

EUROPEAN COMMISSION
DIRECTORATE GENERAL FOR ENERGY (DG XVII)

SMALL HYDROPOWER
GENERAL FRAMEWORK FOR LEGISLATION
AND AUTHORIZATION PROCEDURES IN
THE EUROPEAN UNION

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Editor: IWB - Ingenieurgesellschaft für Wasserbau
und Bautechnik G mbH

Contract No.: 4.1030/E/93.07

November 1994

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1. Structure of the study

1.0 Main objectives.

During the past few years, there has been a growing awareness by, non-governmental agencies (Declaración de Madrid), individual Member States, European Parliament and the European Commission, of the large potential of renewable energy resources and of its positive impact on the global environment. The Commission with programmes like THERMIE and VALOREN, has contributed to promote new technologies and to develop a good number of small hydro schemes. However the rate of market penetration in the use of renewable energy resources will inevitably be subverted unless major obstacles are tackled with vigorous and sustained action. Political attitudes, reflected in the institutional framework, and distorted competition in the energy market are probably the major obstacles hindering the objectives set out in the ALTENER programme for the year 2005, and more specifically the one aiming to triple the production of electricity from renewable resources.

The objectives of this study, undertaken by IWB mbH in the name of ESHA (European Small Hydropower Association) within the framework of the «ALTENER» programme, entails the institutional framework's problematic and entail the following activities:

- to collect current legislation, and procedures, applicable to Small Hydro in the different Member States
- to analyse the information and data collected in those Member States where hydroelectric energy has a significant potential
- to produce recommendations aiming to simplify existing procedures and coordinate the policy of Member States in the field of small hydro in order to achieve its dynamic development and market penetration.

1.1 Programme of Work

To achieve the above objectives we undertook the following tasks:

1. Complete and update the study drawn up in 1991 by IDAE on «Legislation and Administrative Procedures in the EC Countries with impact on Renewable Energies», to get a valid picture on:

- a) how the independent electricity generation is regulated in the E.C.member states, specifying limits for the installed capacity and/or for the energy supplied annually to the grid
- b) administrative procedures for the authorization of water use (Competitive uses of water; classification of rivers; capacity limits; quantity limits; licencing procedures; regulatory authorities; validity period of licences).
- c) Planning, Construction and Operation licences.(Authorization procedures; regulatory authorities; information to be supplied.
- d) Connection to the grid (Technical requirements;Conditions governing parallel operation with utility networks; connection point; connection voltage; cabling; earthing; metering; transformers; control of producer's equipment; access arrangements; test procedures; certificates of compliance; etc.)
- e) Environmental Constraints. (Requirements of EC directives and international treaties; consequences of national, regional and local legislation on environmental matters; legal obligations for environmental impact assessment; definition of reserved flow; responsible authorities; fishery interests; water quality; flood protection)

- f) Economic and Fiscal Policies. (State subsidies for investments in independent electricity production; tax incentives; local government taxes; allocation of necessary financial resources)
2. Analyse in which form the legislation and administrative procedures in force are hindering a further development of SHP, underlining the differences observed between practices in the Member States
 3. Set up general guidelines to give coherence to the national legislations and administrative procedures in order to promote a further expansion of the use of small hydropower resources

2 Updated Report on Legislation and Administrative Procedures in the E.U. Member States

2.1 Independent production status and buy-back rates

In most Member States, electricity generation and distribution is a monopoly of the state-owned (e.g. France: EDF, Italy :ENEL, Greece:PPC, Portugal:EDP) or well established private owned utilities (Germany, Spain).

Provided, however, that certain conditions are fulfilled, independent electricity generation using renewable energies, is also permitted. and, in general, legislation compels utilities to buy the electricity produced by independent producers in «small» hydropower plants (France, Greece, Ireland, Italy, Portugal, Spain, United Kingdom, Germany).

Independent producers are not allowed in any Member State (with the exception of the UK) to sell electricity to third parties that therefore must be delivered to the grid. The governments, hence, have been compelled to set up rules governing the relationship between independent producers and utilities. One of these rules, fixing the buy-back rate, or price paid by utilities for the electricity delivered to the grid, constitutes a decisive factor in the development of S.H.P.s. Annex I details the buy-back tariffs, valid in the different member states in 1994.

Hereunder is detailed by countries, the legislation corresponding to independent electricity production with special emphasis on the buy-back rates:

2.1.1 Belgium

The generation of electricity is regulated by the Act of 10.03.1925.

Up to now there were no legislation related to the production of electricity using renewable resources. A new project of law (1058-1,14 April 1994), compels the distribution companies to buy the electricity generated by independent producers, located in its area of influence, using renewable resources. Concerning the hydroelectricity, the obligation concerns to the energy generated in plants up to 10 MW.

The price to be paid by the distribution companies is the equivalent to the average price paid by them to the different generation companies along the year, as calculated, by the ministry in charge of the economic affairs.

2.1.2 Denmark

Denmark is not a typical land for hydropower. The existing plants were built according to old privileges. Only one plant, the Tange plant (3 MW) was made according to the actual Danish Law. Public utilities aren't obliged to buy the electricity generated by independent producers, but in general, they agree to do it.

The price to be paid for the electricity delivered to the grid, following agreement between independent producers and the Danish Utilities' Organisation (which is in force until 1994), is equivalent to 70% of the end user price, in the domestic sector, for autoproducers delivering its excess energy and 85% for independent producers delivering all the energy. With the refund, equivalent to the electricity tax - 0.23 Dkr/kWh - and the refund of the 22% VAT, the independent producer delivering all the electricity produced to the grid, gets a price of 0.622 Dkr/kWh

2.1.3 France

The Law 46-628 (8.4.1946) nationalized the electricity industry. Only companies generating less than 12 GWh in 1942 and 1943 were excluded from nationalization.

Nevertheless the amendment of 2.8.1949 (Loi Armengoud) permitted any individual or corporation to generate electricity in plants with a power capacity up to 8000 kVA. EDF was compelled to buy the electricity produced by private generators by the decree 55-662 (20.5.1955), and the decree 56-125 (28.11.1956) fixed sale and purchase terms and tariffs to be applied, evolving in parallel with the E.D.F. tariffs. Notwithstanding, for independent hydroelectric producers with plants up to a capacity of 4.500 kW, a simplified tariff system was negotiated between EAF and EDF that expires at the end of 1994, when it must be renegotiated.

The independent producers with plants up to 8.000 kW can resort to a, theoretically, more favourable tariff, applicable to the energy delivered according to a programme, («fournitures partiellement garanties»). In practice due to the heavy penalties incurred by the producer if does not fulfill the programme, the large majority of independent producers resort to the simplified tariff with only two discrimination periods: the winter season (Nov/March) and the summer season (April/Oct).

Private generators cannot sell to a third party, but EDF is required to transmit the electricity generated by them, to their facilities or their subsidiaries' facilities (up to a maximum of three).

2.1.4 Germany

Anybody, in Germany, can generate electricity, but the distribution is a de facto monopoly, in the hands of well established utilities and local communities.

The German government relies essentially on the principle of the free play of the market mechanism to determine electricity prices. Traditionally, the price paid for the electricity delivered by independent producers, was a result of negotiations between a National Umbrella Organization and the utilities. Utilities were not even forced by law to buy this electricity, and prices paid for it were equivalent to the marginal price (about 0.048 ECU/kWh in 1989). On January 1, 1991, was promulgated the Electricity Supply Law (Stromeinspeisungsgesetz), that established the obligation for the distribution companies to buy electricity from SHP at a certain percentage of the average end user price. Since 1.8.94, when the above law was modified, the buy-back rates for plants up to 500 kW is the 80% of the average price paid by the end user in the last two years: 15.05 pf/kWh. The electricity supplied by plants between 500 kW and 5 MW is 65% of the average end user price: 12.23 pf/kWh.

2.1.5 Greece

The generation transmission and distribution of electricity constitutes a monopoly of the state utility Public Power Corporation (PPC) established by the Law 1468/50.

Whereas the Law 1559/1985, nowadays cancelled except its Article 19, contemplated only the concept of autoproducer (the one that produces electricity to cover his own needs and sell his exceeding to the grid), the Law 2244/1994 that supersedes the above, introduces the concept of small hydropower independent producer, allowed to generate electricity in hydropower plants, not larger than 2 MW (this limit might be extended up to 5 MW, if the proposed plant is not incorporated in PPC's 10-year Development Plan, at the time the potential investor submit a relevant question to the competent service of the Ministry of Industry, Energy & Technology).

The inefficiency of Law 1559/85 has been identified by the Ministry of Industry, Energy and Technology, and a revision of the above Law is under preparation. As far as it is known, the main changes provided by the new Law concern the simplification of the licencing procedures and the possibility given to autoproducers to counterbalance their consumption through the PPC grid, with their production in their SHP. It is hoped that those changes if complemented with more favourable buy-back rates, will promote the development of the mini hydropower plants ($P < 2\text{MW}$). PPC will continue its plans to develop the projects with installed power between 2 and 10 MW.

2.1.6 Ireland

The Act 1927 gives exclusive rights of generation, transport and distribution of electricity to ESB (Electricity Supply Board). Independent production is permitted in hydro plants under 10000 kW of installed power. ESB is obliged to purchase electricity from hydro auto-producers, according to a standard contract of 24.6.91. The average price paid by the Public Utility to the independent producers for the electricity supplied to the grid at medium voltages (10 kV, 20 kV, 38 kV) amounted, until 1994, to 4.0 Irish pence per kWh; for low voltage supplies (380 V) the price was about 95% of the above price.

The situation has now fundamentally changed by the introduction of the «Alternative Energy Requirement (AER)» in April 1994. This initiative has fixed the buy-back rates for the next 15 years by indexing them to the Irish consumer price index. In addition, each new site developer has been invited to bid for an ESB grant on a competitive basis. If the bid is no competitive, no grant will be received and the ESB will also refuse to purchase the

electricity (at any price). The hydro projects will be in competition with bids from SHP, wind and biomass projects as well as being in competition with each other. The AER target is to obtain an overall combined total capacity of 75 MW of projects from all sectors over the next three years. The closing date for registration in the AER was 30 June 1994. Consequently, if the AER rules are rigidly implemented, which is unlikely, it will not be possible to obtain an electricity purchase contract until 1997.

The electricity purchasing tariff is broken down as follows:

	day hours (Mon-Fri)	night & weekend hours
Medium voltage	6,4 p/kWh	2,5 p/kWh
Low voltage	6,1 p/kWh	2,4 p/kWh

2.1.7 Italy

Although electricity generation is a monopoly of ENEL (National Board for Electric Energy), the Law n° 10/1991 on energy conservation, in its article 14, empowers any person, corporate body or local community to generate electricity, from hydro or other renewable resources, without upper limit of capacity (either for its own consumption and/or for selling to ENEL). ENEL has to buy the electricity generated by such independent producers.

On May 12, 1992, it came finally in force the directive 6/1992 of CIP (Interministerial Committee on Prices), which redefines the prices to be paid by ENEL to independent producers, not having received any subsidies for capital investment. Prices depend on whether they deliver all their production (they get better prices) or a part of their production. Prices also differ if the plants have an installed power over 3 MW or less than 3 MW, and also if the plants have less (new plants) or more (existent) than eight years, and if the plant is of the run-of-the-river type or has a reservoir. Next Table reflects the prices in ECU/MWH referring to 1994.

		Plants delivering all the energy or a prefixed part of it		Plants delivering only energy surplus	
		peak hours	other hours	peak hours	other hours
Run-of-river schemes P > 3 MW and schemes with reservoirs		128.31	20.83	base price 102.96 premium* 18.81	20.83
Run-of-river schemes P < 3 MW	new	first 8 years 66.65 remaining 40.83	first 8 years 66.65 remaining 40.83	base price 72.81 premium* 18.81	20.83
	existing	40.83	40.83	72.88 + 18.81*	20.83

* the premium must be multiplied by a coefficient of regularity $R = 1 - 0.55 \frac{\sum s}{E_p}$

where Σ_p = summation of the absolute monthly values, positive and negative, result of the difference between the monthly average of energy delivered in peak hours and the energy delivered in peak hours this particular month and E_p = all the energy delivered in a year in peak hours

An autoproducer can transport his electricity (servizio di vettoriamento) to its own facilities, using the ENEL grid, up to a distance of 100 km, measured by the length of the line. For that service the autoproducer must pay the transport losses plus a fee

2.1.8 Luxembourg

Independent electricity production was legalised in 1993. There is an installed capacity limit of 500 kW/ 1.500 kW and buy-back rates are fixed according to those limits. E.g. for plants below 500 kW, the buy-back rate for peak hours is 2.95 LF/kWh

2.1.9 Netherlands

Independent electricity production was legalised in the early '80 ties, without capacity limit or annual production limit. There are one SHP of 1518 kW (Roermond), one with 4 units of 2.8 MW (Linne) one of 2 MW (Utrecht), one of 10 MW (on the Rhine) , one of 9 MW (Limburg) and various with less than 100 kW each.

Buy-back rates may vary between 5.24 ct/kWh (equivalent to the fuel saving cost) and 10 to 11 ct/kWh approximately, including both fuel saving and capacity (the capacity part of the tariff depends on the plant and varies yearly). Many electricity boards, although non-obliged by law, are paying now higher prices for clean energy, including hydro. Usually they pay up to 15 ct/kWh.

2.1.10 Portugal

According to the Decree 189/88 of 27.05.1988, any person or corporate body, public or private, can generate electricity, provided it employs renewable resources, national fuels, urban or agricultural waste, complies with the technical and safety regulations in force and the apparent power of the scheme does not surpass 10.000 kVA (a combined heat and power scheme is also allowed without limits in power). Local communities can participate in the capital of the above mentioned corporate bodies.

The state utility is obliged by law to buy the electricity produced in the above mentioned circumstances. The price paid for the electricity supplied by the private generators follows the principles of the two-part tariff:

- The energy rate is that paid by the end user, in the voltage level immediately over that used for the connection to the grid.
- The power rate is a function of the power delivered in the peak and day hours.

Asynchronous generators must not draw from the grid more reactive energy than that corresponding to a power factor of 0.85.

For the first eight years, the State guarantees a revenue by the sale of electricity, equivalent to 90 %, in constant money, of the price invoiced by the state utility to the end user in force at the date of the contract being signed between the private generator and the entity in charge of the national grid.

The independent producer cannot sell electricity to a third party unless the area to be supplied does not have a distribution grid, either in service or projected.

2.1.11 Spain

The Law 82/1980, Art. 7, acknowledges the figure of the autoproducer, a person or corporate body that produce electricity to meet a part or the whole of its own needs. The RD 1217/1981 introduces the concept of independent producer, even if it continues to call them autoproducers, when states that the electricity generated in hydroelectric plants with an apparent power per unit, not higher than 5.000 kVA, can be delivered totally or in part to the grid, at the prices specified by the Minister of Industry and Energy. The RD 907/1982 details the relationship between autoproducers and electric utilities, including technical requirements for their interconnection and tariffs to be used. The R.D.1544/1982 to further promote the use of an autochthonous and renewable resource as the hydroelectricity, extended to the electricity generated in hydroelectric plants over 5.000 kVA, built after the 16/7/1982, some of the benefits granted by the RD 907/1982.

The energy delivered by an independent producer may be classified according to the nature of the energy produced as follows:

- Guaranteed supplies, when the producer signs a contract, for at least two years, to provide energy according to annual programmes, specifying the maximum and minimum power to be supplied at peak hours, day hours and night hours.
- Scheduled supplies, when the autoproducer sign a contract to provide the distributor, a certain amount of energy for the next week, subject to giving notice on Friday
- Fleeting energy, when the autoproducer provides electricity erratically.

The price of the kwh is calculated on the basis of the energy rate paid by the end user in the tariff 1.1, for final users with «short utilization», connected at 36 KV. This rate is updated every year by the Ministry of Industry & Energy. No power term is applied. This price, incremented by a percentage corresponding to OFICO («adjustment fund for the electricity sector»), -in 1990 it was 3,5 %-, is multiplied by:

- 0.95 for guaranteed supply
- 0.90 for scheduled energy
- 0.85 for fleeting energy

The rate varies with the time in which the energy is delivered, so if the scheme permits water storage, the producer can deliver the energy in peak hours (4 hours per day) with an increment of 70 %. On the contrary, the price of the energy delivered in the night hours (8 hours in a day) is decreased by 43 %.

The independent producers that have asynchronous generators should pay to the utility into whose grid are connected, a monthly fee equivalent to 10 % of the demand rate corresponding to the reference level 1.1 (less than 36 KV). If the power factor surpasses .90 the independent producer will receive a bonus; if it is below .90 he will pay a charge. In practice the price paid to the independent producer is 70 % to 80 % of the price paid by the end user connected to the same voltage level.

The private generator cannot sell electricity to a third party but can use it in its own facilities, even if they are located far from the plant, paying a fee to the grid (RD 58/1990).

2.1.12 United Kingdom

The Electricity Act 1989 denationalised the electricity industry, and enabled the Secretary of State for Energy, of the Department of Trade and Industry, by Orders, to regulate competition within the privatised industry, and between it and genuine independent producers. Apparently any person can generate electricity in a hydro plant, as independent production, up to 50 MW. After that you need permission of the Secretary of State for Energy, of the Department of Trade and Industry. In Scotland over 1 MW you need permission from Secretary of State for Scotland. RECs (Regional Electricity Companies) are not statutorily bounded to buy the electricity supplied by the independent producers (unless they supply to the Pool, but small hydro producers never do for all sort of reasons). If you get an NFFO contract they have to accept it (but they can make connection charges so high you can't get one)

Section 32 of the Act enables the Secretary of State to require that the public electricity suppliers (the distributors) contract for a specified amount of capacity of non-fossil fuelled generation (the NFFO or non-fossil fuel obligation), some of which may be nuclear and some renewable. This would generally be at a price that was above the average pool price (or the price paid to large generators) but with a more restrictive contract. Section 33 enables the Secretary of State to levy money on sales of fossil-fuelled electricity and to distribute the money to cover the added cost of the non-fossil supplies over the cost had it been fossil-fuelled. The amount of the levy is set each year by the DGES. The first tranche of Renewable Energy covered by a NFFO order was set in 1990 for 102 MW of capacity and the second in 1991 for 457 MW. Twenty-six small-scale hydro schemes with a total capacity of 11.9 MW were offered contracts. Fourteen (14) of these were at new or renovated sites with a capacity of 5.2 MW. In the second tranche 12 hydro projects were contracted at 6p/kWh with a total capacity of 10.36 MW. At the same time 36 hydro projects in Scotland received contracts under a similar arrangement. Further NFFO tranches for renewable energy were announced for England & Wales, Northern Ireland and Scotland (Where is known as Scottish Renewable Order or SRO)

2.2 Administrative procedures for the authorization of water use

An important legislative factor affecting the development of SHPs is the water abstraction procedure which in many countries is very lengthy and complex (e.g. France, Spain, Italy), whereas in others can be fairly quick and straightforward (e.g. Portugal, UK).

The length of time for which a permission of water abstraction is granted also varies from country to country.

2.2.1 Belgium

Water use is regulated by the Law of 28.12.1967, concerning non-navigable rivers. According to this law, the rivers are the property of the Region, the province or the local community depending on their classification. Non-navigable rivers are classified in three categories:

class 1: rivers with a catchment area over 5.000 ha.

class 2: rivers others than class 1 and 3.

class 3: rivers or part of rivers that remain in the same local community where they begin.

A non-navigable river is defined as beginning where its catchment area reaches 100 ha.

In non-navigable rivers the permit to use water should be addressed to «Direction de l'Environnement et des Ressources naturelles» (Région wallone) or to «Departement Leefmilieu en Infrastructuur», Ministerie van de Vlaamse Gemeenschap (Flemish Region).

The authority in navigable rivers is the «Administration des Voies Hydrauliques, Ministère des Travaux Publics de la Région Wallone» and «Departement Leefmilieu en Infrastructuur», Ministerie van de Vlaamse Gemeenschap (Flemish Region).

2.2.2 Denmark

The Watercourse Act no. 404 was issued on 19.5.1992

2.2.3 France

Water in France has public domain status by the Act 16.10.1919 which states that no one can utilise the energy of the tides, rivers and streams without the State's authorization. Concerning hydroelectricity the Act distinguishes between schemes with an installed power up to 4500 kW (small abstractions) and schemes with an installed power over 4500 kW (large abstractions). In small-scale schemes the abstraction of water is the result of an authorization; in large-scale schemes it is the result of a concession. The authorization, as distinct from the concession, is precarious and can be eventually repealed, without indemnity, on the basis of national defense, public safety, salubrity, navigation requirements or protection of aquatic biota. In the authorization procedure, compulsory purchase benefits are only granted to local communities, while in the concession procedure the works to be undertaken may enjoy the benefits of public utility status, making possible compulsory purchase of land by the State and making it available to the producer, without charge. Actually in practice, a private producer never obtains these benefits.

Requests for large water abstractions (remember that the Act Armengaud of 02.08.1949 allows independent producers to build and operate power plants up to 8000 kVA) are addressed to the Minister in charge of energy. The producer should include a dossier constituted according to the decree 88-486 (27.4.1988). After a preliminary study at Ministry level, the dossier is sent to the «Préfet du département» where the main works will be located, to be made public and to be considered by the regional authorities concerned. The results of these formalities are transmitted to the Minister in charge of energy, who proceeds to a final consultation with the involved authorities in the central administration. The producer is informed of any necessary modifications to the project, and after hearing the «Mission Interministérielle de l'Eau» and the «Conseil Supérieur de l'Electricité et du Gaz», the project decree with the concession is sent to the First Minister, and approved by the «Conseil d'Etat». Once authorized to abstract the water, the producer should request the approval by the «Préfet» for the execution of the engineering project. The procedure, requiring six or seven years, grants a concession for 75 years that can be extended for another 30 years.

Requests for small abstractions (the flow that multiplied for the maximum available head and for 9.81 gives a power not bigger than 4.500 kVA) are addressed to the «Préfet du département» where the scheme will be located, who should acknowledge receipt of the dossier within 8 days. The dossier to apply for the authorization should enclose: developer identity (either a person or a corporation); main characteristics of the scheme (intake level, tailwater level, water storage capacity, if any, abstraction flow); description of the schemes with adequate layout drawings; upstream and downstream power plants; estimated capital cost and time schedule; technical and financial capabilities of the developer; justification of ownership of the land where

the powerhouse will be located and right of pass for the waterways and electric lines (a compromise of location will suffice); and an environmental impact assessment if the plant has more than 500 kW installed power, or a «notice d'impact» if the power has less than 500 kW The «Préfet» should send a copy of the dossier to:

- The service charged of the water policy: the DDE (Direction départementale de l'Équipement) for the navigable rivers or the DDAF (Direction départementale de l'Agriculture et de la Forêt) for de no-navigable rivers. This service study the dossier and, eventually, can complete by asking 10 extra copies to the developer, that should send them within 6 months. The study should be finished in a month (those delays are never respected)
- The service responsible for the electricity (DDI), that should retain the project that made a better use of the energy contained in the river course.
- The service responsible for the fishing activities (DDA), that requires information from the «Conseil Supérieur de la Pêche» and from the «Fédération Départementale de la Pêche».
- The service responsible for the environment.

Theoretically, the lack of response of those organisms within two months, are considered as a favorable answer (but in practice this is never respected). At the reception of the above responses the service at the charge of the water policy, return the dossier to the «Préfet», with its proposals of denial or pursuit of the procedure. In case of denial, the «Préfet» will inform the developer with the reasons for the denial.

If the procedure is pursued, the application is submitted to public information, for a minimum period of one month and at the same time the Prefect requires the advise of the «Conseil Général» and the «Commission départementale des sites et environnement», that usually is unfavorable. Two months after the end of the quest, the service in charge of the water policy should send a definitive proposal to the Préfet, that consequently inform to the developer

Since April 1981, a certain number of streams have been classified as non-apt for hydroelectric production. The Decree 81-377 includes the first list of streams where no authorisation ever be granted. The Decrees 84-433 (8.6.1984), 86-404 (12.3.1986), and 87-835 (28.7.1987) enlarge the list of classified streams, and since then more and more streams have been classified as non apt for hydroelectric production. In 1993 less than ten (10) licences had been granted and in 1994, probably only one or two will be granted.

A good number of old schemes - built before 1919 - should be relicensed from 1994 on, and it is expected that the relicensing procedure will also take time (fortunately, in the meantime the plants will continue to operate).

2.2.4 Germany

Water use is regulated by the Act «Wasserhaushaltsgesetz (WHG)» of 16.10.1976, at federal level and the «Landeswassergesetze» issued by the different «länders» at the länder level. The use of water must be authorized at lander level (e.g. Brandenburg 31.1.94, Sachsen 12.1.93, etc.) -a decentralized procedure- by the responsible authorities: «Landratsämter», «Untere Wasserbehörde» and «Regierungspräsidium».

The authorization -»Wasserrechtliche Erlaubnis«- has a validity period of 30 years. In theory the time needed to get a licence is six months, but in practice it varies from land to land. In the Eastern länders, there is no clear definition of how to cope with the old rights for use of water. Whatever the river, new hydropower schemes, by environmental reasons have few changes of being authorised, and practically only rehabilitation of existing plants is permitted.

2.2.5 Greece

Water use is regulated by the Act 1739/87, implemented by the Ministerial Decrees 256/89 and 5813/89, and the authority responsible for granting licences for industrial or energy purposes is the Ministry of Industry, Energy and Technology (YBET). Concerning the use of water resources for energy purposes, the law applies for small (< 5 MW) plants.

The law divides the country into fourteen (14) water divisions. A central advisory body (Interministerial Water Committee) and regional bodies are established for each water division.

A detailed study (including the type and the basic features of the plant's equipment, the cost of the generated electricity, the environmental impact, etc.) should be submitted to the Prefect of the department where the future plant will be located. No installation licence is required for plants up to 20 kW.

The length of time for which a licence is granted is limited to 10 years but can be extended for an undetermined period. The administrative procedure for licensing can be as short as 2 months (Law 2165/93). Licensing is only granted to autoproducers.

2.2.6 Ireland

Water use is regulated according to the riparian rights system. The claim to obtain a right to use water belongs only to those who have access to water through ownership of land bordering a river or stream.

The obstacle in Ireland is the planning permission. The normal planning permission application procedure must be made to the local planning authority (see 2.3). Requirements of other Governmental bodies need to be taken into account.

2.2.7 Italy

The public character of surface and underground water was asserted by the T.U.n.1775 of 11.12.1933, that defines the licensing procedure (art.7-12), the term of the licence (art.21-24) and the abstraction fees for the production of electricity (art.35-38). The law distinguishes between large and small abstractions; hydroelectric purposes are considered large, if the installed power is in excess of 3.000 kW. The licences for large abstractions are granted by the Ministry of Public Works (MLP), whereas the licences for small abstractions are granted by the regional authorities (DPR 616/1977).

The authorization for small abstractions is addressed to the provincial branch of the regional Settore Opere Pubbliche e Difesa di Suolo where the scheme will be located, together with a preliminary project of the hydraulic works to be undertaken to abstract, convey, use and return the water. The Settore has 45 days for a preliminary examination of the project. Once the project is accepted by the «Settore», the investor has to pay 1/40 of the foreseen annual abstraction fee - with a minimum of italian Lit 10.000 -and a sum to cover the costs of the procedure. Details of the project, including the name of the proposer, the site location and the abstracted flow, are published (40 days) in the Official Gazette of the State and in the F.A.L. of the province. Thirty days after the publication of the request the Settore sends a copy of the request to the «Albo Pretorio del Comune» and to several interested regional agencies giving a term of 30 days to present objections. The next step is a visit to the site; if there have been no objections the procedure is simple and quick. If there are objections the objectors should attend the meeting where the producer can defend the scheme. At the end if

objections remain in force a decision of the «Commissione Tecnica Administrativa Regionale» is required. Finally the Settore prepares a draft of the licence, containing the following information:

- . Flow to be diverted
- . Head between the weir and the tailrace
- . Nominal power of the scheme
- . Description of the hydraulic works to be undertaken
- . Requirements to be respected as demanded by the different regional institutions
- . The term of the licence (no longer than 30 years)
- . The abstraction fees
- . The sum to be deposited as bail and field-testing charges
- . A list of laws and regulations on which the licence is conditioned
- . Legal residence of the licensee

The draft, duly signed by the licensee, is approved by the «Giunta Regionale» and published in the Official Gazzette and in the F.A.L. In total the process takes 370 days, which in practice is doubled or tripled.

The Law No 9/1991, in its article 1, considers the simplification and revision of the procedures for authorization of small hydro plants. Of particular interest is the enactment of a regulation that will foresee, among other things, the «peremptory» deadline for the granting of permits, after which date the permits are considered officially granted. The law foresees the abrogation of the TU 1775 of 11/12/1933, once the by-laws announced in article 1, point 1 are in force. But since 1991 no bylaws had been promulgated and consequently the above mentioned procedures remain in force.

2.2.8 Luxembourg

The authorities responsible for a permit to use water are the Ministries of Agriculture, Public Works, Environment and Employment as well as the local community.

2.2.9 Portugal

The licensing procedure to use water for electricity generation is defined in the «Portaria» n°445/88 and 958/89 of 8 July and 28 October respectively. To avoid unnecessary studies, the potential investor, can obtain from the «Instituto da Água» (INAG) preliminary information on the possibility of using water for electricity generation at a certain site. The «portaria» 958/89 specifies the required information to be supplied by the investor: location of the site on a map 1/25000, stream profile, catchment area, type of dam or weir etc. The INAG should provide the required information within 30 days. If the answer is positive the investor can request authorization to use water for producing electricity, presenting the same documents, complemented by a feasibility study, to the «Ministro do Planeamento e da Administração do Território». Once the INAG has verified that the documents presented comply with the requirements of Art 4 of the above «portaria» a payment of 300.000 portuguese escudos should be made. Within a further 60 days, (that can be

extended exceptionally by another 30 days), the INAG will authorize the abstraction of water for a term of 35 years. In this authorization the reserved flow to be provided in the scheme will be specified. If there is more than one project for the same site, the INAG may take another 30 days for their evaluation. There is an order of priorities to be respected in this case; EDP has priority, provided the project they present will, in an average hydrological year, produce twice as much energy as the proposed, and with an internal rate of return at least as great as that specified in the National Energy Plan. The installed power and the execution time should not differ more than 20% and 10% respectively from those foreseen in the feasibility study. Otherwise the project will be reconsidered and a new authorization will be required (Pn°156,Art°9-1). The DGE must decide and inform the proposer in no more than 60 days (DLn°189/88,Art°19°- 5). The DGE report can only be negative if the project does not comply with the technical requirements specified in Article 19°-6. If the DGE report is positive, the Ministry of Industry and Energy should issue the permit within a further 30 days. The producer should commence the works within three years (DLn°189/88, Art° 27°-6).

Recently a new Decree Law - N° 46/94 of February 22- regulates the licencing procedure. By contrast to the above described principles, the demand is submitted to the DRARNs (Direcção Regional de Ambiente e Recursos Naturais) instead to the headquarters of (INAG) in Lisboa.

On receipt of the authorization for the abstraction of water the producer should provide a bond for 5% of the budgeted cost of the scheme. This bond will be redeemed by 50% when works corresponding to 50% of the investment have been constructed. The balance will be redeemed once the MIE authorize the plant's operation, and in any case no more than 180 days after the notification by the producer of the completion of the works (Pn°240, Art°12-2).

No public or private corporate body can have more than 40 MW under construction, by which is meant the total amount of installed power of the projects, which, having obtained water- use authorization and building permits, had not required at the expenditure of at least 10% of their budgeted investment (Pn°249,Art°14)

The contract for the sale of electricity between the private generator and the utility in charge of the national grid, is a standard contract defined in the «portaria» n° 416/90 of June 6.

2.2.10 Spain

The use of water is regulated by the Water Act - Ley 29/85 - that nationalized both surface and underground water, and by the R.D. 849/1986 that developed the Law. A short decentralized procedure, applied to small hydro plants, not exceeding 5.000 kVA per unit, is specified in RD 916/85, and was partially modified by the RD 249/88. A detailed description of the extremely complex procedure is given in a publication of the Ministry of Public Works, «Manual de pequeñas centrales hidroeléctricas». The procedure is outlined below.

The investor should request authorization from the corresponding river authority (Confederación Hidrográfica), enclosing data such as name and address of the petitioner, stream from where the water will be abstracted, flow to be abstracted and point of abstraction. The request is published in the Official Gazette of the Province, giving a month for anyone else to present a competitive project. In the meantime the investor should present his project, justifying the flow to be abstracted, the net head, the installed power and the energy to be produced in an average hydrological year. A list of the properties affected by the project should be enclosed when the investor requests the benefits of compulsory purchase. A bond for 1 % of the budgeted cost of the scheme must be lodged at that time, and will be redeemed on completion of the works.

The river authority has 10 days to examine the documentation and send it to the corresponding authority in the field of industry and energy in the region where the scheme is to be implemented. The river authority has 5 days to decide if the project conflicts with the plans of the State for that catchment area. The investor is informed of a possible conflict, if such is the case, which may affect his project and he must confirm his intention to proceed with the duly amended proposal within 15 days. Within 10 days of such confirmation, the project should be published in the Official Gazette of the Province allowing 20 days for objections. At the same time a copy of the documentation is sent to the Autonomous Region where the scheme is to be implemented. The Region has three months to report on matters within its competence. The river authority has 40 days to report on the project in view of the received objections. After consulting with various governmental bodies, the river authority informs the investor under which conditions the licence for water abstraction will be granted. At the same time the corresponding regional authority in the field of industry and energy authorizes the scheme and approves the electromechanical installation in the powerhouse. If it is the case that DGE grants the benefits allowed under the Law 82/1980 on energy conservation, the investor must proceed to sign the pact with the Ministry of Industry and Energy.

The water abstraction licence is given for 25 years, and usually extended for another 15 years. Notwithstanding, if within the last 15 years, another scheme with higher social interest than the original one, and non compatible with it, is undertaken, the licence would expire and the licensee wouldn't receive any indemnity from the State.

The procedure, theoretically «short», is lengthy and complex. If the terms are respected the procedure should require approximately one year, but in practice it can take 5 or more years.

2.2.11 United Kingdom

The Water Resource Act 1963 nationalized water as a naturally occurring commodity in England and Wales. The Act was extensively amended by The Water Act 1989, which replaced the former Water Authorities by Water Companies and a National Rivers Authority (NRA). The Water Resources Act 1991, a consolidating measure, embodies the 1989 Act.

Abstractions over 20 m³/day must be licenced (1989 Act, Sch. 13, Article 6). According to Sch. 13, paragraph 31 of the Act, «abstraction, in relation to water contained in any source of supply, means the doing of anything whereby any of that water is removed from that source of supply, whether temporarily or permanently, including where it is so removed for the purpose of being transferred to another source of supply and abstract shall be construed accordingly». Sch. 13, Article 18 of the 1989 Act specifies that «no charges, other than those for the purpose of recovering administrative expenses attributable to the exercise by NRA of its function in relation to the licence, shall be levied in respect of water authorized by a licence to be abstracted for use in the production of electricity or any other form of power by any generating station or apparatus of a capacity of no more than five megawatts».

The investor must apply to the NRA for a licence, giving full details of the proposed abstraction. He must publish the application in the London Gazette and in local newspapers and make it available at a convenient place near the site, to be inspected for 28 days. The NRA then considers the objections (if any) and decide the amount of abstraction it will permit. It then issues a licence for this amount for a period of 15 years (NAWPU the national association of water power users propose to get at least 30 years, but the issue is not yet decided)

In Scotland and N. Ireland, where the NRA doesn't operate, no licence is required (but as stated in 2.1.12 hydro plants over 1 MW, cannot be build and operate, without special permission of the Secretary of State for Scotland)

2.3 Planning, Construction and Commissioning

Independently from the authorization to use water, a permit for the planning and construction of the scheme must, in general, be requested separately. The administrative requirements and procedures vary from country to country.

2.3.1 Belgium

The authorities responsible for granting the permit of construction are the «Direction Général de L'Aménagement du Territoire et du Logement» in the Wallone Region and the «Ruimtelijke Ordening en Leefmilieu» in the Flemish Region. The length of time to get this permit is estimated at 75 days minimum.

An independent organisation which inspects the safety of the electric equipment has to approve the installation (AREI rules) before commissioning

2.3.2 Germany

The authorities responsible for granting the permit for construction are the «Landratsämter», the «Regierungs Präsidium» and the «Wasserwirtschaftsämter». A minimum of 3 months is needed.

2.3.3 France

The authorization does not include the permit to build the required structures on the river bed. A permit for building is required from the mayor of the local community where the plant is to be built.

The competent authorities verify on the site that the works conform, either with the «cahier des charges» (concession) or with the water regulation (authorization). The minutes of the visit constitute the permission to operate the plant and are sent to the authority responsible for granting permission: for plants requiring an authorization to the Prefect, for bigger plants to the Ministry of Energy.

2.3.4 Greece

The Ministerial Decree 2708/1987 lists all the documents to be submitted, in order to get the relevant licences to install and operate a small-scale hydro scheme.

A control by competent services of the Ministry of Energy has to be performed.

2.3.5 Ireland

The promoter must apply to the County Council for Planning Permission. The County Council must react within two months, i.e., they must either grant Planning Permission, refuse it or seek further information. The County Council must then make a decision within another two months. If the promoter is not satisfied with the decision of the County Council he may then appeal to An Bord Pleannala (The National Planning Appeals Board). A hearing before An Bord Pleannala is public and representations may be made by any interested party. In the event that a planning application goes this far, the whole procedure usually takes about 18 months. On receipt of an application for Planning Permission the County Council will consult with the Department of Fisheries, the Office of Public Works and the Electricity Supply Board. Once Planning Permission has been granted there is a time limit of four years to erect the scheme

During the late 1980s and early 1990s it was very difficult to get planning permission for small hydro projects due to environmental reasons. In fact ESB had to abandon a good part of its Valoren funded SHP development programme due to the extreme difficulties occurred in obtaining planning permissions. In the last two years the situation has improved somewhat due to a better understanding between private developers and environmental authorities, in particular in non-touristic areas.

2.3.6 Italy

All constructions require a building permit issued by the competent local authorities. Authorisation procedures are governed by national law and are uniform throughout the country. Applications should be submitted to the local authorities.

Moreover, the Ministry of Industry, ENEL and the Technical Office of Building Taxation (UTIF) must be informed of the intention to install a generating plant.

2.3.7 Portugal

Once a licence is granted, the developer should present a project of the electrical scheme to the «Direcção Geral de Energia» (DGE) and the civil works project to the «Instituto da Água» (INAG) which should decide in no more than 60 days. If the decision of both agencies is favourable, the «Ministerio da Indústria e Energia» (MIE) must grant the authorization for construction, within 30 days.

The competent authorities verify on the site that the works conform with the concession. The minutes of the visit constitute the permission to operate the plant and are sent to the authority responsible for granting permission.

2.3.8 Spain

The Ministry of Industry should certify that the developer has a water use licence and that he meets the specification of independent producer according to the Decree 1217/1981. The regional administration responsible for energy must approve the electro-mechanical project (decree 2617/1986). Building permission from the local community authorities is required before beginning the works.

2.3.9 United Kingdom

Hydro power installations are «engineering works» and will therefore require planning consent under the Town and Country Planning Acts. The Local Planning Authority, usually the District Council in England & Wales, the Regional Council in Scotland, has authority to permit or refuse an application, having regard to various «Plans» which set out strategies for land use, and to designations of areas of land (e.g. «Area of Outstanding Natural Beauty» - AONB) which entail degrees of restriction. A fee is payable. In the event of a refusal, an Appeal may be made to the relevant Secretary of State.

Outline drawings and a feasibility study, while not legally necessary, are almost always required. Way leaves for pipelines cables or overhead lines are required from land-owners.

The Planning Authority will also consult other bodies, and their consultation of the National Rivers Authority will add to bureaucratic duplication.

Actual commissioning is carried out by the installing contractor and, as appropriate, representatives of the makers of the machinery, and of course the owner. On the electrical side, for a grid-connected plant, the «Public Electricity Supplier», i.e. generally the local electricity company into whose mains the power will be fed, will be keenly interested and will insist on tests being performed to ensure that the protection devices function correctly, also the metering. The PES normally supplies the metering, either directly at the generator's expenses, or on hire.

The Health and Safety Executive, Factory Inspectorate would also be involved with plants which are commercial and where there may be employees involved. They would inspect the plant and premises. Likewise the Local Fire & Rescues Service would inspect and make sure that fire precautions, appliances, escape routes, etc. are in accordance with the rules.

An EC Directive 89/336/EEC, May 1989, that came into force on 1st January 1994, covers electromagnetic compatibility: both the ability of equipment to prevent interfering emissions, and its capability to avoid effects from other emissions.

However, no numerical standards have been set. Generally speaking, it is portable radios or radio telephones which are susceptible to interference. It remains to be seen whether the simple load-controllers which use switched triacs, and which produce interference on medium and long wave, will be banned. Incidentally, this directive will come into force, in a near future, in every Member State.

2.4 Connection to the grid

Specifications for connection to the grid can also be a deterrent to the development of SHPs and/or affect the viability of a scheme. Utilities that require unreasonable or unnecessary specifications or conditions (locating the connection point far away from the plant) strongly affect the feasibility of a scheme. In any case, utilities should guarantee a certain quality in its service, therefore asking for certain requirements from the independent producer to be connected to the grid.

2.4.1 Belgium

The technical specifications for the connection to the grid of independent power plants of less than 1 MW installed power, are set out in the note C.G.E.E. 2735 of 10.02.87. Furthermore, the document BCEO 2901 of 09.01.91 gives strict guidelines for the connection to the grid by independent producers.

2.4.2 France

The technical requirements for connection to the grid are regulated by EDF bylaws. The connection point will be fixed by E.D.F.. In case of disagreement the DIGEC (Direction du Gaz, de l'Électricité et du Charbon, Ministry of Industry) will arbitrate. The line between the powerhouse and the grid has to be built at the expenses of the independent producer.

2.4.3 Greece

Technical conditions for the connection of private generators to the grid are listed in the Ministerial Decree No. 2769/1988.

2.4.4 Ireland

The technical conditions regarding connection to the grid for independent producers are contained in two documents:

- (a) General conditions governing continuous parallel operation with ESB distribution network of a directly connected synchronous generator (October 1990).
- (b) Conditions governing continuous parallel operation with ESB distribution network of a directly connected mains excited asynchronous generator (May 1989).

Furthermore the installation must be wired in accordance with the latest edition of the National Rules for Electric Installations of the Electrotechnical Council of Ireland.

2.4.5 Italy

The electro technical committee issued in 1987 the Standard n° 22-10 on plants for decentralized production of electric power up to 3000 kW, that provides the criteria for the connection of those plants to the grid.

2.4.6 Portugal

The connection point will be chosen by agreement between the producer and EDP. In case of disagreement the Directorate General of Energy (DGE) will arbitrate the conflict within 30 days. The line between the powerhouse and the grid has to be built at the expenses of the producer but then becomes part of the grid.

The maximum nominal apparent total power of the plant will be 100 kVA, if it is connected to a low voltage line, or 10.000 kVA if it is connected to a medium or high voltage line. Asynchronous generators when connected to a medium or high voltage line may not exceed 5000 kVA. The apparent power of the plant may not exceed 5 % of the minimum short-circuit power at the connection point. The technical requirements for the connection to the grid are specified in a document published by the Ministry of Industry and Energy «Guia Técnico das Instalações de produção independente de energia eléctrica» (December 1989).

2.4.7 Spain

The OM 5.9.1985 stipulates the technical requirements for the connection to the grid of small hydroelectric plants. The distributor, to which the private generator will be connected, must indicate the connection point, the connection voltage, and the maximum and minimum short circuit power. The connection point should be chosen to minimize the investment on the connection line. In case of disagreement the Directorate General of Energy (DGE) or the corresponding regional authority will arbitrate. Asynchronous generators can be connected to a low voltage line, whenever its maximum nominal apparent power does not exceed neither 100 kVA or 50 % of the power of the transformer feeding the line. For plants connected to medium or high tension lines, the maximum total nominal apparent power of the generators should not exceed 5.000 kVA if they are asynchronous or 10.000 kVA if they are synchronous. In both cases the apparent power cannot exceed 50 % of the power of the transformer feeding the line.

2.4.8 United Kingdom

The Regional Electricity Companies (RECs) doesn't object to the physical connection to the grid, but can charge for it what they like. Independent producers are pretending that OFFER (the Office for Electricity Regulation) adjudicate and scale these charges, but this issue is not yet resolved.

The Electricity Council Regulation G59 specifies requirements for paralleling independent generators with the national distribution system. The main aim is safety, for both parties. Recent developments have enabled manufacturers to meet the requirements at an economic cost.

2.5 Environmental Constraints

In a time of increasing concern about global warming through the «greenhouse effect» and the acid rains consequent upon every transformation process involving combustion, small hydropower plants, with no gaseous emissions or waste problems whatsoever, constitutes one of the less polluting energy transformation process. Recent studies show that a small hydro plant of 5 MW avoids the emission of 16.000 t/year CO₂ and 110 t/year SO₂.

The environmental legislation set up by the different countries, with which SHP developers have to comply, are well in line with the CEC Directive 85/337. As detailed hereafter most of the national governments require for the small hydro projects, an Environmental Impact Assessment (EIA), even if this kind of projects are not included in Annex I of the mentioned directive. Even more, at the level of regional and local authorities, aiming to protect the interest of the fishermen or worried by its punctual effects, the constraints are often much more stringent. Power houses are considered in many municipalities as a noisy and disturbing activity requiring adequate sound mitigation measures.

National legislations require, in general, that any works undertaken in a river bed provide a minimum flow ensuring the life and reproduction of fish, and include devices allowing the free passage of migrating fish. The determination of this flow (reserved flow) can be critical for the development of a site, because a too large reserved flow can make economically unfeasible an otherwise good scheme. In most countries reserved flow is stipulated by law, that only fixes a minimum value, but still permits local communities to impose unreasonable additional flows. Certainly, the right value of the reserved flow should be based on actual hydro-biological parameters and not on overestimated values established under the pressure of local ecological groups.

2.5.1 Belgium

In the Flemish Region, electricity falls under the VLAREM legislation. Plants from 100 kW up to 10 MW belong to category 2, while plants over 10 MW belong to category 1. For both categories, temporary building and exploitation permits can be granted under strict conditions. EIA needed in certain areas. For plants under 100 kW there are no restriction but sound regulations.

There is no legislation concerned reserved flow, but there is a non-written guideline, fixing it at one third of the instant flow, with a minimum fixed case by case.

2.5.2 Denmark

Denmark has no specific legislation on that matter. However, in 1992 there were promulgated the Nature Protection Act no. 9/3.1.92 and the Act on Fresh Water Fishing no. 330/14.5.92.

2.5.3 France

The Law 76/629, of 10.07.76, requires, for schemes over 500 kW, an EIA that must be included in the documents presented for the water use licensing; for smaller schemes a simpler assessment, called «notice d'impact», is demanded. The EIA must comply with the article 2 of the decree 77.1141 of 12.10.1977, that develop the Law. A hydro-biological assessment of the stream is required. Article 4 of same decree specifies the contents of the «notice d'impact». The Law 80/512, of 15.07.1980, to protect the nature, the fauna and the flora, permits to classify by decree certain rivers as «reserved rivers», on which any new authorization will never be issued. In the last few years more and more rivers have been classified as «reserved rivers».

The Act 84-512 (Loi relative à la Pêche en eau douce) of 29.06.1984, controlling fishing in fresh water requires, for LTAF discharges under 80 m³/s, a minimum RF equivalent to 10 % of the Long Term Average Flow (LTAF). When that discharge of 80 m³/s is exceeded the minimum RF is fixed at 5 % of the LTAF (Art. 232-6 du Code Rural). Notwithstanding this, an Administration can impose a higher RF if it considers it necessary for fish protection.

2.5.4 Germany

Various laws of the federal states (Bundesländer) assure the protection of the environment.

In some federal states, the residual flow is established by the authorities case by case (common decision of the local Parliament and the Water Economy Office); in others special regulation exists.

In practice, in Bavaria the R.F. can vary between 1/3 of MNQ and 1 MNQ; in Nordrhein- Westfalen, 0.2 to 0.5 MNQ; in Rheinland-Pfalz 1/3 to 1/2 MNQ, in Baden-Württemberg seasonally graduated, and in Hessen case by case. (MNQ is the average low water flow).

2.5.5 Greece

The EC directive for the protection of the environment is valid in Greece. The basic law for the protection of the environment (avoidance of pollution, protection of ecosystems, etc.) is the Law 1650/1986. Special laws and rules for small hydro do not exist, however the auto-producer must refer in his request the environmental impact caused by the operation of his plant. Environmental impact and restoration landscape studies, are required by law, and must be approved by the National and Regional Planning Councils. The Ministerial Decree 5387/90 defines the context of these studies. The operation licence of plants causing unfavourable environmental impacts may be revoked. Penalties are provided by the Law 1559/85.

There is no specific legislation on RF. The RF is determined case by case in the licensing procedure. For the issue of the pertinent license the optimum exploitation of the hydro potential as well as multiple uses of the water are taken into consideration.

2.5.6 Ireland

SI 349/1989 requires an EIA for hydro plants over 20 MW. For smaller schemes the planning authority usually requires an environmental impact study, even if it is not strictly required.

The Fisheries Act 1959 stipulates that the Small Hydro Operator on a salmon river must «make provision for the passage of fish». The small hydro operator is obliged to fit 2 inches (50 mm) screens above and below the turbine at the point of divergence from the main watercourse. Also during the months of March, April and May he must fit a grating of such dimensions that will actually prevent the admission of salmon or other small fish. The interpretation of these conditions lies between the promoter and the Department of Fisheries.

The minimum RF is 1 % of the LTAF. In the west of Ireland, where rivers with anadromous fish are the norm, large RF are now usually required at low head run-of-the-river schemes (typically the flow that is in the river for at least 30% of the year).

2.5.7 Italy

An EIA is only required (D.P.C.M. 23/12/1989) for schemes involving the construction of large reservoirs.

There is no national legislation concerning RF. The Public Works Ministry considers each case on its own merits. Notwithstanding the Autonomous Regions have their own legislation. The Province of Bolzano requires 2 l/s per km² of catchment area (Gazzetta Ufficiale della Repubblica Italiana 48 - 18/2/1983). The Regione Piemonte requires a RF of 10 % of the instantaneous discharge, with abstraction ceasing when the discharge is under 120 l/s in the river Anza, 5 l/s in the river Rosso and 30 l/s in the Ollochia (Bollettino Ufficiale della Regione Piemonte 20 /5/1987).

2.5.8 Netherlands

The E.I.A. is obligatory only for plants over 50 MW. Two Acts, the so called «Natuurbeschermingswet» and the «Hindernet» (effects on the nature and on the surroundings respectively), assure the protection of the environment from the legal point of view.

The Regional Water Boards, through negotiations with the plant owner determine the reserved flow

2.5.9 Portugal

Following the Water Act of 2.8.1985, (Title V, art.90) an EIA must be included in the documentation required for the water abstraction licence.

The INAG specifies the RF in the licence for water abstraction. The criteria used for determining the RF have not been published, but take into consideration, catchment area characteristics, aquatic life in the stream, and number of schemes in the area.

2.5.10 Spain

An EIA must be included in the documentation required for the water abstraction licence. In the Autonomous Community of Galicia, the approval of the EIA is previous to initiating any other procedure. Any scheme which interferes with river discharge by impoundment or by abstraction should make provisions for the safety and passage of fish.

The Water Act (2.8.1988) requires an RF that is at least equivalent to the average summer flow or 2 l/s per km² of catchment area. However the regional governments (Autonomias) can enforce a higher value. The Autonomous Community of Asturias has issued a «resolution» (21.01.1988) concerning RF that classifies the streams in three categories. In class 1 the RF will be the largest of the following three values in l/s:

$$\begin{array}{lll} \text{a) } Q_{ec} = 0.35 Q_{347} & \text{b) } Q_{ec} = \frac{15 Q_{347}}{(\ln Q_{347})^2} & \text{c) } Q_{ec} = 0.25 Q_{347} + 75 \end{array}$$

In class 2 Q_{ec} is the result of adding 2 l/s per km² of catchment area to the Q_{ec} of class 1. In class 3 Q_{ec} is the sum of 4 l/s per km² of catchment area added to the Q_{ec} of class 1. Q_{347} is the streamflow equalled or exceeded 347 days per year.

2.5.11 United Kingdom

Under European Community Directive N° 85/337 which came into force in the UK on 3 July 1988, an EIA must be made for projects which are likely to have a significant effect on the environment by virtue, inter alia, of their nature, size and location. This Assessment must be taken into consideration by the Planning Authority.

The Salmon and Freshwater Fisheries Act 1975 requires any scheme which interferes with river discharge by impoundment or by abstraction to have regard for the safety and passage of fish. Sections 12 to 15 of the Act refer to sluice-gate operations, grating for protection of fish intakes, discharge points and consents.

(Scotland)

The Regional Council determines the RF in the licensing procedure, according to the seasons and the kind of migrating fish existing in the rivers.

The RF may vary between 5 and 25 per cent of the LTAF; 10 per cent is the norm. When the natural flow approaches the RF, the power plant operation is stopped.

(England and Wales)

The RF is set by the National River Authority when it issues a licence. Cases are considered individually, but the minimum RF is the 95 % exceedance flow, i.e. the flow equalled or exceeded for 95 % of the time.

2.6 Economic and Fiscal Supporting Policies

Although there exist in the national legislations State subsidies and fiscal incentives, in most cases funds don't exist anymore for those purposes. In the mediterranean countries, and particularly in Spain and Portugal, the Valoren programme represented a definitive support for hundreds of schemes. Hereunder it is presented the situation in the various Member States:

2.6.1 Belgium

There are no programmes supporting the development of small hydropower

2.6.2 Denmark

Subsidies to individual plants using renewable resources are subjected to the decision of the Ministry of Energy. This subsidy started with 30% of the capital cost, has been reduced subsequently and finally expired in 1989. The programme, designed for windmills and biomass uses, never was applied for SHP.

Since 1980, when the energy taxes were established, the energy produced in plants using renewable resources is tax exempted; but since 1984 the independent producers receive aside a refund equal to the normal electricity tax. Today this refund amounts to 0.23 Dkr per kWh. To this is further added 22 % VAT on the refund.

2.6.3 France

There are no subsidies for SHP development. In fact the Ministry of Environment estimates that during the next few years there shouldn't be any development of the installed capacity.

2.6.4 Germany

National Banks like KfW (Kreditanstalt für Wiederaufbau) and DtA (Deutsche Ausgleichsbank) offer credits with lower than market interests for investment in Renewable Energies (RE). The latter offered credits for SHP (between 1.1.91 to 30.6.93) of about 33.5 million DM. Many States and local governments especially in the new Länders have supporting programmes for RE development amounting to 20-30% of the capital investment, for a total amount of 3.5 million DM, that can be employed for SHP. Also focussed in the new Länders is the subsidy programme for environmentally friendly power stations that is operated by the Deutsche Bundesstiftung Umwelt, the German Foundation for the Environment. They offer 10 million DM for three years, starting 1993.

There is a new programme for 1994, supported by the Federal Ministry of Economic Affairs with 10 million DM for projects in the field of RE; the subsidies for SHP apply to plants with an installed power up to 0.5 MW. A follow-up programme for ensuing years can be introduced by the end of 1994. Subsidies will be paid for the erection of inflatable weirs on top of the old ones to increase head and consequently power generation. Table IV shows the situation respect to subsidies in the German Länders.

Furthermore no coal tax (Kohlepfennig) is paid for the electricity generated in small hydro plants up to 5 MW.

2.6.5 Greece

Law 1892/90 in force since July 31, 1990 provides incentives (grants, interest subsidy, tax deductions) for investments on energy conservation, including plants to generate electricity with renewable resources. The law replaces the old series of development ones, that had proven inefficient. The law has not proven to be quite effective until now, because although, in theory the Law provides a subvention up to 45 % (55 % in certain cases) of such investments, the buy-back rates and the lack of reliable hydrological data, hinder the promotion of private development of SHP.

2.6.6 Ireland

There is no legislation to incenting investments on Renewable Energy Resources.

2.6.7 Italy

Law 308/25-5.82 introduced grants and incentives for energy conservation and generation of electricity by renewable energies, administered in part by the Ministry of Industry and in part by the Regions. A total budget of Lit 1588 billion were allocated in the first three years of implementation of the Law, and contemplated subsidies of up to 50% of the capital cost. A decree was promulgated in 30-11-82 for the payment of subsidies for the refitting and the construction of SHP with a total installed power up to 5 MW. Law n° 10/1991 supports, at least in theory, the promotion of SHPs, subsidizing up to 30% of the capital investment in SHPs up to 3 MW. Unfortunately this law finances also the cogeneration plants that have received most of the allocated resources, and consequently hasn't supported SHP. There is general agreement that there are no more funds in this Law, and that the government isn't likely going to assign some more.

2.6.8 Luxembourg

The Ministerial Regulation of 18/9/90 provides subsidies to foster the use of new and renewable energy sources. This regulation defines the eligible operations, the possible beneficiaries and the application procedure. The subsidy is granted after the completion of the works and calculated on the basis of the submitted receipts of expenses made. Also of particular importance is the Law of 1988, that complements article 32 of the Income Tax Law, and provides a special depreciation allowance for investments in renewable energies equipment.

2.6.9 Netherlands

Dutch policy towards renewable energy resources is applied through a series of basic programmes, although there is practically no specific legal frame for them. The few incentivising measures concern biomass and wind energy.

2.6.10 Portugal

Government Law no. 188/88 of 27 May and the Government Regulation 334/88 established the SIURE programme to promote the development of renewable energies. The candidate operations may comprehend from investment projects in the field of energy conservation, energy production and substitution of oil-derivative resources, up to energy audits, demonstration projects and technical/economic feasibility studies. This system articulates the national support with the ECC programs of financial incentives to capital investments (VALOREN) and activities of R&D&D (CEC) in the energy field. During the first phase of implementation of SIURE 113 projects were approved, corresponding to a total investment of 6500 million escudos and a financial support of 1800 million escudos.

2.6.11 Spain

Although the Law 82/80 on Energy Conservation contemplated capital incentives, and soft loans for the development of renewable energy schemes, the funds allocated were expended since long time. The VALOREN programme established financial aids, according to the Ministerial Order no. 8552 and promoted the construction of more than 300 SHPs during its validity period. There is not foreseen in a near future more financial incentives for the development of SHP.

2.6.12 United Kingdom

Concerning SHP, there is a project to provide up to 50% funding for the services of an approved external consultant, aimed to encourage the assessment of new opportunities for investment in SHP schemes and for the adoption of the best practice in the future use of this energy source. The cost of the study ranges from £4.000 to £15.000 depending on the use and history of the site. One hundred and four studies have been initiated so far; seventy three have been completed and thirteen abandoned at an early stage with no expenditure. Of the 73 studies completed, 5 have been constructed and were operating in early 1993, and 13 had not gone ahead for planning or other environmental reasons.

3 Analyse in which form the legislation and administrative procedures in force are hindering a further development of SHP

As a result of the work undertaken to elaborate this report, we could spot the most relevant barriers affecting the development of the Small Hydro sector. Most of them are related to the institutional framework:

- In 1980, following the oil crisis of the 1973 and 1979, european governments set up the pertinent legislation to encourage renewable resource development, giving special encouragement to small hydropower projects. However the regulatory history during the last few years has shown a significant reversal of policy, moving from the wholesale removal of institutional obstacles to a near hostility to new projects. With the exception of Germany, where buy-back tariffs were significantly improved, national policies switched, through the application of the administrative procedures, from a support and encouragement of small hydro development to the erection of new and daunting barriers to its development.
- The authorization's procedures of small hydro schemes are the best example of the gradual erosion of earlier benefits. Although theoretically, so called «short» procedures legally exist in many countries, up to five years are frequently required to get an authorization to build and operate a hydroelectric power plant. The case is particularly acute in France, where many rivers have been classed as unsuitable for hydroelectric production, no matter what environmental measures could have been foreboded and in Germany, where in spite of the important advances being introduced by the new Electricity Law, there are few chances for a new scheme to be approved.
- In spite of higher government officers usually praising the use of renewable resources -renewable sell well politically- by not providing the necessary integration of the different implied authorities, the procedures are extended beyond any foreseen time.
- Watercourses have many competitive uses - irrigation, water abduction, angling, recreation etc.- that could be easily integrated, but that in practice always seems to oppose each other. For instance, in France, where angling associations are very powerful, their opposition frequently lead to the denial of the licence.
- The environmental impact of small hydroelectric schemes is often largely exaggerated. Although it is generally admitted that small-hydro is globally environmentally friendly, by not releasing CO₂ and acid gases to the atmosphere or compromising the future of the manhood with radioactive wastes, the pressure of local ecologist groups results in the denial of the licence or in the imposition of overstringent environmental regulations that make unprofitable, otherwise excellent schemes. This is particularly true when an unnecessarily high reserved flow is assigned at the time of granting the concession.
- With few exceptions, the electricity generated by independent small-hydro producers must be delivered to the grid. The generation of electricity being up to now a «de facto» monopoly, the price to be paid for this electricity must be regulated by the competent authorities. In some countries, this price is too low to make the schemes profitable, and in others is the object of short term contracts that hinder the financing of the project. Fortunately, in 1994 the situation experimented a noteworthy improvement: Belgium and Greece recognised the status of independent producer, improving the buy-back tariffs and enlarging the limit for small hydropower to 10 MW, and in Spain, a new draft of decree will setup the medium term contracts for the sale of electricity, and the limit to be considered «small» also to 10 MW.
- Small hydro is capital intensive; without innovative financing systems - project-financing, third party financing, subsidised loans etc. - its development is compromised.

Hereunder the most relevant findings: (According to the point 1.1 we'll limit the analysis to the countries where small hydropower has significant potential: France, Germany, Greece, Ireland, Italy, Portugal, Spain and United Kingdom)

3.1 Independent production status

Every member state, hereunder analyzed, empowers any person, corporate or local community to generate electricity from hydro, or any other renewable resource (combined heat and power schemes are also allowed for the same purpose in most of the countries). In all those countries, except UK where the obligation is limited to producers with an NFFO or a SRO contract, the distribution companies, are compelled by law, to buy all the energy delivered by the autonomous producers, unless there is technically impossible.

The maximum power capacity of a hydro plant, to be allowed to generate electricity under the status of independent producer, varies from country to country. The maximum power capacity for a plant to be permitted to generate electricity as independent production is not necessarily the same as to be considered «small». Table II in the ANNEX reflects the situation in the Member States subject to analysis.

3.2 Power's limit to be qualified as «small»

There is no consensus in M.S. on the definition of small hydropower: some countries, like Portugal, Ireland and now, Greece and Belgium accept 10 MW as the upper installed capacity; in Italy the limit is fixed at 3 MW (plants with larger installed power should sell their electricity at lower prices) and in France the limit was established at 8 MW. Spain and UK favour 5 MW, although in Spain this maximum power is understood as the power of each unit, and a small power plant can have several (no limited) units. (A new decree related to the independent production of electricity will fix, in Spain, the limit at 10 MW of total installed capacity)

We recommend that all Member States fix the limit at 10 MW, the same figure adopted by ESHA and UNIPEDE (International Union of Producers and Distributors of Electricity)

3.3 Connection to the grid

In all the analysed countries there is a pertinent legislation concerning the connection to the grid for independent producers. The first and usually most controversial item is the location of the connection point. In general the connection point is chosen by agreement between the distributor and the producer although in France is fixed by EDF; in France, Portugal, and Spain a governmental agency will arbitrate in case of disagreement. It must be assumed that if the decision is entirely left in the hands of the distributor, the obligation of purchase would be only nominal because the distributor can invalidate the obligation forcing the producer to connect at a considerable distance of its plant. In UK the distribution companies (RECs) can charge as much as they like for the connection, whereby the obligation to purchase the electricity (already limited to the winners of a NFFO bidding) is practically eliminated.

Regarding the technicalities of the connection, there are no major problems, because the specifications are fixed by the standards in use, guaranteeing the safety of the installations. In France and Ireland the technical conditions are regulated by the State owned electricity company. In the other countries the conditions are fixed, either by the government itself or by the national electro-technical committee.

3.4 Water's rights authorization

This is definitely the most controversial issue. In most of the countries the procedure for small hydro plants is decentralized and one definite authority is responsible for the procedure (in France the «service de police des eaux», in Spain the basin authority, in Italy the «Settore Opere Pubbliche e Difesa di Suolo», in Portugal the DRARNs (Direcção Regional de Ambiente e Recursos Naturais). In Greece and UK the procedure is centralized, respectively in the Ministry of Energy and in the River Authority.

What makes the procedure so long and complex is the large number of regional and local departments that must be consulted. The experience shows that some of those departments defer by months their response, slowing the whole procedure. We are well aware that the use of water, being of public domain, cannot be granted using the administrative silence as a positive response, if the time limit for processing the applications is surpassed, but the Administration responsible for the authorization should make use of this principle for the reports to be delivered by the affected departments.. Authorization procedures cannot exceed 16 months, and preferably be solved in one year.

Usually, the authorization procedure is broken down in parts, duplicating the time required for the procedure. E.g., the Administration granting the permit for the electric connection line is different that the one that authorise the use of water, and duplicates the procedure: consultation with different departments, public information etc.

Unfortunately the period of validity of the operating licence, has been decreasing in the last few years. Licences that were either perpetual or with a validity period of 75 years, are now granted for a much shorter period (10 years in Greece, 15 years suggested in UK, 30 years in Germany, 35 years in Portugal, 25 years with a supplement of another 15 in Spain...). Since the beginning of the century, the selling price of the kWh has been dramatically reduced in real terms. Today the price of a kWh is ten times less in constant money that in the 1910s, where most of the small hydro schemes were built. Consequently, the pay-back period had been extended. In the mediterranean countries, where the small hydro potential is more relevant, the droughts menace the feasibility of new schemes at medium term. Thirty five years -renewable- should be the average norm.

3.5 Environmental impact

This point is very closely connected to the water rights authorization. In some areas (e.g. Galicia , Spain) the environmental impact study is previous to any other procedure's step. Probably as much as 90% of the authorization's denial came from a refuse of the authority responsible for the environment, based either on their own criteria or under pressure of the angling or pseudo-ecologists associations.

Globally small hydro power, as a no gas emitter, is one of the friendliest ways of generating electricity. However, the global convenience of generating hydro-electricity must be reconciled with the need to protect the water biota. In Switzerland a working group known as «water power conciliation group» consisting of representatives of Federal and Cantonal Governments, of well-known associations for environmental protection and of energy producing associations, is aiming to establish a consensus in the conflict between exploitation and protection of natural resources.

Furthermore, it should not be ignored that small hydropower (up to 10 MW) is exempted from the so-called CO2 taxes in the proposed directive of the CEC no. 226/2-6-92 to the council.

A green label granted by a «conciliation group» as the above, consisting of representatives of Central and Regional Governments, of well-recognised associations for environmental protection and of energy producing associations, aimed to reconcile the exploitation of the hydraulic energy of the watercourses and the protection of these watercourses, could be acceptable if that will mean that it wouldn't be discussed in the ulterior process of the scheme authorization

4 Set up general guidelines to give coherence to the national legislations and administrative procedures

4.1 General comments.

The comments hereunder had been elaborated using excerpts from communications of well known specialists to international conferences or from papers published in renowned magazines, so they represent not only the opinions of the report's authors but also those of developers, consultants and manufacturers, through Europe.

A potential investor, before building can begin, should apply for the water use authorization, and that implies incurring in preliminary expenses to pay for an Environmental Impact Assessment and a feasibility study, which must be undertaken by a firm or individual consultant with credibility. Such studies will cost between 10.000 and 15.000 ECUs, depending on site location, available data and the kind of organization undertaking the study. Then you should add the solicitors' fees for agreement with owners and the purchase of land, if necessary (most national procedures requires you own the land where the plant will be located and the right of pas for waterways and electric lines), expenses that can amount close to 10.000 additional ECUs. All that means, that before to apply for the authorization, the developer has already expended from 20.000 to 30.000 ECUs, without knowing in advance if he will get the licence. Here comes the first element of risk, because the rules of the game are not well established and no investor can be sure to get a positive answer. Once the developer applies for the authorization, must wait from three to six years, to get a response, due to the objections presented by the environmental and angling lobbies, which frequently oppose the construction of new schemes. Once obtained the water use authorization the developer still needs to get the approvals: to build the powerhouse, in a land that, being usually of rural nature, must be reclassified for industrial use; to lay the electric connection line that depends of other regional authority; to make the preliminary equipment tests.. etc.

To avoid that situation, the qualifications to be satisfied in order to obtain a licence should be clearly established, and the procedures streamlined, so it can be granted in a maximum period of one year. One only responsible authority should be responsible for all the authorizations, and the required advice of other administration or authorities should have a character of subsidiarity; if their reports don't arrive at the time required by the procedures they should be considered as favorable. Environmental opposition will be the main problem to tackle. In Switzerland, a working group known as the «water power conciliation group» consisting of representatives of Federal and Cantonal Governments, of associations for environmental protection and of energy producers associations, is actually aiming to obtain a consensus in the conflict between exploitation and protection of the nature. We wouldn't object to the creation of a green label for SHPs, granted by a group like the above mentioned, on the basis that this label would guarantee the licence approval in short time.

Since most SHPs are of the run-of-river type, with little or no storage, the hydrological assessment is critical. This is the second element of risk. Although there may be many years of record of rainfall and/or gauged discharge, there cannot be a guarantee that sequences of dry years will not occur. Dry years mean low output and low revenues, and conventional loans take no accounts of natural events. The developer can always insure his scheme against such a risk, but it will increase his operation expenses. The generalization of innovative financial schemes that share the risk (e.g. third party financing) would help to develop a scheme. Otherwise, the short period of validity of the licence, such as is becoming usual practice in the M.S.'s concessional procedures, would hinder such development.

The heavy capital costs of small hydroelectric schemes need to be paid back with revenues coming from the sale of electricity. Here again the price consented by the distributors (a small hydro independent producer cannot sale its electricity directly to a customer and must deliver it to the grid) varies widely from country to country. As shown in Table I, the price per MWh varies from a low 12.67 ECUs for Belgium to a high 75.95 ECUs for NFFO contracts in UK. Furthermore in some M.S. prices long term contracts between utilities and independent producers don't exist. Here comes the third element of risk. According to the C.E.C Recommendation of November 1988, buy-back tariffs should be established on the basis of long term avoided costs. But in some countries, distribution companies use for this purpose the fuel avoided cost. Here again there is a lack of coherence between objectives and means to reach them. In Switzerland, the «Energy 2000» programme, consequent with the new Energy Article within the Federal Constitution in 1991, established, among other objectives, a growth of 5 per cent for hydropower. The new Resolution for the Use of Energy fixed the electricity buy-back rates for renewable electric energy based on the equivalent costs for the production of energy from new «clean» Swiss plants, and the Federal Department of Traffic and Energy recommended a minimum average rate of SFr 160/MWh (approx. 107 ECU/MWh). The E.U. aim to triple the electricity generated with renewable energy (The Energy National Plan of Spain has the same objective) but keep the rates at a level incompatible with the construction of new plants. And all that because every M.S. refuses to internalize the external costs of the conventional processes. A step forward would be to accept higher rates for the first eight years of operation (the way chosen in Italy, but with far too low rates), considering the extra rate as a government subsidy to pay for lower CO₂ emissions. With fair rates, developers could easily cope with extra requirements in nature's protection, improving the chances of granting the licences. Already in some M.S. (Germany and others) the river authorities take a part of the «ecologic» expenses in the form of fish ladders and protection grids, under the general framework of river bed's improvements.

At the same time something must be done to avoid the building-up of portfolios of authorizations: just applying for licences with the idea of building-up a portfolio of concessions, to speculate with them in future and postponing the construction of the schemes. This probably has been one of the motives of the great load of procedural applications in recent years in some M.S.. The petitioner of an authorization should be obliged to pay a certain substantial percentage of the construction budget, to be rescued as far as the construction is going on as planned in the time schedule. In some M.S. that bond already exists (in Portugal represents 5% of the budget).

4.2 Precise recommendations

A «light directive» should, in the opinion of ESHA, include the following aspects:

- 1 The maximum limit for a hydropower plant, to be considered as small, would be 10 MW, following the principles adopted by four Member States, by ESHA and by the International Union of Producers and Distributors of Electricity (UNIPEDE).

- 2 The procedure for SHP authorization should figure out all the qualifications to be satisfied by the plant. That includes the layout of the plant, the requirements for the plant to be inserted in the landscape in function of the territory where the scheme will be built, and the fish circulation devices to be incorporated (Fish passes, protection grids etc), depending on the river. The reserved flow will be proposed by the consultant that made the environmental impact assessment, following the national legislation on the matter, but the local administration can increase its value by proving that it is necessary for the protection of the biota. By a normal juridical principle the one that made a statement is the one that should prove its necessity, and not the other way around
- 3 The authorization to build and operate a small hydropower scheme should be the responsibility of one organism, preferably of a decentralized administration agency (Basin authority, Regional delegation of the services responsible for the natural resources, etc.) . The procedure should specify the time required by every procedure step and the responses of the administrations concerned by the scheme, requested by the responsible agency, should respect this period of time; at the end of this period the lack of response will be considered as favourable. The organism responsible for the authorization should fulfill the procedure in a maximum period of 16 months. All required authorizations for the building and operation of the plant (building licence, electric connection lines authorization, right of pass on communal land, etc.) should be requested by the above mentioned organism. That means that sixteen months after the application, the authorization must be denied or the plant can start to be built.
- 4 The price to be paid for the energy delivered to the distributors' grid should be based on the long term avoided cost of the new plants, to be built in the future, and should include the external costs (environmental, social, dependency of fossil resources, enforcement of local grids, etc.) consequent to the conventional generation process. A certain capacity term should be included in the tariff, considering that, even if a single SHP cannot ensure any capacity, the whole park of SHPs can.
- 5 Due to the long life of the electro-mechanic equipment employed by the SHP, the relative long pay-back periods of the capital investment, and the uncertainty of the hydrological cycles, the validity time for the authorization wouldn't be below 35 years renewable.

Note from C. Penche: As shown in the ALTENER Seminar (Santiago de Compostela) environmental discussions are the main reason to extend the authorization period and even to deny it. It was clear in the seminar that we should find a set of rules, defining the environmental requirements of each scheme, for this to be approved. These requirements vary with the circumstances: schemes in high mountain or on the plain; schemes on rivers with anadromous fish; schemes located on natural parks, etc. I propose to include here, as clause 6, the last paragraph of article 3.5, but being a very sensitive point I would like to know the remarks coming from persons or institutions involved in the process, to decide if this clause should be included here or not.

