2006: 3,6% 2007: 4,2% 2008: 5,0% 2009: 6% from 2010: 7,5%	Electricity dealers	no	no	no		

This system has replaced the feed-in tariff system.

Lack of certificates that confirm that electricity comes from those RES

Lack of organized forms of renewable electricity trade

According to this decree the obligation is fulfilled when energy utility will buy a certain percentage of electricity from RES (this percentage is gradually increased (Presently it is 2,85%) up to 7,5% in 2010) and heat from RES (there are several conditions when the energy utility can deny buying heat from RES). Moreover, electricity from RES shall also mean the proportion of electricity produced from biomass or biogas when co-firing them with fossil fuels. Finally the obligation is fulfilled when energy utility buys the certain percentage of electricity from co-generation plants (this percentage is gradually increased (presently it is 12,4%) up to 16% in 2010).

Prohibition of investment in nuclear power plants until 2020

In the „Polish Energy Policy till 2020" nuclear energy is not concerned until 2020. Only in a further progress scenario the development of nuclear energy is perceived from 2015 due to increasing electricity demand. Taking into account social resistance and increasing energy efficiency together with current surplus of electricity production it is not expected that new nuclear plants will be built before 2020. Additionally, a remarkable decline of power of the nuclear lobby can be observed.

7.3 Indirect Schemes

Czech Republic (CZ)

Government programme for the support of Energy Savings and the Utilisation of Renewable and Secondary Sources of Energy	Subsidies
Involved technologies	Max. %
Educational, promotional activities in the field of renewable energy	Up to 100 %

Greece (GR)

Promotion campaigns for energy efficiency and renewable energy technologies

Energy efficiency (EE) and renewable energy technologies have encountered various difficulties into their being accepted by the Greek market. Some of them derive from a certain degree of lack of knowledge and experience on the subject. On the other hand, societal and environmental factors are deeply interlinked with wider social acceptance.

Aiming at the obliteration of these difficulties and a greater penetration of such technologies into the Greek market, many campaigns about RES and EE have been carried out in the past years. Institutions such as Ministries, environmental organisations and research centres, like CRES (the Centre for Renewable Energy Sources), have supported campaigns for the promotion of these technologies and the dissemination of information across various selected groups (e.g. engineers, students, general public)

CRES has been very active in all the above-mentioned sectors. In the framework of many European and national programmes, it has been engaged with the organization of conferences, workshops and technical meetings as well as it has published leaflets, technical brochures and educational guides, proceedings and electronic tools (CDs and websites) for the promotion on important topics such as RES (Wind energy, photovoltaic, solar thermal) and EE issues like co-generation, energy efficiency in buildings (envelope and electro-mechanical equipment)/ lighting/ transport.

Ireland (IE)

Waste management policy in Ireland, affecting renewable energy from landfill gas		Regulation	
Involved Technologies	Operational period	Goal	Specification of instruments
Waste	15 years from October 1998	<p>Double landfill gas generating capacity from 12MW to 25MW and generation of additional 200,000MWh per year.</p> <p>Thermal facilities are expected to generate 360,000MWh heat and 500,000MWh electricity per year</p>	<p>A minimum of 65% reduction in the biodegradable municipal waste consigned to landfill</p> <p>Recycling of 35% municipals' waste</p> <p>The development of composting and other feasible biological treatment facilities capable of treating up to 300,000 tones of organic waste, annually</p> <p>A diversion of 50% of overall household waste away from landfill</p> <p>A rationalization of municipal waste landfills</p>

Portugal (PT)

The governmental programme “Água Quente Solar”⁵⁹

Under an initiative of the Ministry of Economy, the “Água Quente Solar” programme was launched in 2002. Its main goal is the development of the thermal solar market reaching an amount of 150.000 m² of solar panels sold every year, which would led to the installation of 1.5 Mm² till 2010. The main activities undertaken by the programme are the following:

- Marketing campaign and valorisation of economic and social benefits of solar hot water;
- Promotion of the development of two market chains: hot water energy service and selling/installation of solar collector systems;
- Development of the quality certification guarantees for systems, installers and designers;
- Improvement of the fiscal incentives available to solar hot water systems.

Enhancement of administrative procedures

The implementation of RES and RUE projects related with electricity generation became recently simplified and faster. Some administrative and licence procedures were enhanced in order to overcome identified barriers. This was achieved by changing the legal framework that rules the environmental licensing schemes and the demanding process for connections to the electric grid. Most of the changes were made to allow the speed up and clearness of the administrative procedures. The new legal frame will raise the investors' confidence and will bring efficiency to the market.

United Kingdom (UK)

DTI Capital Grants: Major PV Demonstration Programme

Accreditation of PV installers.

Free information about approved PV modules and awareness raising to a range of customer types.

EST Community Energy (UK-wide)

Free information and expert advice is provided under the scheme.

⁵⁹ In English “Solar Hot Water”

EST Save Energy campaign / Energy Efficiency Advice Centres (UK-wide)

- Domestic sector equivalent of Action Energy, run high profile marketing campaigns (e.g. Energy Efficiency Week, “Behaving Badly”)
- Provision of free information and advice mainly through network of 52 local Energy Efficiency Advice Centres (EEACs). EEACs refer clients to appropriate direct grants schemes
- 6 EEACs are participating in a trial, fulfilling the additional role of Renewable Energy Advice Centre, providing corresponding free information and advice
- Database of “Energy Efficiency Recommended” products and associated label (appears on both appliances and retrofit RUE measures)

Countryside Agency Community Renewables Initiative

Local Support Teams have been formed (in 10 rural areas in England so far) to help localities devise their own ideas and developments for renewable energy by providing free advice and training. Partnerships include local councils, energy experts, government bodies and other specialists.

EST Practical Help

Guidance and support for local authorities – in many ways the non-financial counterpart to the HECAction programme but with less of an emphasis on ‘just’ RUE (more on RES).

Planning Policy Guidance 22: Renewable Energy

This is a guidance note from the ODPM⁶⁰ (department responsible for planning policy / legislation) which asks local planning authorities to take RES into consideration. It also features a separate annex on photovoltaics.

Some local authorities have agreed to require a specific minimum RES (inc. co-generation) in new developments in order to grant planning permission.

⁶⁰ Office of the Deputy Prime Minister

8 HEAT SECTOR – PROMOTION STRATEGIES FOR RES - H IN EUROPE

An overview about existing promotion strategies for RES-H will be given in this section. It is structured according to the typology developed in chapter 3 into financial and non-financial strategies on the one hand and into schemes that are designed for the pre-investment/implementation, for the investment/implementation or the post-implementation phase on the other.

8.1 Financial Strategies

8.1.1 Pre-investment / Implementation

Financial pre-investment strategies first of all cover support mechanisms of R&D and demonstration projects. Almost all EU countries provide some kind of R&D support for RES-H. A cross-country comparison is hardly practicable in this area because the programmes in most cases are embedded into a wider range of research activities. Hence, detailed figures for the budget that is spent for RES-H R&D is hardly available. Even a complete listing of relevant programmes is almost infeasible due to a very wide range of thematic areas that are covered within research programmes.

Therefore, this chapter aims at providing an overview about the most important schemes.

Austria (AT)

There are several research programmes which offer means for energy research.

At federal Level: the most important ones are:

- the Research Programms for Industry (Forschungsförderungsfonds für die gewerbliche Wirtschaft-FFF)
- the Fund for Scientific Research (Fonds zur Förderung der Wissenschaftlichen Forschung - FWF)
- the Research Fund for Regional and Local Energy Concepts and District Heat and
- Austrian Program on Technologies for Sustainable Development (nachhaltig Wirtschaften)

At regional level most of the provinces have developed their own programs. An Example could be the Energy Technology Program (ETP) in the province of Upper Austria.

Within the framework of existing subprograms of the Austrian Program on Technologies for Sustainable Development like “Building of Tomorrow”, “Factory of Tomorrow” or recently “Energy Systems of Tomorrow” several demonstration projects in the field of new energies are planned.

France (FR)

Solar thermal programme Helios 2000-2006

“The programme objective is to bring the solar thermal market to maturity by 2006 and to make solar thermal competitive with traditional electric water heating.

Total budget is around 6.5 mln EUR per year. Grants are given for promotional demonstration of solar cooling systems, R&D and pre-normative support.

Partnerships with regional councils are envisaged and additional services and incentives are provided by ADEME and partners. Includes also subsidies for solar thermal systems (mentioned in section investment) “

“Broad efforts of the government in the whole chain of market development (pre-normative research, training, communication, etc.). Active presence since many years internationally recognised market players – both in technology as in research.

Weakest points in the solar thermal policy seem to be the insufficiently striking and large scale targeted communication of successful projects (both technology as innovative market approaches which are existing).

Considering the broad government support and the active presence of internationally recognised market players it is expected that a stable and significant market development will occur. It is nevertheless clear that the effectiveness of solar thermal policy is relatively low compared to the potential. According to private communications with local and regional market players, funds used to finance investment premiums are sufficiently large and seldom fully used.”

Germany (DE)

Support Program Resources R&D program

Support Program Resources R&D		Support of R&D and Demonstration Projects
Involved technologies	Subsidy contribution	Available annual Budget
Biomass	Up to 100%	113 million Euro

Period of the policy: 1996-2004

Support Program Resources for demonstration projects of the Federal Environment Ministry

Support Program Resources for demonstration projects of the Federal Environment Ministry					Demonstration Projects
Involved technologies	Subsidy contribution	Interest loan (%)	Years of free repayment	Repayment period (years)	Maximum eligible investment costs Available annual Budget
All	Up to 30%	4,3	5	Up to 30	70% of total costs ts

This incentive program consists basically of soft loans. In exceptional cases investment subsidies could be considered, too.

Greece (GR)

Projects in RES and/or RUE-Energy Savings research, development, demonstration and exploitation can, in principle, receive financial support from a number of specialised national programmes, not specifically targeted towards renewables, but, nonetheless, covering this thematic area, as well. These programmes are administered primarily by the Ministry of Development/General Secretariat for Research and Technology, the Ministry of Agriculture and the Ministry of Environment, Physical Planning and Public Works.

The Ministry of Development / General Secretariat for Research and Technology included several R&D-related national programmes, co-financed by the Greek 2nd Community Support Framework (CSF), including:

- i) PAVE, which is a programme supporting the development of industrial research and innovation in Greece.

- ii) PEPER, which is a programme supporting pilot/demonstration projects, provides financing in two stages: a) feasibility study; b) realisation of the pilot project.
- iii) SYN, which is a programme of R&D co-financing.
- iv) PENED, which is a programme supporting the development of the Greek research potential (academic institutions and laboratories).

The above Research and Technology (R&T) programmes of the Operational Programme for Research & Technology (OPRET II) have now been incorporated in the OPC and seven R&T Measures are administered by GSRT of the Ministry of Development in several priority axes

Hungary (HU)

Technical Development Fund 2000 (OMFB)

Subsidies for technological development and research up to 60% of the total investment costs (in case of SME 70%)

Aim: improve the efficiency of the conversion and increase the supply of renewables

Netherlands (NL)

Subsidy Energy Programs(DEN)

Subsidy Energy Programs(DEN)		Support of R&D and Demonstration Projects
Involved technologies	Subsidy contribution	Available Budget in 2003
All	25-60%	16 million Euro

This program offers subsidies which range between 25% and 60% of the total project costs depending on the technology applied and on the project.

The total available budget for 2003 was 16 million Euros. The program includes the subsidy of feasibility studies too.

Poland (PL)

Ecofund

Among others Ecofund supports demonstration projects aiming at the “reduction of the emissions of gases that cause global climate changes”. Projects are granted with 20 % to 70% of the total costs, depending on the per capita income of applicants and the fact if it is an innovatory, non-commercial or commercial project.

Slovenia (SL)

Environment Ministry Fund

Involved technologies	Total Budget (€)
Feasibility studies for biomass district heating	170000

Spain (ES)**Plan de fomento de las Energías renovables (1999-2010)**

Technologies included	Budget (1996-2006)
All RES	2,5 Million Euro ⁶¹

Target: To double the share of RES-E from 6% in 1998 to 12% in 2010.

The plan includes the guidelines for the promotion of RES until 2010. Among the planned measures, basically fiscal incentives and investment subsidies incentives for research activities and demonstrations projects are also foreseen. The plan will be reviewed in 2004 and the new guidelines for 2006-2010 will be set. The program is mostly conducted by the autonomous regions and represents the continuation of the previous Energy Saving and Efficiency Plan

United Kingdom (UK)***DTI's New & Renewable Energy R&D Programme***

R&D grants for industry from the DTI with the stated aim of improving the competitiveness of the UK's renewables industry.

Proposals must include innovation that offers the prospect of reduced cost and/or improved performance of renewable energy.

Faraday Partnerships

Faraday Partnerships	Support of R&D
Involved technologies	Budget ⁶²
All	£400k/year (≈635k Euros/year)

- Faraday Partnerships aim to improve the competitiveness of UK industry through more effective interaction (knowledge and technology transfer) between the science and technology base and industry.
- Funding takes the form of:
 - A grant from DTI or other Government Department of up to £400k per year for at least three years to establish and operate the infrastructure of the Faraday Partnership.

A ring fenced grant of £1million from a Research Council (see directly below) or combination of Councils or from a Government Department for research projects which satisfy the twin criteria of excellent science and industrial relevance.

⁶¹ This amount includes all foreseen activities in the Plan and not only research and demonstration projects

⁶² This amount includes the budget for the overall program and therefore includes technologies from other sectors.

Research Councils

Research Councils	Support of R&D
Involved technologies	Budget ⁶³ (2003-2006)
All	£28Mio (≈44 Mio Euros)

Statutory control and the bulk of funding for the Research Councils comes from the DTI

There are seven Research Councils, each covering a different area of science. They administer a wide range of R&D grants for which the charitable and academic sectors are eligible. In particular, three of them, led by the Natural Environment Research Council (NERC)⁶⁴, will be investing £28m in research into sustainable energy over three years (from April 2003)

Carbon Trust Low Carbon Innovation Programme. R&D grants from the Carbon Trust

Carbon Trust Low Carbon Innovation Programme. R&D grants from the Carbon Trust	Support of R&D
Involved technologies	Budget ⁶⁵ (2003-2006)
All	£75Mio (≈119 Mio Euros)

Innovative research, development or demonstration projects (for which all sectors are eligible) or commercial co-investments with the potential to reduce greenhouse gas emissions can apply for grant funding of up to £250,000 (repayable on successful exploitation) towards their cost. Initially up to £75m available under the Programme over three years (2002-2004)

8.1.2 Investment/ Implementation

Financial – investment/implementation schemes provide incentives for the actual investment and implementation phase of RES-H facilities. Most of the considered countries have implemented investment subsidies for RES-H technologies. Also tax incentives (reduction of income tax and VAT) are commonly used, whereas soft loans and voluntary agreements as well as post-investment schemes – in contrary to the area of RES-E – are of minor importance.

8.1.2.1 Tax- Incentive

A lot of the EU-15 countries (and selected accession countries) have implemented tax incentives for the promotion of RES-H. They first of all refer to a reduction of income tax and VAT. A cross-country comparison is not feasible due to widely differing design of tax incentives. Moreover, the details of these policies regarding eligible costs, general legal tax regulations etc. have a strong impact and therefore would have to be considered, which was not feasible within this report. Hence, this section cannot go beyond a listing of the most important tax incentives schemes for RES-H.

⁶³ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

⁶⁴ Engineering and Physical Sciences Research Council (EPSRC) and Economic and Social Research Council (ESRC)

⁶⁵ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

Austria (AT)***Deduction of investments for RES from the income tax***

Deduction of investments for RES from the income tax			Tax incentive
Involved technologies	Type of tax incentive	Maximum deductible amount per year	Addressed to: (private, companies...)
<ul style="list-style-type: none"> ▪ heat pumps ▪ solar thermal collectors ▪ biomass ▪ heat recovery installations ▪ district heating 	Income tax reduction	1.825	all

Investments and repayments of loans for housing refurbishment if the reform includes energy efficiency measures can be deducted from the income tax. The installation of the following technologies is included:

- heat pumps
- solar energy
- biomass
- heat recovery installations
- district heating
-

Repayments of loans of such expenses which occurred after 1980 are also included. Normal payers can deduct a maximum amount of 2.920 Euro per annum. This amount can be increased in special cases e.g. lone parents (the eligible amount is increased in 2.920 Euro) and families with more than three children (the eligible amount is increased in 1.460 Euro). Furthermore only 25% of the total investments are eligible to be deducted (i.e. a maximum amount of 1.825 Euro). If the annual income is higher than 34.600 the eligible investment costs are reduced progressively from 25% until 0% if the total annual income is 50.900 Euro or higher.

Belgium (BE)***Company Tax – Depreciation/Amortisation of investment. Company Tax Code (1992)***

Company Tax – Depreciation/Amortisation of investment. Company Tax Code (1992)			Tax incentive
Involved technologies	Type of tax incentive	Maximum value of the regressive depreciation (%)	Addressed to: (private, companies...)
All	Regressive Depreciation	40	Companies

The company tax code of 1992 allows to choose between linear and regressive (accelerated) depreciation of investments. The regressive depreciation is calculated on the residual (depreciated) value of the investment, it is twice the linear, but may not exceed 40%.

Company Tax – Deduction for investment. Company Tax Code (1992)

Deduction for investment. Company Tax Code (1992)			Tax incentive	
Involved technologies	Type of tax incentive	Maximum deductible amount per year	Normal rate	Addressed to:(private, companies...)
All	Deduction for investments	13,5%	0-3,5%	Companies

Companies investing in environmental friendly benefit from a 13,5 % deduction for 2001. Tax payers can spread the deduction on several years. For normal investments the normal deduction is up to 3,5%.

Value added tax (VAT)

Reduction on Value added Tax (VAT)			Tax incentive	
Involved technologies	Type of tax incentive	Value	Normal rate	Addressed to: (private, companies...)
All	Reduction on VAT	6%	12-21%	Natural persons

The legislation fixes the percentage of VAT for installations contributing to improve the energy efficiency of buildings to a reduced value set at 6% instead 12% which is set for coal and solid fuels or 21% wich is set for electricity and mineral products.

France (FR)

Lower VAT for RES investments

Lower VAT	Tax Incentive		
Involved Technologies	Type of tax incentive (income tax, VAT tax..)	Value of incentive	Addressed to: (private, companies...)
Every kind of renewable equipment	VAT	Only 5,5% VAT	Private consumers

No impact on industry or businesses, only on consumers;
Implemented in 2001 and expected to continue;

Deduction for investments on income tax

Deduction investments for	Tax Incentive		
Involved Technologies	Type of tax incentive (income tax, VAT tax..)	Value of incentive	Addressed to: (private, companies...)
Every kind of renewable equipment	Income tax	Deduction of 15% of the investment costs (max. 3.300 Euro/year)	Private consumers

Implemented in 2000 and expected to continue

Italy (IT)
Lower VAT rates for solar heat systems

Reduction on Value added Tax (V.A.T)			Tax incentive	
Involved technologies	Type of tax incentive	Value for RES	Normal rate	Addressed to:(private, companies...)
Solar heat systems	Reduction on VAT	10%	20%	Natural persons

Period of the policy: 1999- ongoing

Netherlands (NL)
Tax deduction for renewable Energy Investments (EIA)

Tax deduction for renewable Energy Investments (EIA)				Tax incentive	
Involved technologies	Type of tax incentive	Maximum deductible amount	Maximum investment which is eligible per project	Maximum EIA per year per company	Addressed to:(private, companies...)
Most renewable energy systems (qualifying list is published yearly)	Deduction for investments	Only 55% of the invested sum is taxed	103 million euro	161 million euro	Companies

Period of the policy: 1997-2010

Budget: not official limit but the minister can close the financing if the amount of requests exceeds certain limits. In 2002 1,5 billion Euros were used.

Green Funds in the Netherlands

Green Funds in the Netherlands			Tax incentive
Involved technologies	Type of tax incentive	Minimum investment required (€)	Addressed to:(private, companies...)
Most renewable energy systems	Income tax reduction	22.689	Private investors

Period of the policy: 1995-2010

Private investors are exempted from the income tax if dividends are obtained from investments in green projects and green funds (renewable energy projects and environmental protection). A certificate issued by the Ministry of Environment is required to get the tax exemption.

Portugal (PT)

VAT Reduction		Tax incentive		
Involved technologies	Type of tax incentive	Value	Normal rate	Addressed to: (private, companies...)
Solar, geothermal	Reduction on VAT	12%	19%	Natural persons

There is a tax relief scheme based on the reduction of VAT rate. Reduced VAT taxation at 12% rate (compared to the normal VAT rate of 19%) applies to the purchasing of RES equipment and other type of energy conversion equipment:

- Equipment for solar, wind and geothermal energy conversion
- Equipment for collecting and use of other alternative energy sources
- Equipment for energy production from incineration or transforming of waste
- Equipment for prospecting and searching of oil and/or natural gas

Equipment for measurement and control aimed at avoiding or reducing pollution

IRS Reduction

IRS Reduction			Tax incentive
Involved technologies	Type of tax incentive	Maximum deductible amount per year (%)	Addressed to: (private, companies...)
All RES	Income tax reduction	700€ (or 30% of the investment made)	private

Household investors receive tax credits on their personal income tax (IRS⁶⁶) for investment in renewable energy technologies. Deductions to the tax total amount are allowed to the limit of 30% of the investment made, with a maximum ceiling of 700 € per year (2003 rules). However, these deductions are not cumulative with other deductions concerning home purchasing or conservation expenses.

⁶⁶ In Portuguese: “Imposto sobre os Rendimentos Singulares”.

IRC Reduction

IRC Reduction			Tax incentive	
Involved technologies	Type of tax incentive	Maximum value of the regressive depreciation (%)	Normal rate (%)	Addressed (private, companies...)to:
All	Regressive Depreciation	25	7	Companies

The other tax alleviation schemes on-going is the favourable taxation on corporate profit tax (IRC⁶⁷). This scheme improves the time scale for accounting depreciation of solar energy equipment. The current depreciation rate of durable equipment is 7.14 %, corresponding to 14 years, while for solar thermal and solar PV energy the depreciation rate is 25% per year, i.e. based on 4 years depreciation time.

Spain (ES)**Plan de fomento de las Energías renovables (1999-2010)**

Technologies included	Budget (1996-2006)	Budget (1996-2006) for tax incentives
All RES	2,5 Million Euros ⁶⁸	0,925 Million Euros

Target: To double the share of RES-E from 6% in 1998 to 12% in 2010.

The plan includes the guidelines for the promotion of RES until 2010. Among the planned measures, basically fiscal incentives and investment subsidies incentives for research activities and demonstrations projects are also foreseen. The plan will be reviewed in 2004 and the new guidelines for 2006-2010 will be set. The program is mostly conducted by the autonomous regions and represents the continuation of the previous Energy Saving and Efficiency Plan.

Direct Tax Provisions for environmentally Friendly Investments

Technologies included	Type of tax incentive	Value of the Tax	Normal Tax
All RES	Tax deduction	10% liability deduction	35 %

The Corporate Tax Law includes since 1996 a deduction for the earnings coming from environmentally friendly technologies. The measure is funded by means of personal income taxes

Tax on business activities discount

Technologies included	Type of tax incentive	Value of the Tax	Normal Tax
All RES	Tax reduction	Up to 50%	100%

The energy use or production of energy from RES may have a discount in the municipal tax up to 50%. The exact value depends on the municipal authority.

⁶⁷ In Portuguese: "Imposto sobre os Rendimentos Colectivos".

⁶⁸ This amount includes all foreseen activities in the Plan and not only research and demonstration projects

- Incentives for Active solar Thermal under the Plan de Fomento de las Energias renovables (see chapter Investment Subsidies)
- Incentives for Biomass under the Plan de Fomento de las Energias Renovables

Sweden (SE)

Favourable Taxation for Renewable (Heat production)

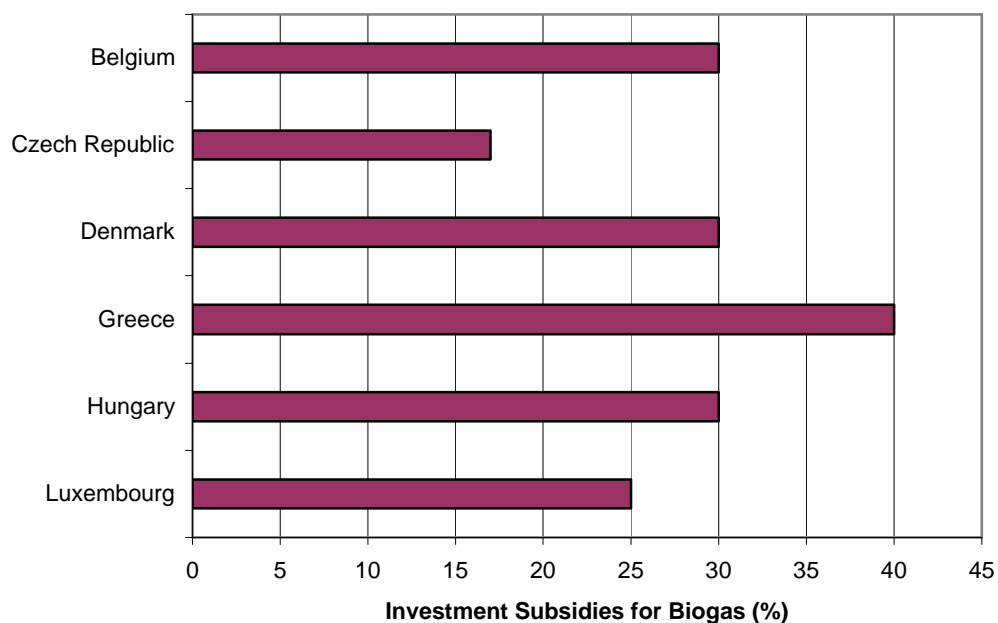
Taxes are levied on non renewable electricity sources in the categories of energy tax,

Carbon dioxide tax, and sulphur tax. The types and levels of tax applied to a given energy resource vary depending on whether the fuel is used for heating, electricity, or as motor fuel

8.1.2.2 Investment Subsidies

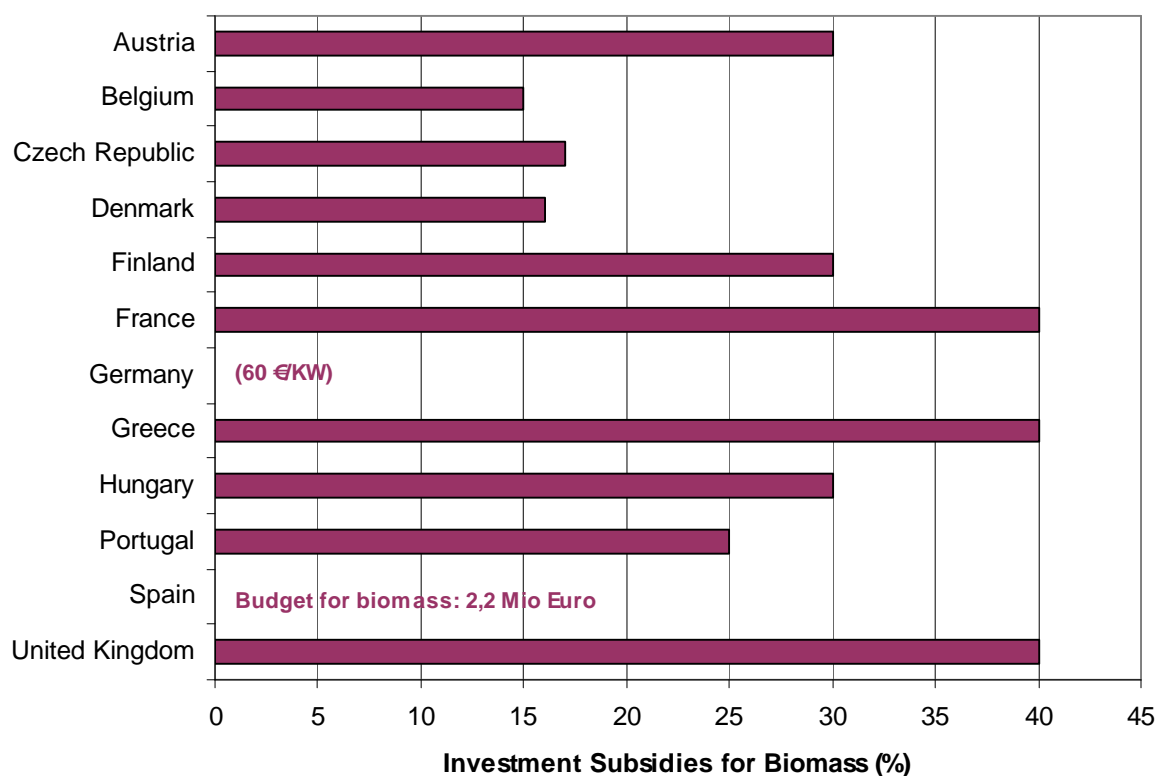
Investment Subsidies are also awarded for heat generation from RES. They are usually granted per percent (%) of investment costs, with respect to different technologies. In some EU countries (Hungary, Greece, Finland, Belgium) subsidies for heat generation from RES are the same as subsidies for electricity generation from RES.

The following figures show a cross-country comparison of the level of investment subsidies for different RES-H technologies. Subsidies are typically around 30% with a maximum of 40% (exemption UK: max 50% for heat pumps and solar thermal). A detailed description of the schemes country by country is given afterwards.



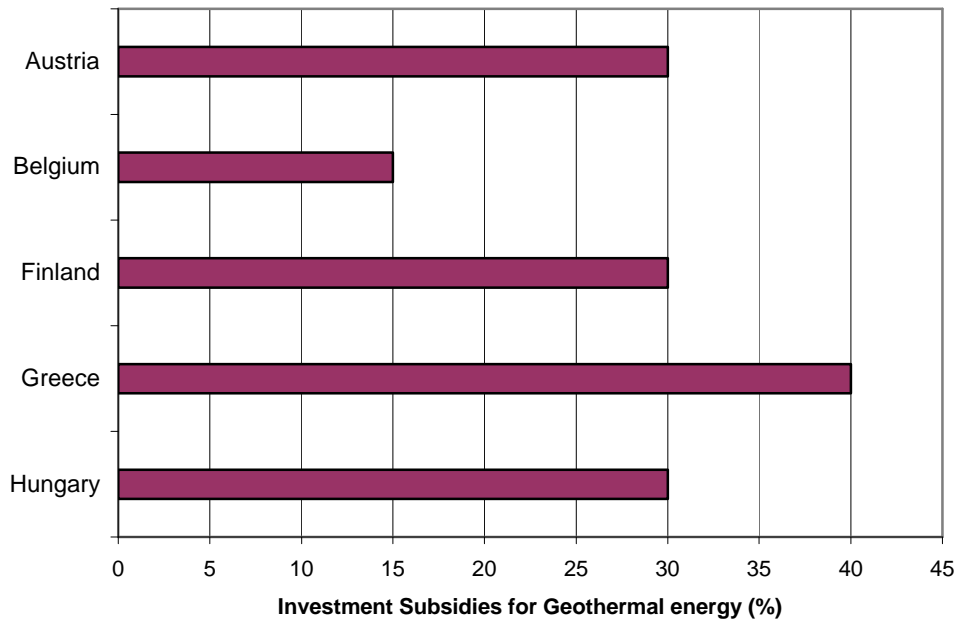
Country	Remarks
Belgium	Investment subsidies for public and communal building up to 30%, no restriction of the size.
Czech Republic	Investment subsidies for heat generation up to 17%
Denmark	Subsidy up to 30%, maximal 132.450€
Greece	State support programs provide grants up to 40% of investment costs. Level of subsidy is independent of geographical region of the country
Hungary	Subsidies awarded to private investors and companies
Luxembourg	Budget (1996-2006) for investment subsidies (biomass) : 2,2 Mio Euro

Figure 8.1 Investment Subsidies for heat from biogas in EU-15 and selected Accession countries



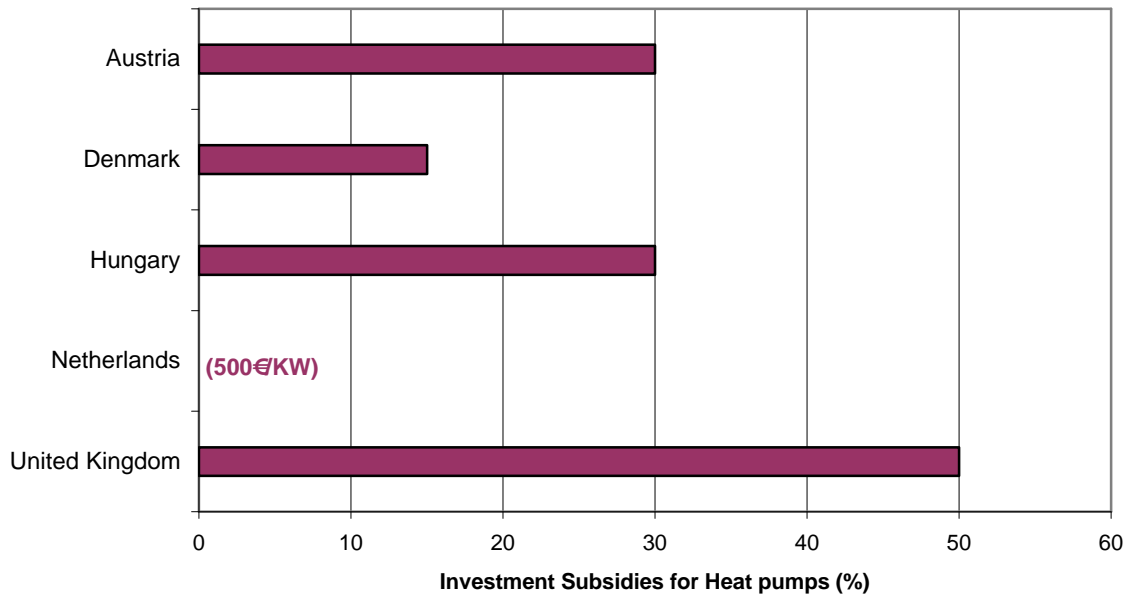
Country	Remarks
Austria	Investment subsidies up to 30%., minimum investment size 10,000€, other technical requirements (e.g. size of plant) on regional level
Belgium	Investment subsidies for public and communal building up to 30%, no restriction of the size.
Czech Republic	Investment subsidies for heat generation up to 17%
Denmark	Subsidy up to 16%, maximal 132.450€
Finland	Ministry of Trade and Industry hands out subsidies up to 30% of the investment cost for RES-E. The investor is required to be a legal entity in order to receive subsidy
France	Subsidy up to 40%
Germany	German Market Incentive Program, automatic fuel supply 60€/KW, manual fuel supply 50€/KW
Greece	State support programs provide grants up to 40% of investment costs. Level of subsidy is independent of geographical region of the country
Hungary	Subsidies awarded to private investors and companies
Portugal	Incentives subsidies under the Plan de Fomrnto de las Energias
Spain	Budget (1996-2006) for investment subsidies (biomass) : 2,2 Mio Euro
United Kingdom	Subsidy of 40%, size of plant <20MWe

Figure 8.2 Investment Subsidies for heat from biomass in EU-15 and selected Accession countries



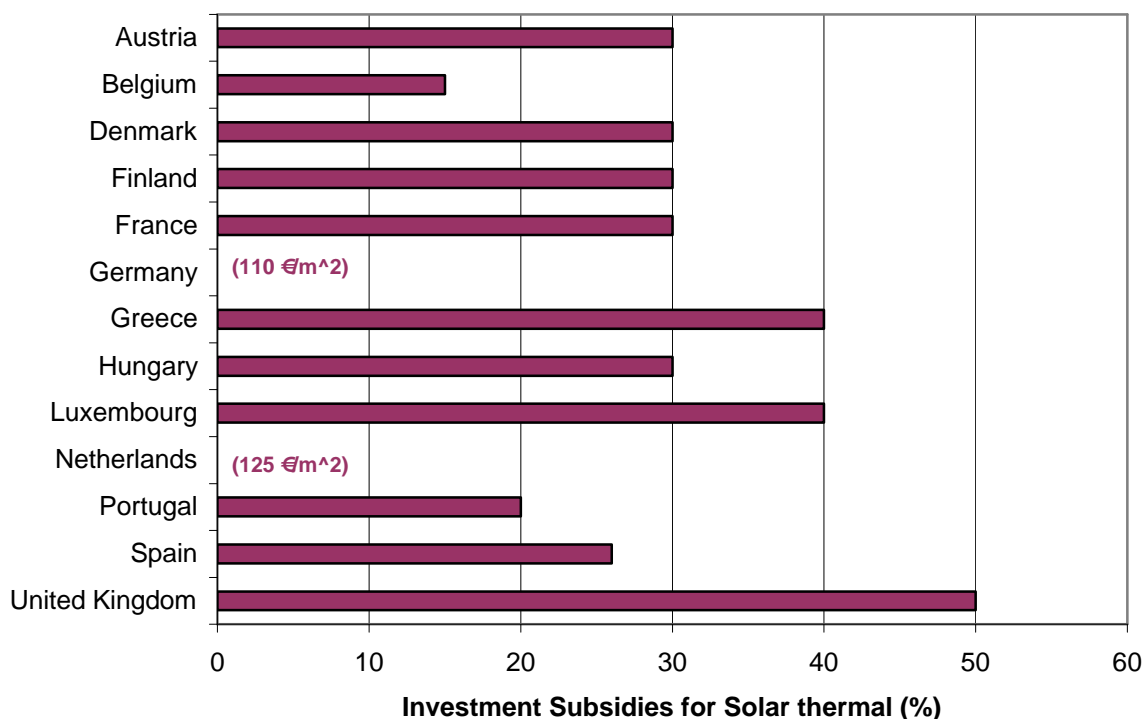
Country	Remarks
Austria	Investment subsidies up to 30%, mainly on regional level, minimum investment size 35,000€
Belgium	Investment subsidies for public and communal building up to 15%, no restriction of the size.
Finland	Ministry of Trade and Industry hands out subsidies up to 30% of the investment cost for RES-E. The investor is required to be a legal entity in order to receive subsidy
Greece	State support programs provide grants up to 40% of investment costs. Level of subsidy is independent of geographical region of the country
Hungary	Subsidies awarded to private investors and companies

Figure 8.3 Investment Subsidies for heat from geothermal energy in EU-15 and selected Accession countries



Country	Remarks
Austria	Investment subsidies up to 30% in Lower Austria, up to 50% in Upper Austria
Denmark	Subsidy up to 15%, maximal 132.450€
Hungary	Subsidies awarded to private investors and companies
Netherlands	Minimum investment size 700€
United Kingdom	Subsidy of 50%, maximal £100,000

Figure 8.4 Investment Subsidies for heat from heat pumps in EU-15 and selected Accession countries



Country	Remarks
Austria	Investment subsidies up to 30%., minimum investment size 10,000€, other technical requirements (e.g. size of plant) on regional level
Belgium	Investment subsidies for public and communal building up to 30%, no restriction of the size. In Wallonie, Solar thermal support program, grants of 625€
Denmark	Subsidy up to 30%, maximal 132.450€
Finland	Ministry of Trade and Industry hands out subsidies up to 30% of the investment cost for RES-E. The investor is required to be a legal entity in order to receive subsidy
France	Subsidy up to 30%, maximal 1250€
Germany	German Market Incentive Program, for the first 200m ² : 110€/ m ² , more than 200m ² : 60€/ m ²
Greece	State support programs provide grants up to 40% of investment costs
Hungary	Subsidies awarded to private investors and companies
Luxemburg	Subsidy of 40%, maximum rebate up to 2,200€ for domestic hot water, up to 3,000€ for water and space heating, up to 38,000€ for non- domestic sector
Netherlands	Minimum investment size 455-700€
Portugal	Incentives subsidies under the Plan de Fomrnto de las Energias
Spain	Maximum 26% of the eligible costs
United Kingdom	Subsidy of 50%, maximal £100,000

Figure 8.5 Investment Subsidies for heat from solar thermal in EU-15 and selected Accession countries

Austria (AT)

Environmental support program of the Ministry of Agriculture, Forestry, Environment and Water Management in Austria. “Kommunalkredit-Program ”

Environmental support program of the Ministry of Agriculture, Forestry, Environment and Water Management in Austria. “Kommunalkredit-Program ”			Investment subsidy
Involved technologies	Minimum Investment size (Euro)	Value %	Size of the plants
Solar thermal	10.000	30	Small Hydro< 2MW)
Biomass and Biomass CHP	10.000	30	
Geothermal	35.000	30	

In the field of the electricity production the following technologies and aspects are eligible:

- Solar thermal: 30% of investment costs for collector systems with approximately more than 10 m² of collector surface. The total investment costs have to be higher than 10.000 Euro.
- Biomass: Up to 30% of the investment costs for automated biomass heating systems and biomass fired CHP. The total investment costs have to be higher than 10.000 Euro.
- Geothermal: Up to 30% of the investments. This subsidy is limited for projects with an investment size higher than 35.000 Euro.

Support for renewable energy technologies within the framework of the support for residential housing in the provinces.

Support for renewable energy technologies within the framework of the support for residential housing in the provinces		Investment subsidy	
Involved technologies	Value [€/m ²]	Max. €	Value %
Solar thermal			
<i>Carinthia</i>		581 (water heating) 1163 (water and space heating)	30
<i>Styria</i>	35	2000	
<i>Lower Austria</i>		1500 (water heating) 1163 (water and space heating)	30
<i>Upper Austria</i>		2906	50
<i>Vorarlberg</i>		(depending on housing type)	25
<i>Vienna</i>		1500 (Water heating systems connected to the central heating system) 2200 (Water heating systems connected to the central heating system)	30
Biomass			
<i>Carinthia</i>		2180	30
<i>Styria</i>		800-1800 (depending on the technology)	25
<i>Upper Austria</i> (wood gasifying boilers)		1500	25
<i>Salzburg</i>		2906/2180 (depending on the type)	30
Heat Pumps			
<i>Lower Austria</i>		1500 (water heating) 2200 (water and space heating)	30
<i>Upper Austria</i>		2180	50
<i>Vorarlberg</i>		(depending on housing type)	

- Carinthia: Solar thermal systems and biomass plants are supported with a subsidy up to 30% of the investment costs. The subsidy is limited to 581 Euro for water heating and to 1163 Euro for water and space heating systems, to 2180 Euro for biomass heating systems with automatic fuel supply.

- Lower Austria: Solar thermal systems and heat pumps are supported with a subsidy up to 30% of the investment costs. The subsidy is limited to 1500 Euro for solar thermal water heating and to 2200 Euro for solar thermal water and space heating systems, to 1500 Euro for heat pumps for water heating and to 2200 for heat pumps for water and space heating systems
- Upper Austria: Solar thermal systems and heat pumps are supported with a subsidy up to 50% of the investment costs. The subsidy is limited to 2906 Euro for solar systems, to 2180 Euro for heat pumps. Wood gasifying boilers are supported with a subsidy up to 25% of the investment costs with a maximum support volume of 1500 Euro.
- Salzburg: Solar thermal systems and heat pumps are supported with a subsidy which is calculated taking into account an “eco” score system (Öko-zuschlagspunkte) which depends on the applied technology . Furthermore new wood heating systems are supported with 30% of the investment costs with a maximum volume of 1962 euro for wood chip and pellet systems and 1.744 Euro for log wood heating systems with heat storage.
- Styria: Solar thermal systems and biomass plants are supported with the following amounts:
 - solar systems: 35 Euro per m² up to 2.000 Euro per accommodation unit
 - Wood heating systems: 25% of the investment cost. The maximum amount depends on the technology and vary between 800 Euro and 1.800 Euro.
- Vorarlberg: Solar thermal in one-family houses are supported with a subsidy up to 1.817 Euro for water heating and up to 3.634 Euro water and space heating. For multiple dwellings the subsidy amounts 25% of the total investment. The total investment subsidy for heat pumps depends on the house type and the heat source.
- Vienna: Solar thermal systems are supported with a subsidy of 30% of the investment costs. The subsidy is limited to 1.500 Euro for water heating systems which are not connected to the heating systems and to 2.200 Euro for water systems which are connected to the heating system.

Belgium (BE)

Solar Thermal Support Program in Wallonie: SOLTHERM

Support for renewable energy technologies within the framework of the support for residential housing in the provinces			Investment subsidy
Involved technologies	Value [€]	€/m ²	Max. €
Solar thermal	625	75 ⁶⁹	2500 (or up to 75% of the investment)

- Objective: 200.000 m² of solar panels by 2010 (or 42.000 installations after ten years – 168.000 m²)
- Term: 200-2010
- Included sectors: all (except UREBA beneficiaries)

⁶⁹ Only for cases with greater surface areas

UREBA: Investments Subsidy Schemes for RES in the Walloon Region in the public sector

UREBA: Investments Subsidy Schemes for RES in the Walloon Region in the public sector		Investment subsidy
Involved technologies	Value %	Size of the plants
All	30	No restriction in the size but at least an offset of 10% CO ₂ compared to classical reference installations has to be reached

Investment subsidy for public and communal buildings up to 30%. Although there is no restriction for the size of the plants at least a reduction of 10% of CO₂ compared to classical reference installations has to be reached. The programs also includes subsidies up to 50% for pre-feasibility studies and energy audits.

Investments Subsidy Schemes for RES in the Walloon Region in the private sector

Investments Subsidy Schemes for RES in the Walloon Region in the private sector		Investment subsidy
Involved technologies	Value %	Size of the plants
Solar energy, Biomass and geothermal energy	15	No restriction in the size but projects have to prove high quality, saving on raw materials and energy

Subsidies up to 15% of the eligible costs are available. Eligible costs are:

- Investments in new RES equipment
- Production of RES equipment outside the EU for export.

Investments Subsidy Schemes for RES in Flanders in the private sector

Investments Subsidy Schemes for RES in the Walloon Region in the private sector		Investment subsidy
Involved technologies	Value %	Size of the plants
All	<i>At present:</i> <ul style="list-style-type: none"> ▪ Up to 20 (SMEs) ▪ Up to 10 (medium and large enterprises) 	No restriction in the size but projects have to prove high quality, saving on raw materials and energy
	<i>Under discussion:</i> Up to 40	Up to maximum of 3.6 M€/year per project Projects have to prove high quality, saving on raw materials and energy

Czech Republic (CZ)

State Environmental Fund	Investment subsidy	
Involved technologies	Max. %	Total Budget
Biomass	17%	8,9 M€ (1991-1999)(*)
Biogas		

(*) total budget both for electricity and heat

Denmark (DK)

Act on utilisation of renewable energies

Act on utilisation of renewable energies	Investment subsidies			
Involved Technologies	Max. €	Min. €	Max. (%)	Total Budget (M€) in year 2001
Solar thermal	132.450	265	30	18,8
Biomass	132.450	265	16	
Biogas	132.450	265	30	
Heat pump	132.450	265	15	

Since 1981 (latest amendment 1997)

Target: increase the supply of renewable energies; increase the demand for renewable energies;

Finland (FI)

State decision 29/99: Investments Subsidies	Investment subsidy
Involved technologies	Value %
Heat from solid fuels, other renewables	30%

Ministry of Trade and Industry hands out subsidies of 30% (wind 40%) of the investment costs to renewable energy technologies. The investor is required to be a legal entity in order to receive subsidies. In the Action plan the subsidies will remain at present level the possibility of including private persons or households.

France (FR)

Solar thermal programme Helios 2000-2006

Solar thermal programme Helios 2000-2006	Investment subsidies		
Involved Technologies	Max. €	Min. €	Value (%)
Solar thermal	1250	750	30%

“The programme objective is to bring the solar thermal market to maturity by 2006 and to make solar thermal competitive with traditional electric water heating.

Total budget: around 6.5 mln EUR per year

Partnerships with regional councils are envisaged and additional services and incentives are provided by ADEME and partners. Includes also training, R&D (mentioned in section preinvestment) “

Biomass introduction programme PBEDL 2000-2006

Plan Bio-energie Development Local 2000-2006	Investment subsidies	
Involved Technologies	Max. Value (%)	Total budget per year [M€]
Biomass	40	16*

Target: increase the use of biomass for energy in residential and industrial setting. Objective: 1000 MW new installations in 2006. Around 600 MW should be achieved in the residential sector in collective heating. Besides the subsidies the programme includes certification of equipment, communications campaign targeting the general public etc. (mentioned in part preinvestment).

* total budget for the whole programme including subsidies for heat and electricity plants, communications campaigns etc.

Germany (DE)

German Market Incentive Program

Energy Subsidy Regulation (EPR) and Energy Performance Advice (EPA)	Investment subsidy
Involved technologies	Investment subsidy (€)
Solar thermal collectors	Size of the plant
	For the first 200 m ² : 110 /m ²
	More than 200 m ² : 60 €/m ²
	Expansion of existing collectors: 60€/m ²
Biomass	
<i>Automatic fuel supply</i>	60€/kW
	>8 kW and <100 kW
<i>Manual fuel supply</i>	50€/kW
	<15kW and <100kW

Period of the policy: 1999-2006

Greece (GR)

National OPC

National OPC	Investment subsidies	
Involved Technologies	Minimum investment cost required (€)	Value (%)
Biomass	44000	40
Solar energy		40-50

The Measure 2.1 of Sub-programme 2 of the National Operational Programme for Competitiveness (OPC) / CSF III (2000-2006) is devoted entirely to providing State support (grants) to private investments in:

- a) renewables,
- b) rational use of energy, and
- c) small-scale (<50 MW_e) cogeneration.

The total budget of Measure 2.1, for the 2000-2006 period of CSF III, is 1.07 billion Euros, of which 35.6% or 382 million Euros is the public subsidy available to RES/RUE/CHP investments. About two-thirds of the total available subsidy (~ 260 million Euros) is foreseen to be awarded specifically to RES investment projects.

Law 2601/98

Law 2601/98	Minimum investment cost required (€)	Value (%)	Total Budget (€)
Biomass	176000	40	14,7 million
Biogas		40	
Geothermal		40	
Hydropower		40	
Solar energy		40	
Wind energy		40	

It is interesting to note that the issuing of the above Presidential Decree has stalled for almost three years now, mainly because it is considered that the State's financial burden, from the application of the above measures, will be excessive

This is a financial instrument-umbrella, covering all private investments in Greece, in all sectors of economic activity. It has a strong regional character, in that the level of public support depends strongly on the particular geographic region, in which the given private investment is planned to materialise. Regions with high unemployment rates and low incomes per capita receive the highest investment subsidies from the State.

Investments in RES installations (both electricity- and heat-producing ones) have a special status under **Law 2601/98**, similar to the one bestowed to other selected categories of investments, such as investments in high technology, environmental protection, etc. More specifically, the main provisions of Law 2601/98 concerning public support of RES investments are as follows:

- 40% public subsidy (grant) on the total eligible RES investment cost + 40% subsidy on the interest of loans obtained for the purpose of financing the RES investment
- Alternatively, 40% subsidy on the loan interest + 100% tax deduction on the RES investment cost
- Level of subsidy (40%) is independent of the RES technology and the geographical region of the country
- Required own capital : 40% (min) of the total investment cost
- Minimum investment cost required : 176,000 Euro
- Maximum subsidy granted : 14.7 million Euro
- Maximum investment cost subsidised : 36.7 million Euro

Proposals for private investments can be submitted to the National Development Law 2601/98 at any time and they are evaluated on their own merit, i.e. independently of other submitted proposals. Law 2601/98 does not have any total budget cup, thus there is (theoretically) no limit in the number and budget of proposals that can be funded.

Hungary (HU)

Energy Saving Programme and Action Plan

Involved technologies	Max. €	Max. %	Total Budget (M€)	Addressed to: (private, companies...)
All kinds of RES-H	824	30	1.442(*)	private
All kinds of RES-H	8,240	30		companies

(*) total budget in 2001 for electricity and heat

Environmental Protection Fund (KAC)

Involved technologies	Max. %	Total Budget (M€)
All kinds of RES-E	30	2.5 (*)

(*) total budget from 1997-2000 for electricity and heat

Fund is collected from air polluters.

Biomass usage for energy production

Involved technologies	Max. %
Biomass	30

Luxembourg (LU)

Specific allocation of public funds under the framework law according to the regulations of 5.8.1994 and 17.7.2001 for solar thermal projects			Investment Subsidies
Involved Technologies	Value (%)	Operational period	Maximum rebate [€]
Solar thermal	40%	till 2004	Domestic. Up to 2,200€ for water heating only
			Domestic: Up to 3,000€ for water and space heating
			Domestic: Up to 38,000€ for apartment building
			Up to 38,000€ for non domestic sector

Skeleton Laws of 5.08.1993 and 22.07.1994 with respect to biomass projects			Investment subsidies
Involved Technologies	Value (%)	Operational period	Maximum subsidy [€]
Biomass (Biogas and wood)	25%	Jan. 2001 till Dec. 2004	Central heating (using wood chips, pellets, or gasification heating): Up to a maximum of 3,000€
			Heating: For projects of regional scale or importance up to 75,000€
	For projects with regional scale or importance 50%		Network heating (using wood chips) up to 38,000€
	Biogas installations: Up to 38,000€		
	Biogas: For projects of regional scale or importance up to 150,000€		
	Sanitation installations: Up to 38,000€		
	Sanitation installations: For projects of regional scale or importance: Up to 150,000€		

Netherlands (NL)

Energy Subsidy Regulation (EPR) and Energy Performance Advice (EPA)

Energy Subsidy Regulation (EPR) and Energy Performance Advice (EPA)		Investment subsidy	
Involved technologies	Minimum Investment size (Euro) Subsidy (€)	Subsidy €/m ² Max. (€)	Budget in 2003 (€) ⁷⁰
• Individual systems	455-700	-	54 milliopn
• Collective systems	-	125	
Heat pump boilers			
• Individual systems	700	-	
• Collective systems	-	500 ⁷¹	

⁷⁰ (including the subsidy for solar boilers and heat-pump boilers)

⁷¹ per house

CO2 Reduction Plan

CO2 Reduction Plan		Bidding system + Investment subsidy		
Involved technologies	Guaranteed duration [a]	Max price (Euro/Tonne CO ₂)	Subsidy (% of investment costs)	Total budget up to end of the program (2010) (€)
All large scale RES projects	13	4,59	30-40%	425 Million

Period of the policy: 1996-2010

Target: to reduce 4-5 Megatonne CO₂

The program is a combination of a bidding system and an investment subsidy.

Poland (PL)

Ecofund

Foundation for the efficient administration of the money derived from the conversion of a part of the foreign debt of Poland into a fund intended to support environmental protection projects; RES is a priority of the fund; (GHG and air pollution reduction)

Grants mainly for technical investment projects; 15% up to 70 % for innovatory projects;

All types of RES;

Minimum size for some project types

e.g.: 400 kW for biomass boilers

100m² solar collectors;

budget 2001: 51 Million PLN; (almost one third of all expenses of the Ecofund)

National fund for Environment Protection and Water Management (NFEP)

Portugal (PT)

MAPE grants

MAPE grants		Investment subsidy				
Involved technologies	Value % of the investment subsidy	Max. inv. subsidy	Eligible costs for the loan	Interest rate of the loan	Min. Size of the plants	Max. Size of the plant
rehabilitation of non-residential buildings including HVAC (heating, ventilation and air conditioning) using RES	20% of investment costs	300.000 €	20% of the not granted investment costs	0%	n.a	n.a

Period of the policy: 2000-2006

MAPE, which stands for Measure for the Exploitation of the Energy Potential and Rational Use of Energy, is the current scheme for promoting RES and RUE projects, during the investment phase. MAPE was set up under the POE (Operational Programme for Economy), which is now renamed to PRIME, included in the third CSF (from 2000 till 2006). The Program consists basically in soft loans and investment subsidies.

Slovenia (SL)

Environment Ministry Fund

Involved technologies	Total Budget (€)
Biomass individual heating systems	1 M€
Geothermal, solar thermal	460000 (*)
Biomass district heating	4,77 M€

(*) total budget together for geothermal (electricity and heat), PV, wind and solar thermal

Spain (ES)

Incentives for Active Solar Thermal under the Plan de Fomento de las Energías renovables:Financing Line ICO⁷²-IDAE⁷³

Technologies included	Max.eligible costs of the systems (€/m²)	Investment subsidy (%)	Interest rate (%)	Repayment period	Years of free repayment	Total Budget (1996-2006) for subsidies	Budget (1996-2006) for other incentives	Budget (1996-2006) for tax incentives
Solar Thermal	Between 397 and 675 depending on installation type and temperature of the fluid (> or < than 60°C)	Max. 26 % of the max. eligible costs	Euribor minus 2,5 ⁷⁴ -	7	0	48,5 Million Euros ⁷⁵ for individual installations and 78,5 Million Euros for collective installations	40 Million Euros for interest subsidies in individual installations 6,9 Million euros for other incentives in collective installations	38,6 Millions Euros for collective installations

Special measure within the framework of the “Plan de Fomento de las Energías Renovables” which basically consists of tax incentives, soft loans and investment subsidies. Within the framework of the Financing Line ICO-IDEA only PV-Projects and Solar thermal are eligible to receive investment subsidies. An IDAE discount of 3,5 points for the interest rate is applied Both investment subsidy and the IDAE discount are transferred to the investor account in order to pay the loan.

⁷² Instituto de Crédito Oficial

⁷³ Instituto para la diversificación y Ahorro de la Energía

⁷⁴ An IDAE discount of 3,5 points is applied

⁷⁵ This amount includes all foreseen activities in the Plan and not only research and demonstration projects

Incentives for Biomass under the Plan de Fomento de las Energías Renovables

Technologies included	Total Budget (1996-2006) for subsidies	Budget (1996-2006) for fuel production subsidies	Budget (1996-2006) for investment subsidies	Budget (1996-2006) for tax incentives
Domestic heating	56,9 Mio Euro	2,2 Mio Euro	40,5 Mio Euro	6 Mio Euro
Industrial heating	77,4 Mio Euro	53,2 Mio Euro	-	24,2 Mio Euro

Special measure within the framework of the “Plan de Fomento de las Energías Renovables” which basically consists of tax incentives, soft loans and investment subsidies.

United Kingdom (UK)
Clear Skies Scheme

Clear Skies Scheme			Investment subsidy		
Involved technologies	Value	Max subsidy	Size of the plants	Addressed to	Budget ⁷⁶
Solar thermal,	£500	-	-	households	£10 Mio (≈16Mio Euros)
Heat Pumps	£1200	-	-		
Wood fuelled boiler systems	£50/kWth	-	<30 ⁷⁷ kWth		
Room heaters/stoves with automated wood pellet feed	£600	-	-		
Solar thermal, Heat Pumps, Wood fuelled Room heaters/stoves with automated wood pellet feed boiler systems,	50%	£100.000	-	Communities	

Direct, fixed grants towards investments in RES technologies, targeted at householders and communities, with stated aim of contributing to sustainable development

⁷⁶ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

⁷⁷ Installations larger than 5kWe are allowable but Ccapayity about 5 kWe will not receive a grant

DTI Capital Grants Programme: Bio-energy (UK-wide)

Clear Skies Scheme		Investment subsidy		
Involved technologies	Value (%)	Size of the plants	Addressed to	Budget ⁷⁸
Biomass heating installations or small (less than 1 MWe) CHP installations	40%	<20 MWe	Project developers	£66 Mio (≈105 Mio Euros)

Direct, fixed grant programme directed at project developers and organisations with stated aim of contributing to climate change, renewables and CHP targets, creating a market for bio-energy, encouraging rural development and alleviating fuel poverty

- Scheme provides funds to cover up to 40% of eligible cost of building complete installations of⁷⁹:
 - large-scale (min. 20MW_e) high efficiency electricity generation using energy crops or medium-scale (min. 1MW_e) electricity generation or CHP using energy crops;
 - clusters of biomass heating installations or small (less than 1MW_e) CHP installations, or industrial heating installations supplying process heat or space heating with an output of more than 0.5MW heat⁸⁰

£66m budget has been completely allocated (includes £36m lottery money)

Defra Energy Crops Scheme (UK-wide)

Clear Skies Scheme		Investment subsidy	
Involved technologies	Value	Addressed to	Budget (2000-2006) ⁸¹
Energy crops	£1.600 per hectare for short rotation coppice £1000 per hectare for willow or poplar and £920 per hectare for miscanthus	Private sector	£29 Mio (≈46 Mio Euros)

Direct, fixed grant programme directed at the private sector with stated primary aim of rural development, as well as contribution toward environmental and social objectives

- £29m available from 2000 to 2006 toward:
 - establishment grants of: £1,600 or £1,000 per hectare, depending on land type, for establishing short rotation coppice (SRC) of either willow or poplar and £920 per hectare for establishing miscanthus
 - grants of up to 50% of the costs of establishing producer groups (e.g. legal costs office equipment etc) for short rotation coppice

Crops must be grown for electricity, heat or co-generation within a “reasonable” radius of the growing land

⁷⁸ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

⁷⁹ See also ‘Demonstration and pilot projects’.

⁸⁰ £3m of the total £66m budget was allocated to this initially.

⁸¹ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

8.1.2.3 Soft loans

Austria (AT)

Soft loans for RES-H technologies are granted in the frame of support for residential buildings – often combined with efficiency standards and other requirements. The design varies among the nine provinces. Some details of these schemes are explained in the RUE-chapter.

Furthermore, there are some other schemes which provide soft loans for some kind of RES-H technologies. For example, the support for solar systems by the Chamber of Workers in the Burgenland.

Support for solar systems by the Chamber of Workers in the Burgenland				soft loans
Involved technologies	Interest loan (%)	Repayment period	Years of free repayment	Max. investment costs eligible (Euro)
Solar thermal collectors	0	The pay back rates are 50 € per month independent of the amount of the loan	Dependent of the amount of the loan	3650

Within the framework of Housing Loans of the Chamber of Workers persons employed in the province Burgenland which not exceed a certain income limit are eligible to receive a loan for refurbishment of their housing installation of a solar thermal system. The maximum amount of the loan is 3650 Euro and the interest rate is set to zero per cent.

Germany (DE)

ERP and DtA Environment and Energy Efficiency Program

ERP and DtA Environment and Energy Efficiency Program					soft loans
Involved technologies	Interest loan (%)	Repayment period	Years of free repayment	Adressed to	Max. investment costs eligible (Euro)
All	0			Small and medium enterprises	
New provinces	4,5	15	5		75% of total investment costs
Old provinces	4,7	10	2		50% of total investment costs

This measure represents one of the most important instruments for large scale projects.

Hungary (HU)

Energy Loan Programme

Involved technologies	Interest loan	Loan max (€)	Available budget (M€)
All kinds of RES-H technologies	50 % of the actual base interest rate of the national bank	124.000	4,1 (*)

(*) total available annual budget for energy saving and RES in the year 2000

Slovenia (SL)

Efficient use of energy investment fund

Involved technologies	Interest loan
All kind of RES-E technologies	One third lower than commercial interest rates

Spain (ES)

Financing Line IDAE-ICO for the year 2003 in the framework of the Plan de Fomento de las Energías Renovables

Technologies included	Max. eligible costs of the systems	Interest rate (%)	Repayment period⁸²	Years of free repayment⁸³	Maximum Amount per beneficiary	Total Budget for 2003 (€)
Self consumption, Biomass, solar energy, Biogas energy use, Energy valorization of waste.	Depending on the technology	Euribor minus 2,5 ⁸⁴ -	5	1	70% of the eligible costs	179.700.000
				0		
			7	2		
				0		
			10	2		
				0		

The funds will be facilitated through the banks that have signed the agreement. This Finance Line operates within the framework of the **Plan de Fomento de las Energías Renovables**, the aim of which is to ensure that by 2010 12% of primary energy consumption in Spain comes from renewable energy sources. The interest rate is variable fixed to the Euribor for 6 months plus one percentage point. Once the IDAE discount has been applied –which is 3.5 the final interest rate for the beneficiary is Euribor minus 2.5.

⁸² the repayment period can be selected by the beneficiary

⁸³ depending on the repayment period

⁸⁴ An IDAE discount of 3,5 points is applied

8.1.3 Post-investment / Implementation

In contrary to promotion schemes for RES-E, in the field of RES-H post-investment schemes are dominated by investment schemes, first of all investment subsidies. The important post-investment schemes for RES-H are energy taxes on fossil fuels and tax exemptions on RES.

Energy taxes are described more detailed in chapter 4.

United Kingdom (UK)

UK Emissions Trading Scheme (UK ETS)

UK Emissions Trading Scheme (UK ETS)	Quotas
Involved technologies	Budget
All	£215m (≈397 Mio Euros)

- Started April 2002
 - Open to all sectors of UK economy
 - Covers a basket of 6 GHGs
 - Government has made available £215m in incentive monies to kick-start trading (not for participants in Climate Change / “negotiated” Agreements, see above)
 - Incentive is offered in return for taking on a binding emissions reduction target over 5 years
 - Three entry routes:
 - *Direct participants* take on 5 year reduction target in return for incentive
 - *Companies in Climate Change Agreements* can choose to trade to meet their targets through the scheme (see above), thereby benefiting from extra flexibility and lower compliance costs
- Project participants* earn credits that can be traded through the scheme, increasing the supply for target holders that wish to buy them to meet their obligations

8.2 Non Financial Strategies

Denmark (DK)

Solar heating obligation in new buildings

<i>Solar heating obligation in new buildings</i>	Regulation		
Involved Technologies	Specification of regulation	Exemptions	Addressed to: (private, companies...)
Solar thermal	Obligation for solar heating for hot water (50 to 60% in smaller installations and 25 to 40% in larger installations)	Installations using other RES for hot water production	Public and commercial buildings, independent institutions, large summerhouses

Target: increase the supply for renewables.

Because private buildings are exempted the expected impact is strongly restricted.

France (FR)

Biomass introduction programme PBEDL 2000-2006

Target: increase the use of biomass for energy in residential and industrial setting. Objective: 1000 MW new installations in 2006. Around 600 MW should be achieved in the residential sector in collective heating. The programme includes certification of equipment, communications campaign targeting the general public etc. Besides these activities also subsidies for investors are granted (mentioned in part financial/investment).

Solar thermal programme Helios 2000-2006

“The programme objective is to bring the solar thermal market to maturity by 2006 and to make solar thermal competitive with traditional electric water heating.

Total budget: around 6.5 mln EUR per year

Technical and financial consultancy for installations in tertiary/collective buildings,

Communications campaign targeting the general public;

Partnerships with regional councils are envisaged and additional services and incentives are provided by ADEME and partners. Includes also subsidies for solar thermal systems (mentioned in section investment) “

“Broad efforts of the government in the whole chain of market development (pre-normative research, training, communication, etc.). Active presence since many years internationally recognised market players – both in technology as in research.

Weakest points in the solar thermal policy seem to be the insufficiently striking and large scale targeted communication of successful projects (both technology as innovative market approaches which are existing).

Considering the broad government support and the active presence of internationally recognised market players it is expected that a stable and significant market development will occur. It is nevertheless clear that the effectiveness of solar thermal policy is relatively low compared to the potential. According to private communications with local and regional market players, funds used to finance investment premiums are sufficiently large and seldom fully used.”

Greece (GR)

Regulation for Rational and Efficient Use of Energy

In 1995, the Greek Ministry of Environment, Urban Planning and Public Works prepared an Action Plan, entitled “**Energy 2001**”, aiming at promoting the use of RES, as well as the application of energy-efficiency technologies, in the building sector. The Action Plan was prepared in order to define specific measures for the reduction of greenhouse gas emissions in buildings, in accordance with the “**National Action Plan for the Abatement of CO₂ and Other Greenhouse Gases**”. Following official adoption of the Action Plan by the Greek Government, “**Energy 2001**” was further reinforced by the enactment of **Ministerial Decree (MD) 21475/98**, which incorporated the provisions of Council Directive 93/76/EC (SAVE Directive) for the stabilisation of CO₂ emissions and the efficient use of energy in buildings.

Article 4 of the MD 21475/98 provides for the future issuing of a Regulation for the Rational and Efficient Use of Energy (RREUE), which will be in compliance with the Greek General Building Code and will replace the existing Regulation on the thermal insulation of buildings. The drafting of the Regulation has been assigned by the Ministry of Environment, Urban Planning and Public Works to the Centre for Renewable Energy Sources (CRES), and it has been carried out in accordance with the provisions and specifications set out by MD 21475/98.

As far as the incorporation of RES in buildings is concerned, the Ministry's specifications for the drafting of the Regulation encompass the following:

- determination of the building's energy requirements and their potential degree of coverage through RES
- specifications of active solar systems (ASS)
- determination of the ASS contribution to space and water heating (compulsory)
- determination of the contribution of photovoltaic systems (PVs) to the coverage of the building's electrical loads (optional)
- study for the incorporation of ASS (compulsory) and PVs (optional) in buildings
- determination of the requirements for the installation of building energy systems for the exploitation of RES.

Poland (PL)

Green Power Purchase Obligation, Ministry of Economy Ordinance of 51 December 2000

Energy enterprises dealing with trade of heat are obliged to purchase heat from non-conventional and renewable energy sources interconnected to the common grid;

According to this decree the obligation is fulfilled when energy utility will buy a certain percentage of electricity from RES (this percentage is gradually increased (Presently it is 2,85%) up to 7,5% in 2010) and heat from RES (there are several conditions when the energy utility can deny buying heat from RES e.g., if the planned justified cost of heat purchase from RES will lead to an increase of heat price or tariffs, in a given year and a given utility, by more than the annual inflation factor for the preceding year. Moreover heat derived from burning wood waste contaminated by chlorine, heavy metals or chemical compounds etc. is excluded).

Portugal (PT)

Enhancement of administrative procedures

The implementation of RES and RUE projects related with electricity generation became recently simplified and faster. Some administrative and licence procedures were enhanced in order to overcome identified barriers. This was achieved by changing the legal framework that rules the environmental licensing schemes and the demanding process for connections to the electric grid. Most of the changes were made to allow the speed up and clearness of the administrative procedures. The new legal frame will raise the investors' confidence and will bring efficiency to the market.

RSECE

RSECE⁸⁵ are the regulations of HVAC systems for buildings. RSECE must be verified, under the licensing scheme, whenever building, or building zones, have thermal loads above a minimum threshold. RSECE impose size standards on the thermal power of the systems to be installed, as regards both space heating (plus hot water power, if the sanitary hot water production system is common to the heating system) and cooling. Buildings, or zones, with low space heating or cooling loads are not considered by these regulations. RSECE also define a number of pre-requirements concerning the design, installation and operations of HVAC systems. For example, the regulations establish the need for free-cooling beyond a given rate of supply air flow and the heat recovery from exhaust air beyond a given power level. Intended to promote energy efficiency, these requirements apply not only to HVAC systems but also to equipment, controls, energy metering and building energy management systems.

⁸⁵ In Portuguese, "Regulamento dos Sistemas Energéticos de Climatização em Edifícios"

8.3 Indirect Schemes

Czech Republic (CZ)

Government programme for the support of Energy Savings and the Utilisation of Renewable and Secondary Sources of Energy	Subsidies
Involved technologies	Max. %
Educational, promotional activities in the field of renewable energy	Up to 100 %

Greece (GR)

Promotion campaigns for energy efficiency

Energy efficiency (EE) and renewable energy technologies have encountered various difficulties into their being accepted by the Greek market. Some of them derive from a certain degree of lack of knowledge and experience on the subject. On the other hand, societal and environmental factors are deeply interlinked with wider social acceptance.

Aiming at the obliteration of these difficulties and a greater penetration of such technologies into the Greek market, many campaigns about RES and EE have been carried out in the past years. Institutions such as Ministries, environmental organisations and research centres, like CRES (the Centre for Renewable Energy Sources), have supported campaigns for the promotion of these technologies and the dissemination of information across various selected groups (e.g. engineers, students, general public)

Legislation for Boilers – Burners and other appliances in buildings

Apart from the introduction of natural gas, a major intervention in the residential and tertiary sector in order to reduce greenhouse gases emissions is energy conservation. The legislative framework in force for the promotion of energy conservation in the buildings' sector includes:

- Minimum energy efficiency standards were set by the EU for non-industrial boilers (Directive 92/42/EC) and refrigerators and freezers (Directive 96/57/EC). Greek legislation has been harmonised in accordance with both EU standards through the **Presidential Decrees 335/1993** and **178/1998**.
- The general obligations for energy labelling are set by Directive 92/75/EC - harmonisation by the **Presidential Decree 180/1994**, while particular provisions are set for refrigerators/freezers (Directive 94/2/EC - harmonisation by the **Ministerial Decision 25810/1994**, washing machines (Directive 95/12/EC - harmonisation by **Ministerial Decision 3972/96**), dryers (Directive 95/13/EC - harmonisation by **Ministerial Decision 3972/96**); for combined washer-dryers (Directive 96/60/EC) - harmonisation by **Ministerial Decision 9142/97** and for dishwashers (Directive 97/17/EC) - harmonisation by **Ministerial Decision 10200/98**.

Ireland (IR)

Waste management policy in Ireland, affecting renewable energy from landfill gas	Regulation		
Involved Technologies	Operational period	Goal	Specification of instruments

Waste	15 years from October 1998	Thermal facilities expected to generate 360,000MWh heat per year	<ul style="list-style-type: none"> - A minimum of 65% reduction in the biodegradable municipal waste consigned to landfill - Recycling of 35% municipals' waste - The development of composting and other feasible biological treatment facilities capable of treating up to 300,000 tones of organic waste, annually - A diversion of 50% of overall household waste away from landfill - A rationalization of municipal waste landfills
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Luxembourg (LU)

PEEC (Programme d'actions d'Economies d'Energies dans les Communes)	Subsidies		
Involved Technologies*	Value (%)	Operational period	Maximum [€]
Solar thermal	25%	1996 till undetermined	Domestic sector: Up to a maximum of 1,487€ Non-domestic sector: Up to a maximum of 0.0372M€

Major issues: Projects indirectly supported by information dissemination and awareness-raising activities and technical support. Energy Agency provides support by providing advice on finance and planning, and by conducting feasibility studies, and promoting the program amongst municipalities.

The scheme does not appear to have a significant effect in RES realization. In 1997 one project was realized under the program – solar panel installation for swimming pool.

PEEC (Programme d'actions d'Economies d'Energies dans les Communes)	Subsidies		
Involved Technologies*	Value (%)	Operational period	Maximum [€]
Biomass	25%	1996 till undetermined	Domestic sector: Up to a maximum of 1,487€ Non-domestic sector: Up to a maximum of 36,783€

Major issues: Projects indirectly supported by information dissemination and awareness-raising activities and technical support. Energy Agency provides support by providing advice on finance and planning, and by conducting feasibility studies, and promoting the program amongst municipalities.

The scheme does not appear to have a significant effect in RES realization. In 1997 one biomass project was realized under the program – the installation of a wood burning heating system.

Portugal (PT)

The governmental programme “Água Quente Solar”⁸⁶

Under an initiative of the Ministry of Economy, the “Água Quente Solar” programme was launched in 2002. Its main goal is the development of the thermal solar market reaching an amount of 150.000 m² of solar panels sold every year, which would led to the installation of 1.5 Mm² till 2010. The main activities undertake by the programme are the following:

- Marketing campaign and valorisation of economic and social benefits of solar hot water;

⁸⁶ In English “Solar Hot Water”

- Promotion of the development of two market chains: hot water energy service and selling/installation of solar collector systems;
- Development of the quality certification guarantees for systems, installers and designers;
- Improvement of the fiscal incentives available to solar hot water systems.

United Kingdom (UK)

EST Community Energy (UK-wide)

Free information and expert advice is provided under the scheme.

EST Save Energy campaign / Energy Efficiency Advice Centres (UK-wide)

- Domestic sector equivalent of Action Energy, run high profile marketing campaigns (e.g. Energy Efficiency Week, “Behaving Badly”)
- Provision of free information and advice mainly through network of 52 local Energy Efficiency Advice Centres (EEACs). EEACs refer clients to appropriate direct grants schemes
- 6 EEACs are participating in a trial, fulfilling the additional role of Renewable Energy Advice Centre, providing corresponding free information and advice
- Database of “Energy Efficiency Recommended” products and associated label (appears on both appliances and retrofit RUE measures).
- **Countryside Agency Community Renewables Initiative**
- Local Support Teams have been formed (in 10 rural areas in England so far) to help localities devise their own ideas and developments for renewable energy by providing free advice and training. Partnerships include local councils, energy experts, government bodies and other specialists.
- **EST Practical Help** Guidance and support for local authorities – in many ways the non-financial counterpart to the HECAction programme but with less of an emphasis on ‘just’ RUE (more on RES).

Planning Policy Guidance 22: Renewable Energy

This is a guidance note from the ODPM⁸⁷ (department responsible for planning policy / legislation) which asks local planning authorities to take RES into consideration. Some local authorities have agreed to require a specific minimum RES (inc. co-generation) in new developments in order to grant planning permission.

⁸⁷ Office of the Deputy Prime Minister

9 TRANSPORT SECTOR – PROMOTION STRATEGIES FOR RES - T IN EUROPE

An overview about existing promotion strategies for RES-T will be given in this section. It is structured according to the typology developed in chapter 3 into financial and non-financial strategies on the one hand and into schemes that are designed for the pre-investment/implementation, for the investment/implementation or the post-implementation phase on the other.

9.1 Financial Strategies

9.1.1 Pre-investment / Implementation

Financial pre-investment strategies first of all cover support mechanisms of R&D and demonstration projects. Quite a number of EU countries provide some kind of R&D support for RES-T. A cross-country comparison is hardly practicable in this area because the programmes in most cases are embedded into a wider range of research activities. Hence, detailed figures for the budget that is spent for RES-T R&D is hardly available. Even a complete listing of relevant programmes is almost infeasible due to a very wide range of thematic areas that are covered within research programmes.

Therefore, this chapter aims at providing an overview about the most important schemes.

Austria (AT)

There are several research programmes which offer means for energy research, and partly are dedicated to RES-T and especially biofuels.

At federal Level: the most important ones are:

- the Research Programms for Industry (Forschungsförderungsfonds für die gewerbliche Wirtschaft-FFF)
- the Fund for Scientific Research (Fonds zur Förderung der Wissenschaftlichen Forschung - FWF)
- the Research Fund for Regional and Local Energy Concepts and District Heat and
- Austrian Program on Technologies for Sustainable Development (nachhaltig Wirtschaften)

At regional level most of the provinces have developed their own programs. An Example could be the Energy Technology Program (ETP) in the province of Upper Austria.

Within the framework of existing subprograms of the Austrian Program on Technologies for Sustainable Development like “Building of Tomorrow”, “Factory of Tomorrow” or recently “Energy Systems of Tomorrow” several demonstration projects in the field of new energies are planned.

Germany (DE)

Support Program Resources R&D program

Support Program Resources R&D program		Support of R&D and Demonstration Projects
Involved technologies	Subsidy contribution	Available annual Budget
Biomass	Up to 100%	113 million Euro

Period of the policy: 1996-2004

Support Program Resources for demonstration projects of the Federal Environment Ministry

Support Program Resources for demonstration projects of the Federal Environment Ministry					Demonstration Projects
Involved technologies	Subsidy contribution	Interest loan (%)	Years of free repayment	Repayment period (years)	Maximum eligible investment costs Available annual Budget
All	Up to 30%	4,3	5	Up to 30	70% of total costs ts

This incentive program consists basically of soft loans. In exceptional cases investment subsidies could be considered too.

Hungary (HU)

Technical Development Fund 2000 (OMFB)

Subsidies for technological development and research up to 60% of the total investment costs (in case of SME 70%)

Aim: improve the efficiency of the conversion and increase the supply of renewables

Poland (PL)

Ecofund

Among others Ecofund supports demonstration projects aiming at the “reduction of the emissions of gases that cause global climate changes”. Projects are granted with 20 % to 70% of the total costs, depending on the per capita income of applicants and the fact if it is an innovatory, non-commercial or commercial project.

United Kingdom (UK)

DTI’s New & Renewable Energy R&D Programme

DTI’s New & Renewable Energy R&D Programme	Support of R&D
Involved technologies	Budget ⁸⁸
biofuels	£19 Mio./year (≈30 Mio €/year)

R&D grants for industry from the DTI with the stated aim of improving the competitiveness of the UK’s renewables industry

Proposals must include innovation that offers the prospect of reduced cost and/or improved performance of renewable energy

⁸⁸ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

Faraday Partnerships

Faraday Partnerships	Support of R&D
Involved technologies	Budget⁸⁹
All	£400k/year (≈635k Euros/year)

- Faraday Partnerships aim to improve the competitiveness of UK industry through more effective interaction (knowledge and technology transfer) between the science and technology base and industry
- Funding takes the form of:
 - A grant from DTI or other Government Department of up to £400k per year for at least three years to establish and operate the infrastructure of the Faraday Partnership

A ring fenced grant of £1million from a Research Council (see directly below) or combination of Councils or from a Government Department for research projects which satisfy the twin criteria of excellent science and industrial relevance

Research Councils

Research Councils	Support of R&D
Involved technologies	Budget⁹⁰ (2003-2006)
All	£28Mio (≈44 Mio Euros)

Statutory control and the bulk of funding for the Research Councils comes from the DTI

There are seven Research Councils, each covering a different area of science. They administer a wide range of R&D grants for which the charitable and academic sectors are eligible

In particular, three of them, led by the Natural Environment Research Council (NERC)⁹¹, will be investing £28m in research into sustainable energy over three years (from April 2003)

⁸⁹ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

⁹⁰ This amount includes the budget for the overall program and therefore includes technologies from other sectors.

⁹¹ Engineering and Physical Sciences Research Council (EPSRC) and Economic and Social Research Council (ESRC)

Carbon Trust Low Carbon Innovation Programme. R&D grants from the Carbon Trust

Carbon Trust Low Carbon Innovation Programme. R&D grants from the Carbon Trust	Support of R&D
Involved technologies	Budget⁹² (2003-2006)
All	£75Mio (≈119 Mio Euros)

Innovative research, development or demonstration projects (for which all sectors are eligible) or commercial co-investments with the potential to reduce greenhouse gas emissions can apply for grant funding of up to £250,000 (repayable on successful exploitation) towards their cost. Initially up to £75m available under the Programme over three years (2002-2004)

9.1.2 Investment/ Implementation

Financial – investment/implementation schemes provide incentives for the actual investment and implementation phase of RES-T facilities. Most of the considered countries have implemented tax incentives (reduction of income tax and VAT), whereas subsidies, soft loans and voluntary agreements as well as post-investment schemes – in contrary to the area of RES-E – are of minor importance.

9.1.2.1 Tax- Incentive

A lot of the EU-15 countries (and selected accession countries) have implemented tax incentives for the promotion of RES-T. They first of all refer to a reduction of income tax and VAT. A cross-country comparison is not feasible due to widely differing design of tax incentives. Moreover, the details of these policies regarding eligible costs, general legal tax regulations etc. have a strong impact and therefore would have to be considered, which was not feasible within this report. Hence, this section cannot go beyond a listing of the most important tax incentives schemes for RES-T.

Belgium (BE)

Company Tax – Depreciation/Amortisation of investment. Company Tax Code (1992)

Company Tax – Depreciation/Amortisation of investment. Company Tax Code (1992)			Tax incentive
Involved technologies	Type of tax incentive	Maximum value of the regressive depreciation (%)	Addressed to: (private, companies...)
All	Regressive Depreciation	40	Companies

The company tax code of 1992 allows to choose between linear and regressive (accelerated) depreciation of investments. The regressive depreciation is calculated on the

⁹² This amount includes the budget for the overall program and therefore includes technologies from other sectors.

residual (depreciated) value of the investment, it is twice the linear, but may not exceed 40%.

Company Tax – Deduction for investment. Company Tax Code (1992)

Deduction for investment. Company Tax Code (1992)			Tax incentive	
Involved technologies	Type of tax incentive	Maximum deductible amount per year	Normal rate	Addressed to:(private, companies...)
All	Deduction for investments	13,5%	0-3,5%	Companies

Companies investing in environmental friendly technologies benefit from a 13,5 % deduction for 2001. Tax payers can spread the deduction on several years. For normal investments the normal deduction is up to 3,5%.

Value added tax (VAT)

Reduction on Value added Tax (VAT)			Tax incentive	
Involved technologies	Type of tax incentive	Value	Normal rate	Addressed to:(private, companies...)
All	Reduction on VAT	6%	12-21%	Natural persons

The legislation fixes the percentage of VAT for installations contributing to improve the energy efficiency of buildings to a reduced value set at 6% instead 12% which is set for coal and solid fuels or 21% which is set for electricity and mineral products.

France (FR)

Lower VAT for RES investments

Lower VAT	Tax Incentive			
Involved Technologies	Type of tax incentive (income tax, VAT tax..)	Value of incentive	Normal tax	Addressed to: (private, companies...)
Every kind of renewable equipment	VAT	Only 5,5% VAT		Private consumers

No impact on industry or businesses, only on consumers;

Implemented in 2001 and expected to continue;

Deduction for investments on income tax

Deduction investments	for	Tax Incentive	
Involved Technologies	Type of tax incentive (income tax, VAT tax..)	Value of incentive	Addressed to: (private, companies...)
Every kind of renewable equipment	Income tax	Deduction of 15% of the investment costs (max. 3.300 Euro/year)	Private consumers

Implemented in 2000 and expected to continue;

Italy (IT)
Tax exemptions for biofuels

Tax exemptions for biofuels			Tax incentive
Involved technologies	Type of tax incentive	tax for RES	Normal tax
Biofuels	Energy tax exemption	0	n.a

Period of the policy: 2001-ongoing

Spain (ES)
Direct Tax Provisions for environmentally Friendly Investments

Technologies included	Type of tax incentive	Value of the Tax	Normal Tax
All RES	Tax deduction	10% liability deduction	35 %

The Corporate Tax Law includes since 1996 a deduction for the earnings coming from environmentally friendly technologies. The measure is funded by means of personal income taxes

Tax on business activities discount

Technologies included	Type of tax incentive	Value of the Tax	Normal Tax
All RES	Tax reduction	Up to 50%	100%

The energy use or production of energy from RES may have a discount in the municipal tax up to 50%. The exact value depends on the municipal authority.

9.1.2.2 Investment Subsidies and Soft Loans

Germany (DE)

Support for biogenic fuels and lubricants

Support for biogenic fuels and lubricants			Investment subsidy
Involved technologies	Minimum Investment size (Euro)	Investment subsidy	Available annual budget (million Euro)
<i>Biogenic fuels and lubricants</i>		Up to 100% of the investment costs	10,23

Subsidy for the conversion of machinery and vehicles in agricultural and other sectors.

ERP and DtA Environment and Energy Efficiency Program

ERP and DtA Environment and Energy Efficiency Program				soft loans	
Involved technologies	Interest loan (%)	Repayment period	Years of free repayment	Addressed to	Max. investment costs eligible (Euro)
all	0			Small and medium enterprises	
New provinces	4,5	15	5		75% of total investment costs
Old provinces	4,7	10	2		50% of total investment costs

This measure represents one of the most important instruments for large scale projects.

Poland (PL)

Ecofund

Foundation for the efficient administration of the money derived from the conversion of a part of the foreign debt of Poland into a fund intended to support environmental protection projects; RES is a priority of the fund; (GHG and air pollution reduction)

Grants mainly for technical investment projects; 15% up to 70 % for innovatory projects;

All types of RES;

Minimum size for some project types

e.g.: 400 kW for biomass boilers

100m² solar collectors;

160 kW wind turbines;

budget 2001: 51 Million PLN; (almost one third of all expenses of the Ecofund)

Portugal (PT)**Vehicle Acquisition Tax Reduction**

Vehicle Acquisition Tax Reduction		Tax incentive	
Technologies included	Type of tax incentive	Value of the Tax	Normal Tax
Solar	Tax reduction	40%	100%

Another tax relief scheme concerns the reduction on vehicle acquisition tax (IA⁹³). 40% reduction for vehicles with hybrid engines partially fuelled by LPG, NG, electricity or solar energy, on one hand, and also fuelled by gas oil or gasoline, on the other hand.

Spain (ES)**Incentives for Biofuels under the Plan de Fomento de las Energías Renovables**

Technologies included	Total Budget (1996-2006) for subsidies	Budget (1996-2006) for other incentives	Budget (1996-2006) for tax incentives
Biofuels	614,8 Mio Euros	577 Mio Euros	37,8 Mio Euros

Special measure within the framework of the “Plan de Fomento de las Energías Renovables” which basically consists of tax incentives, soft loans and investment subsidies.

9.1.3 Post-investment / Implementation

In contrary to promotion schemes for RES-E and RES-H, in the field of transport promotion schemes are dominated by tax-exemptions, first of all of fuel taxes. Therefore the most important (post-investment) schemes for RES-T are energy taxes on fossil fuels and tax exemptions on RES.

Energy taxes are described more detailed in chapter 4.

9.2 Non Financial Strategies

Poland (PL)**Biofuel act**

The objective of **Biofuel Act** is to regulate the creation of wide-scale biofuel market. In the past 18 months Poland witnessed a hot political debate about liquid biofuels for motor vehicles. Biofuel Act finally was adopted with amended third version of the proposal. The project has taken into consideration several proposals of EU regulations. Third proposal, like previous, stipulates that separate filling columns will have to be available with non-bio and bio-fuel, with very clear information displayed about the content of bio-components. Strict control of the quality and composition of the

⁹³ In Portuguese, Imposto Automóvel

fuels will be also implemented. It is also stated that that the bio-components added to fuel must come from the polish raw material, which will soon become in conflict with EU legislation. Finally Poland's President Aleksander Kwasniewski signed the third version of the Biofuel Act on the 17th of November 2003.

The Biofuel Act imposes the obligation of blending bio-components (bioethanol and ethyl or methyl esters) in the conventional fuels. It makes also possible to sell pure biofuels or at high concentration in mineral oil derivatives. It is in accordance with EC DIRECTIVE (**DIRECTIVE 2003/30/EC**) on the promotion of the use of biofuels or other renewable fuels for transport

Biocomponents have to be added both to diesel and gasoline. The amount is set by the Council of Minsters in the form of a decree, each year. For 2004 with regard to biodiesel, the minimum volume of bioesters is 0,11%. For bioethanol including bioethanol in ETBE (ethyl-tertio-butyl-ether) and in ethyl-tertio-amyl-ether the required blend is 1,60 % till the end of September. From 1st October until 31st December it is 2,40 %. The percentage by volume of bio-ETBE that is calculated as biofuel is 47%, The percentage by volume of ethyl-tertio-amyl-ether that is calculated as biofuel is 40%.

9.3 INDIRECT SCHEMES

Many EU countries have implemented some kind of indirect schemes aiming at the support of education or promotion of sustainable transport system. Most of them have a strong focus on energy efficiency and RUE in the field of transport. That includes the promotion of public transport systems as well as regional planning and consumer behaviour. Energy efficiency issues with respect to transport have been excluded from the project **Invert** because this would have gone far beyond the scope of this work.

Partly these policies also refer to RES for transport purposes as biofuels. Some of these programmes are listed below.

Czech Republic (CZ)

Government programme for the support of Energy Savings and the Utilisation of Renewable and Secondary Sources of Energy	
Involved technologies	Max. %
Educational, promotional activities in the field of renewable energy	Up to 100 %

Greece (GR)

Regulation for Rational and Efficient Use of Energy

In 1995, the Greek Ministry of Environment, Urban Planning and Public Works prepared an Action Plan, entitled “**Energy 2001**”, aiming at promoting the use of RES, as well as the application of energy-efficiency technologies, in the building sector. The Action Plan was prepared in order to define specific measures for the reduction of greenhouse gas emissions in buildings, in accordance with the “**National Action Plan for the Abatement of CO₂ and Other Greenhouse Gases**”. Following official adoption of the Action Plan by the Greek Government, “**Energy 2001**” was further reinforced by the enactment of **Ministerial Decree (MD) 21475/98**, which incorporated the provisions of Council Directive 93/76/EC (SAVE Directive) for the stabilisation of CO₂ emissions and the efficient use of energy in buildings.

A successful example is found in the scheme 'Day without Cars' organised by the Ministry for Public Works and Environment, which aspires to encourage the use of public transport and consequently achieve energy saving and environmental conservation. The Ministry is also responsible for the organization of the 'Green Week' every year, which comprises various events. The Ministry for Development has also been involved in the informational campaign about energy labelling of domestic appliances (publication of relevant leaflets, press releases, meetings). Many environmental organizations have also waged their campaigns via radio broadcasts and press releases, handling topics such as RES, energy efficiency in buildings etc.

United Kingdom (UK)

EST Transport Energy Initiative: PowerShift, CleanUp and BestPractice (UK-wide)

Freely available information on sustainable transport including site visits for private and commercial vehicle users

PowerShift and CleanUp programmes provide information (technology registers) and run marketing campaigns on their areas respectively. BestPractice provides information on sustainable fleet management, freight and travel plans for commercial vehicle users.

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