SMART –
Strategies to Promote Small Scale
Hydro Electricity Production In Europe

Small Hydro Power Plants In Europe: Handbook On Administrative Procedures Requested

JULY, 2009

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EXECUTIVE SUMMARY

This Handbook is deliverable of Work Package No. 2 “Review of normative, legal procedures and environmental issues” of the project SMART. The handbook, addressed to Public Operators, with the summary and critical review of the existing normative, institutional procedures and environmental issues to install hydro electric plants, includes the following topics:

- Administrative and technical procedures to obtain concession to derive water, used from the public local authorities in each country of the partnerships: strong and weak points of any legislation;
- Environmental issues concerning the installation of different types of mini hydro plants;
- Connection of mini hydro plants to the electric network in different countries;
- Intervention strategies for improving of existing procedures related to the implementation of mini hydro plants.

Direct expected benefits, among others, are the following: reduction of legal barriers through the implementation of clear/standard administrative procedures to obtain SHP concessions; improvement in the management of water resources, taking into account the need of producing electricity with SHP; increase of the knowledge of public administrations and related institutions concerning SHP. All this will contribute to an intensive diffusion of SHP.

INTRODUCTION

The SMART project (Strategies to promote small scale hydro electricity production in Europe) is supported by the “Intelligent Energy - Europe” Programme (Contract N°: EIE-07-064). The coordinator of the project is Provincia di Cremona - Italy, with other partners in the project being: CESI RICERCA SPA (now ERSE) - Italy, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture - Croatia, Karlovac Regional Authority - Croatia, Norwegian University of Science and Technology Trondheim - Norway, Regional Secretariat of Attica - Greece and Energieagentur Waldviertel – Austria. Duration of the project is 36 months.

The SMART project addresses the important barriers for the expansion of small-scale hydro electricity production in Europe: the lack of suitable support methodologies and tools able to create a clear view of the mini-hydro potential in the territory, the complexity of the legal/administrative processes to obtain concessions, the economical/financial attraction of private investors. The main objective of the project is to give clear contributions to pull down these non-technological barriers, as helpful tools for the European, national, regional and local authority decision-makers for increasing the implementation of small-scale hydro electricity plants. Due to policies, methodologies & tools to improve water resources management, to better communicate, disseminate opportunities to investors, and to increase the interest of stakeholders to invest in small-scale electric plant will be defined. Five representative regions in the partner countries will serve as learning areas about strategic actions. A mix of disseminating tools, website, contact points, publications, meetings and workshops will be carried out. Target groups are national, regional and local authority decision-makers, public operators, investors, end users in general.

The SMART project has six Work Packages. This Handbook is developed within the frame of the project Work Package No. 2 “Review of normative, legal procedures and environmental issues”. The Handbook gives a review of normative, institutional legal procedures and environmental issues assessing the latest developments in the implementation of small-scale hydro electric plants in EU/partner countries identifying the strengths, main obstacles and weak points of the existing practices for concessions. The aim is to reduce legal barriers through the implementation of clear/standard procedure to obtain the concessions permissions. This will result in improving the awareness of the small hydro electricity potential and the benefits related to its exploitation. Other directly expected results, among others, are the following: improvement in the management of water resources, taking into account the need of producing electricity with SHP; increase of the knowledge of public administrations and the related institutions concerning small-scale hydro electricity potential in their own territory; increase of the interest of stakeholders to invest in SHP, also through private/public join initiatives; increase the dissemination of SHP initiatives including new opportunities among final users in general; exchange of experiences concerning small hydro power generation, within the partnership and with other EU countries, wide dissemination of the findings of the SMART project across the European countries.

The Handbook addresses all groups and persons involved in the use of hydropower and in particular SHP. These are: public administrators, producers, distributors/sellers, research centres, users of this energy source and on other and all groups having any influence on the processes. The most important target groups are: the public local authorities that have to give water use concession; regional/national organised and transnational decision-makers, representing several entities in their country; policy decision-makers in the participating countries and EU-wide; investors; small and medium enterprises; entrepreneurs; esearch centres; universities; professional disseminators and multipliers such as energy agencies; environmental organisations; non profit organisation; European Small Hydropower Associations (ESHA) + RES associations. Using the Handbook recommendations, they will be able to act more effectively, improving their awareness and knowledge of problems associated with the diffusion of SHP. The promotion of small-scale hydro electricity production in Europe will contribute to an intensive diffusion of SHP, which will have positive environmental, economical and political impacts.

The Handbook consists of the following five chapters.

Chapter 1 “Inalienable principles regarding the right to use water and the authorization of SHP in different EU countries” presents inalienable principles (a mention to competing uses of water) and kinds of permits in partner’s countries.

Chapter 2 “Analysis of the normatives about SHP in different EU countries (Italy, Croatia, Greece, Norway, Austria, Portugal, Spain, Serbia, Bosnia & Herzegovina, Bulgaria, Romania, Germany and Poland)” presents the general overview of the situation of SHP implementation, institutions responsible for making and executing acts (laws), rules, permissions and procedures, review of the normatives and mention to forms of state support for SHP electricity production both in partners countries and in the neighboring countries.

Chapter 3 “Analysis of environmental and administrative procedures in different partner countries about SHP” gives legal SHP definition, delegated and concerned authorities in partner countries and describes procedures such as Environmental impact assessment, Obtaining the concession for use of the water, The authorization to build an SHP and The authorization to build the electric line of SHP - procedure to connect the plants to the grid. All procedures are presented with required application of technical documents to be submitted (technical, economic and environmental sections of the laws), timing of procedures (from application to license granting), costs (taxes, procedure fees, and other compensation costs), evaluation criteria and flow chart.

Chapter 4 “Critical review of different regulations regarding the points of Chapter 3” presents the weak and the strong points of different regulations and most important conflicts related to the use of water in partner countries.

Chapter 5 “Strategies to improve the existing regulations” gives recommendations, methodologies and tools to apply to new applicants to be authorized in different partner countries.

CHAPTER 1

INALIENABLE PRINCIPLES REGARDING THE RIGHT TO USE WATER AND THE AUTHORIZATION OF SHP IN DIFFERENT EU COUNTRIES

This chapter presents inalienable principles (a mention to competing uses of water) and list of main requested permits (i.e. kinds of permits) in partner countries.

1.1 ITALY

1.1.1 Inalienable principles (a mention to competing uses of water)

1.1.1.1 Public nature of water resources

The Legislative Decree 152/2006, art. 144 states: "All waters, surface water and groundwater, even though not drawn from underground, are a state property". Italian regulations have referred to the public nature of water since the Albertine code in 1865[1] which divided state properties into public state property and assets. Public state property includes rivers and streams that are inalienable by their nature. Any other asset that belongs to the State is part of its property, alienable by means of specific acts. Such principle is entirely resumed in the current civil code. Italian legislation, from the unity of Italy onwards, has basically considered water as a public property capable of generating advantages for the benefit of the prevailing political and economic interests. In this general framework, the laws that followed had two fundamental aims:
the protection of the public use of water was to be considered a priority as against possible private use. This aspect was faced without a proper planning of water use;
the protection from disasters connected to water. It is no accident that the first regulations governing the concession grants were part of the legal regulations regarding public works.

Law no. 2644 of 18842 separated the rules and regulations of water use from public works regulations and established the cataloguing of public waters: that is of those waters that by their nature and quantity could meet public use interests. Such aptitude, that the water body had to possess in the natural state, was to be declared through the registration of the water body in the relevant lists of public waters through the agency of the Ministry of Public Works after hearing the homonymous Higher Council. [3] That same law changed and streamlined the concession procedure for diversions. The streamlining of the procedure, carried on thanks to the issuing of the Royal Decree of 9th October 1919, no. 2161[4] was necessary to meet the extraordinary energy increase, and thus the extraordinary increase of concession requests for hydroelectric use, raised due to the war. The increase of concession deeds also required the establishment of a special magistrature, the court for waters, in order to settle the controversies arisen due to the ever increasing use of water by third parties. In those years, a substantial change took place: the social benefit derived from the public use of water became a minor point if compared to the benefit deriving from certain private uses for industrial and agricultural purposes. Consequently, concessions became the most important instruments for the management of the asset. The limit is the precise and not programmatic nature of such management.

The first systematic action regarding waters took place in 1933, with Consolidation Act no. 17755,

[1] **Civil Code of the Kingdom of Italy 1865: Book II of Ownership, Chapter III of the assets with regard to their owners** art. 425 and following: "…rivers and streams …are state properties";
[2] **Law no. 2644 of 10th August 1884 on public water diversions;**
[3] **Law no. 2248 of 20th March 1865 annexe F public works act.** It shows that water rules and regulations derived directly from the law on public works. It considered water only from the limited point of view of civil defence, that is protecting people and territories from overflows;
[4] **Royal Decree no. 2161 of 9th October 1919 provisions on public water diversions and uses and on reservoirs and artificial lakes**, abrogated by art. 234 of the R.D. of 11th December 1933, no. 1775;
[5] **Royal Decree no. 1775 of 11th December 1933 Consolidation Act of the provisions of the law on waters and electrical systems (Italian Official Gazette no. 5 of 8th January 1934);**

where water, rather than being seen as a common asset for the whole community and intended for the fulfilment of primary needs, was considered as a resource necessary to support the national energy policy, through the production of hydroelectric power: the essential "white coal " for a country poor in fossil fuels. Such systematic approach towards waters, set by the 1933 regulations and the relevant enacting decree6 has been in force so far. Under the over-mentioned consolidation act, water was basically used for the production of hydroelectric power, for drinking water and for irrigation. The real change as regards the public nature of the resource took place with the issuing of the Galli act in 19947, which in art. 1 states that all waters, surface water and groundwater, “even though not drawn from underground” are public, regardless of, as provided for in previous regulations, their aptitude to become public as a result of their registration in the relevant lists. Such principle introduced the distinctiveness of water, progressively less available, which cannot be under sway but only used, and as such it must be protected in order to optimize the resource and to manage the local water services efficiently from the functional and economic point of view.

The Galli act turned water into a resource, not an asset anymore, and as such it must be preserved for future generations. So the barycentre of the public water system moved towards the use regime rather than towards the ownership regime. The legislative decree of 3rd April 2006, no. 1528 abrogated the Galli act and further changed the definition of public waters, stating that: “All waters, surface water and groundwater, even though not drawn from underground, are a state property”. Art. 823 of the civil code prescribe the following rule as regards the circulation of all state properties: they are inalienable and they cannot be subject to third parties’ rights, except in the terms and conditions set by the laws concerning them.

1.1.1.2 The protection of the rights of third parties

It refers to the protection of the legal title to use water obtained through a concession deed. The grant of concessions must provide for an inspection of the existing uses which must not be, in any way, damaged by the prospective new use. Such protection is carried out by means of a particularly long administrative procedure, which envisages at least 4 steps for the application to be publicized, and as many steps so that any interested person can take part in the proceedings with remarks or justified objections towards the proposed diversion. Any use considered of greater public importance than the use of an individual grantee (this is the case for the hydroelectric use which is declared of public interest at concession grant) must take into consideration all pre-existing uses.

1.1.1.3 The principle of solidarity

The Legislative Decree no. 152 of 2006 is the regulation that adopted, in Italy, the European Directives[9] regarding the protection of water resources, and that introduced the general principle according to which the protection and the improvement of the environmental conditions, as well as the cautious and rational use of natural resources, promote the quality levels of human life (art. 2). At national level, law no. 36/94[10] anticipated the concept according to which water resources should be managed according to solidarity criteria and according to the protection of the expectations and of the rights of future generations. The aim is to not endanger water resources, the liveability of the environment, agriculture, aquatic fauna and flora, the geomorphologic processes and the hydrologic balance. The tool is a management of water use oriented towards the conservation and the renewal of the resources. And that same regulation in art. 1 states: “any water use shall be carried out safeguarding the expectations and the rights of future generations to benefit from an intact environmental heritage”. Such principle gave rise, due to its innovative view, to several litigations. Ruling no. 259/1996 of the Constitutional Court declared the constitutional legitimacy of law 36/1994, and explained that water is a primary asset for human life, and, due to its limited availability, it must be protected and included in the wider framework of environmental protection, which aims at maintaining the environmental heritage intact.

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[6] **Royal Decree no. 1285 of 14th August 1920 Regulations for public water diversions and uses. (Italian Official Gazette no. 245 of 16/10/1920)**. still to be considered valid since it is not included in the list of rules expressly abrogated by Consolidation Act no. 1775, and because the regulations concerning this Consolidation Act have never been enacted;

[7] **Directive 2000/60/EEC of the European Parliament and of Council, of 20th December 1994,** sets up a framework for the EC action on waters;

[8] **Legislative Decree no. 152 of 3rd April 2006 as amended and supplemented, Regulations on the environment (Italian Official Gazette no. 88 of 14th April 2006 Ordinary Supplement);**

[9] **Directive 2000/60/EEC of the European Parliament and of Council, of 20th December 1994,** sets up a framework for the EC action on waters

[10] **Law no. 36 of 5th January 1994 Provisions on water resources;**

The Galli act was fulfilled through a constitutional change that took place on 28th October 2004, when the Chamber of Deputies approved, during the first meeting, the amendment of article 9. The first two paragraphs were added with a third one according to which: "(The Republic) ... protects the environment and the ecosystems, also in the interests of future generations. It protects the biodiversity and promotes respect for animals". Subsequently, ruling no. 2001 of 200611 of the Council of State confirmed that water, especially quality water, is itself a value and must be protected regardless of its aptitude to meet human needs.

The ruling of the Council of State occurred when the Environmental Code came into force; art. 144 sets out the principles of water protection and confirms what the Galli act already claimed: it states that waters are a resource that must be protected and used according to solidarity criteria, and that any use shall be carried out safeguarding the expectations and the rights of future generations to benefit from an intact environmental heritage. It also adds that the rules and regulations on water use aim at its rationalization, in order to avoid waste and to foster the renewal of resources, not to endanger water resources, the liveability of the environment, agriculture, pisciculture, aquatic fauna and flora, the geomorphologic processes and the hydrologic balance. Through the environmental code, Directive 2000/60/EC finds its way into Italian legislation; such Directive is fundamental for the continental coordination of water policies: water is not only a commercial product like all others anymore, but rather an asset to protect, safeguard and handle as such.

Art. 3 of the new environmental code rules that: “Every human activity …omissis… must comply with the principle of sustainable development, in order to ensure that the fulfilment of the needs of the current generations does not endanger the quality of life and the chances of future generations. The activity of the public administration, too, must aim at allowing the best possible implementation of the principle of sustainable development; therefore, when making a comparative, discretionary, choice between public and private interests, the interests of environmental and cultural heritage protection must be a priority”.

The achievement of such high objectives cannot disregard a precise territorial planning which, today, is carried out through the Water Protection Plans, identified as extracts of the more comprehensive District Basin Plans. The district basin Authority must work out the basin plan and express its opinion regarding the consistency between the Basin Plan objectives and the EC, national, regional and local plans and programmes also relating to water protection and water management (Water Protection Plans).

1.1.1.4 Competing uses of water

Due art. 144 of the Legislative Decree 152/2006 states that all waters are a state property, you have to get the permission to use the water before to install a small hydro power plant. Water use concession is always limited in time and is bound both to the need to guarantee the quantitative balance, and to the need to achieve quality standards, according to what has been planned for the catchment basin.

Art 167 of the new water code states that during dry spells or in case of water shortage, when existing diversions are regulated, human consumption first and then agricultural use, including aquaculture activities, must be guaranteed. The same code, in art. 168, also sets a limit to the use of water for hydroelectric purposes, stating that public authorities can use the water stored in reservoirs for hydroelectric purposes in order to face water emergencies. Such priority classification of water use cannot be seen in the same way as a fundamental principle and as the subject of this treatment; yet it is a fundamental aspect for the implementation of the regulation as it introduces an ethical principle necessary to manage water as a vital asset for human beings.

More, Regional Rule no. 2 of 28 March 2006 fix that potable use of water has priority on all others uses; between all other uses, in case of scarcity of water, has priority the agricultural use.

1.1.1.5 Public usefulness of the works

Under the Decree no. 387/2003, the works related to hydro power plant construction, as well as the works connected and the infrastructures necessary for the construction and operation of said plants shall be considered of public usefulness; they cannot be deferred and are urgent; this allows starting the procedures for land expropriation.

[11] **Ruling of the Council of State Sec. VI of 11th April 2006 no. 2001** “the need to preserve water intact and protect it is a primary value, established by preceptive and not merely programmatic regulations, in consideration of the shortage of such resource and of the need to preserve it in order to protect the needs of future generations against a further thinning out of the primary asset”

1.1.2 List of main requested permits

Related to what has been describing above, in Italy there are three kind of permit to construct a Small Hydro Power Plant:

Kind of Permit	Authority Delegated
Water use concession for hydroelectric use with power <=3000 kW	Provincial office (e.g. Cremona)
Authorization to build the hydro power with no limit of power	Provincial office (e.g. Cremona)
Authorization to build the electric power line having voltage <= 150.000 volt	Provincial office (e.g. Cremona)

The concession is due the fact water is a public resource so you can only get the permission to use the water, because the water is not for sale.

The authorization is given directly to the applicant that is responsible for every future inconvenience to the environmental or civil problem.

1.2 CROATIA

1.2.1 Inalienable principles (a mention to competing uses of water)

The most important legislative documents that regulate the right to use water and water estate in Croatia are the following:

- The Water Management Strategy (OG 91/08);
- The Concession Act (OG 89/92 and OG 125/08);
- The Water Act (OG 107/95 and OG 150/05);
- The Water Management Financing Act ()OG 107/(95);
- An Ordinance on Issuing Water Acts (OG 28/96);
- The Regulaton on conditions and procedures for obtaining concession on water and public water estate (OG 99/96 and OG 11/98).

According to ***the Water Management Strategy***, entered into force in July 2008 as one of the most important legislative document regarding water management in Croatia:

- water is a public resource which, because of its natural properties cannot be anybody's property and enjoys special protection of the Republic of Croatia;
- water is the means for life and work and shall be used on conditions in compliance with the Croatian legislation;
- total water resource in Croatia is valuable natural and developmental potential and shall be managed rationally and sustainably;
- total water need shall be satisfied uniformly and rightfully on the whole state territory;
- priorities and criteria in water management shall be defined on the state level based on environmental principles as well as social and suistainable development in accordance with the state development policy.

The most important Act regarding the right to use water in Croatia is, undoubtedly ***The Water Act*** (OG 107/95 and OG 150/05). According to Article 1, it regulates the legal status of water and water estate, the methods and conditions of water management (water use, water protection., regulation of water courses and other water bodies and protection from adverse effects of water), the method of organizing and performing water management activities; powers and duties of Government administration and other Government bodies, local authorities and other legal subjects, and other issues of importance to water management. This Act establishes Hrvatske vode (Eng. "Croatian Waters") as the legal entity in charge of water management tasks in Croatia. According to Article 3 water is a public resource which, because of its natural properties cannot be anybody's property and enjoys special protection of the Republic of Croatia.

The water works are civil works, or groups of such works, together with the corresponding equipment, consisting of technical or technological units, and serving for regulation of watercourses and other water

bodies, protection from adverse effects of water, water extraction for various purposes, and for water protection (Article 8).

Water management consists of a group of activities, decisions and measures meant for the purpose of maintenance, improvement and establishment of the integrity of the water regime in a given area, which is achieved in particular by providing the required quantities of water of adequate quality for various purposes, by protection of water against pollution, regulation of watercourses and other water bodies, and by protection from adverse effects of water (Article 5). For any water use exceeding the limits of general use a water rights permit shall be required (Article 27).

The right of using water power for electricity production may be awarded on the basis of concession contract and the water rights permit (Article 49). The basic principle in making the decision on awarding of the right to use water power is the principle of greater public interest (improvement of the general standard of living, environmental protection, health protection etc.) and rational use of water (Article 49). The right of using water power is awarded for a limited period of time.

According to Article 59 the requirements on water works are the following:

- they shall allow returning of water into watercourse or other water body;
- they shall not reduce the existing extent of water use for water supply, irrigation and other purposes;
- they shall not reduce the level of protection from adverse effects of water;
- they shall not deteriorate health conditions, conditions of environment, flora and fauna, property and legal interests, pedestrian, road and railway traffic.

The construction of storage reservoirs – to ensure their multipurpose character – regarding protection from floods and other adverse effects of water and provision of water for water supply, irrigation and other purposes shall be in compliance with the concession contract, water rights permit and location permit. The contract concluded by investors in the construction determines the responsibility of bearing a corresponding portion of construction costs and participation in technical and economic maintenance of the reservoir and its environment after completion of construction.

1.2.2 List of main requested permits

The water permit for water utilization sets forth the purpose, location, method, conditions and the scope of water utilization of the beneficiary, as well as other conditions comprised in the ***Ordinance on Issuing Water Acts*** **(OG 28/96)**. The water permit for water utilization shall be issued by the Croatian Waters /Hrvatske vode (Article 129).

According to the ***Ordinance on Issuing Water Acts (OG 28/96)*** the **request for issuing water permit,** except for the request for issuing water permit for production and release of chemical substances and preparations, which by its use may be discharged in waters, shall be accompanied by:

- data on the title and headquarters of the water permit holder;
- basic data on the activities of the beneficiary;
- general layout of the wider area with indication of the facility;
- location, building and use permit, water conditions and water consent, final inspection protocol made by the representatives of the body in charge of water management;
- concession contract for cases provided in Article 143 of the Water Act,
- evidence on paid administrative fee (Article 14 of Ordinance on Issuing Water Acts).

The concession is a means of acquiring the right to use water and public water estate, or the right to carry out industrial and other activities on water and on public water estate. Concession contract is necessary for SHP construction in Croatia.

According to ***The regulation on conditions and procedures for obtaining concession on water and public water estate*** (OG 99/96 and OG 11/98) the concession period for hydropower plants construction in accordance to maximum installation capacity are the following:

- above 20 MW – maximum 99 years;
- between 5 and 20 MW – maximum 60 years;
- under 5 MW – maximum 30 years.

The concession fee for SHP construction consists of: the concession fee per year + initial fee for water usage.

Technical data on dams or barrier profile and the accumulation basin (capacity curve, high waters capacity, anticipated water level oscillations etc.)

Apart from the above documents, the request for issuing the water permit, depending on the type of the facility or works for which it is issued, shall be accompanied by the following documents for **water utilization for power plants and other operational purposes** (hydro power plants, mills, saw-mills etc.):

- hydrological survey with water balance in the utilization profile;
- technical data on dams or barrier profile and the accumulation basin (capacity curve, high waters capacity, anticipated water level oscillations, etc.;
- data or project excerpts on capacity, method of water utilization, providing for biological minimum, etc.;
- data on average annual electricity production;
- operations manual;
- project of dam and pertinent facilities technical monitoring;
- survey on dam demolition and water wave execution.

Related to the above, there are three kinds of permits to construct a Small Hydro Power Plant in Croatia:

KIND OF PERMIT	Authority Delegated
Concession for electric power plants from 5 to 20 MW	Ministry for Water Management
Concession for electric power plants under 5 MW	County Authorities
Water rights permit	Croatian Waters

1.3 GREECE

1.3.1 Inalienable principles (a mention to competing uses of water)

The Water Framework Directive (WFD) 2000/60 supports the establishment of national and European water policies and strategies. The Directive primarily aims at maintaining a "good ecological status" of water aquifers through the study and application of "management plans" for each hydrological region. The Directive handles the water sector as an entity, while it retains high requirements and specifications for a series of components of the water cycle, such as surface waters, underground and marine waters, ecosystems etc. All the European countries - and naturally Greece - are compelled to conform to this "constitutive map" of waters, in the next years. A number of steps have been taken in the right direction but quite a few issues have not been settled yet. A lot of things have to be settled, some of which are analyzed in the Chapter 2 of this Handbook.

1.3.1.1 Legal framework

On the basis of the above, a new legislative and institutional framework was introduced in Greece in December 2003. It consists of Law 3199/9-12-2003 (OJG 280A/2003) on the "protection and the sustainable management of the water resources" and the Presidential Decree 51/8-3-2007 (OJG 54A/2007), with which the EU Water Framework Directive (WFD) (2000/60/EC) is transposed into the national legislation.

These laws supplement previous legislation such as 75/440 on the quality of surface waters from which drinking water is obtained 80/778 on the quality of drinking water, 73/404 on pollution of waters drom detergeants, 76/464 on spilling of pollutants on waters, 79/923, 2006/113, 78/659 on the quality of waters for maintaining the life of fish and shells, 80/68, 2006/118 on the protection of underground waters, 91/676 on the protection of water from farming activities.

1.3.1.2 Right to water

Greece has ratified the International Covenant on Economic, Social and Cultural Rights, where it is stated in Art. 11 that: "The States Parties to the present Covenant recognize the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions."

1.3.1.3 Main institution for water management

The main national competent authority for water protection and management in Greece is the Central Water Agency of the Hellenic Ministry for the Environment, Physical Planning and Public Works. The

National Water Committee determines the overall national policy for water protection and management. Furthermore, the Regional Water Directorates have the competence for the protection and management of all river basins within the Region's boundaries, but they constitute relatively new structure with a mandate not fully supported by the necessary budget.

The territorial water management: Management Plans for the 14 Greek river basin districts are defined according to the EU WFD. **Inter-ministerial coordination** is assured by the National Water Committee presided by the Environment Minister while **Public participation** is assured by the National and Regional Water Councils.

1.3.1.4 Main issues of water resources management

Water scarcity is the main challenge for Greece. This situation is even exacerbated by ***timely uneven distributions*** of water availability with main rainfalls in winter and drought periods in summer, when the water demand is at its peak. Furthermore, the major users of water in Greece are mainly located in the Eastern and Southern regions of the country, which are rather disadvantageous for natural enrichment. Furthermore, the agricultural sector is the main water user in the country with approximately 84% of total water consumption carried out for irrigation purposes. Irrigation threatens water quantity due to outdated infrastructures and unauthorised abstraction of groundwater resources that lead to over-exploitation. Thus, the uneven natural water enrichment and the non-regulated high consumption of natural water have created a complex water use issue that has to be resolved with appropriate legislation.

The mean cost recovery level (for all water uses) for the whole country is estimated at 59.18% but the levels vary according to the river basin districts. The mean precipitation of the Mediterranean European countries is 840 mm/year. Attica's mean inter-annual precipitation is approximately 400 – 450 mm/year. **Water resources, hydraulic works and water uses are interrelated and inter-influenced factors, composing the whole water sector of a country.** Therefore, a national policy is required for management and decisions.

1.3.1.5 Water pricing and cost recovery

The Water Framework Directive 2000/60, primarily aims at maintaining a "good ecological status" of water aquifers through the study and application of "management plans" for each hydrological region. The Directive handles the water sector as an entity, while it retains high requirements and specifications for a series of components of the water cycle, such as surface waters, underground and marine waters, ecosystems etc. All the European countries and naturally Greece have to conform to this "constitutive map" of waters, in the next years. In that spirit, the Directive requires that the true opportunity cost of water resources is covered by the resource users. Such pricing schemes will be introduced in Greece by 2010.

1.3.1.6 Water use

As indicated above, the shortage of water (drought) in Greece is attributed not only to the availability of the water resources, but also to water utilization practices. Unfortunately, as previously mentioned, the major users of water in Greece are mainly located in the Eastern and Southern regions of the country, which is rather disadvantageous in terms of the natural enrichment. Moreover, Greece does not have a balanced scheme of water uses, as the rural usage takes the lion's share of 86%. More specifically, 96% of the rural consumption is allocated to irrigation - 80% of which is wasted either in the hydrologic circle or in other losses. Similarly, there is a high urban use of water in Greece. For example, the region of Attica has consumption three times greater than that of Central Macedonia. On the basis of the above, the water supply situation is expected to become worse under the recent climate-change conditions attributed to the greenhouse effect. Thus, it is absolutely necessary in Greece to face the dramatic depletion of existing water resources through the systematic study of climatic changes and their impact on the water resources, the estimation of needed hydraulic works and the adoption of systemic water management practices across water basins. Certainly, the hydrologic regime in Greece, as far as the amount of total precipitation is concerned, is similar to the other Mediterranean countries of the European Union. However, there is a certain hydrologic particularity which differentiates the Eastern regions of the country from the Aegean islands and Crete, in terms of natural enrichment. These regions experience an "endemic" shortage of water that appears to be critical. The lack of measures for natural enrichment and the very high water consumption and the water loss, like in the case of Thessaly and Attica, coupled with the insufficient legal

framework for water management create a very difficult situation for SHP in Greece.

Recently, Greece followed some of the existing organisational schemes and applied rational reorganisation of its entire water sector with the support of Act 3199/2003. Thus, it established the Central Water Service in the Hellenic Ministry for the Environment, Physical Planning and Public Works, which is supported by the National Water Research Institute. The WFD has been partially incorporated in the Greek law. Greece, but it is behind schedule compared to other European countries. **Water uses still do not follow a balanced and rational sharing of the available resources.** For the rural use, in particular, a rural national water policy has not been planned and implemented, at least concerning the proper choice for cultivation of land based on each region's water availability, the observance of the laws regarding exploitation and pollution of underground waters, the reduction of water losses and water consumption for irrigations (amendment of irrigation practices etc) and the briefing and guidance of citizens and farmers on these subjects.

The development of systems and tools for water management in the water basins of Western Greece, Ipirus, Attica, Stera Ellada and Thessaly has been incorporated ina study officially submitted to the Ministry of Development - Directorate of Water Resources in December 2008 (PDE2002/SE0613 0000/OPS 57734). The fairly recent development of appropriate tools supporting water management in Greece is reflected in the transnational databases the European Environmental Agency (EEA) (http://dataservice.eea.europa.eu/dataservice/metadetaills), which presents clearly the status quo with regard to water management and the associated unresolved issues of the rights to use water in certain EU countries, like Greece.

The existing situation regarding water use in Greece, the country has opted toward the implementation of WFD through a general legislative framework which is to be implemented through presidential decrees or decisions. However the implementation of related measures for a full transposition were not fully adopted and transmitted to the Commission. Consequently, the Commission sent Greece a first written warning in July 2005. Greece has replied that draft implementing legislation is being prepared but has given no concrete timetable for its adoption. The Commission has consequently decided to send Greece a final written warning (http://europa.eu /rapid/pressReleasesAction).

1.3.2 List of main requested permits

Hydro power plants require the same permits as any other plant utilizing renewable resources. Namely, licence to produce electricity, environmental impact assessment, building permit, installationand operation permits. These things will be discussed in detail in Chapter 3.3.

1.4 NORWAY

1.4.1 Inalienable principles (a mention to competing uses of water)

Norway is one of the most developed countries in the world in terms of hydro power, and about 97% of the electricity supply is produced by hydro power. As early as 1877 the first hydro turbine used for electrical power output was installed, and hydro power is considered as the driving force in the industrialization of Norway.

In order to maintain a sustainable water resource management the following user-interests must be considered for each individual project:

- environmental needs with respect to fauna and flora conservation;
- outdoor recreation;
- cultural heritage;
- fisheries;
- drinking water, irrigation and recipient use;
- land reclamation and drainage;
- flood and erosion protection;
- aquaculture;
- hydro power;
- other industrial and commercial uses, e.g. gravel extraction;
- transport sector, e.g. waterways, roads, railways.

A river system belongs to the owner of the land it covers, unless otherwise dictated by special legal

status. The owners on each side of a river system have equal rights to exploit its hydro power, unless special legal grounds dictate otherwise.

The landowner may oppose others exercising rights to a river system belonging to him without special legal grounds. Within the framework set by the legislation the landowner himself may control the river system provided no special rights are an obstacle to this.

The water authorities may stipulate restrictions on the rights to a property in the interest of a future supply of drinking water that is being planned. Such a restriction may not be imposed for more than five years. The restriction may be renewed once for up to five additional years.

A landowner along a river system may without a licence pursuant to current section in the Act abstract water for his household and domestic animals on the property. If there is a shortage of water, the landowners along the river system have equal rights as needed to abstract water for the following purposes according to the following ranking:

1. permanent household;
2. domestic animals.

If necessary, the water authorities may issue further administrative decisions regarding the distribution and implementation of the abstraction of water during shortages, including taking into account adjacent properties not abutting the river system and the public interest. If the water authorities receive a request to issue a decision on distribution or implementation, the decision on whether or not the request is to be honoured shall be considered to be an individual decision.

The water authorities may stipulate in the rules for reservoir operation or terms and conditions for the licence that the abstraction right shall be limited to a certain quantity or be annulled completely in exchange for the licensee paying compensation for damage or nuisance.

Anyone may use a river system for:

a) abstraction of water without digging trenches or using a permanent pipe or engine power;
b) swimming in accordance with Act No. 16 of 28. of June 1957 relating to outdoor recreation;
c) non-motorised traffic;
d) motorised traffic on open or ice-covered river systems when taking place in accordance with Act No. 82 of 10. of June 1977 relating to motorised traffic on uncultivated land and in watercourses and the landowner has not prohibited it pursuant to paragraph two.

The use of river systems shall take place with such consideration that it does not cause nuisances of significance for the landowner or other users. The landowner may prohibit motorised traffic in the river system. The water authorities may set aside a prohibition, if after weighing the interests put forward the prohibition would have to be deemed unreasonable. The water authorities may grant permission to charging a reasonable fee for traffic in canals and river systems that have been adapted for this purpose.

Everyone has the right to retrieve objects that have sunk in river systems and to float logs in river systems that are deep enough to float logs provided that this does not trigger a requirement to obtain a licence pursuant to current section in the Act. If it must be regarded as waste, the rules in the Pollution Control Act apply. Regarding the right to fish, the rules in Act No. 47 of 15 May 1992 relating to salmonoid and fresh-water fish etc.

1.4.2 List of main requested permits

Without the permission of the King (hereinafter referred to as licence) no one other than the State may with full legal effect acquire the right of ownership or of use to waterfalls (falls or rapids) that, when harnessed, can be expected to produce more than 4,000 natural horsepower either alone, or in conjunction with other waterfalls that the acquirer owns or uses when it can be appropriate to develop them jointly. The licence obligation also applies to agreements relating to acquisition of long-term disposition rights to hydro power resources.

However, a licence is not necessary when waterfalls are acquired through distribution of joint marital property or by inheritance, redemption of allodial property or transfer when the acquirer (the heir) has greater allodial rights than the transferor (the deceased), is the latter’s spouse or is related to him by marriage in direct line of ascent or descent or in the first or second collateral branch. If a licence was previously granted for the waterfall in question, the conditions stipulated in the licence shall also apply to the new acquirer.

Disputes about the amount of power shall be determined by appraisement unless the acquirer agrees having the Ministry concerned take the decision. When special considerations exist, the Ministry

concerned may in individual cases make exceptions from the licence obligation and right of pre-emption. Should the acquired waterfall not be utilised for power production, the King may permit acquisition without the application of the basic rules in current section of the Act.

Should the licensee subsequently apply to develop the waterfall, the King shall stipulate terms and conditions in line with the basic rules of the Act in effect at the time in question.

A river system is defined as all stagnant or flowing surface water with a perennial flow, with appurtenant bottom and banks up to the highest ordinary floodwater level. Even if certain sections of a river system flow underground or under glaciers, it is considered to be a river system in its entirety. Watercourses without a perennial flow are also considered to be river systems if they are clearly distinct from their surroundings. In the Water Resources Act, the following terms are defined:

a) **Measures in a river system:** Watercourse installations and other measures in a river system that by their nature are apt to affect the rate of flow, water level, the bed of a river or direction or speed of the current or the physical or chemical water quality in a manner other than by pollution;
b) **Watercourse installation:** Building or structure in or above a river system other than overhead lines;
c) **Perennial flow:** Flow of water that at a mean temperature above freezing does not dry up from natural causes more often than every ten years on average;
d) **Highest ordinary floodwater level:** Water level at the highest flood that may be expected empirically every ten years on average.

No one may impede the flow of water in river systems without authority in this Act. Development and other utilisation of land should preferably take place so that precipitation can still drain by infiltration into the ground. The water authorities may order measures that will improve infiltration into the ground, provided this can be implemented without unreasonable costs.

No one may implement measures in a river system that may be of appreciable harm or nuisance to any public interest in the river system or the sea, unless this is done in pursuance of the rules in current section of the Act or with a licence from the water authorities.

The water authorities may by regulation or in the individual case stipulate that measures outside of the river system that may have tangible impacts on a river system must have a licence. In that case the Act's other rules regarding measures in a river system shall also apply, except the power pursuant to current section of the Act to petition for an advance decision on whether the measures are subject to a licensing requirement.

If measures in a river system that fall under paragraph 1 in the Act must be implemented immediately to prevent material damage, notification shall be given to the water authorities as soon as possible. If necessary, the water authorities may issue orders on its design and to take corrective action. In other respects, further rules in the Act apply to the requirement to obtain a licence and licensing.

The water authorities may set quality targets for river systems, *inter alia* on rate of flow, the content of substances and occurrence of species in the river system and provisions on the obligations of the water authorities if the quality targets are not reached. Quality targets that are to be binding on the exercise of public authority shall be set pursuant the rules for regulation in the Public Administration Act. Quality targets for pollutants shall be set pursuant to the Pollution Control Act.

1.5 AUSTRIA

1.5.1 Inalienable principles (a mention to competing uses of water)

In general, surface water in Europe is public property. In Austria, there is a distinction between public and privately owned surface water. This brings about a number of differences according to regulations in the Austrian Water Act (among others for the applications for water use permits, as well as for measures for flood prevention). Private surface water in most cases is owned by the landowner holding the surrounding property – ground water since 1934 is being exclusively treated as privately owned.

But for private property rights on water several restrictions apply – Austrian landowners cannot do with their water whatever they want. For the use of spring water from one's own property, one does not need any official authorization. But each utilization exceeding the owner's own needs requires official permission. If third parties are supplied by a domestic well, permission according to the Water Act is necessary. The administration states in a consensual procedure how much water may be used, expressing it in liters per second.

Property rights in case of flowing private waters refer not only to the river-bed, but also to the water as

such. In cases in which the river-bed belongs to a private owner, this does not necessarily apply to the water within it. Mostly, the flowing water is not subject to the owners' disposition unless he holds a permit for its use issued after actively claiming it.

Ownership structures become especially relevant as soon as commercial utilization is planned - for instance by the construction of a hydropower plant. The Water Act also states that private water, whenever public water is fed into it, automatically becomes public water, although the river-bed remains private. Austria's big rivers are all public. The "Österreichische Bundesforste" ("Austrian National Forest Company" – the biggest forest owner) is also considered as the biggest water owner.

1.5.1.1 The Riparian Rights' Authority

The Riparian Rights Authority exclusively executes administrative power above all water-bodies and above all kinds of water utilization and hydraulic construction. As far as public interest creates necessity for this, the Riparian Rights' Authority may interfere into third parties' rights. In urgent cases, especially in case of danger in delay, the Riparian Rights' Authority may act immediately. In all cases of intervention, compensation has to be paid. An important part of the riparian rights procedure is the stating of the compensation; the Riparian Rights' Authority is in charge of it. The Riparian Rights' Authority is able to secure water supply in a prospective way by the creation of protected zones and riparian sanctuaries. As far as the Water Act does not state anything different, the county authority holds primary jurisdiction.

1.5.1.2 Water information system for five federal lands

Since 2001, the Länder Salzburg, Carinthia, Vorarlberg, Burgenland and Styria operate a joint **water information system** (WIS). The harmonization of the data models and coordinated further development of various software components brings along remarkable synergies. Apart from financial aspects, this initiative creates a simple and open access to the riparian data-base of the mentioned Länder.

Everybody is granted access to the Riparian Rights Registry as far as this does not interfere with legally protected data.

The Riparian Rights' Authority by decree may proclaim that certain parts of river catchments areas of waterworks gain the status of protected areas or sanctuaries in order to protect potable water resources. In these areas, certain activities are forbidden or restricted. By the stating of such a protected character and by restricting water utilization rights, the need for maintenance of quality and quantity of ground water is respected.

The imposed restrictions for the different levels of protection would always react to the demands arising from different soil structure.

1.5.2 List of main requested permits

Ground use
Private agreement with landowner – if it is on external ground.

1.5.2.1 Permit according to the reparian right

It is required, if the "consensus data" of the plant will change – e.g. measure of water use, function of the plant, flow of water after expansion, height of fall;
Competent authority: district administration authority for plants up to 500 kW, governor for plants over 500 kW.

1.5.2.2 Permit according to nature conservation law

Requirement depending on singular case;
Competent authority: district administration authority (nature conservation).

1.5.2.3 Permit according to building law

Requirement depending on singular case;
Competent authority: mayor and/or in some municipalities the magistrate (building law).

1.5.2.4 Concentrated permit procedure

Coordination of 1.5.2.1 and 1.5.2.2 and 1.5.2.3 are under one procedure. That means that the legal acts for these permits – if anyhow possible – to be carried out simultanously.

For electricity generation plants that need a permit according to electricity law, a permit or notification according to building law regulations is not required, as these building law regulations are also to be considered in the permit procedure according to electricity law.

In practice the competent authority tries in case of revitalisation or new construction of SHP, to carry out the particular statutory permit procedures (reparian right, nature conservation right, building right) within a coordinated procedure – unless eminent factors or circumstances argues against this.

It is recommended, to establish contact to the authorities before filing the application. Also the local fishery association should be contacted to antogonise possible problems.

Permit according to the electricity right
Is required in case of construction, significant modification and operation of electricity generation plants with installed bottleneck capacity of 30 kW or more.
Competent authority: federal land government - department für industry.

Appreciation as „green electricity plant“
Competent authority is the federal land government.

Feeding in the electricity to the grid
Regional grid operator allocates a counting point to the plant.

National support for the venture – up to 30%
Kommunalkredit Austria – a special bank on behalf of the Austrian national government.

Regional support fort the venture – up to 25% additional to national support
Federal land government of Lower Austria.

CHAPTER 2

ANALYSIS OF THE NORMATIVES ABOUT SHP IN DIFFERENT EU COUNTRIES

This chapter presents a general overview of the situation of SHP implementation, institutions responsible for making and executing acts (laws), rules, permissions and procedures, review of the normatives and mention to forms of state support for SHP electricity production, both in partner countries and in the neighboring countries (Italy, Croatia, Greece, Norway, Austria, Portugal, Spain, Serbia, Bosnia & Herzegovina, Bulgaria, Romania, Germany and Poland).

2.1 ITALY

2.1.1 General overview of the situation of SHP implementation

According to 2001 European statistics (ESHA 2003), Italy ranked first among the EU-15 countries, accounting for 22% of installed capacity and of power generated by mini hydro plants. More recently, according to the data on the development of mini hydropower published by G.S.E. (Gestore dei Servizi Elettrici - Electric Service Agency), in December 2007 Italy numbered more than *1200 plants* with a capacity of <1 MW, and over *650 plants* with capacity between 1 and 10 MW, for a total installed capacity of about *2523 MW*.

Table 2.1. Gross effective capacity and gross generation in 2007 (GSE)

Plant size [Capacity]	Number of plants	Gross effective capacity [MW]	Gross generation [GWh]
< 1 MW	1.194	437	1.416
1 - 10 MW	641	2.086	5.684

Despite the fact that this sector has been widely exploited thanks to the liberalization of the electricity market occurred at the end of the 1990s, hydropower has been constantly developing. In particular, focusing on mini hydroelectric plants (capacity < 1 MW), it can be observed that the gross effective capacity increased by 2% every year, between 2000 and 2007 (Table 2.2).

Table 2.2. Data on gross effective capacity [MW] per plant size - (source GSE and TERNA)

Capacity	2000	2001	2002	2003	2004	2005	2006	2007	Variation 00-07
< 1 MW	374	384	398	406	413	419	427	437	17 %
1 – 10 MW	1.823	1.849	1.892	1.923	1.951	1.986	2.040	2.086	14 %
Total	2.197	2.233	2.290	2.329	2.399	2.405	2.467	2.523	14.8 %

Such increase cannot be observed in terms of generated power, as mini hydro plants gross generation is closely linked to water availability and, thus, to interannual climate variability. For example, Table 2.3 shows the minimum generation level in 2003 and 2007, years characterised by severe drought that affected the whole country.

Table 2.3. Data on gross generation [GWh] per plant size - (source GSE and TERNA)

Plant size [Capacity]	2000	2001	2002	2003	2004	2005	2006	2007
< 1 MW	1.550	1.667	1.603	1.455	1.731	1.525	1.521	1.416
1 – 10 MW	6.566	6.988	6.443	5.736	7.128	6.090	6.354	5.684
> 10 MW	36.088	38.153	31.471	29.482	33.884	28.450	29.119	25.715
Total	44.204	46.810	39.519	36.674	42.744	36.066	36.994	32.815

The promotion of the development of small hydropower started in the 1990s thanks to the issuing of rules that stimulated the generation of power from renewable sources. In 1995, the Interdepartmental Commission for Economic Planning (Commissione Interministeriale per la Pianificazione Economica) approved the National Plan for a Sustainable Development (Piano Nazionale per lo Sviluppo Sostenibile), and in 1999 the "White Paper on the Energetic Enhancement of Renewable Sources" was published; it set the policies, the strategies and the objectives to achieve by the period 2008-2012. As regards small-scale hydropower, the document proposed 3000 MW of installed capacity, but according to the data, Italy seems far from achieving such objective.

2.1.2 Institutions responsible for making and executing acts (laws), rules, permissions and procedures

This is a fundamental aspect for the hydroelectric sector, because decentralization (provided for by the legislative decree 112/98) has taken place, but not at the same level in the various Italian regions. The national institutional framework is characterised and conditioned by the start of the process that should lead to the **"federal" reform of the State**. The process of decentralization started with the delegated law 59/9712 and the subsequent legislative decrees, which divided competences among the State, the regions and the local bodies, and ended with the DPCM (Decree of the President of the Council of Ministers) on the transfer of personnel and assets. Article 89 of the legislative decree 112/98 sets the functions assigned to the regions and to the local bodies, among which: design, construction and management of hydraulic works of any type; **the dams not included in article 91, paragraph 1** (which identifies large dams); first aid and **hydraulic policing tasks** under the royal decree no. 523 of 25th July 1904 and the royal decree no. 2669 of 9th December 1937, concessions of hydraulic works and river areas also under article 8 of law no. 37 of 5th January 1994; **water police**, also as regards the enforcement of the consolidation act approved by the royal decree no. 1775 of 11th December 1933; **management of state water**, including all the administrative functions relating to public water diversions, calculation of concession fees and the collection of the relevant proceeds, appointment of regulators for the distribution of water resources. As regards the aspects relating to the authorization to build a (small-scale) hydroelectric plant and more closely linked to **energy and plant-engineering**, the legislative decree no. 112/98 assigns the following functions **to the Provinces**, as regards the direction and coordination provided for by regional energy plans:

1. drawing up and the adoption of action plans for the promotion of renewable sources and energy saving;
2. authorization to install and operate power plants from renewable resources, without limit of power;
3. authorization to build electric pipeline to connect the power plant to the electric Grid, with voltage under 150.000 volt.

2.1.3 Review of the normatives

Mini hydropower development in Italy faces a rather complex regulatory framework, which can be summarized as follows:

2.3.1. National laws on water and environmental protection;
2.3.2. National laws on the energy sector;
2.3.3. Rules regulating the environmental compatibility assessments of plants.

2.1.3.1 National laws on the environment

The potential use of water (public asset[13]) for productive purposes (generally for private benefit) is subordinate to the need to protect water quantity and quality, as well as to protect the environmental quality of aquatic ecosystems. The quantitative protection of the resource contributes to achieve the qualitative purposes of water bodies, through the planning of water uses aiming at avoiding repercussions on water quality and at allowing a sustainable water consumption. The Italian current national regulations on water use are based on two fundamental regulatory instruments:

[12] **Law no. 59 of 15th March 1997**, Delegation to the Government as regards the assignment of functions and tasks to the regions and to the local bodies, as regards the reform of the Public Administration and administrative simplification

[13] **Chapter 1 *Public Nature of Water Resources*.: The Legislative Decree 152/2006**, in art. 144 states: "All waters, surface water and groundwater, even though not drawn from underground, are a state property".

- the **Royal Decree no. 1775 of 1933** regulating public water use: on waters specifically deals with the rules on public water concessions, and, despite some evident limits, it highlights the need to favour certain types of water use according to their relevance for the economic life of the country. So the Royal Decree 1775/1933 represents the basis of the administrative procedures for granting public water diversion concessions by the competent authority[14];
- the **environmental Consolidation Act no. 152 of 2006** that implements the EU Water Framework Directive and deals with the quantitative and qualitative protection of water, as well as the protection of aquatic ecosystems: outline law no. 152/2006, delegates the Government as regards law no. 308 of 2004[15] on the reorganization, coordination and integration of environmental rules.

The provision streamlines, rationalizes, coordinates and clarifies the environmental laws in six key sectors, subdivided in 5 chapters:

- procedures for the strategic environmental assessment (SEA), for the environmental impact assessment (EIA) and for the integrated environmental authorization (IPPC);
- soil protection, fight against desertification, protection of water against pollution and water resources management;
- waste management and reclamations;
- air protection and reduction of emissions to the atmosphere;
- environmental damage.

The following four strategic profiles were adopted for the drawing up of the Consolidation Act:

- adoption of the EU directives not yet included in the Italian legislation as regards the sectors that are the objects of the delegation (eight directives);
- unification of the provisions relating to homogeneous sectors, in order to reduce repetitions;
- transcription, in a single regulatory provision, of rules that were previously strewn in subsequent laws but dealing with the same topic.

As regards water protection and water resource management, besides providing for the reorganization of regulatory provisions, the code adopts the Protection Plan as a planning tool, and confirms the public nature of waters. Moreover, the environmental code amends the Royal Decree 1775/33 and includes clauses necessary to condition the grant of concessions to the sustainable use of water. Water use concession is always limited in time and is bound both to the need to guarantee the quantitative balance, and to the need to achieve quality standards, according to what has been planned for the catchment basin. Therefore, the grant of concessions shall take planning into account; that is why water withdrawals are granted provided that:

1. they do not endanger the maintenance or the achievement of the quality objectives established for the concerned waterway;
2. **the reserved flow** and water balance are guaranteed;
3. the reuse of purified sewage water or rainwater is not possible, or that even if it is possible, the reuse is not economically sustainable.

Basin planning, of which the Basin Authority is in charge, is corroborated by the regional detailed planning through the Water Protection Plan (WPP), under regional competence. The Water Protection Plan, already introduced by the legislative decree no. 152 of 11th May 1999 and then adopted by the new environmental code, is a programmatic document that should contain the regional programmatic directions on pressure limitation, water saving, aquatic ecosystems safeguard.

The Reserved Flow is the minimum quantity of water that must be guaranteed for the survival of the aquatic biocenosis, the safeguard of the water body and, in general, for the multiple uses the river is intended for (bathing, navigation, aesthetic and recreational purposes).

The reserved flow should guarantee the hydrological condition for the survival of biocenosis in the diverted reaches and for the ecological equilibrium of concerned ecosystems.

The regulation of the Reserved Flow is a fundamental aspect in the mini hydro sector as it imposes a **minimum quantity of water** that must be maintained downstream the diversion, diminishing the water quantity available for the diversion and this affects the profitability of the plant. It must be highlighted that the regulation of the Reserved Flow envisages, for new diversions, the installation of measuring devices to

[14] **Chapter 3: Concession grant procedures**

[15] **Law no. 308 of 15th December 2004:** Delegation to the Government as regards the reorganization, coordination and integration of environmental rules and directly applicable measures "

control released flows; installation and management cost will be borne by the grantee.

The environmental code identifies the fields of application of the Reserved Flow and the allocation of competences for its implementation on the territory:

- the technical competence to identify the criteria for Reserved Flow definition lies with the Basin Authority (within the specific competence of water balance planning). The Basin Authority also expresses its opinion, which is binding for the final approval of the Water Protection Plan;
- the regulatory competence lies with the Regions; they introduce the RF regulation in the Water Protection Plan and/or in subsequent enacting decrees or rules;
- the administrative competence, that is the competence to communicate the RF value to the diversion grantee, lies with the authority having competence upon concession grant (Province or Region).

The ministerial decree of 28th July 2004, annex 1, gives some indications about the general criteria and the field of application of the Reserved Flow. This rule emphasizes how the Reserved Flow is an important indicator both in order to plan the protection of the water body and in order to regulate diversion concessions and the authorizations to discharge waters. For every concerned water body, meant as homogeneous reach[16] of the river identified in the Protection Plan, there are some factors affecting the Reserved Flow that must be taken into consideration: naturalistic aspects (hydrogeological and geomorphological characteristics, preservation and recovery of the river ecosystem and environment) and anthropic aspects (river-bed modifications, residual polluting loads from point and non-point sources). While awaiting for the Protection Plans, the Reserved Flow can be defined according to the criteria and the formulas identified by the former Basin Authorities established by the abrogated law 183/89. As regards the field of application, the mentioned directives identify water bodies for which the Reserved Flow should be identified as priority:

- significant water bodies[17];
- water bodies with a specific functional use[18];
- water bodies concerned by anthropic actions that modify the natural flow regime.

Point 7.4 of the ministerial decree shows the methods to calculate the Reserved Flow, specifying that "It being understood that the Protection Plans must assess the specific value of the Reserved Flow for each river reach considered according to the over-mentioned general criteria; due to the delay in arranging the afore-said Plans, the Reserved Flow may be assessed using regional and experimental methods."

The general criteria for assessing the Reserved Flow follow two different calculation procedures:

- the first is based on the processing of hydrological and morphological parameters, such as the area of the diverted basin, the average, annual or monthly flow of the river, etc;
- the second is based on the search for environmental conditions suitable to the development of one or more species typical of the river community.

Due to the wide range of methods currently available the proposals suggested by the Basin Authorities or adopted by the Regions are numberless. The Regional Regulatory status is the following:

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[16] **Homogeneous reach of the waterway**: identified according to geomorphological, hydrological, hydraulic and biological characteristics, as well as due to the presence and extent of withdrawals and discharges.

[17] **Annexe 1 to the third part of the L.D. 152/06 as amended and supplemented: The significant water bodies** are those bodies that the competent authorities identify according to specific characteristics included in the annexe, and that, consequently, must be monitored in order to achieve environmental quality objectives. All the water bodies that, due to naturalistic and/or landscape value, or due to special current uses, are substantially interesting form the environmental point of view, must be monitored, along with all the water bodies that, due to the polluting load they convey, may have a considerable negative effect on significant water bodies. Significant water bodies are:

- as regards surface waterways: first order natural waterways (directly flowing into the sea) with a catchment basin above 200 square Km and second or higher order natural waterways with a catchment basin above 400 square Km. The waterways that, for natural reasons, have a flow equal to 0 for more than 120 days a year, in an average hydrological year, are not considered significant.
- as regards lakes: those whose water surface is equal to or above 0,5 square Km during the maximum storage period

as regards artificial water bodies: all artificial canals that return at least part of their waters into natural surface water bodies and that have a flow of at least 3 mc/s, and the artificial lakes and reservoirs whose catchment basin is affected by anthropic activities that may compromise their quality and whose surface is at least 1 square Km or whose storage capacity is at least 5 million mc during the maximum storage period.

[18] **The waters with a specific functional use are (ART. 79 L.D. 152/2006 as amended and supplemented)**

a) surface fresh waters intended for the production of drinking water;
b) bathing waters;
c) fresh waters that require protection and improvement in order to be suitable to fish life;
d) waters intended for shellfish life.

Region	Regional law	Delegation for Examination	Delegation for fees	Delegation for diversion authorization	Moratorium on concessions	Regional regulations on diversion rules	Limits on the Reserved Flow	PER
Piedmont	R.L. no. 44/2000	YES	The region decides	Yes, with opinion of Region.	NO	Regional Regulations) no.10/2003	YES	YES
Aosta Valley	There isn't difference between Region and Province functions				NO	YES	YES	YES
Lombardy	R.L. no. 26/2003	YES	YES	YES	provi of Sondrio	R.R. 24/03/2008 no. 2	YES	YES
Trentino Alto Adige	Trento and Bolzano are self governing Provinces	YES	YES	YES	YES	YES	YES	YES only Trento
Liguria	R.L. no. 18 /1999	Only for small diversions	NO	Only for small diversions	NO	NO	YES	YES
Friuli Venezia Giulia	NO	NO	NO	NO	NO	Regional Law no. 16/2002	NO	YES
Veneto	NO	Not to provinces	NO	NO	NO	R.D. n.1000/2004	YES	It's being approved
Tuscany	R.L. no. 88/1998	YES	YES	YES	NO (only in case of water emergency)	NO	NO	YES
Emilia Romagna	R.L. no. 3/1999	NO	NO	NO	NO	Regional regulations no. 41/2001	YES	YES
Marche	R.L. no. 10/1999	YES	50% of the regional fees	YES	NO	R.L. no.5 of 9th June 2006	YES	YES
Abruzzi	R.L. no. 72/1998 and no. 81/98	YES	NO	Only for small diversions	YES	R. R. 13/08/2007, no. 3/R	NO	YES
Umbria	NO	NO	NO	NO	NO	NO	YES	YES
Latium	R.L. no. 53/1998	Only for small diversions	NO	Only for small diversions	NO	NO	NO	YES
Campania	YES	YES	YES	YES	Reg. Decree no. 1220/07	NO	NO	It's being approved
Puglia	R.L. no. 25/2000	Not specified			NO	NO	YES	It's being drawn
Molise	R.L. no. 34/1999	Only for small diversions	NO	YES	NO	NO	YES	YES
Basilicata	R.L. no. 7/1999	NO	NO	NO	NO	Reg. Decree no. 1984/06	YES	YES
Calabria	R.L. no. 34/2002	YES	NO	Also large diversions	NO	NO	YES	YES
Sicily	NO	NO	NO	NO	NO	NO	NO	NO
Sardinia	R.L. no.9/2006	YES	NO	YES	NO	NO	YES	YES

(source CESI Ricerca spa – 2008)

2.1.3.2 National laws concerning the energy sector

In Italy, the authorization to build hydroelectric plants to generate hydroelectric power is governed by the legislative decree no. 387/2003 which adopted the EU directive on renewable energies no. 2002/77/EC and which delegated such function to the Italian regions. Such decree comprises measures aiming at rationalizing and streamlining authorization procedures for the construction of plants supplied by renewable sources and, even though it was approved in 2003, it has not yet been fully adopted by all Italian regions and with the same criteria. The following table lists all the regional deeds that adopted the

legislative decree no. 387/2003 and that actually put it into effect (source A.P.E.R.– 2008):

REGION	ART. 12	PER (Regional Energy Plan)	Authority delegated
Abruzzo	DGR (Regional Council Decree) 351/2007	DGR 1189 of 05/12/01	Region
Basilicata	Draft	DCR (Regional Board Resolution) 220 of 26/06/01	Not received
Calabria	DGR 832 of 15/11/04	DCR 315 of 14/02/05	Region
Campania	DGR 1955 of 30/11/06	DGR 109 of 2/2/05	Region
Emilia Romagna	LR (Regional Law) 26 of 23/12/04	DGR 2678 and 2679 of 23/12/02	Region (P>50 MWt) Provinces (other cases)
Friuli Venezia Giulia	LR 30 of 19/11/02 LR 24 of 27/11/06	DGR 1021 of 4/5/07	Provinces (25<P<50 MWt) Municipalities (P<10 MWt) (10-25 MWt →partner municipalities)
Lazio	DGR 517/2008	DCR 45 of 14/02/01 + proposed review	
Liguria	LR 22 of 29/5/07 DGR 551/2008	DGR 43 of 02/12/03	Provinces
Lombardia	LR 26 of 12/12/03	DGR 12467 of 21/2/03 + DGR VIII/4277 of 7/3/07	Provinces
Marche	Draft	DACR (Regional Board Administrative Resolution) 175 of 16/02/05	Not received
Molise	DCR 167/2008 LR 15/2008	DGR 117 of 10/7/06	Region
Piemonte	**	DGR 351-3642 of 03/02/04	Provinces
Apulia	DGR 35 of 23/1/07	Draft	Region
Sardegna	DGR 31-7 of 27/7/04	DGR 34/13 of 2/8/06	Not received
Sicilia	**	Draft	Not received
Toscana	LR 39 of 24/02/05	DCR 1 18/1/2000 updated in 2002 + draft PIER (Regional Energy Direction Plan) 2007	Region (wind>50 kW and geothermal) and Provinces (other cases)
Umbria	LR 21 of 03/11/04 LR 5 of 26/03/08	DCR 402 of 21/7/04	Municipalities
Valle d'Aosta	LR 23 of 14/10/05 LR 3 of 03/01/06	DCR 3146/XI of 3/4/03	Region
Veneto	DGR 1000 of 06/04/04 hydroelectric	DGR 7 of 28/01/05	Region
Aut. Prov. of Bolzano	**	DGP (Provincial Council Resolution) 7080 of 22/12/97	Provinces
Aut. Prov. of Trento	**	DGR 2438 03/10/03	Provinces

The table shows that many regional deeds are very recent, some are dated 2008, and that in some regions the functions have been fully delegated to the Provinces (in case of Lombardy – Cremona), whereas in others the Region maintained the whole function (in case of Calabria, Campania and Veneto). Besides this different identification of the competent offices, there are also different criteria of application of the decree no. 387/2003. The procedure provided for by the decree is a unified procedure that comprises all the various authorizations and permissions issued by the competent bodies and adopts two fundamental objectives of the over-mentioned EU Directive:

- the pulling down of non-technical obstacles to the increase of power generation from RES (Renewable Energy Sources);
- The streamlining and speeding up of administrative procedures.

The decree no. 387/2003 consists of a single procedure for all construction types of renewable sources

(solar, biomasses, water, etc.) and provides for the employment of the Conference of the Concerned Bodies (Conferenza dei Servizi) during which, in one or more meetings, all competent public bodies are required to express their opinion; such conference ends with a rejection or a concession grant.

The course of the conference of the concerned bodies is clearly regulated and well defined by law no. 241/1990, which sets examination time and procedures of the public administration, guaranteeing that private citizens can access and view the concerned documents. The unified procedure was designed to group all the different administrative procedures concerning the construction of a power plant supplied by renewable sources and, as regards small-scale hydropower, to join, at least, the concession procedure of water diversion for hydroelectric purposes to the construction and use procedure. So, in case of hydropower, the firm that wants to build the power station should submit all the necessary documents to obtain the water diversion concession together with a complete project of the plants and of all the works and the infrastructures directly connected and functional to the hydroelectric power station, such as long-distance power lines. Within 30 days from the receipt of the above-said application, the deputed office should start the procedure provided for by decree no. 387/2003 and summon the conference of the concerned bodies, except suspend it in order to start the sub-procedure relating to the diversion concession grant which is longer and more complex.

Following a survey carried out by the provincial offices of Cremona, through the reference to the websites of the Italian regions, it could be established that some delegated offices, such as the Provincial Administrations of Piedmont and the Regional Offices of Veneto, apply the procedure that has been so far described and that considers the diversion concession as a sub-procedure of the authorization to build the power station. Nevertheless, there are many other cases, such as the Provincial Administrations of Lombardy that, following precise indications by the Regione Lombardia, start the procedure relating to the construction authorization according to decree no. 387/2003 ***always only after*** acquiring the concession to use water for hydroelectric purposes, so that some of the Bodies involved during diversion concession are once again involved during the procedure for the authorization to build the power station.

The decree no. 387/2003 is of fundamental importance because it has introduced a unified procedure and has clearly defined the renewable energy sources, that is: wind power, solar power, geothermal power, waves and tides, hydropower, biomasses, landfill gases, residual gases from purification processes and biogases. As small-scale hydro plants fully fall within the previous definition, it is advisable to focus the attention on the following regulatory principles introduced when the decree came into force (2003):

1. the works to build the plants and the works connected and the infrastructures necessary to build and to use the plants shall be considered of public usefulness; they cannot be deferred and are urgent;
2. the construction and the use are subject to a single authorization, in obedience of the current regulations on the protection of the environment, of the landscape and of the historical and artistic heritage;
3. the authorization is issued following a unified procedure, in which all concerned Administrations participate, and it is carried out in obedience of simplification principles and according to the law no. 241 of 7th August 1990 as amended and supplemented.

Item 1) is of fundamental importance because it recognizes the importance to promote the renewable sources for power generation and the consequent reduction of CO2 released, and places them on the same level of large power plants supplied by conventional sources (that employ fuel oil, methane and coal), to which the principle of public usefulness has applied since the first nationalization of the Italian power sector, occurred with the establishment of ENEL (National Body for Electric Energy) in 1962.

Items 2) and 3) introduced a real regulatory innovation in the energy sector, because as regards the power station supplied with conventional sources, the only unified procedure is provided for by law no. 55/2002, which only applies to large plants with a capacity above 300 MW. So, if someone wants to build a plant supplied with conventional sources with a capacity below 300 MW, he/she would be subject to several different rules, and thus, to a more complex regulatory procedure compared to that of the renewable source, because the procedure to acquire the opinions has not been unified.

Before the decree came into force, Italy did not have a unified procedure for the renewable sources and, according to the plant characteristics, it was necessary to acquire more favourable opinions, each of which was necessary to assess the plant according to regulatory specifications, and each of which was issued by a different Administration, with consequent delays due to the fragmentation of the individual administrative procedures. Moreover, thanks to the decree no. 387/2003, also the procedures relating to the assessment of the connected works, such as the construction of a long-distance power line, are carried out during the same conference of the concerned bodies that must end within 180 consecutive

days from the date in which the application is submitted. The introduction of the unified procedure was favourably welcomed by the market operators and by the Public Administrations, but needs a further harmonization of the application procedures at local level. As to the various regulatory provisions on renewable energies that, in the past years, have followed one another, here follows a description of the most significant:

Law no. 9 of 9/01/1991 comprises some general measures that aim at fostering the participation of entities other than the operator, then state-owned (ENEL), in activities such as production, transport, transformation, distribution and sale of electricity, and the liberalization, from the strictly legal point of view, of power generation plants supplied with renewable and assimilated sources (hydroelectric as well). The coming into force of this regulation should have abrogated the rules of the consolidation act provisions on water and power plants approved by the royal decree no. 1775 of 11th December 1933. Since such regulation has never been issued, the Consolidation Act no. 1775 of 1933 still applies.

Law no. 10 of 9/01/1991 promotes rules for the implementation of the new National Energy Plan on the rational use of energy, energy saving and development of renewable energy sources, in accordance with the European energy policy.

Resolution C.I.P. no. 6 of 29th April 1992 strongly promotes power generation using renewable sources and sets the sale prices, which are considerably more moderate than those applied to the power generated using traditional sources. (see also the resolutions of AEEG no. 89 of 1999, no. 56 of 2000 and no. 62 of 2002).

The Legislative Decree no. 79 of 16/03/99 liberalized the generation of power on the whole national territory and, for the first time in Italy and it introduced an obligation for those operators who put more than 100 GWh/year in the national grid: at least 2% of such power must come from plants supplied with renewable sources. In order to support such obligation, the so-called “Green certificates” give an incentive to the producer for every kWh generated; such incentive may vary according to the renewable source and to the date after which the plants have been built. The plants, that operate in or that will operate from 2008, due to new construction, restoration or extension, will receive the Green Certificates for 15 years; such Green Certificates will be equal to the product of the net generation of power using renewable sources by a coefficient, relating to the type of source, which for hydro plants, is equal to the unit.

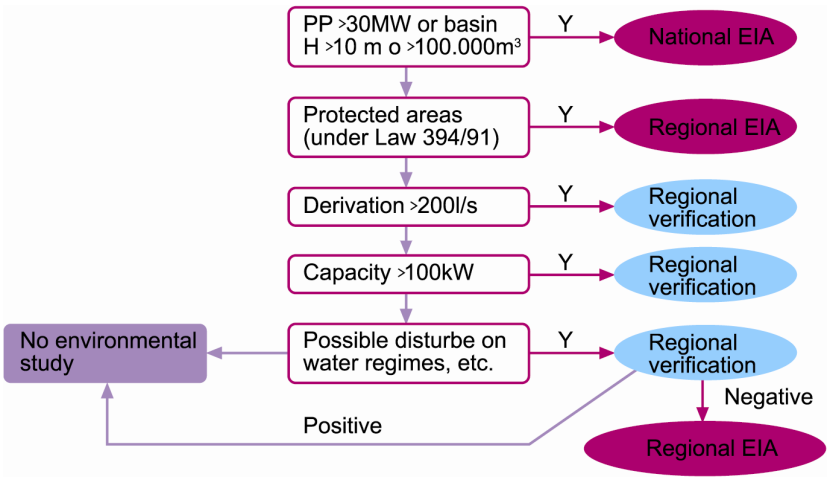
2.1.3.3 Environmental compatibility

One of the general principles of the environmental code is the following: “every legally significant human activity shall comply with the principle of sustainable development, in order to guarantee that the fulfilment of the needs of present generations will not compromise the quality of life and the chances of future generations”. For a long time, Italian regulation has provided for the preventive assessment of the environmental consequences deriving from the construction and operation of any significant work, through the carrying out of the Environmental Impact Assessment (EIA) procedure. In case of small-scale hydro plants, the Regions are in charge of all the aspects concerning the environmental integration of the plant, under Legislative Decree 152/2006 and the recent Legislative Decree no. 4/2008. Depending upon the plants characteristics (and the supposed environmental impact) the Decree 4/2008 makes provision for the projects to undergo either the EIA procedure (regional or national) or the screening procedure (Verification procedure) to assess the need of further in-depth study (i.e. if there is the need of a complete EIA procedure). In Annex II, III and IV the works and plants are catalogued which have to undergo respectively the national EIA procedure, the regional EIA procedure and the Verification procedure. For the works and plants of the III and IV annexes, which are located, even if partially, within a protected area (as defined under the law n. 394/91), the dimensional standards to establish the procedure to follow have to be halved. The 4/2008 L. D. specifies also the criteria for the Verification Procedure (Annex V) and the contents of the Environmental Impact Study (Annex VII).

The criteria to follow in the verification procedure to assess if a plant has to be subjected to EIA are given as follows (Annex V):

- specific design features (work size and its production cycle);
- localization of designed plant, considering protected areas (Sites of Community Importance or Special Areas of Conservation by 79/409/CEE and 92/43/CEE directives) or sensible areas because of lack of natural resources, density of population, historic and cultural significance;
- potential impact of the plant (duration, frequency, reversibility, probability, etc.).

In the case of mini hydro plants, the rules are schematised in the following figure:



2.1.4 Mention to forms of state support for SHP electricity production

The SHP electricity production can be oriented to self-consumption, that is the direct use by the producer, or more commonly to the sale to the Distribution Network Operator.

Sale prices are regulated by the Italian Regulatory Authority for Electricity (hereinafter “AEEG”), based on the electricity market, and are updated every year.

The most common incentive system to support the development of renewable energy plants in Italy is based on the Green Certificates.

The Green Certificates are born by the no. 79/99 Bersani Decree and the no. 244/07 and 239/04 financial laws, as well as the no. 387/03 L.D.; these measures have established that, for energy agents which put in the Electric Grid more than 100 GWh/year, at least 2% of electric energy is produced by renewable source plant. This contribution is increased by 0.35%/year from 2004 to 2006 and by 0.75% from 2007 to 2011.

For the plants built before 2008, the Green Certificates are issued for 12 years, in conformity with the no. 267 article 4 comma d) letter of the L.D. no. 152/06, for all plants fed by renewable source into operating from 1/04/1999 to 31/12/2007.

Together with Green Certificates there are to be other financial measures like community, national and regional contributions, deductions from taxes.

In particular to support the development of small renewable power plants, which have high management and maintenance costs in relation to the energy production, AEEG had fixed minimum sale prices of the electric energy (no. 34/05 and no. 280/07 resolutions). For hydraulic source, SHP plants up to 1 MW are admitted to this form of incentives called reserved collection (“ritiro dedicato”). Minimum selling prices for SHP are fixed following a classification of the plants defined by AEEG (no. 109/98 resolution) on the basis of the average annual energy production.

The latest up-to-date sale prices (2009) are so fixed:

Plant Class (MWh/year)	Price (€/kWh)
< 250	0.1404
250 - 500	0.1073
500 -1000	0.0867
1000-2000	0.0805

The whole incentive system for renewable energy has been recently revised by no. 244/2007 and no. 133/2008 financial laws and the ARG/elt 1/09 resolution.

Specifically the new incentive system provides for a revision of the Green Certificate system and the introduction of the all-inclusive fixed price. The new rules applies only to plants gone into operation after 31 December 2007.

As regard to the green certificate the revised system provides for a differentiation of the value depending on the energy source.

The amount of energy which can be supported by GC is calculated on the produced energy multiplied by a coefficient which is, for hydraulic source, equal to one. In this case the GC are issued for 15 years.

The sale price of the GC is defined as the difference between 180 €/MWh and the average annual sale price of electric energy in the previous year. For example in 2008 the Distribution Network Operator, given a price of 67,12 €/MWh for 2007 (as defined by the no. 24/08 resolution of the A.E.E.G) fixed the Green Certificates price equal to 112,88 €/MWh.

By the last no. ARG/elt 1/09 resolution of the AEEG the frame of the incentives to renewable energy sources is completed because it provides for the application of all-inclusive fixed price (sale price + green certificates) equal to 0.22€/kWh. This incentive applies only to SHP up to 1 MW nominal power and, as before stated, to plants gone into operation after 31 December 2007.

The multiplicative coefficients and the all-inclusive fixed price must be updated every three years by Ministerial Decree.

Another form of incentive deriving from the no. ARG/elt 74/08 resolution is the application of the electric energy exchange (on place) service, which allows the renewable energy plants up to 200 kW to put in the national grid the produced energy and to consume it later on. An economical contribution for the producer is provided based on the energy amount supplied to the electric grid, but it has still to be defined.

Following the rules in force it has become impossible to cumulate different forms of public incentives: the producers may apply for the Green Certificates contribution or all-inclusive fixed price only if they do not take advantage of other incentives (national, local or community).

2.2 CROATIA

2.2.1 General overview of the situation of SHP implementation

Apart from more than 2000 MW installed generation capacity in hydro power plants owned by HEP with an average yearly production of 6092 GWh, there are only a few small hydro power plants producing rather small amounts of electricity. The average yearly production of SHP is about 110 GWh. Basic information on small hydro power plants are presented in Table 2.4.

Table 2.4. Small hydro power plants in Croatia (2009)

Small hydro power plants	**Installed capacity MW**
HE Jaruga (HEP), run of river	7.2
HE Golubić (HEP), run of river	6.54
HE Ozalj (HEP), run of river	5.5
HE Krčić (HEP), run of river	0.34
CHE Fužina (HEP), pumped storage	4
HE Zavrelje (HEP), storage	2
CHE Lepenica (HEP), pumped stor.	1.4
HE Zelini Vir (HEP), storage	1.7
Total small hydro HEP	**28.68**

Small hydro power plants (private)	**MW**
MHE Kupčina (Bujan)	0.045
MHE Čabranka I, II (Fininvest)	1.29
MHE Čabranka (Urh)	0.008
HE Roški Slap (Hidrowatt)	1.64
Pamučna industrija Duga Resa	1.1
MAHE Matković I (Matković strojna obrada metala)	0.02
MAHE Matković II (mHE Matković obrt)	0.02
Total small hydro private	**4.123**

It is expected that the adoption implementation of secondary legislation will establish a stimulating

framework for increased penetration of new renewable energy sources. The following documents have been adopted:

- Tariff system for the production of electricity from renewable energy sources and cogeneration - pursuant to the Energy Act, Article 28, (Official Gazette 33/07);
- Regulation on the fee for the promotion of electricity production from renewable energy sources and cogeneration - pursuant to the Energy Act, Article 28, (Official Gazette 33/07);
- Ordinance on the usage of renewable energy sources and cogeneration - pursuant to the Energy Act, Article 14, (Official Gazette 67/07);
- Regulation on minimum share of electricity produced from renewable energy sources and cogeneration in the electricity supply - pursuant to the Electricity Market Act, Article 26, (Official Gazette 33/07);
- Ordinance on the obtaining of the eligible electricity producer status - pursuant to the Electricity Market Act, Article 8, (Official Gazette 67/07).

2.2.2 Institutions responsible for making and executing acts (laws), rules, permissions and procedures

Institutions responsible for making and executing acts (laws), rules, permissions and procedures in energy sector in the Republic of Croatia are:

- the Ministry of Economy, Labour and Entrepreneurship (MoELE);
- the Ministry of Environmental Protection, Physical Planning and Construction (MoEPPPC);
- the Ministry of Agriculture, Forestry and Water Management (MoAFWM);
- the Regional Authority;
- the Distribution System Operator (DSO);
- the Croatian Transmission System Operator, HEP Operator prijenosnog sustava (HEP-OPS);
- the Croatian Energy Regulatory Agency, Hrvatska energetska regulatorna agencija (HERA);
- Croatian Energy Market Operator, Hrvatski operator tržišta energije (HROTE);
- Independent System and Market Operator (ISMO);
- Transmission System Operator (TSO).

Croatian Energy Regulatory Agency (HERA)

Croatian Energy Regulatory Agency (HERA) is an autonomous, independent and non-profit public institution which regulates energy activities in the Republic of Croatia. HERA performs activities of special interest for the Republic of Croatia, based on public authority.

HERA's obligations, authorities and responsibilities are based on the Act on the Regulation of Energy Activities, the Energy Act and other legislation regulating particular energy activities.

HERA is governed by the Steering Committee, consisting of five members, one of which is the President and one the Deputy President. The Steering Committee's members are appointed and relieved of duty by the Croatian Parliament, upon the proposal of the Government of the Republic of Croatia. The Steering Committee's members are appointed to a term of five years with the possibility of reappointment.

HERA is the legal successor of the Croatian Energy Regulatory Council (VRED). The founder of HERA is the Republic of Croatia and the founding rights are exercised by the Croatian Government.

Croatian Transmission System Operator (HEP-OPS)

The mission of the Croatian transmission system operator company HEP- Operator prijenosnog sustava d.o.o. (HEP-OPS) is to operate the power system of the Republic of Croatia, to transmit electricity and to maintain and develop the transmission network with the aim of reliable electricity supply and trade at lowest cost. As part of the restructuring of the electricity sector intended to open up and develop the electricity market in Croatia pursuant to the Energy Act, the Act Amending the Energy Act and the Electricity Market Act, HEP-OPS started to operate on 4 April 2005. HEP-OPS is sole transmission system operator in the Republic of Croatia. HEP-OPS has the license to carry out electricity transmission as a public service. The company performs its functions transparently and independently, in accordance with the Croatian Companies Act. HEP-OPS is a member of HEP Group as a subsidiary or daughter company of the parent company HEP d.d.

Croatian Energy Market Operator (HROTE)

Croatian Energy Market Operator (HROTE) started to operate on 4 April 2005. HROTE performs activities

of organizing the electricity market as a public service, under the supervision of the Croatian Energy Regulatory Agency (HERA). HROTE's main responsibilities include: issuing Electricity Market Rules, registration of contractual obligations among market participants, keeping records of eligible customers, keeping records of suppliers, preparation of a day ahead market plan, settlement of balancing energy, keeping registry of eligible producers, collecting fee for incentivizing the renewables and cogeneration from suppliers and its distribution to eligible producers, analysing the electricity market and recommending measures for its improvement.

The company is financed from the fee for electricity market organization which is a part of electricity price. The fee is determined by the Croatian Government at the proposal of the Ministry of Economy, Labour and Entrepreneurship.

2.2.3 Review of the normatives

The normatives to derive water for small-scale hydro power plants in Croatia are:

Laws (Acts)

- Physical Planning Act;
- Building Act;
- Environment Protection Act;
- Nature Protection Act;
- Concessions Act;
- Water Act;
- Energy Act;
- Regulation of Energy Activities Act;
- Electricity Market Act.

Book of Rules

- Ordinance on environmental impact assessment (OG 59/00, 136/04, 85/06);
- Ordinance of derive water on nature;
- Ordinance on the usage of renewable energy sources and cogeneration (OG 67/07);
- Ordinance on the obtaining of the eligible electricity producer status (OG 67/07);
- Tariff system for the production of electricity from renewable energy sources and cogeneration (OG 33/07);
- Rules on Charges for Connection to the Network and for Increase in Connected Power (OG 28/06);
- Rules on Conditions for the Carrying Out of an Energy Activity.

Permissions

- Permission for electricity production

Reforms of energy sector in Croatia have started in the year 2000 with promulgation of the five acts (Energy Act, Gas Market Act, Electricity Market Act, Oil and Oil Derivatives Market Act, Regulation of Energy Activities Act). These acts were in compliance with EU Directive 96/92/EC.

Following changes in the European energy legislation, changes were made in the Croatian legislative framework in order to harmonize with the EU energy legislation relating to electricity. In December 2004, the Croatian Parliament passed a package of three new energy related acts (Energy Act, Electricity market Act and on the Regulation of Energy Activities) resulting in change from ISMO to TSO model.

The Energy Act includes provisions concerning energy policy and energy development planning, national energy programs, energy efficiency and renewable energy sources, carrying out of energy activities, electricity market and public services, energy prices, conditions of energy supply, administrative and inspection supervision. The Electricity Market Act establishes the electricity market by setting out the timeline of opening of the electricity market.

There are two customer categories in Croatia: eligible and tariff customers. Eligible customers, or customers who can freely choose their electricity supplier, are defined in the Electricity Market Act. These are all customers connected at high voltage and customers with an annual consumption above 9 GWh. Since July 1, 2007 the status of eligible customer is granted to all commercial customers.

The status of eligible customer gives the right to the customer to freely choose his supplier. Residential

customers and small customers with up to 50 employees and total income of up to 70 million kuna (1 euro ≈ 7,3 kuna) can remain in the status of tariff customer even after being granted the status of eligible customer.

Total electricity price for eligible customers consists of: electricity price contracted with a supplier, transmission network fee or distribution network fee, fee for electricity market organization activities, fee for performing regulation of energy activities, fee for incentivizing electricity production from renewable energy sources and cogeneration.

The Act on the Regulation of Energy Activities sets out the activity, authority and organization of the Croatian Energy Regulatory Agency as an autonomous, independent and non-profit institution with public authority which reports to the Croatian Parliament. The objectives of the regulation are: regulated network access, establishment of the energy market and competition, and protection of customers and energy entrepreneurs.

Environmental regulations affecting SHP concession in Croatia are:

- the Nature Protection Act (OG 70/05);
- the Environment Protection Act (OG 110/07);
- the Ordinance on Environmental Impact Assessment (OG 59/00, 136/04, 85/06, 64/08).

The Nature Protection Act (OG 70/05) does not mention SHP directly but some of the articles have direct or indirect impact on SHP. The purpose of this Act is to regulate the system of protection and integrated conservation of nature and its values.

The objectives and tasks for nature protection are:

- to conserve and restore the existing biological and landscape diversity to a state of a natural balance and relations harmonised with human activities;
- to assess the state of the natural environment and ensure monitoring of that state;
- to provide a system for the protection of natural values for the purpose of a lasting conservation of the features that form the basis for designating them as protected;
- to provide a sustainable use of natural resources for the benefit of the present and future generations without substantial degradation of the parts of the natural environment and with the least possible disturbance to the balance of its components;
- to contribute to conservation of the natural state of the soil, conservation of the quality, quantity and availability of water, maintenance of the atmosphere, generation of oxygen and maintenance of the climate;
- to prevent harmful human activities.

The Environment Protection Act (OG 110/07) regulates: environmental protection and sustainable development principles, protection of environmental components and protection against environmental burdening, actors in environmental protection, sustainable development and environmental protection documents, environmental protection instruments, environmental monitoring, information system, ensuring access to environmental information, public participation in environmental matters, access to justice, liability for damage, financing and instruments of general environmental policy, administrative and inspection supervision.

Environmental protection ensures integrated preservation of environmental quality, conservation of biological and landscape diversity and rational use of natural assets and energy in an environmentally sound manner, as basic conditions for healthy and sustainable development. The environment represents an asset of interest to the Republic of Croatia and enjoys its special protection. Through projects carried out in the environment the quality of life, human health, flora and fauna may be affected within the framework of sustainable development.

The goals of environmental protection are:

1. protection of human life and health;
2. protection of flora and fauna, biological and landscape diversity and preservation of ecological stability;
3. protection and improvement of the quality of individual environmental components;
4. protection of the ozone layer and climate change mitigation;
5. protection and restoration of cultural and aesthetic landscape values;
6. prevention of major accidents involving dangerous substances;
7. prevention and reduction of environmental pollution;
8. continuous use of natural resources;
9. rational use of energy and promoting the use of renewable energy sources;
10. elimination of environmental pollution effects;
11. improvement of the disturbed natural balance and restoration of its regeneration capabilities;
12. achievement of sustainable production and consumption;

13. phase-out and substitution of use of dangerous and harmful substances;
14. sustainable use of natural assets, without significant damage or threat to the environment;
15. improvement of environmental status and securing a healthy environment.

Water protection includes water protection measures and improvement of water quality with the aim of avoiding or reducing the adverse effects on human health, freshwater eco systems, quality of life and the environment as a whole. Protection of water against pollution is implemented with the aim of preserving human life and health and protecting the environment, as well as enabling sustainable, harmless and undisturbed use of water for various purposes.

The definition and purpose of the Environment Impact Assessment (EIA) are:

- EIA identifies, describes and evaluates in an appropriate manner the impact of the project on the environment, by establishing the possible direct and indirect effects of the project on the soil, water, sea, air, forest, climate, human beings, flora and fauna, landscape, material assets, cultural heritage, taking into account their mutual interrelations;
- EIA shall ensure the realisation of the prevention principle in the early phase of project planning in order to reduce the effects of the project to the least possible extent and achieve the greatest possible level of preservation of environmental quality;
- EIA shall be carried out as part of the preparation of the intended project, prior to issuing the location permit for SHP project implementation;
- The measures and/or programme for environmental monitoring established in the decision on the environmental acceptability of the project shall be a mandatory part of the content of the project implementation permits which are issued pursuant to special regulations.

SHP - Projects for which Environmental Impact Assessment is subject to evaluation of the need for assessment define the Ordinance on Environment Impact Assessment (OG 64/08). The procedure for carrying out the Evaluation of the need for environmental impact assessment shall be carried out by the Ministry of Environmental Protection (www.mzopu.hr) upon a written request from the developer.

The Ordinance on Environment Impact Assessment (OG 64/08) determines the Contents of the Study of Environmental Impact Assessment:

1. description of the intervention and its location;
2. acceptability assessment of the intervention;
3. environmental protection measures and implementation plan;
4. the study conclusion;
5. the study summary for public inspection prepared for the general public;
6. data sources.

The Study of Environmental Impact Assessment determines:

- argumentation of the intervention's most appropriate variant;
- review of the environmental impact of the selected variant of the intervention;
- environmental protection measures during execution and use, or cessation of use and/or removal of the intervention, including measures for prevention and mitigation of consequences of possible ecological accidents;
- monitoring programme, if necessary, related to the state of the environment during the intervention's execution and use, or cessation of use, with argumentation.

2.2.4 Mention to forms of state support for SHP electricity production

Regulation on a minimum share of electricity produced from renewable energy sources and cogeneration in the electricity supply determines, for the period until 2010, a minimum share of electricity that energy subjects for supply are obliged to take from plants using renewable energy sources and cogeneration plants with the status of privileged producer. The minimum share of electricity produced from RES does not include energy from hydro power plants with an installed power of over 10 MW.

In the Regulation the minimum RES value is set at 5.8% of total electricity supplied in 2010, or approximately 1100 GWh. The total amount of particular RES technology that can obtain a privileged status and right to the feed-in tariff is limited to 80% of the minimum share. That would be approximately 880 GWh.

The tariff system determines the amount of feed-in price (C) as the total agreed price in kn/kWh (1 euro ≈ 7,3 kuna) for the delivered electricity from the renewable energy sources. The tariffs for the electricity produced in the small hydro power plants depend on the installed power.

Prices foreseen in the adopted version of the tariff system:

- power plants, installed power less than 1 MW C = 0.69 kuna/kWh
- power plants, installed power from 1 MW to 10 MW:
  production up to 5000 MWh/year C = 0.69 kuna/kWh
  production from 5000 MWh/year to 15000 MWh/year C = 0.55 kuna/kWh
  production over 15000 MWh/year C = 0.42 kuna/kWh

Feed-in price C will be yearly corrected by retail price index (RPI) according to expression:

$$C_{current\ year} = C_{previous\ year} \times RPI_{previous\ year}$$

2.3 GREECE

2.3.1 General overview of the situation of SHP implementation

In Greece, hydropower has had a leading share of electricity generated by Renewable Energy Sources (RES), with the operation of Small Hydropower Plants (SHPs) being rather low, so far. Certainly the introduction or improvement of the Greek relevant legislation during the last decade yielded a dynamic investing interest in SHP. In a recent study carried out by Douridas (2006), the author examined the administrative, geographic and technical characteristics of a total of 250 operating or licensed SHP projects. He showed that in a total of 430 MW SHP capacity can be added up to the central grid, increasing inland hydropower energy use by 14%. More specifically, an analytical examination of the analysed data showed that 48 plants operate with a total of 73.35 MW capacity, 53 plants are under construction (119.92 MW), and 159 projects have been granted Production License (309.95 MW). At this point in time, 2009, the existing capacity is 160 MW. The author, also, found reported that an examination of authorization dates indicated that the time needed for obtaining construction licensing is shorter nowdays, and, in fact, administrative procedures were cut down from 22 months in 2003, to 12 months in 2004 and 10 months in 2005. The SHP in relation RES has an energy efficiency result of 30~67, while the corresponding values for Wind Energy, Biomass, and Photovoltaic range between 5~39, 3~27 and 1~4, respectively (ESHA, 2005).

The distinction between Small HydroPower Plants (SHPs) and large ones is the limit of 10 MW of installed capacity, adopted by European Union as well as by the Greek state. According to the Greek Ministry of Development the contribution of RES in the domestic gross electricity consumption was 12.2% in 2005, nearly half of the respective target of 20.1% for the year 2010. The installed capacity of SHPs was 72.4 MW, less than a quarter of the targeted 364 MW set for the year 2010.

Furthermore, the feed-in tariff in Greece for the interconnected system is73 euro per MWh, where as the feed-in tariff for the non-interconnected islands is 86 euro per MWh.

Estimated total installed capacity of MHPPs in Greece

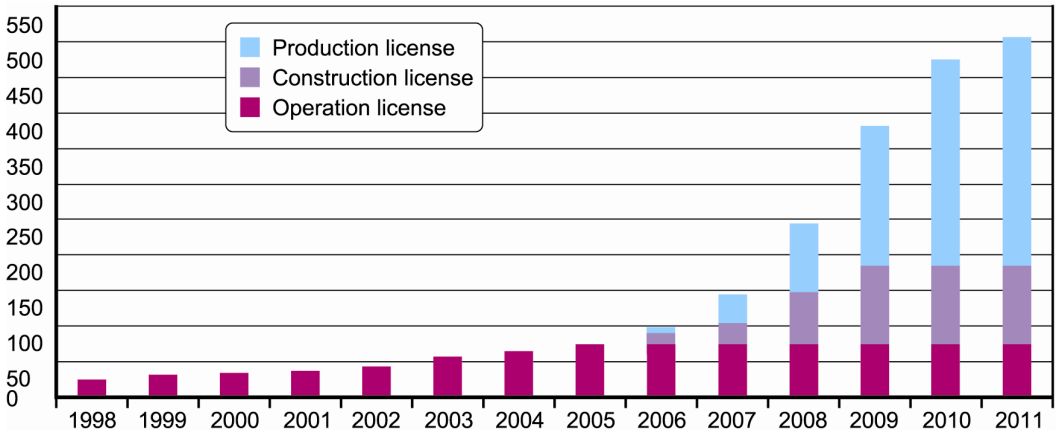


Figure 2.1. SHP development history and future estimation in Greece

2.3.2 Institutions responsible for making and executing acts (laws), rules, permissions and procedures

During the past decade legislation regarding the incorporation of SHPPs and RES in general in the Energy Grid (EG) has evolved significantly, having been adjusted to the directives of the European Community. European policy in favour of RES and the rationalization of energy management is imposed by the will to protect the environment (White Paper) in accordance to the commitments undertaken in Kyoto Protocol, as well as by the need to secure energy supply by reducing its dependence on energy imports (Green Paper).

In Greece, Law 2244/1994 instituted the development of RES, setting the authorization framework and favourable prices for renewable energy. This Law instituted the concept of the independent energy producer, which was limited up to 5 MW capacity for small hydro units. Law 2773/1999 founded the Greek Energy Market, instituted the **Regulatory Agency for Energy (RAE)** and the Hellenic **Transmission System Operator (HTSO S.A.)**, cancelling the former energy monopoly of the Public Power Corporation (PPC).

Laws 2941/2001 and 3175/2003 solved various problems concerning project development, such us forest land occupation, connection to the grid and authorization procedures. The recent Law 3486/2006 applied Directive 2001/77 on Greek legislation, aiming to enhance the promotion of RES. The authorization and pricing framework were revised and the "Guarantees of origin" issuing system was instituted.

The **Ministry of Development** is responsible for planning the national energy strategy and issuing **Production Licenses** to independent producers, advised by **RAE**. **RAE** is responsible for studying and qualifying the applications, in accordance with the "**Code for Electricity Production and Trade Licences**". The management of the procedures for issuing environmental authorization and **Construction License** is held by the local administration agencies, assisted by the local **Forest Inspection Agencies**. The **Operation License** is issued by the **Minister of Development**, with the advisory participation of HTSO and the **Center for Renewable Energy Sources (CRES)**. The current environmental authorization procedures have been set by the **Ministerial Decree 104247/2006**.

2.3.3 Review of the normatives

The exsting legislation can be classified into four categories:

- feasibility of the project/ licence to produce electricity;
- evironmental impact assessment;
- bulding and operations licence.

The releveant laws are:

Law. 2244/1994 "Adjustment of issues of electricity production from renewable energy resources and conventional fuel and other" (OGJ A' 168).

Law 2508/1997, Art. 3 on "Sustainable land development of cities and other urban areas of the countries and other provisions" (OGJ A' 124).

Law, Art. 15, 2742/1999 "Zoning development and sustainable development and other provisions" (OGJ A' 207).

Law. 2773/1999 "Liberalizing the market of electricity, adjusting issues of energy policy, adjusting issues and other provisions" (OGJ A' 286).

Law 2941/2001 "Simplification of establishment and permit granting procedures for the establishment RES companies" (OGJ A' 201).

Law 3017/2002 "Ratification of the Kyoto Protocol in the Charter of the United Nations on climate change" (OGJ A' 117).

Law 3028/2002 "For the protection of antiquities and cultural heritage in general" (OGJ A' 153).

Law 63/2005 "Codification of legislation for the Government and Governing Tools" (OGJ A' 98).

Common Ministerial Decision 33318/3028/1998 on "Defining measures and procedures for the preservation of natural eco areas, etc" (OGJ B' 1289).

Common Ministerial Decision 15393/2332/2002 on "Enlistment of public and private works and activities in categories according to article 3 of law. 1650/1986, as replaced by article1 of law 3010/2002 on the "Harmonization of Law 1650/1986 with EU Directives 97/11 and 96/61 etc" (OGJ A' 91), as supplemented by Common Ministerial Decision 145799/2005 (OGJ B' 1002).

Common Ministerial Decision 25535/3281/2002 on the "Approval of Environmental Terms from the

General Secretary of Regional works and activities that are enlisted in subcategory 2 of Category A' etc." (OGJ B' 1463).

Common Ministerial Decision 11014/703/ (OGJ104/2003) on the "Procedure for the Preliminary Environmental Assessment and Evaluation and Approval of Environmental Terms according to article 4 law 1650/1986 (A' 160) as replaced by Law (Art 2 3010/2002) on the "Harmonization of law 1650/1986 with the EU Directives 97/11 and 96/61/EU and other provisions" (A' 91)" (OGJ B' 332).

Common Ministerial Decision 37111/2021/2003 on "Defining the way and participation of the public during the procedure of Environmental Terms Approval of works and activities according to Law 1650/1986, Art. 5, para. 2 and Law 3010/2002, Art. 3, pa. 2" (OGJ B' 1391).

Common Ministerial Decision 145799/2005 on "Supplementing 15393/2332/2002 (OGJ 1022/B/5.8.2002). Classification of public and private works and activities in categories, according to Law 1650/1986 (OGJ A' 160) as replaced by article 1 of law 3010/2002 "Harmonization of law 650/1986 with the EU Directives 97/11 και 96/61 (A'91)" (OGJ B' 1002).

EEC Directive 85/337 of the Council of the 27th of June 1985 "For the evaluation of specific private and public plans to the environment" (EU L 175/05.07.1985).

EEC Directive 92/43 of the Council of the 21st of May 1992 "For the preservation of natural habitats as well as wild fauna and flora" (EE L206/22.07.1992).

EC Directive 97/11/EC of the Council of the 3d of March 1997 "For the adjustment of Directive 85/337/EEC for the evaluation of specific private and public works on the environment" (EU L073/14.03.1997).

EU Directive 2001/77 on the "Promotion of electricity from renewable energy resources within the internal market of electricity" (EE L 283/27.10.2001).

Law 2773/1999 allowed the private sector to enter the electricity production sector. This Law allowed the establishment of RAE, the independent authority, and DESMIE, owned 51% by the government and 49% by PPC, responsible for the management and Transfer of Electricity. Also, PPC was transformed into a private electricity producer.

In accordance with the Directive 96/92, Law 2244/1994 defined the pricing for RES and introduced the 2% tax on electricity sales produced from RES. This Law defined SHP to the level of 10MW.

Law 2941/2001 defined the RES establishment issues. It allowed connections between SHPs and the Grid to be carried out in accordance with the specifications of DESMIE. Moreover, SHP plants, like any other RES plant are considered common good projects, thus, the confiscation of land is legal.

The Building and Operation Permits are issued by the project relevant Strategic Planning Development Directorates of Regional Secretariats, which coordinated the collection of all other documents.

Law 27731999 was replaced by Law 3175/2003 which allowed a free competition in the electricity market; procedures were simplified with regard to the use of land for the support and extension of electricity lines.

Law 3468/2006 (OJ 27/6/2006) adopted the Directive 2001/77 introduced the use of RES electricity production in the local market and in accordance with the rules and regulations in line with electricity production from RES or cogeneration; it defined rules and procedures for issuing permits, the time limitations for permits, the project implementation by licence holders. Moreover, this Law defined the pricing for SHP being 73 και 84,6 €/MWh for the connected and no connected system, respectively. At last, an Inter-ministerial committee is established with representatives from the Ministry of Development, the Ministry of Environment, Planning and Public Works, the Ministry of Agriculture, RAE and DESMIE in order to promote and support RES investment plans.

The following decrees clarify issues related to this Law:

- 1442/02.10.2006 on the contacts for selling electricity;
- 448/3.4.2007 on production licencing for generating electricity via RES and COGEN;
- 1153/7.2007 on building and operation licencing for facilities generating electricity via RES;
- 2464/3.12.2008 on land planning for RES.

The need to promote Renewable Energy Resources within the energy market of the country has been supported by the Ministerial Decision 104247 of the Ministry of Environment, Planning and Public Works (OGJ May 26, 2006), encompasses the Process of Preliminary Environmental Assessment and Evaluation of Environmental Terms for Renewable Energy Sources (RES) works according to Law 1650/1986, Art. 4, as replaced by Law 3010/2002, Art. 2. It requires one Folder for Pre-study of Environmental Repercussion (PER) type I and another folder on Renewable Energy Sources (RES) Works type II. This important document may include the following contents:

1.0 Introduction.
2.0 Description of project:
2.1 Geographical location of projec;t
2.2 Description of project (main project and accompanying projects such as road construction, work for connecting networks, etc.).
3.0 Objective, importance, necessity and economic evidence of the project – Correlation with other projects:
3.1 Target, importance and necessity of the project;
3.2 Historical development of the project;
3.3 Economic data of the project;
3.4 Correlation of project with other projects or activities.
4.0 Description of alternative solutions.
5.0 Environmental condition:
5.A Area of Study.
5.B Bio characteristics:
5.B.1 Climatic and bioclimatic characteristics;
5.B.2 Morphological and site-logical characteristics;
5.B.3 Land, geological and tectonic characteristics;
5.B.4 Supply of water.
5.C Natural environment:
5.C.1 General data;
5.C.2 Special natural areas;
5.C.3 Other natural areas;
5.C.4 Description of the natural environmental of the area of study.
5.D Human made environment:
5.D.1 Land-planning and land uses;
5.D.2 Structured environment;
5.D.3 Historical and cultural environment;
5.D.4 Social-economic environment - technical structures;
5.D.5 Pressures to the environment from human activities;
5.D.6 Atmospheric environment;
5.D.7 Acoustic environment, vibrations, radiation;
5.D.8 Surface and underground waters.
5.E Tendencies of environmental development – zero solution.
6.0 The initial assessment and evaluation of environmental repercussions (mainly the project's and its accompanying work with the assessment of accumulative and co operational repercussions):
6.1 Non biotic characteristics:
6.1.1 Climatological and bio-climatological characteristics;
6.1.2 Morphological and area-logical characteristics;
6.1.3 Land-logical and tectonic characteristics;
6.1.4 Water flow;
6.2 Natural environment;
6.3 Man made environment:
6.3.1 Land uses;
6.3.2 Structured environment;
6.3.3 Historical and cultural environment;
6.3.4 Social-economic environment - technical structure;
6.3.5 Atmospheric environment;
6.3.6 Acoustic environment, vibrations, radiation;
6.3.7 Surface and underground waters.
7.0 Direction for Resolving Environmental Repercussions.
8.0 Assessment of difficulties expected to come up during the development of the SER.
9.0 Required basic studies.
10 Maps – sketches:
10.1 Maps (with project noted):
10.1.1 Map for orientation (suggested position of the project);
10.1.2 Map of the general area 1:50.000 or other suitable scale;

10.1.3 Geological map 1:50.000 to 1:25.000 or other suitable scale as long as road works are predicted;
10.1.4 Hydrographical map of the of the suitable scale as long as interventions to hydrographical network of the area;
10.1.5 Map imprinting natural dwellings 1:50.000 or other suitable scale;
10.1.6 Map for the use of land 1:5.000 to 1:25.000 or other suitable scale;
10.1.7 Map of positions for photographs taken for Chapter 13;
10.1.8 Maps with specialised information necessary for the complete description of the environmental situation.
10.2 Sketches:
10.2.1 Horizontal alignment in scale 1:10.000 or other suitable scale for the installations accompanying the project;
11.0 Permits – approvals.
12.0 Bibliography – sources.
13.0 Photographic substantiation.
14.0 Annexes.

1442/02.10.2006 on the contacts for selling electricity;
448/3.4.2007 on production licensing for generating electricity via RES and COGEN;
1153/7.2007 on building and operation licensing for facilities generating electricity via RES;
2464/3.12.2008 on land planning for RES;

2.3.4 Mention to forms of state support for SHP electricity production

The government of Greece provides support to renewable resources in two ways:

- subsidizing the original investment. If the projectqualifies according to the"Development Law" up to 35% of the original investment can be covered by the state. This Law covers all investment projects in Greece and is not specific to projects related to renewable energy resources;
- Guaranteed feed rate for the project. For small hydro power projects (up to 15 MW) there is a quranteed feed rate of 73 euros per MWh for installations connected to the national grid and a feed rate of 84.6 euro per MWh for installations in islands not connected to the national grid.

2.4 NORWAY

2.4.1 General overview of the situation of SHP implementation

The average Norwegian production of electrical energy is estimated to be 122 TWh. Hydropower represent 96% of installed capacity and therefore the annual energy production varies due to the variations in rainfall. In year 2000, the annual energy production was 143 TWh, while in 1996 it was 105 TWh. In 2007, the total energy production from hydro power was 121,8 TWh, where the energy production from SHP represented 5,1%. Table 2.5 show the facts from SHP in Norway in 2007.

Table 2.5. Power output and annual energy production from SHP in 2007

Plant Size	Number of Power Plants	Power Output [MW]	Annual Energy Production [GWh]
> 100 kW	201	8	41
0,1 - 1 MW	231	110	490
1 - 10 MW	368	1.247	5.640

The statistics of the implementation of new small hydro power plants in Norway in the period from 2002 to 2007 is shown in Table 2.6. This shows that there has been a dramatic change in the number of power plant from 2005 to 2006. This is due to increased energy prices and implementation of support for energy production from SHP from the government.

Table 2.6. Number of small hydro power plants in Norway

Plant Size	2002	2004	2005	2006	2007
> 100 kW	74	74	74	164	201
0,1 - 1 MW	98	98	98	192	231
1 - 10 MW	252	258	280	293	368

The total installed capacity from small hydropower has increased from 932 MW in 2002 to 1365 MW in 2007. The relative largest increase of installed capacity has happened for SHP below 100 kW with a 267% while the SHP above 1 MW has increased with only 36%. However, the power output has changed with only 5 MW for SHP below 100 kW while the SHP above 1 MW has increased with 332 MW. This is shown in Table 2.7

Table 2.7. Total installed capacity in Norwegian SHP

Plant Size	2002	2004	2005	2006	2007
> 100 kW	3 MW	3 MW	3 MW	6 MW	8 MW
0,1 - 1 MW	14 MW	14 MW	14 MW	91 MW	110 MW
1 - 10 MW	915 MW	952 MW	1.025 MW	1.035 MW	1.247 MW

The annual energy production from SHP in Norway has increased from 4413 GWh in 2002 to 6171 GWh in 2007. This is shown in Table 2.8

Table 2.8. Annual energy production from SHP in Norway

Plant Size	2002	2004	2005	2006	2007
> 100 kW	18 GWh	18 GWh	18 GWh	29 GWh	41 GWh
0,1 - 1 MW	74 GWh	74 GWh	74 GWh	375 GWh	490 GWh
1 - 10 MW	4.321 GWh	4.323 GWh	4.780 GWh	4.850 GWh	5.640 GWh

Due to environmental conflicts it is hard to achieve acceptance for large scale hydro power, hence the focus is more or less confined to improvement of already regulated rivers. However, the government has presented a strategy for development of small hydro power with emphasis on:

- importance for the energy supply;
- importance for local development;
- secure income for farmers to maintain settlement patterns in rural districts.

2.4.2 Institutions responsible for making and executing acts (laws), rules, permissions and procedures

The Norwegian Water Resources and Energy Directorate (NVE) hold the managing responsibility according to the Energy Act and the Water Resources Act. Furthermore NVE is assisting the Ministry of Petroleum and Energy (OED) managing the Industrial Licensing Act and the Act Relating to Regulations of Watercourses.

NVE is subordinated to the Ministry of Petroleum and Energy, and is responsible for the administration of Norway´s water and energy resources. NVE has the legislative power to issue regulations and to make individual decisions and perform preparatory procedures of cases to be resolved by the Ministry of Petroleum and Energy.

The goals of NVE are to ensure consistent and environmentally sound management of water resources, promote an efficient energy market and cost-effective energy systems, and contribute to the economic utilization of energy.

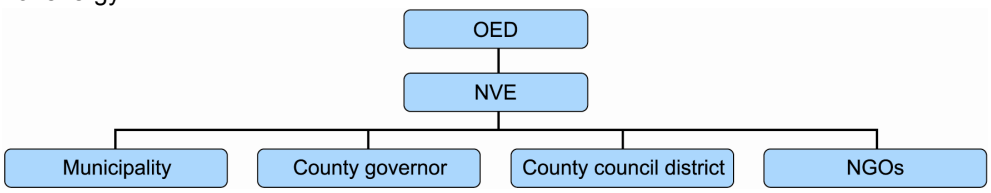


Figure 2.2. Flow chart illustrating the competent authorities, related authorities and public organisations

The definition of intervention in waterfalls, river system etc is every intervention which may alter the water flow, water level or the surrounding environment.

2.4.3 Review of the normatives

The main objective of the different laws and regulation is to secure a sustainable management of the waterfalls and river system. The main legislation involves the following acts:

- The Acquisition Act: Licenses to acquire waterfalls and shares in power utilities;
- The Water Resources Act: Licenses regarding all kind of measures in the river system;
- The Watercourse Regulation Act: Licenses to establish reservoirs and to transfer water;
- The Energy Act: Licenses for transmission lines and electric equipment;
- The Planning and Building Act: A general law, maintained by the municipality, governing all kind of construction activities and land use. Handling procedures, notifications and provisions concerning EIA.

The procedures include co-ordination with the Pollution Control Act and The Cultural Heritage Act. Also, The Energy Act only yields when the project involves high-voltage components (U >1000 V AC / U > 1500 V DC).

The Industrial Licensing Act (Act No. 16 of 14. of December 1917) relating to acquisition of waterfalls, mines and other real property.

The Watercourse Regulation Act (Act No. 17 of 14. of December 1917) relating to the adjustment of licence fees annual compensation and funds, pursuant to water resources legislation. Regulations within the Watercourse Regulation Act mainly contain:

- regulations relating to the adjustment of licence fees, annual compensation and funds etc., pursuant to water resources legislation;
- delegation of competent authority pursuant to The Watercourse Regulation Act;
- delegation of authority to OED pursuant to The Watercourse Regulation Act;
- delegation of authority related to stipulation of the threshold of payment to business development fund.

The Energy Act (Act No. 50 of 29. of June 1990) relating to the generation, conversion, transmission, trading, distribution and use of energy. Regulations within the Energy Act contain:

- regulations concerning the generation, conversion, transmission, trading, distribution and use of energy;
- security provisions for the power supply system;
- regulations relating to implementation in Norwegian law of EEA Agreement Annex IV item 1 (Council Regulation (EEC) No 1056/72 of 18 May 1972) on notification of investment projects of interest to the European Economic Area in the petroleum, natural gas and electricity sectors;
- regulations governing the planning and implementation of requisitioning of power and enforced reductions in supply in connection with electricity rationing;
- regulations governing metering, settlement and coordinated action in connection with electricity trading and invoicing of network services;
- regulations governing financial and technical reporting, income caps for network operations and transmission tariffs;.
- regulations governing the payment of a levy on the grid tariff into the Energy Fund (Energy Fund Regulations);
- instructions for the Power Supply Preparedness Organisation;
- regulations relating to the system responsibility in the power system;
- regulations relating to contingency planning in the power supply system;
- regulations relating to energy planning;
- regulations relating to the quality of supply in the Norwegian power system.

The Water Resources Act (Act No. 82 of 24. of November 2000) relating to river systems and groundwater. Regulations within the Water Resources Act contain:

- regulations governing filing requirements for well drilling and ground water surveys;
- regulations governing the safety and supervision of watercourse structures;
- regulations governing qualifications for those undertaking the planning, construction and operation of watercourse structures;
- regulations governing internal quality control to comply with the Act relating to river systems and ground water;
- regulations relating to the adjustment of licence fees, annual compensation and funds etc., pursuant to water resources legislation.

2.4.4 Mention to forms of state support for SHP electricity production

The Norwegian government does not provide any form of support for SHP electricity production. However, there are a lot of political attentions towards green certificates and it is decided that this will be implemented in 2012. The framework for the certificates is discussed with neighbouring countries and it is still to be decided what kind of support this will give to the SHP.

The Norwegian SHP has shown to develop without governmental support. Developers of SHP find projects that are economical viable and therefore the government does not want to support these projects.

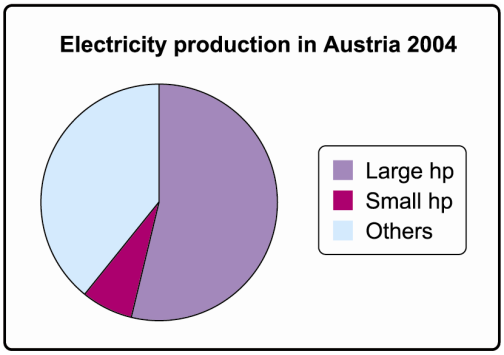
2.5 AUSTRIA

2.5.1 General overview of the situation of SHP implementation

- Actually more than 2.400 SHP with an installed capacity of about 950 MW feed in nearly 4.000 GWh green electricity to the grid;
- There are 1.300 different plant owners;
- They cover approx. 8% of the Austrian electricity demand respectively supply 1,5 Mio households (= 50% of Austrian households) with electric energy. This energy amount corresponds approx. to the production of 5 – 8 large scale hydro power plants on the river Danube;
- Through utilization of SHP there can approx. 3,8 Mio t CO_2 be annually saved, that would result from electricity generation of fossil energy sources.

Hydropower is Austria's leading energy source:

- the overall annual electricity consumption in Austria makes up ~ 50.000 GWh;
- share of renewables ~ 70%.



	GWh p.a.
Hydropower potential in Austria	75.000
Technically exploitable hereof	60.000
Exploitable hereof	52.000
Exploited share of this potential	39.500
Unused but exploitable	**12.500**

Market shares:

- ¾ large scale hydropower (>10 MW);
- ¼ small hydropower (<10 MW).

Particle size distribution of SHP (2005)

Bottleneck capacity	Number	Capacity in kW	Work in kWh
to 200 kW	1.442	87.395	336.527.480
200 kW - 500 kW	292	97.453	385.136.260
500 kW - 1 MW	184	128.082	467.545.871
1.000 kW - 2 MW	118	174.307	597.777.320
2.000 kW - 5 MW	73	230.272	744.455.354
5.000 kW - 10 MW	34	265.205	880.778.835
	2.143	**982.714**	**3.412.221.120**

2.5.2 Institutions responsible for making and executing acts (laws), rules, permissions and procedures

The federalist structure of Austria brings about a split of legal matters. Austria is divided into 9 Länder, to each of them more or less different SHP plant permission procedures apply. These differences range from

the sphere of basic political priorities in water utilization issues to the sphere of decision making procedures.

In the Land of Upper Austria (Oberösterreich) for instance, there is a comprehensive official guideline for the re-vitalization of small hydropower-plants and a coordinated advisory service solution characterized by close cooperation between public bodies and private consultants. In Lower Austria, however, no such integrated system is in place. Here more emphasis is put on each project's and procedure's individual features. This individuality has to be taken into account. It would be desirable and helpful from the point of view of all stakeholders to find more coordination within the entire system.

As to water utilization, the issue of river revitalization makes up a clear focus for the Lower Austrian authorities because of the European Water Framework Directive EWFD.

For this reason, ecologization and flood prevention are of similar importance, and energy production clearly is given lesser priority.

As soon as the idea of the erection (respectively revitalization, enlargement or upgrading) of a SHP plant in Lower Austria has emerged, one may turn towards different expert institutions in order to find information, advice and contacts:

Public contact points for making laws:

- Laws to the following subjects are legislated by the national government of Austria – water law, hydropraphy, water works promotion, torrent and avalanche stabilisation, electricity economy and organisation, green electricity, remediation of contaminated sites, national highways, waste (most parts), soil conservation, forestry, environmental impact assessment, mining, railway, shipping, criminal law, food law (drinking water decree), industry, civil law, environmental labelling;
- Laws to the following subjects are legislated by the government of the federal land – nature and landscape conservation, environmental protection, electricity concerns, fishery, land use regulation, civil engineering, waste economy, land roads, industry.

Public contact points for judicial execution:

- Municipal office – it provides brief information on who is in charge of what, and refers the interested party to the County Council ("Bezirkshauptmannschaft") or to the experts of the Land administration's construction department;
- In Lower Austria, there are no less than 21 Counties. In each County council, there is at least one jurist in charge able to inform in legal and process engineering aspects. In most cases, this information will be jointly passed on; hearings take place in the presence of both the jurist and the construction department expert in charge;
- Within Lower Austria there are 5 regional construction department offices; each of them employing at least one for riparian right and construction issues. The provide advice and appraisal in their offices, as well as at regular visits to the county councils and at the location of existing or planned plants. They are in charge mainly of technical and legal (ecological) affairs;
- The Water Affairs Department of the Lower Austrian Land administration: The experts of the regional construction departments are affiliated to this office, as well as a group of experts located in the central Land administration office, who are responsible for various problem details in technical, legal, ecological respect and who are directly involved into decision processes;
- The energy department of the Lower Austrian Land administration, which is in charge of issues related to energy technology and energy economy such as the estimation of the relevance of projects for energy economy or questions of financial funding;
- The energy and nuclear radiation laws department of the Lower Austrian Land administration – it is in charge of legal questions concerning energy. They deal with questions of feeding-in of electricity into the public grid and of the certification as a producer of green electricity.

Private contact points:

Apart from information, consultation and contact procurement, the following services are being offered:

- Association of SHP producers ("Verein Kleinwasserkraft Niederösterreich") - lobbying institution for SHP plant operators offering policy advice in SHP-related issues, PR;
- Energy Agency of the Regions ("Energieagentur der Regionen") - mediation, project development, regional networking, awareness raising;
- Planning offices for hydro-engineering - plant conception, tendering, project management, construction

surveillance;
- "Regulars' table" for regional energy talks - exchange of experience, regional networking.

2.5.3 Review of the normatives

In Austria, only the Federal State may pass laws on water issues. The main source of legislation is the **Water Act from 1959** („Wasserrechtsgesetz 1959") in its latest version which already is in line with the European Water Framework Directive. Further relevant laws are:

- The Hydrography Act (Hydrographiegesetz) from 1979;
- The Water Works Promotion Act („Wasserbautenförderungsgesetz") from 1985;
- The Torrent and Avalanche Act („Wildbach- und Lawinenverbauungsgesetz");
- The Landfill Remediation Act (Altlastensanierungsgesetz).

There are also following other law subjects with more or less relevance to SHP:

- Nature and landscape conservation;
- Soil conservation;
- Road law;
- Building law;
- Industry law;
- Mining law;
- Forestry law;
- Railway law;
- Shipping law;
- Waste law;
- Criminal law;
- Civil law;
- Food law (drinking water decree);
- Environmental impact assesment law;
- Electricity law – electricity feeding in to grid;
- Electricity economy and organisation law;
- Green electricity law;
- Green electricity decree with feed in tarifs;
- Austrian environmental labelling – directive ZU 46 „green electricity".

The matter relates also to a variety of other regulations such as transportation laws, construction, trade, mining, forestry, railroad, shipping, electricity, waste, criminal, civil and food legislation. None of them is a part of the Austrian water legislation in its narrower sense.

The Water Act is a part of the Public Rights' sphere and is dominated by the strive fort he public wellbeing and the care for other persons' rights. Its leitmotiv is to maintain public interests and the rights of others. The sole authority above all water-bodies and above all kinds of utilization and construction activities referring to water is being held by the Riparian rights authority. Without their agreeing nobody, not even the state, may interfere into water resources in a more than minor way.

Generally, rights for the use of water are being registered in the central Water Registry ***("Wasserbuch")***. It makes the established and new rights visible. It thus has a function in riparian matters which compares to the Austrian land registry in relation to real estate. In Austria, official Riparian Rights' Registries have been existing from the mid 19th century onwards, for instance the Styrian Water Book from 1872 onwards.

The Austrian Riparian Rights' Registry is a public registry held evident by the ***Länder*** (9 federal countries). It is subject to § 124 and following in the ***Water Act*** from 1959 (WRG). All major riparian rights are being registered in it. The Registry does not hold a constitutive character, which means that in a contradiction between a permission decree and the Reparian Rights Registry only the decree states factual right. Nevertheless, the Riparian Rights' Registry is of high declarative importance. It consists of:

- an ***evidence*** of rights granted;
- a collection ***of documents*** pertaining to the rights listed in the evidence (e.g. permits);
- necessary maps and tools;
- a survey on ***water co-operatives and water Associations,*** their statutes and their legal representatives and members;
- various ***regulations*** (e.g. regulations on water purity, sanctuaries, protected areas, remediation plans).

Name and address of every holder of a right and the related property or facility as well as the time-span of the validity of this right have to be listed in the evidence.

In Austria, the Governor ("Landeshauptmann") has to procure a separate registry for each county (Verwaltungsbezirk). Only in part it is carried out in electronic form. In Lower Austria, for instance, already all data can be accessed electronically via the so-called ***Wasserdatenverbund*** (WDV).

2.5.4 Mention to forms of state support for SHP electricity production

2.5.4.1 National support in Austria – Investment Subsidy for electricity producing plants

Objective Target - The liberalisation of the electricity markets requests a protection of attractive basic conditions for renewable energy sources in the long term. By means of the prioritization of the eco-electricity plants at the setting of tariffs by the federation in the law of the electricity industry and organisation (EIWOG), in the eco-electricity law and in the tariff regulation one of the most important signs was already set. Therefore electricity generating plants that feed into the public net do not have an additional need of aid money.

The possible heat supply of these plants for self-supply continues to be subsidized.

Target group - all individual and juristic persons, especially:

- Companies that exercise professional activities (but not limited to industry regulation act);
- Confessional institutions and non-profit unions;
- Institutions of public authorities in terms of business with market-determined activities;
- Electric supply companies.

Individual and juristic persons, that receive subsidies from their assistance systems especially the agricultural subsidy, do not receive further assistance.

Object of the subsidy - Plants for self-supply for energy from wind and water power, photovoltaics in island position, biogas: it concerns plants, that do not supply the public net. Small hydro power plants only receive subsidies up to an electric power of 2 MW, when they are revitalised resp. newly constructed in extreme locations.

Basis for subsidy - Subsidy "de-minimis": all environmental related investment costs are basis for this subsidy. Subsidy beyond "de-minimis": the additional environmental related investment costs are the basis for subsidy at plants for self-supply. The additional environmental related investment costs are calculated by the Kommunalkredit Public Consulting GmbH by deducting the costs of a standardised reference scenario from the total environmental investment costs.

The specific investment costs for these plants are 550,- Euro/kW. The reference costs result from the multiplication of these costs with the power of the plant.

Assistance rate - Standard assistance rate:
"de-minimis"-projects: max. 30% of all environmental related investment costs.
Projects bejond "de-minimis": max. 40% (power out of renewable energy sources) of the additional environmental related investment costs (and possible allowances), but max. 30% of all environmental related investment costs.

Conditions for subsidy
The Kommunalkredit Public Consulting GmbH must receive the application form before start of work resp. delivery date. The total environmental related investment costs must be at least 10.000 euro.

Necessary documents:

- application form for the subsidy;
- detailed technical and economical documents of the planned activity. With photovoltaics and small hydro power plants a filled-in technical data sheet is requested;
- detailed technical and economical documents to verify the specifications in the data sheet;
- plants for self-supply: reasons for special conditions according to the object subsidised;
- comparable offers for the concerned plants or services or a cost estimate of an authorised planner

to control the adequacy of the costs;
- calculation of profitability;
- report of the bank;
- prove of the personal and plant related allowance to control the plant (as far as necessary for the operation of the plant);
- juristic persons: extract from the Commercial Register.

2.5.4.2 National support - renewable energy feed-in tariff for eco-electricity

The eco-electricity law 2002 was amended in 2006 with resulted in new subsidy conditions for new eco-electricity plants. For existing plants the old laws are still valid. The new law enables now subsidy possibilities for the following plants:

- small hydro power plants (max. capacity up to 10 MW): feed-in tariff system with current with purchase commitment;
- "other eco-electricity plants" (wind, sun, geothermal energy, biomass, waste with high biogenic percentage, landfill gas, sewage gas and biogas): supply tariff system with current with purchase commitment;
- heat tariff (combined support for electric energy and heat) for eco-electricity plants on the basis of compact biomass, that get the tariffs according the feed-in tariff system order 2002.;
- existing or modernised CHP plants for the public district heat supply: support tariff;
- investment grants for "medium hydro power plants" (max. capacity more than 10 and up to 20 MW, incl.);
- investment grants for new CHP plants.

Feed in Tariffs Overview

At present the following feed in tariff directives are in force:

- feed in tariff directive 2002 + amendment 2005;
- Feed in tariff directive 2006.

Plant type	Tariff running time	Tariff
Existing plants (permit before 01.01.2003)	until 31.12.2008	According to BGBl. II Nr. 508/2002 idF BGBl. II Nr. 254/2005 (Feed in directive 02 + amendment 05)
	For plants up to 1 MW EPL: 12 years from 1.1.2009	Market price according to § 20 Green Electricity Law minus compensating energy costs
New construction or revitalisation before 01.01.2008	15 years from starting of new plants or if extension of yearly average output +50% - OR 13 years if extension of yearly average output +15%	According to BGBl. II Nr. 508/2002 idF BGBl. II Nr. 254/2005 (Feed in directive 02 + amendment 05)
	12 years after lapse of the tariff specified above (only plants up to 1 MW bottle-neck capacity)	Market price according to § 20 Green Electricity Law minus compensating energy costs
New construction or revitalisation after 01.01.2008	Guarantee period according to new directive – mini. 10 years	Tariff according a directive that should have been enacted until 2008
	For plants up to 1 MW bottle-neck capacity: 12 years after lapse of the tariff specified above	Market price according to § 20 Green Electricity Law minus compensating energy costs

Key points of the amendment to the Green Electricity Law 2006

The amendment to the green electricity law 2006 contains various alterations, the most important ones from the domain subsidy of the electricity generation out of renewable energy sources are summarized as followes:

With the amendment new frame conditions for the years 2006-2011 are defined. For small hydro power plants the subsidy system in general remains the same, also the 9% goal out of the year 2008 continues to be valid. The supply tariffs for existing plants that were approved before January 1st, 2003, and not revitalised since then, they finish end of 2008 except for plants up to 1 MW. They continue to have an obligation to buy at the market price, minus compensating energy expenses, for another 12 years.

The granting of feed-in contracts by the "Green electricity execution body" – this institution replaces the three parties responsible for the three eco-balance regions as of 1.10.2006 – follows the principle "first-come-first-served": Depending on the category of the plant contracts are being issued until the yearly additional volume of supply tariffs is exhausted. The „Green electricity execution body" has to publish the free funds daily.

2.5.4.3 Federal land Lower Austria

Consulting Campaign for the Owners of Small Hydro Power Plants

The consulting campaign is an important part of the "masterplan small hydro power" in Lower Austria. Owners of small hydro power plants can make use of subsidised consulting that mainly informs about possible improvements of existing plants but also about the valuation of the location.

What does the consulting contain?

- Visiting of the plant and survey of possible resources on-site;
- Issuing of a concept with a first cost evaluation – possibly in more versions;
- Intensive discussion of the concept.

What does the consulting not contain?

- The consulting does not contain any detailed or completed planning. This must be ordered separately by the owner.

Acceleration of the Procedure

In case of voluntary revitalisation measures an acceleration of the procedure is, under certain circumstances, possible. Extra authorised jurists, specialists for hydraulic engineering and specialists for nature protection are responsible for the procedure.

Assistance for Revitalisations

As of 2009 there exists a new subsidy for investments in ecological improvements of small hydro power plants. Up to 30% of the investment costs are subsidise out of the federal funds (on the basis of the environmental subsidy law).

These subsidies were raised by the land Lower Austria up to 25% which enables a total subsidy of up to 55% of the investment costs.

For technical revitalisation measures Lower Austria continues an according subsidy which means up to 25% of the investment costs (max. 50.000,- Euro) are subsidised. The allocation of ecological and technical subsidies is coordinated.

2.5.4.4 Federal land Styria

Consultancy subsidy for small hydro power plants

Objective target – The increase of the green electricity production out of small hydro power plants in Styria is the goal of this temporary subsidy activity.

Applicants for the subsidy – all natural and juristic persons (except juristic persons or holding companies that are mainly in public property) who plan to revitalise, restore or build a small hydro power plant in Styria can apply for a subsidy.

Object of the Subsidy

Consultancy by an independent consultant with the target to certify the plant as ecoelectricity plant, the resulting supply tariffs included (either through revitalisation or an according increase of the capacity or a new building).

The consultancy must contain the following matters:

- measures for the revitalisation, rebuilding, modernisation, extension or new building of a small hydro power plant including an economic estimation;
- use of new technologies in the field of power plant construction, control engineering, etc.;
- proposals for the ecological improvement (p.ex. fish ladders or the like);
- information for the achievement of the different tariff groups.

The plant must fulfill one of the following conditions:

- A SHP with an electric power of up to 3.000 kW resp. 15,000.000 kWh actual yearly energy

capacity, that is revitalised, modernised, newly built or extended. By this adaptation the rate regulation § 3(2) or (3) is valid for the first time.

- OR: New building of a small hydro power plant with an electric power of up to 3.000 kW resp. 15,000.000 kWh actual yearly energy capacity.

Mode and Amound of the Subsidy

The subsidy rate is max. 90% of the consultancy costs per power plant resp. water right location or planning area (reach), but max. 1.000,- Euro (net) per plant. When the criteria are fulfilled, the subsidy is granted as lost allowance.

2.6 SPAIN AND PORTUGAL

2.6.1 Spain

2.6.1.1 Hydroelectric production

Spain has a tradition in hydroelectric generation dating back to the end of XIX century. At the beginning of 1900 about 40% of the national electric generation derived from hydropower plants, but a real boost in the hydroelectric development happened during the forties, with the constitution of a number of public electricity companies. Many power plant were designed with the purpose to exploit entirely the water resources available in the hydrographic basin. Due to the greatly irregular precipitation pattern which characterised the Spanish climate, many of the dams have been constructed for combined irrigation and hydroelectric use. According to the data presented by ESHA (ESHA, 2003), hydroelectric generation has increased by 67% over the period 1990-2001; in fact during this period the promotion of renewable energy have been greatly supported through a number of national plans and new regulation to encourage investment for new power plants and the refurbishment of the old plants.

During 1996 the Ministry of Industry and Energy decided to modify the present legal framework of the electricity system in order to encourage greater liberalization and to assure competition between electricity companies, taking measures to guarantee a lower cost of electrical energy to the consumer.

Nowadays hydropower still represents one of the most important energetic sources in Spain. As regard to the small hydropower, a substantial development started during the nineties. SHP electricity generation has followed an upward trend over the period 1990-2001 (ESHA 2003) especially since 1992 as can be observed in the following table.

Table 2.9. Trends in the installed capacity in Spain, 1990-2001 (ESHA, 2003)

	SHP Installed Capacity in MW			Electrical Capacity		Share to EU-15
	SHP< 10 MW	SHP< 1 MW	1 MW< SHP< 10 MW	Total installed capacity in MW	SHP contribution	SHP installed capacity
1990	162	162	0	43417	0.37%	4.02%
1991	169	169	0	43629	0.39%	3.36%
1992	1090	181	909	43841	2.49%	13.86%
1993	1180	189	991	43913	2.69%	13.19%
1994	1242	191	1051	44489	2.79%	13.52%
1995	1313	196	1117	45849	2.86%	13.94%
1996	1414	210	1204	46921	3.01%	14.65%
1997	1465	214	1251	48586	3.02%	15.02%
1998	1506	209	1297	50010	3.01%	15.30%
1999	1530	227	1303	52413	2.92%	15.69%
2000	1567	228	1339	53529	2.93%	16.75%
2001	1618	234	1384	55508	2.91%	16.33%

In the reference period electricity generation from SHP rose by six times from 685 GWh in 1990 to 4 436 GWh in 2001. According to Eurostat figures, in the year 2004 Spain accounted for about 16% of the total SHP installed capacity in the EU-25, being the third SHP producer after Italy and Austria. (www.esha.be "State of the art of small hydropower in EU-25"). The present energetic goals for Spain are those reported in the *Plan de Energias Renovables (PER) de Espaňa 2005-2010* prepared by the Ministry

of Industry Tourism and Trade. In the document the potential SHP (<10MW) to be developed has been assessed taking into considerations all the new projects under construction or in course of authorization procedure, which are likely to start production within the considered period (2005-2010). This assessment resulted in an estimated increment of 450 MW, which added to the existing capacity of 1749 MW (situation for 2004) would lead to a total capacity of 2199 MW at the end of 2010.

The same approach applied to hydroelectric projects between 10 and 50 MW gives an estimated increase of 360 MW in the period 2005-2010. The PER for 2005-2010 acknowledges that the development of hydroelectric generation is being hold back by important barriers, essentially of administrative type. Measures to assure the energetic objectives for SHP refers to administrative, socio economical and legal aspects. In particular it is highlighted:

- the existence of unexploited potential linked to public infrastructures, which should be exploited by public tender, and to the minimum flow to be released at the dams;
- the necessity to improve the legal framework for grid access and operating conditions;
- the necessity to maintain the economic support provided by the Special Regime (Law 54/1997 for the Electric Sector; Royal Decree 436/2004 for update tariffs).

Figures reported for the Spanish situation in 1996 pointed out that whilst a gross potential of 138 TWh was theoretically available for hydroelectric exploitation (natural potential subtracted for the water consumption) the Catalogue of Hydroelectric Uses prepared by UNESA (1992) assessed that only a potential of 6 TWh was still unexploited and economically feasible.

The document concluded that for half of the potential SHP sites there are considerable difficulties due to conflicts with other water or land uses or because of environmental reasons.

The possibility to increase hydroelectric generation is strictly linked to the water planning (Irrigation Plan, National Hydrological Plan, Waterbasin Hydrological Plans).

Modification of the water planning are likely to be introduced with the new Water Legislation which is to be adopted in compliance with the European Water Framework Directive 2000/60.

2.6.1.2 Normative framework

For the realization of new small hydropower plant a number of authorization have to be considered, independenty from the power plant size. The regulation is based on national Royal Decrees, but the procedures to obtain water concession, plant authorization and grid connection are defined at the Regional level (Comunidad Autónomas). As for Italy, Spanish legislation consider water as a public resource, thus nobody has the priority for the use of the water. Water concession is given by the *Confederaciones Hidrograficas u Organismo de Cuenca* (Waterbasin Authority).

The procedure to obtain the concession for a SHP plant must therefore undergo a public concurs. The procedure applies to SHP of nominal power<10MW and can be synthesised as follows:

1. Presentation of the request for water concession for hydroelectric use (Royal Decree 249/88): the application must be addressed to the Water Planning Department of the corresponding Regions.
2. Publication of the application through the *Boletìn Oficial de la Provincia y Ayuntamientos* (1 to 3 months). This step gives the possibility to the competitors to present concurrent project for the same site.
3. Delivery of copies of the project (civil works and electro mechanic installations) to the Municipal Industry Department and to the Water Planning Department. At this point the Water Department informs the *Comisaria de Aguas* about all the concurrent requests.
4. All the application not excluded for incompatibility or irregularities must be published in the Official Gazzette of the corresponding Province.
5. The Regional Authority delivers a communication document.
6. Inspection of the site and preparation of the report with the participation of the following boards:
   - Provincial Department for agricultural development (IRYDA);
   - Provincial Department for Nature Protection (ICONA);
   - Board for Territory Planning;
   - Dam Department (when necessary).
7. The final decision is reported by the Comisaria de Aguas, in a document which contains all the details regarding the selected project. The excluded applicants are to be informed of the decision.
8. After acceptance of the contractual terms by the winner, the concession grant can be isseued.
9. Delivery of the concession to the Ministry of Industry, to the Region and some other interested boards

10. At this point the Ministry can grant the authorization for the Electromechanical installation and for the grid connection.
11. With the issue of both the concession and the authorization of the Ministry, the Municipal Licence can be granted.

As for any other productive plant SHP projects must undergo the environmental impact analysis. It is not clear in which point of this procedure the environmental impact analysis starts.

2.6.1.3 Grid connection

Under the current legislation for installation with generation capacity lower that 50 MW the authorization procedure for grid connection is regulated by the Administration of the Regional Government. It appears that a simplified procedure exists for very small installations (maximum power of 100 kW). The cost for grid connection is sustained by the power plant owner. The price for selling electricity is regulated by the Royal Decree 436/2004, which sets up the methodology to update the legal and economic system in the special regulation. Following this Decree the owner can choose between two options: to sell the electricity to the local distributor company thus with a regulated rate (a percentage of the electric average rate in the reference period) or to sell the electricity in the free market (in this case incentive and premium are also provided).

2.6.2 Portugal

2.6.2.1 Hydroelectric production

In Portugal, electricity production from renewable energy sources (RES-E) is dominated by ***hydro power***. In 2004, ***9,869 GWh*** out of a total green electricity production of 12,214 GWh was generated by means of this RES. With a production of 1,264 GWh, solid biomass was ranked second highest as a source of RES-E in 2004, but just as in the case of hydro power, little growth was achieved. In Portugal, biogas, PV and onshore wind both have low penetration rates, but experience considerable growth. In these sectors, average annual growth rates of 47%, 62% and 54%, respectively, were observed between 1997 and 2004. By 2005, the biogas sector had further doubled its production (from 15 GWh in 2004 to 34 GWh in 2005), while the onshore wind power sector doubled its capacity (from 552 MW in 2004 to 1021 MW in 2005). The figure 1 reports the electricity generation by type of RES (1991-2004), in which it is possible to observe the large contribution from the large and ***small-scale*** hydropower.

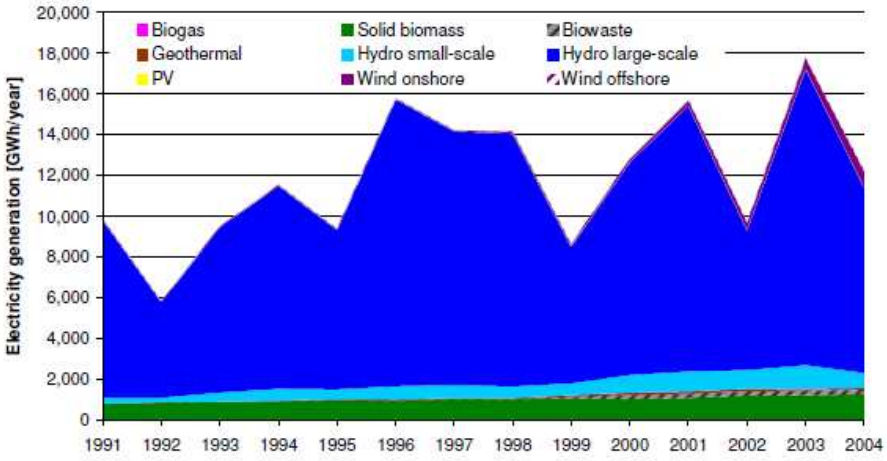


Figure 2.3. Electricity generation from renewable energy sources in Portugal (GWh) (Source: European Commission)

The total electrical installed capacity in Portugal rose by 49% over the period 1990-2001, which represented the highest increase in the EU-15. About 3% of this installed capacity corresponded to SHP in 2001. This high contribution is a reflection of the SHP development in Portugal over the reference period. As shown in Table 2.10, SHP installed capacity tripled from 1990 to 2001. At EU-15 level, about 3% of the EU-15 SHP capacity was installed in Portugal in 2001.

Table 2.10. Trends in the installed capacity in Portugal, 1990-2001 (ESHA, 2003)

	SHP Installed Capacity in MW			Electrical Capacity		Share to EU-15
	SHP< 10 MW	SHP< 1 MW	1 MW< SHP< 10 MW	Total installed capacity in MW	SHP contribution	SHP installed capacity
1990	121	24	97	7396	1.64%	3.00%
1991	121	23	98	7448	1.62%	2.41%
1992	154	23	131	8199	1.88%	1.96%
1993	211	24	187	8699	2.43%	2.36%
1994	235	29	206	8806	2.67%	2.56%
1995	246	22	224	9318	2.64%	2.61%
1996	248	22	226	9380	2.64%	2.57%
1997	245	22	223	9468	2.59%	2.51%
1998	247	19	228	9786	2.52%	2.51%
1999	257	22	235	10758	2.39%	2.64%
2000	307	27	280	10898	2.82%	3.28%
2001	317	27	290	10990	2.88%	3.20%

Electricity generation from SHP has increased almost four times over the reference period from 261 GWh in 1990 to 982 GWh in 2001. SHP represented about 7% of the hydropower generation and about 2% of the country's electricity generation in 2001. About 31% of the electricity generated in Portugal came from hydropower in 2001.

The development of small hydro in Portugal is a good case study of removing non-technical barriers to private investment in the power sector. In 1988, Decree-Law 189/88 came into force, defining the rules for the independent production from renewables, allowing single persons, and private and public enterprises to produce electrical energy, with the limit of 10 MW of installed power. In parallel, the licensing procedure to use water for electricity generation was clearly established by legislation. Both regulations were responsible for the small hydro boom in the early 1990's.

2.6.2.2 Main supporting policies towards meeting national targets

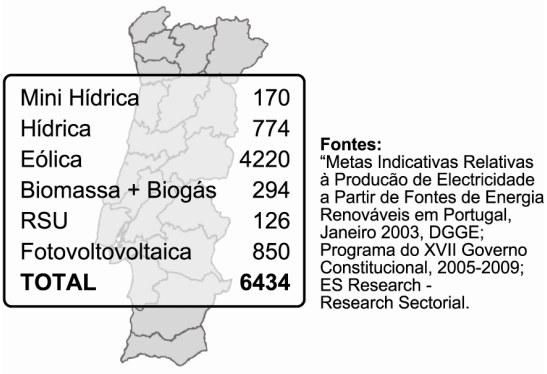
Portugal, which nearly met its RES-E target for 2010 in 1997, has now moved further away from this target. A sharp decline between 1997 (38.5%) and 2004 (23.84%) was observed. For that reason, the following measures have been taken to stimulate the uptake of RES-E:

- fixed Feed-in tariffs per kWh exist for PV, wave energy, small hydro, wind power, forest biomass, urban waste and biogas;
- tendering procedures were used in 2005 and 2006 in connection to wind and biomass installations;
- investment subsidies up to 40% can be obtained;
- tax reductions are available.

Since January 2006, when Directive 2003/30/EC was transposed into national law, a broad range of policy measures has been taken to ensure the uptake of RES-H and investment subsidies has became available.

2.6.2.3 Small hydropower potential

In Portugal the small hydropower potential is distributed all over the national territory, with higher concentration in the North and Central part of the country. Although it is difficult to assess the real value of the still remaining SHP potential in Portugal, it could be estimated in about 1000 MW, from which 500-600 MW able to be concretized until 2010, with a mean production of about 1.500/1.800 GWh/year.



Although Portugal has pointed its RES production in wind energy, the investment programmed by the government concerning hydropower is about 15% percent of its total budget, from which about 20% is driven to SHP development, as it is reported in Figure 2.4.

Figure 2.4. Estimated investments of Portuguese government in RES till 2010 (EUR millions)

2.6.2.4 Difficulties concerning SHP concessions

In the last years, the request for SHP concessions in Portugal has dropped substantially due to the following factors:

- difficulties in the concession process, where several public institutions are involved without any coordination among each other;
- difficulties in the connection with the electrical grid, due to insufficiencies in the power net system;
- lack of objective criteria for the technical evaluation by the different public bodies, concerning the release of SHP concessions;
- strong environmental constrains and regulations that invalidate potential SHP projects;
- to long time needed by the public bodies to analyze the concession requests, due to lack of human resources.

Main topics to be improved for a better SHP implementation in Portugal are the following:

- better intercommunion between public bodies involved in the concession processes;
- clarification of undefined legal competences of public bodies related to water resources management;
- definition of clear operational criteria for environmental assessment and compensation procedures, including the registration of consultant references;
- improvement of human resources inside the public agencies in charged of releasing water and hydropower concessions.

2.7 SERBIA AND BOSNIA & HERZEGOVINA

2.7.1 Serbia

2.7.1.1 Hydropower and small hydropower plants potential

The Republic of Serbia is located in the South-eastern Europe in the heart of the Balkan Peninsula, and covers the area of 88,361 km^2. The installed total capacity of electricity generating power plants is 8,355 MW, of which: 5,171 MW (62% of the total) are in lignite-fired thermal power plants, 353 MW are gas-fired and liquid fuel-fired CHP plants (about 4%) and 2,831 MW (34%) are hydropower plants (Run-of-the-river HPPs 1849 MW, Storage HPPs 368 MW, Reversible HPP 614 MW). Total electricity production in 2007 was 38897 GWh, of which: 28484 GWh (73.3%) was produced by thermal power plants, 483 GWh (1.3%) by CHP plants, and 9930 GWh (25.5%) by hydropower plants. Because of the high own consumption of the electricity production sector (around 10%) and high distribution losses (around 15%) due to the poor condition of the grid system, only around 75 per cent of gross production is available for final electricity consumption. In 2007 this consumption was 28749 GWh, in which the greatest share was realized by households 52.45%.Electricity prices in Serbia have increased significantly since 2000. In 2007 the average selling price of electricity was 3.699 RSD/kWh or 4.62 €c/kWh.

In the period 2008 – 2015, around 0.9% of the average annual growth rates of electricity consumption are expected. Relatively stable increase in electricity consumption in industry of around 2.7% per year and a milder increase in low voltage consumption of around 1.4% per year shall lead to reduction of unevenness of consumption. According to these predictions the final consumption of electric energy is expected to be around 35,480 GWh in 2015. For that reason national energy policy calls for increased use of renewable resources to meet the rising electricity needs. The promotion of the use of renewable energy as a national development priority is included in a number of national regulations, programmes and strategies, such as the *2004 Law on Energy*, the *2005 Energy Development Strategy for 2015*, the *Energy Strategy Implementation Programme 2007-2012* and the *National Strategy of Serbia* within the accession of Serbia to the European Union.

Hydropower is the most important source of renewable energy in Serbia. There is some use of other renewable energy sources (biomass, geothermal and solar thermal), but their actual contribution to electricity production is small compared to their potential. The major watercourses in Serbia include: Danube River (which runs, through Serbia for 588 km), Sava River (206 km), Drina River (220 km), Tisa River (168 km), Velika Morava River (185 km) and Zapadna Morava River (308 km). All rivers belong to three sea basins: the Black Sea, the Adriatic Sea and the Aegean Sea. The Black Sea watershed includes 176 billion m^3 of water, the Adriatic around 2 billion m^3, and the Aegean Sea about 0.5 billion m^3. The

Danube River basin system covers most of the country's territory. Only 8 per cent of Serbia's available water resources originate in the country (Inland water flow in Serbia is approximately 16 billion m^3 annually); the remaining 92 per cent is transit water entering the country through the watercourses. (The volume of transit waters is approximately 162 billion m^3 a year).

The total hydro potential in Serbia is estimated at 25,000 GWh a year. Of this, 17,500 GWh per year have been identified as technically and economically feasible and 10,000 GWh is already utilized, mostly in the large hydropower plants with a capacity of more than 10 MW. The rest of the technically useful hydro potential of 7,000 GWh is given at the rivers Morava (2,300 GWh), Drina and Lim (1,900 GWh) and the Danube (1,000 GWh) for hydro plants with a generation power of more than 10 MW and an annual production of 5,200 GWh.

In 1990 the total number of Small hydropower plants (SHP) was 69, with installed power of 49 MW; of these 31 SHP operated while 38 were out of production. However, according to the questionnaire from 2002 only 31 SHPs were in function (1 working with 50% of nominal power, 1 isolated, and 1 under construction) while 13 SHPs were out of production. Some of SHPs which had been in function in 1990 were not mentioned in 2002 questionnaire (like Ostrovica n.p.1.05 MW, Jelašnica n.p. 0.5 MW, Ras n.p.5.6 MW, Grošnica n.p. 0.445 MW, Kosjerić n.p. 0.155 MW, Arilje n.p. 0.130 MW, etc.), some of them stopped working (like Arandjelovac n.p. 0.148 MW, Sokolja n.p. 0.3 MW, Bistrica n.p. 0.2 MW) and some of SHPs were revitalized (Pod Gradom on river Djetinja n.p. 0.2 MW, SHP Bogutovac 1 and Bogutovac 2).

Generally hydropower potential in Serbia can be utilized by:

- building the new objects (with possible annual production of 1683.5 GWh);
- reconstruction of existing object (134 GWh);
- embedding the objects in water management facilities (60 GWh).

Building of new SHP objects cover almost 90% of all solutions. This option is based on studies analyzing the hydropower potential of the Serbian rivers. The most important are "*Cadastre of small hydro plant in Serbia without the provinces*" and "*Cadastre of small hydro plant in Vojvodina*". The first document is made by the company *Energoprojekt–Hidroinženjering* in cooperation with the *Institute for Water Industry Jaroslav Carni* in 1987. The cadastre explores the area of 56000 km^2 in central Serbia, without the province Vojvodina. The document contains the data of about 865 possible locations for SHPs with nominal power of more than 0.1 MW (520 locations enable the building of plants with nominal power less than 0.5 MW, 298 locations with nominal power in the range of 0.5 ÷2 MW and 38 locations with nominal power in the range of 2÷10 MW). The total capacity of those plants is expected to be 453 MW with possible annual production of 1683.5 GWh per year. The second document, made by *Hidroinvest DTD* in 1989, contains the data of about 135 possible locations of SHPs with total capacity of 25.5 MW and possible annual production of 93.5 GWh per year in Vojvodina.

On the other hand, the specific cost of such solution (4.9÷10 Eurocent/kW)is much higher than in other two possibilities (in the case of reconstruction specific cost is in the range 0.9÷1.3 Eurocent/kW and in the case of objects embedding 1.9÷2.1 Eurocent/kW). Therefore, for an investor it is much more favourable to build small hydro power plants at the existing installations, because then there is no need to invest in construction, which in some cases can amount to over 80% of the plant investment.

2.7.1.2 Legal frame for construction and electrical power generation in SHP

According to authorities from the *Direction for Electric Power Development and Investments of Serbia*, the country has excellent renewable potentials, but the investors are especially interested in SHP plants and wind farms. The first important step in that direction was the *Law on Energy* which recognised small hydropower plants for the first time, and introduced privileged prices for producers of energy using renewable resources. However, there are several obstacles that have to be removed in order to open the door for more intensive investments in SHP plants.

The first problem is the fact that studies which analyse the hydropower potential in Serbia are scarce, out-of-date, and most information is based on estimates. The Serbian Ministry for Mining and Energy, however, says that this study will be revised in the near future.

Next, the current procedure for solving legal property issues are still complicated and non-attractive for potential investments. Very often in practice, the owners of estates where energy facilities are to be located, increasing the prices of their estates up to unreal and unacceptable levels, blackmailing the investors in this way. However, there are already simple mechanisms (like the one used for charging sales taxes of real estate in Belgrade) that, with a little bit of modification, could be applied to solve the property rights issues when this kind of facilities are in question.

Undefined regulative for the electricity production from renewable resources restrained the long-term planning of investments. Besides, the EPS has the obligation to enable the electric grid connection for privileged producers and to take off the produced energy from them; in practice EPS try to keep the monopole on the Serbian Electricity market (often by demonstrating the lack of interest to help such competitions). Another difficulty relates to the necessary amount of money: depending on the location, investments range for new SHP is from 1200 to 5000 €/kW; the price of electricity produced by SHP plant is still the lowest in the region (3.3 €cent/kWh) and not competitive enough vs. other big conventional producers. Also, the bank interest rates in Serbia for this sort of loan (credit mechanism that will enable mortgage registration for future energy facilities) are much higher than in the West. This problem could be solved by giving guarantees to the banks by the state for these loans.

The procedures for acquiring all the necessary documents are long and complicated. According to the experience of some investors of SHP this procedure usually takes more than a year. By future simplification, the procedure should be automated and this time period should be reduced.

The regulations concerning the construction of SHP and electric power generation in Serbia can be classified in two groups: the group of regulations for getting the approval for construction and the group of regulations for obtaining the rights for electrical power generation.

The first group regulates the need for construction, the way of obtaining the approval for construction and the way of obtaining the approval for using the object. These groups of regulations are covered by:

1. the law on planning and construction;
2. the spatial plan of the Republic of Serbia;
3. the urban and space planning of local self-government.

The second group regulates the process of obtaining the rights for Electrical power generation. This process has two phases: in the first phase the applicant got the approval for accomplishing the activities of public interest. These groups of regulation are covered by:

4. the Law on public enterprises and practicing of agency form public interest;
5. the Law on waters;
6. the Ordinance of water utilization fees, water protection fees and fees for the material derived from watercourse in 2007;
7. the Act regulating content of technical documentation which has to be produced in procedure for getting the water-management approval and water-management permit;
8. the Law on environmental protection;
9. the Law on environmental impact assessment (*EIA*);
10. the Ordinance for establishing the list of project for which *EIA* is obligated and the list of projects for which *EIA* can be demanded;
11. the Act regulating content of request for *EIA* and content of request for assessment of the scope and content of study for *EIA*;
12. the Regulation on content of *EIA* study.

The second phase regulates the way of getting the approval for carrying out the energy activities. These groups of regulations are covered by:

13. the Energy Law;
14. the Law of ratification of the Energy Community;
15. the Ordinance on conditions for electricity delivery;
16. the Regulation on criteria for issuing the energy permit; content of the request and the way of issuing the energy permit;
17. the Regulations on conditions for professional staff and the way of issuing and suspension the license for energy activity;
18. the Energy policy of the Republic of Serbia;
19. the Program for implementation of Energy policy of the Republic of Serbia.

2.7.1.3 Procedure for construction of SHP

1. Preparation of documentation which is necessary for getting the approval for construction of SHP:

1.1. Request for energy permit;
1.2. Cadastre excerpt or the act of cadastre terms;
1.3. Act of competent body about the purpose of the property where the energy facilities will be constructed;

1.4. Elaborate for construction of energy object for which the energy permit is needed;
1.5. Bank declaration of readiness to attend the applicant;
1.6. Proof about adequate solvency;
1.7. Decision from the operator of transmission or distribution electric power system
1.8. Water-management terms;
1.9. Water-management approval;
2. Getting the approval for construction:
2.1. Request for getting the approval for construction;
3. Caring out the operation necessary for building:
3.1. Pre-feasibility study;
3.2. Feasibility study;
3.3. Technical documentation necessary for construction of SHP.
4. Object construction and Technical review of object:
4.1. Object construction- carrying out the works;
4.2. Technical review of object;
4.3. Trial run;
5. Getting the service permission

2.7.2 Bosnia & Herzegovina

2.7.2.1 Small hydropower plants potential

With the constantly increasing price of oil and energy in general, having potential convenient for the construction of SHP plants of 1005 MW (3520 GWh/year), only small part of it being utilized, Bosnia and Herzegovina has a chance to increase its energy production through utilisation of unused potential.

The situation in Bosnia and Herzegovina regarding SHP plants is slightly below the world trends. The comparison of the European Union and Bosnia and Herzegovina, with respect to the basic particularities regarding small hydro power utilization, is given in Table 2.11.

Table 2.11. Comparison of EU and BiH

	Europe	B&H
Number of SHP plants	17400	13
Installed capacity (MW)	10300	28.38
Annual production (GWh/year)	41000	144.75*
% of total hydropower production	9	1.9
% of the total electricity production	2	0.8
Average capacity of a SHP plant (MW)	West. Europe 0.7 East. Europe 0.2	2.18
Total upgrading potential (MW)	20372	976.25
European average SHP electricity production costs (c€)	5 - 15	n/a
European average SHP investment costs (€/kW)	1200 - 3500	4593.8**
Target installed capacity by 2010 (MW)	14000	n/a
Target annual production by 2010 (GWh/year)	55000	n/a

* Energy capability
** Average of all potential SHP plants in the Federation BiH based on preliminary design assessment. Economically unfavourable plants are also included.

The existing SHP plants in BiH, with some technical details are listed in Table 2.12.

All of the existing SHP plants are connected to the grid, therefore primary application being grid-based power generation. Other applications, such as rural residential and community lighting and other needs, or rural small industry, agriculture and other productive uses do not exist at present.

Taking into account the current population characteristics in Bosnia and Herzegovina (migration of

people after the war from rural to urban areas, especially from remote villages, a lot of destroyed and abandoned villages where nobody returned the “dying” villages in which only older people live) it is not realistic to expect construction of SHP plant in such areas where distribution grid does not exist. It is also unlikely to expect investments into SHP plants for small industry due to high investment costs, still unpredictable und unregulated market and poor financial possibilities of small entrpreneurs. Therefore, only investment in SHP plants for grid based power generation can be expected in the following years.

Figure 2.5. SHP plant in construction on Prusacka River at Vranica Mountain - water intake, penstock, powerhouse

Figure 2.6. Capital costs statistics of the future planned SHP plants in Federation BiH

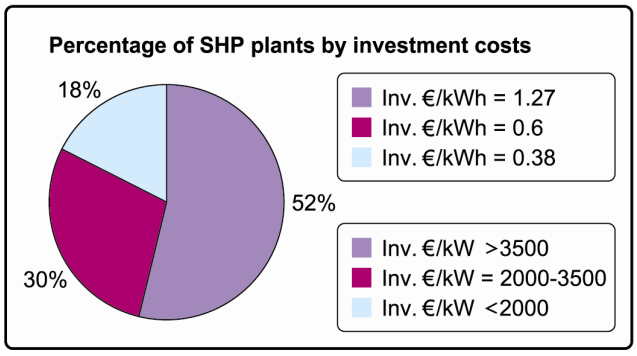


Table 2.12. Technical details of the existing small hydro power plants in Bosnia and Herzegovina (2008)

No.	Name	Location/ River	Installed capacity, [MW]	Energy output, [GWh]
1	**Una Kostela**	Bihać/ Una	8	56
2	**Krušnica**	Bosanska Krupa/ Krušnica	2x0.23	2.4
3	**Bihać**	Bihać/ Una	1x0.14	0.6
4	**Modrac**	Lukavac/ Spreča	1x1.898	10
5	**Osanica**	Goražde/ Osanica	2x0.542	6.4
6	**Hrid**	Sarajevo/ Water system	2x0.2	0.9
7	**Snježnica**	Teočak/ Rastošnica	0.5	1.5
8	**Bastašica**	Drvar/Unac	0.12	0.8
9	**Bogatići**	Trnovo/ Željeznica	8	33
10	**Vlasenica**	Vlasenica/ Jadar	0.8	6.9
11	**Mesići**	Rogatica/Prača	3.08	16
12	**Tišća**	Vlasenica/Tišća	2.12	10
13	**Štrpci**	n/a.	0.06	0.25

The average specific investment costs in BiH by kW of installed capacity are rather high, due to the existence of many economically unfavourable plants. Some 50% fall into the EU range (1200-3500 €/kW).

The capital cost varies significantly due to different field conditions. The average values of some technical and financial parameters of potential SHP plants in BiH are: for an installed capacity of 783 kW and annual energy production of 3.4 GWh a specific investment of 4.6 k€/kW i.e. 0.91 €/kWh (total investment: 2700 k€).

The span of the investment costs is rather wide due to many influencing factors. The average value of investment for the plants with investment costs higher than 3500 €/kW is some 6650 €/kW, for the plants within the range 2000 - 3500 €/kW it is 2750€/kW, and for those below 2000 €/kW limit is some 1650 €/kW. When it comes to realisation of an SHP the costs may vary due to variations from the preliminary design figures, some of which can be obsolete, and also due to further optimisation by investor.

In Croatia, a typical capital cost is 4.7 k€/kW, ranging from 2.1 k€/kW in southern Croatia to 9.1 k€/kW in Central Croatia.

Precise estimates are not available. According to the EP BiH, operation and maintenance during a 20 year period is estimated at 30% of the capital costs. At Energoinvest – Higra, Sarajevo, a company dealing with hydro plants projects, operation and maintenance are estimated to be between 5 and 15€ per installed kW.

According to the decision of the Government of Federation BiH for electrical energy from renewable sources up to 5 MW capacity EP BiH offers to the potential owners the purchase price of 7.74 pf/kWh (3.96 c€/kWh), which is the basic price. There is a possibility to obtain a 10% higher price for the first half of the concession period, namely 8.514 pf/kWh (4.353 c€/kWh), and in the second half 6.94 pf/kWh (3.548 c€/kWh), which would facilitate repayment of the credit. There is also a possibility to obtain additional 10% increase in the purchase price in case of a need for additional investment into the distribution grid. The best solution would be the construction of an SHP plant for own consumption. In that case the price of the electrical energy is practically retail price.

Due to rather unfavourable interests on domestic credits which vary over the time due to market uncertainty, and taking into account the fact that investment costs are in the range of the European ones, the payback period is longer than 10 years, even up to 20 years. Concerning the lifetime of a SHP plant of longer than 30 years, and the possibility to obtain concession on a 20year period, it is still acceptable. The insurance for an SHP plant is about 1% of the capital costs. With the decrease in interest rate (already having a decreasing tendency), which can be expected as soon as the market and political situation is stabilised, the payback period will be significantly improved.

2.7.2.2 Legal frame for construction and electrical power generation in SHP

In order to commence construction of any facility, including an SHP plant, it is necessary to meet certain legal conditions, namely to procure town-planning approval, construction permit and permit for use.

Town-planning approval: The construction of the structure, execution of the civil and other works above or under the ground, as well as the change of the purpose of construction land or structure have to be in accordance with the plan and prescribed conditions, and that is to be confirmed by issuing a resolution on the town-planning approval. The town-planning approval is also to be obtained for the exploration and utilization of natural resources (minerals, raw materials, forest, water, agricultural land, etc.).

The request for issuing should be submitted to an administrative agency authorised for activities and works in the field of urbanism. The request is to be submitted to an administrative agency, that is authorised body (cantonal, federal) through a municipal administrative agency.

The request for issuing the town-planning approval contains:

- number of a cadastre lot;
- preliminary design;
- the data referring to the water utilization and the possibility of jeopardizing the environment;
- explanation of the request with elements needed for issuing the conditions.

The Construction permit: The request for issuing the approval for construction is to be submitted to the administrative body authorized for works and activities of construction, namely to the administrative agency that issued the town-planning approval.

The request is to be accompanied by:

- the proof on the right to dispose of the land (regardless of whether it is a property, right of servitude or right of land);
- the approvals being legally in-effect;

- two copies of the technical documentation for obtaining the construction permit (the design for construction).

Upon obtaining the construction permit having the legal power, the execution of civil works can commence.

The Permit for use: Upon completion of construction of the object and its connection to the grid, but prior to starting the utilization of an SHP plant, the technical inspection is to be performed in order to check its technical faultlessness and to issue the permit for usage. The technical inspection is to be performed by the agency that has issued the permission for construction through engaging a commission of professionals. The request should contain:

- a copy of the construction permit;
- a copy of the cadastre lot with the structure situation;
- a written statement of the contractor on works and conditions for maintenance;
- a written report of the construction supervisor.

Act on facilities for which it is necessary to have the environmental impact assessment and which can be put into operation only if "the environmental permission" is obtained was accepted in the Federation of Bosnia and Herzegovina in the year 2004 (Official Gazette of B&H Federation No. 19/04). The act refers to the new facility or the reconstruction of the facility. According to this Act, hydro power plants with the capacity of a single unit higher than 5 MW or higher than 2 MW if there are several units in a row at a distance less than 2 km are to obtain the environmental permission. For hydro power plants with the capacity higher than 1 MW the environmental impact assessment is done by the assessment of the Federal Ministry.

2.8 BULGARIA AND ROMANIA

2.8.1 Bulgaria

Bulgaria's State Energy and Water Regulation Commission, SEWRC, has increased feed-in prices for electricity generated on the basis of all forms of renewable energy, as of April 2009. The biggest price increase applies to small hydropower plants (8.2%) and the smallest to power plants of up to 5 MW fired by wood waste (0.9%). For modern wind turbines with a capacity of 800 kW or more, the feed-in tariff has been increased 1.6% in the case of those with an annual operation of up to 2,250 full effective hours, and 2.4% above that threshold.

The Bulgarian Energy Holding EAD (BEH EAD) was established on September 18th 2008 with a Decision of the Minister of Economy and Energy in order to monitor acquisition, management, estimation and sell of shares in trade companies that carry out business activity in the areas of production, output, transport, transit, storage, management, distribution, sell and/or buy of natural gas, coal, electricity and heating, as well as other types of energy sources. BEH EAD is a joint-stock company owned 100% by "Maritsa Iztok" Mines EAD, TPP "Maritsa Iztok 2" EAD, NPP "Kozloduy" EAD, NEK EAD and ECO EAD, "Bulgargas" EAD, "Bulgartransgas" EAD and "Bulgartel" EAD. BEH EAD that carries out licensed activities of transmission, system operation, electricity generation in HPPs and PSHPPs (2 563 MW), supply of electric power to consumers connected to the transmission network and to the Electric Power Distribution Companies, and is a party in long term bilateral power purchase agreements. The company **Electricity System Operator, incorporating also the Market Operator (ESO EAD)**, which has been separated from NEK EAD since January 1st 2007, after restructuring according to the requirements of Directive 2003/54, with transmission assets owned by the mother company. The **electric power distribution** is provided by regional companies, which in result of a package privatisation procedure have become a majority property (by 67%) of **E.ON AG** (South East Bulgaria), **EVN AG** (South West Bulgaria) and **CEZ a.s.** (West Bulgaria). In view of compliance with the requirements of Directive 2003/54, the companies have been restructured by separating the activities for electrical power distribution and supply in organizational and juristic plan (www.mee.government.bg).

On the contrary, Bulgaria has installed capacities of 275, 273 and 238 MW and low head power plants (head<5 m). The promotion of electricity produced from renewable energy sources in the provisions of the Electricity Law 318/2003. Chapter V of Law 318/2003 deals with definitions, technical utilization, marketing conditions and facilities are announced: Law 318/2003, Article 51, the competent authority (ANRE) will regulate the technical conditions for access to the electrical network and the technical conditions for marketing the electricity from RES. The promotion of RES is also provided by the Energy Efficiency Law 199/2000.

2.8.2 Romania

In Romania, an indirect stimulating mechanism for the utilization of RES is regulated but RES electricity schemes are lacking. Interestingly enough, investments promoting the use of RES are considered to the environmental protection investments receiving 40 to 100 percent subsidy for eligible costs depending on the need. Installations receiving higher subsidy will not receive any other financial support.

In Romania, the installed capacity of hydropower is 6,120 MW, representing nearly 30 percent of Romania's total installed electricity generating capacity. Unfortunately, lack of funding is the greatest barrier to increasing current capacity. The hydroelectric reserves of Romania are developed along the Danube and in the valleys of rivers emerging from the mountains. Other hydro resources include nearly 2,500 lakes, ranging from the glacial lakes of the mountains to those of the plains and the marshes of the Danube delta region.

2.9 GERMANY AND POLAND

2.9.1 Germany

2.9.1.1 The legislation

Until the 1st September of 2006 the federal states were principally in charge of the legislation for the legislation pertaining to water, through the water right (Wassergesetz WG). Therefore there did not exist a national legislation on water.

The government was only able to intervene in the water legislation through the framework legislation. Since the 1st September 2006 laws can be enacted by the German state through the concurrent legislation authority within the framework of the water management act (Wasserhaushaltsgesetz WHG).

The water management act applies to:

1. bodies of water above ground;
2. coastal waters;
3. ground water.

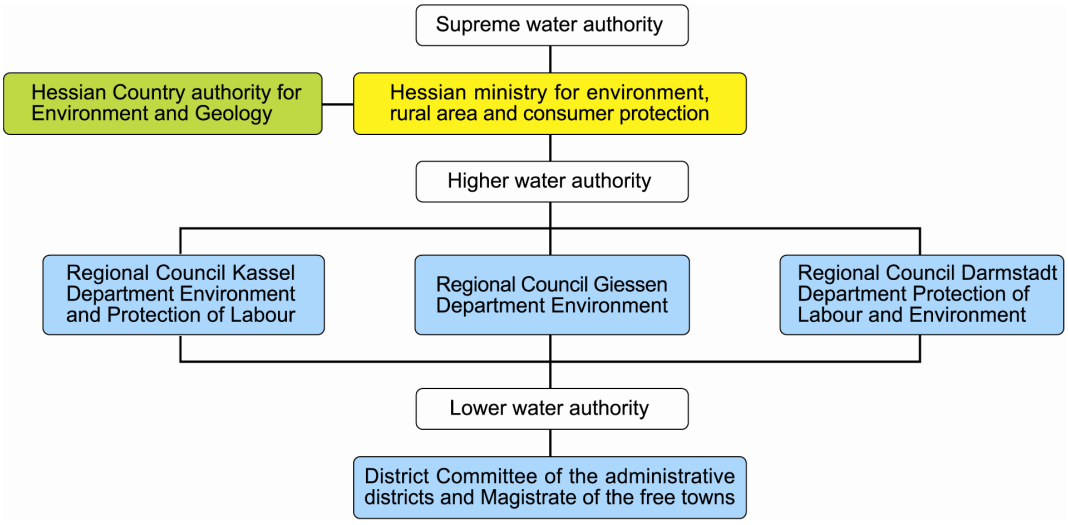
Among other things the water management act declares, that property does not authorize

1. use of a body of water, that requires according to the water management act a permission;
2. expansion of a body of water above ground.

Furthermore issues like concessions for permissions and use of facilities that have influence on bodies of water are regulated.

Each state has its own law on water, because if the government has not taken legislative action, the laws pertaining to water are matter of the states. However, the states have the possibility to deviate from the water management act.

The following chart gives an overview of how the water management administration works in the German state Hessen:



The legislation pertaining to water doesn't only play a role in measures of hydraulic engineering, but also has to be obeyed in many other authorization or planning processes, like for example in authorization processes under the Federal Immission Control Act (Bundes-Immisionsschutzgesetz) or in town planning under the Federal Building Code (Baugesetzbuch).

For the cooperation between the federal government and the states the so-called "Bund/Länder-Arbeitsgemeinschaft Wasser (LAWA)" (government/state joint venture for water) was founded in 1956. The purpose of the joint venture is to discuss collective questions on water management and water law, to find solutions together and to give recommendations for the implementation.

The federal government as well as the states is committed to translate the guidelines of the European Water Framework Directive into national law. Due to that reason the Water Management Act (WHG) was considerably changed in 2002. An important point is that the management of water resources is organized in accord to the commuting areas of rivers. As this areas cross state borders the states have intensified their cooperation in the LAWA. Among other things they have concluded treaties, which regulate the governmental cooperation beyond state borders.

The integrated management of flowing waters and lakes for border-crossing bodies of water is carried out in the framework of international commissions for river areas or bilaterally for border rivers or lakes.

Germany is a member of several international river area commissions, whose activities are based on internationally binding conventions.

This applies to the rivers Rhein (Rhine), Donau (Danube), Elbe, Oder, Maas (Meuse), Mosel/Saar and to the Bodensee (Lake Constance).

In addition to the Water Management Act (WHG) and the legislation on water of the particular state specific law and implementation regulations are to be obeyed when building or operating a hydro plant.

There are also tasks under public law that the operators of small hydro power plants have to fulfill.

Among others:

- maintenance and operation of weirs, watergates, dams, bridges, etc.;
- large scale commitments of maintenance of water bodies;
- tasks concerning the general hydrography including measurements of water level, amount of effluent, observation of the oxygen content, etc.;
- measures of the flood and civil protection;
- fees for use of water.

Another important law related to SHP is the Renewable Energies Act (Erneuerbare-Energien-Gesetz EEG). It is supposed to advance the expansion of energy supply facilities. It aims to increase the percentage that renewable energies contribute to power supply by at least 30 percent until the year 2020 and continually after that. To this purpose rules have been laid down to define refund for renewable energies.

The minimum refund for hydro power is:

- for plants up to 500 Kilowatt (kW) inclusively: 9,67 Cent/kWh
- for plants from 500 KW up to 5 Megawatt (MW) inclusively: 6,65 Cent/kWh.

The refund for an installed plant remains constant over 30 years. The refund for plants that have come on stream newly decreases by 1 percent of the previous year's value every year, starting with the year 2004.

In the section from 5 MW up to 150 MW inclusively only plants are being sponsored, which were able to increase their power by at least 15 percent because of a renovation and which meet ecological criteria. The refund is then only paid for the additional power, which is generated through the renovation and amounts for a labor increase:

1. up to 500 kW inclusively: 7,67 Cent/kWh;
2. up to 10 MW inclusively: 6,65 Cent/kWh;
3. up to 500 kW inclusively: 6,10 Cent/kWh;
4. up to 500 kW inclusively: 4,56 Cent/kWh;
5. of more than 50 MW: 3,70 Cent/kWh,

in newly installed hydro plants at already existing weirs.

The refund for the plant remains constant over 15 years and is paid until the end of the 15th year following the date of activation. The refund for newly added plants decreases by 1 percent of the previous year's value every year, starting also with the year 2004.

2.9.1.2 State of discussions concerning water right and ecology

Because of the discussions about hydro power in context with water ecology and flood prevention for the next time in Germany the focus will be laid more on the modernization of existing plants and on the revitalization of decommissioned plants. Supporters and opponents are distributed across different groups from economy, administration, environment protection or also private persons without special relation to hydro power.

Hydro power supporters advocate also the erection of additional plants on new places. If there are realistic mid term chances for that cannot be said with general validity.

2.9.1.3 State of hydropower use

It is estimated, that in 1890 there were around 70.000 water wheels an turbines in Germany. In a study the actual number of hydro power plants was declared with around 6.500. Further 6.500 places show according to this study useable potential for new plants.

As there are no concrete accounts about existing but not used water rights, we can actually just dray on estimations. According to that there are presently around 20.000 places with unutilized water rights in Germany.

2.9.2 Poland

2.9.2.1 General overview

In Polish terminology, small hydropower ranges from 1-5 MW of installed electrical capacity. Plants smaller than this are named mini hydropower stations, those exceeding 5 MW are called large. The share of hydropower in gross domestic electricity production makes up no more than 1,5%. The potential of the large rivers reaches 23.000 GWh p.a., 13.700 of which can be technically exploited. By us in all the technically exploitable potential, the hydropower share of domestic electricity production would rise from 1,5 to almost 10%. Apart from this, also small rivers have a considerable potential. Today Poland exploits only 12 % of its hydropower resources. Efficiency of use is constantly rising thanks to new technologies such as turbo regulators able to exploit energy of flooding, etc. It currently is a main goal to enlarge artificial retention capabilities. Today, approx. 400 hydropower stations are in operation in Poland. Only some dozens of them exceed 5 MW of installed electrical power, some of them accumulate water to produce peak-time electricity.

The number of SHP stations grows strongly. Power stations with an accumulated absolute electrical capacity of 98 MW are under construction or in the planning phase. The average payback period of new SHP plants is 8 - 10 years, wherever existing buildings can be used it is 4-6 ys.

Especially in the Vistula catchments, where regulation works have to be undertaken for flood prevention reasons, a number of new power stations with capacity in the range from 5 to 160 MW can and shall be built.

Currently, construction activities are strongest in the following regions (voivodships): olsztyński, gdański, słupski i bydgoski. For most of them, existing water accumulation systems can be used. "Energoprojekt" has calculated the energy potential of technological upgrading of existing Polish hydropower stations. By making use of existing buildings and hydrotechnological buildings, approx. 650 SHP plants could be revitalized thus producing more than 80 MW. Additionally, in favorable conditions a lot of new hydrotechnological buildings could be erected in places of former HP production. There, 400 new SHP Plants could be put into operation thus producing additional 120 MW of electrical capacity. Finally, some 1000 entirely new SHP stations could be built, producing more than one million of MWh of electricity. In Polish rivers, for regulatory purposes more than 300 lowland dams are in operation. In 1954, 6330 of the formerly 6500 SHP were active in Poland. Currently, only some 400 of them are still active, having a capacity of approx. 30 MW. Approximately 650 locations are considered to be worth revitalizing. They will them produce ~80MW. Even more important are locations, where never in history SHP was exploited. Some 400 SHPP could be set up, with additional 120 MW produced there.Hydroelectric power as possible renewable source to be developed in the territory.

With Poland having practically no fossil fuel resources except of coal, and with energy import cost pressure on GDP constantly rising, it is very important for Poland to better utilize its hydropower potential. An analysis of the specific small hydropower potential (GWh per year and per km²) has been undertaken. It shows that although Poland has got a high specific hydropower potential, the specific SMALL hydropower

potential of Poland is only 80 MWh/a, km², which is clearly below European average. This is related to the rather small share of mountainous area within the whole of the national territory. The Southern Polish border region with Slovakia and the Czech Republic show topographic structures of good SHP potential. In Poland, the contribution of SHP to all electricity produced makes up 0,6% - this is not high. Trend of concession demands of the last years: The number of permissions edited in constantly growing. Still, due to inconvenient economic feed-in conditions lesser concessions get edited than would be desirable in order to meet European targets. But according to the EU's Renewable Energy Sources Directive, this situation is to change dramatically in the course of the next two years to come. Hydropower plants of capacity over 5 MW are the main suppliers of energy from renewable sources to the National Electricity System. In 2002, they had a 68,4% share in the "green" energy market. Small power plants of capacity below 5 MW delivered 26,2% of renewable energy. In 2002, according to data of the ERO[19], in the national hydropower plants (including small hydropower plants) in total 872 MW were installed. They generated and transmitted to the network 2,249.724 MWh. Main applicants for new mini hydro concessions - According to PELIKAN, only 6 % of all Polish SHP plants are run by private persons or SMEs. Private investors face growing problems in permit preparation. For this reason most new plants are being built by water management authorities who also have easier access to public funding and are able to negotiate better feed in-tariffs respectively they are electricity utilities themselves. Private market actors complain that they are given fewer rights than large state-owned institutions and utilities.

Main factors limiting a further development of mini hydro plants in your territory: Main hindrance is the unfavorable feed-in tariff, but also a lack of transparency of information on attractive sites, lack of current owners' investment capital and slow and badly predictable concession editing procedure. According to PELIKAN, the main barrier is the insecurity of the feed-in tariffs and insecurity of the regulation of operation conditions in respect to Riparian and nature protection rights, property rights and grid-related issues. In objective terms, a comparison among the new member states shows there must be grave hindrances for the further exploitation of small hydropower. This large difference is mainly due to unfavorable economic conditions. Fishery and competition with other land-use are perceived as main hindrances for an increase of SHP. Competition with other uses is more often seen as a hindrance than in the average of the NMS and acceding countries. Visual impacts, water regulation and environmental regulation as a hindrance are not often namedThema 2: Wasserrahmenrichtlnie - Ziele.

2.9.2.2 Water frame directive objectives

Concerning the management of water quantity and quality; water use planning at watershed scale; management and solution of water use conflicts.

Main water uses - The major water use linked to hydroenergy is flood protection and retention. Among the categories listed above, industrial is leading, followed by domestic and agricultural. Hydropower is focused on a couple of favorable regions only.

Main environmental impacts of mini hydro plants and possible way how they could be easily mitigated: There are subjective and objective impacts. Many people feel bothered by visual effects of small hydro power stations on landscape, and would tend to over-estimate temporary effects appearing in the construction phase. These can be mitigated by deeper and more sensitive and client-related information. Negative fish migration effects can be mitigated by technical means, and the effect on micro-climate is very often positive. Derived flow regulations are in place and have to be controlled. Among other objective negative impacts there is the destruction of litoral habitats and hunting grounds of endangered species during the course of construction and operation of SHP plants.

Management of water resources at a local scale: In the area of best perspectives for small hydro-power there is some competition with other forms of water usage. In his transnational questionnaire project, PUNYS hat detected that this issue is more relevant in Poland than in most other new member states and acceding countries. Industrial and agricultural water-use can quite often well coexist with hydropower, but with Poland being a highly industrialized country with a diversified agriculture, local interferences will sometimes appear. Tourism and recreation-related land-use could even profit from hydropower projects, as some good example cases provided with edutainment hiking trails prove. Involvement in planning of water resource uses at your territory, instruments and actions applied, authorities involved (see also 6.2.). Regional catchments conceptions regulate water uses at regional level. They

[19] Polish Energy Regulator (also source of this information)

exist for the 2 main catchments Vistula and Odra. Regional Water management boards (RZGW) are present all over the country and centrally coordinated. The public authorities involved react relatively positive to SHP issues. In Poland, the positive opinion of politicians towards small hydropower is significant. Still, polish SHP activists do not always think that this is true. Also the general public thinks about SHP quiet positively. The positive opinion of environmental bodies recognized in the empiric research project creates very good conditions for further projects.

Main problems related to the implementation of the local normative for the reserved minimum flows: ambiguity of the calculation to establish the minimum flow, control systems for the survey of released flows.

Authorization procedures: concerning the description of the administrative process for water concession and power plant realization; problems and obstacles related to the overall process.

2.9.2.3 Short description of the complete bureaucratic process

Procedures are regulated mainly according to the Polish Law (*Prawo wodne*) and the Polish Construction Act. Also zoning regulations are important, and so are ecological regulations. The most important documents to be presented are a construction project for building permit, a Riparian project (*operat wodno-prawny*), a hydrotechnical project of the power-station, a technological project and a (draft) contract with regional utilities on the connection to the power-grid and on the feed-in of electricity. In all these steps, the investor may receive support from the Polish Small Hydropower Association (*Towarzystwa Rozwoju Małych Elektrowni Wodnych TRMEW*) even without requiring membership. Building permits are edited by the Micro-region Administration and in some major and complicated cases the County administration. Municipalities are not involved. – Nevertheless it is them who edit the mandatory "decision on allocation of investment for a public purpose and the "Decision on Construction Conditions". In case that more than one municipality is involved, one may deposit the application and project in one of them, which will then contact the other(s). All steps to be undertaken in order to sell renewable energy at the subsidized market are published in an info package which can be downloaded at: http://www.ure.gov.pl/index.php?dzial=236&id=784. Boards which have to give an opinion for the authorization playing a major role in the process: The main public bodies involved are the Regional Board of Water Management – RZGW with inspectors and water surveillance, the National Board of Water Management controlled by the Minister of Water Economy (presented in more detail in chapter 7.4.), the Administration of Agricultural rivers, voivodship, powiat and gmina (region, micro-region and municipality).

Different processes depending upon the uses of the requested water in the course of the delivering of the water concession: Their basics are laid down in the *Metodyka jednolitych bilansów wodno-gospodarczych, Hydroprojekt, Warszawa, 1992*. Their practical forms differ from case to case between regions.

Different processes depending upon the type/localization of the mini hydro plant for the delivery of the power plant concession: These processes are decided upon individually from case to case. Good information on this topic can be taken from user entries at the internet forum at www.mew.pl, in which project owners would discuss their current problems also on concession procedures.

Standardized protocols (with special regards to environmental impact assessment) for the evaluation of new mini hydro plant requests: EIA takes place according to the law on EIA without any special guideline for EIA in cases of hydropower.

Most frequent motivations to reject a mini hydro new request are formal incorrectness – documents missing or not adequately prepared and protest of consensus parties (stakeholders).

Cases of renounce during the proposal period - Due to long procedure duration this can happen quite frequently, mainly in cases of private project ownership. The forum at www.mew.pl gives an impression about this field (in Polish language).

Possibilities for improvement of the actual structure of the bureaucratic process: The whole process to get licenses in a theoretical best case takes from 3-6 months in Poland. In practice, the shortest possible project license preparation duration is one year, which can be reached only in excellent conditions, with small plants and highly motivated public servants. The political climate is the factor which can bring about more possible delay than any other factor. Need for modification of the overall approach to release mini hydro plants concession: In Poland it is not deemed necessary. For example make provisions to evaluate all water concession demands gathered in a certain period of the year, to promote the planning of water uses. Possibilities for the invention of decision-making procedures tackling new mini hydropower plants with respect to a common approach: This would indeed be worth trying also in Poland. But one has to make sure that published data will be objective without hidden assistance for certain site owners. Possible

reduction of critical environmental hazards and conflicts among stakeholders of such an approach to promote mini hydro development: Such an approach could potentially reach both mentioned targets. Projects could be made fit better into the river basin and show better performance as to flooding hazards and environmental issues, stakeholder discussion could be made easier, and even specific investment costs could be reduced by starting from the economically best projects instead of starting where there is an upcoming private initiative. There is an official National Water Management Strategy from Sept. 13, 2005 accepted by the council of Ministers covering all three “problem axes” (as they are called there): Technology, finance and institutional sphere. It contains a project list with priority ranking. Evaluation is foreseen ex-ante, on-going and ex-post. Hydropower is mentioned in this strategy, but unfortunately the priority list leaves this sector aside entirely. The Polish National Water management Organization and its branch offices build own hydro-energy projects, thus acting as a competitor to private entrepreneurial subjects; this might explain a certain rivalry and lack of information on attractive locations. Currently, hydroplants get built by the RZGW at Swinna Poreba w Skawie, at Katy-Myscowa at the Wislok river, at Malczyce na Odrze, at Nieszawa and at Niepolomice, both at the Vistula. RZGW Gdansk builds at Nogat. For the Vistula catchments, which makes up 80% of the national hydro-energy potential, there is a long-term official strategy, the Program for Vistula River Its Catchments Area by 2020. Its implementation builds upon the need to continuous seeking for optimum solutions and reconciliation of various views aimed at clear definition of the role the Vistula River and its tributaries. The period assumed, i.e. by 2020, has been recognized as that required to achieve the equilibrium status of and putting in order the management of the river basin, given the need to remedy a huge bulk of the areas occurred there so far. The program was initiated by the Non-Governmental Organizations, the statutory activity profile of which concerns the protection of the Vistula River. In April 1998, the Cooperation Declaration on the Vistula River and Its Catchments Area (the “Warsaw Declaration”) was signed. Also for the Odra, there is a similar strategy, elaborated in 2006: www.programodra.pl/ramka.htm. It focuses on some major investment projects, containing also small hydropower, an integrated feasibility study, and a GIS-based digital 3D-model.

Krajowa Rada Gospodarki Wody - National Council of Water Management: Its activity profile comprises the pronouncing of opinions on water management, flood control and drought impact, and in particular to present and provide advice on the proposals for improvements in the state of water resources and flood control throughout the national territory, investment plans and programs in the field of water management, and legal acts regulating water management issues.

Standardized protocols for the evaluation of projects with particular regards to environmental impact assessment - Conditions for hydrotechnological construction measures are laid down in a binding guideline (*Rozporządzenie Ministra Ochrony Środowiska, Zasobów Naturalnych I Leśnictwa*) elaborated by the Polish Ministry of the Environment (*Ministerstwo Środowiska*) from Feb.20, 1996 on technical conditions to be met by hydrotechnical buildings and on their allocation (regulation nr. 1997.21.111 issued at March 5, 1997). It can be found in Polish at: http://www.mos.gov.pl/2prawo/rozporzadzenia_ms/1997.21.111.shtml.

Pricing - Green electricity prices are created on a green electricity “certificate of origin”-market. Recent research has inquired, how much money SHP operators receive for a property right for one certificate of origin - results show that most Polish small hydropower plant owners raise 230-235 PLN, which is approx. 60 Eurocent.

CHAPTER 3

ANALYSIS OF ENVIRONMENTAL AND ADMINISTRATIVE PROCEDURES IN DIFFERENT PARTNER COUNTRIES ABOUT SHP

This chapter gives legal SHP definition, delegated and concerned authorities in partner countries and describes the procedures as Environmental impact assessment, Obtaining the concession for use of the water, Authorization to build a SHP and Authorization to build the electric line of SHP - procedure to connect the plants to the grid. All procedures are presented with the required application technical documents to submit (technical, economic and environmental sections of the laws), timing of procedures (from application to license granting), costs (taxes, procedure fees, and other compensation costs), evaluation criteria and flow chart.

3.1 ITALY

3.1.1 Legal definition of small hydroelectric plants

In Italy, the only legal classification of hydroelectric plants is given, according to their average annual rated capacity, by the rules that also govern the procedures to grant public water concessions for hydroelectric use. Art. 6 of the Royal Decree no. 1775/1933 defines the plants with an installed capacity greater than 3000 kW as large diversions of public water for hydroelectric use. All the other plants, with an average annual capacity lower than or equal to 3000 kW, are small diversions of public water for hydroelectric use. They do not have a legal definition, but they are generally named “mini hydroelectric” plants in order to distinguish them from “large hydroelectric” plants:

• Power plant with power <= 3000 kW	• Name: Small Hydro power plant
• Power plant with power > 3000 kW	• Name: Hydro power plant

Authorities delegated to give the permissions to build a Small Hydro Power Plant are as follow:

• Environmental impact assessment (EIA)	• If needed, Regional office (e.g. Lombardia)
• Permission to derive water for hydroelectric use with power ≤ 3000 kW	• Provincial office (e.g. Cremona)
• Authorization to build the hydro power with no limit of power	• Provincial office (e.g. Cremona)
• Authorization to build the electric power line having voltage ≤ 150.000 volt	• Provincial office (e.g. Cremona)

3.1.2 Environmental impact assessment (EIA)

As introduced in the Chapter 2, the procedure for environmental compatibility are regulated for their general lines by the 4/2008 L.D. The EIA (national) procedure includes two important phases:

a) **the verification** to assess if an EIA procedure is needed (max 90 days from date of request);
b) **the environmental impact assessment.**

Kind of work which require the verification	Authority delegated
Small Hydro Plant with a diversion of water with capacity over 200 litres/second if it is not in a protected natural area	Regional Offices
Small Hydro Power Plants with power over 100 kW	Regional Offices
Hydroelectric plant situated within a Sites of Community Importance (SCI)	Regional Offices
Aerial Electric pipeline with voltage > 100 kV and length > 3 km	Regional Offices

The verification is coordinated as follows:

1. the applicant begins the procedure by delivering the preliminary project and the environmental preliminary study to the competent authority (Lombardia's Regional Offices) and a public notice of the application must be published on the regional Official Gazette. The documentation to be presented should in any case contain the minimum standards of IV annex of the 4/2008 L.D.:
    - a project description containing information about its features, localization and size;
    - a description of necessary measures to avoid, to reduce or compensate its negative impacts;
    - necessary data to identify and to evaluate the most important impacts for environment and cultural heritage, which project can produce either during its construction or during its running;
    - a brief description of the alternative options considered by the design proposer, including so called zero option, specifying the main reasons of the best choice from environmental impact point of view;
    - a description of specified impact monitoring measures, to offset unexpected negative impacts at the right time and to allow competent authority to be able to take right corrective measures;
    - a non technical abstract about size and running features of the project and about data and information of the EI study, including its graphic works.
2. consultation: within 45 days from publication any interested subject can present remarks and objections.
3. according to verification's standards (V annex of decree) and the results of consultation, the competent authority has 45 days to express a positive or negative opinion. In case the competent authority decides the project must not be subjected to EIA procedure, the verification procedure is concluded. Otherwise, starts the EIA procedure.

Kind of work which require directly the EIA	Authority delegated
Small Hydro Plant with a diversion of water with capacity over 100 litres/second if it is in a protected natural area	Regional's Offices
Hydro Power Plants having a power capacity over 40.000 kW	Environment Ministry
Aerial Electric pipeline with voltage > 150 kV and length > 15 km	Environment Ministry
Aerial Electric pipeline with voltage > 100 kV and length > 10 km	Regional Offices
Underground Electric pipeline with length > 40 km	EnvironmentMinistry

The environmental impact assessment (EIA) procedure is coordinated as follows:

- definition of environmental impact (EI) study's contents (max 60 days); this is an optional phase the proposer can ask for to the competent authority to define the contents of EI study, details and methodologies to adopt;
- project submission and publication: by this moment it starts the computation for the duration of all the subsequent phases;
- check of documents by the competent authority (max 30 days from start);
- consultation phase: within 60 days from the submission any interested subject (either private or public) may access to the documentation and present observations to the project. The competent authority can chose whether to call for a public inquiry or a more synthetic form of public participation. During this period the competent authority must acquire and evaluate all the needed documentation;
- after the consultation phase the proposer may apply for presenting additional documentation (max 30 days from start). The proposer has a maximum of 60 + 60 days to present documents integration
- within 120 days from the project submission the competent authority may request for additional documents (). The proposer has a maximum of 60 + 60 days to present documents integration
- in case of a substantial modification of the original project the competent authority may decide for

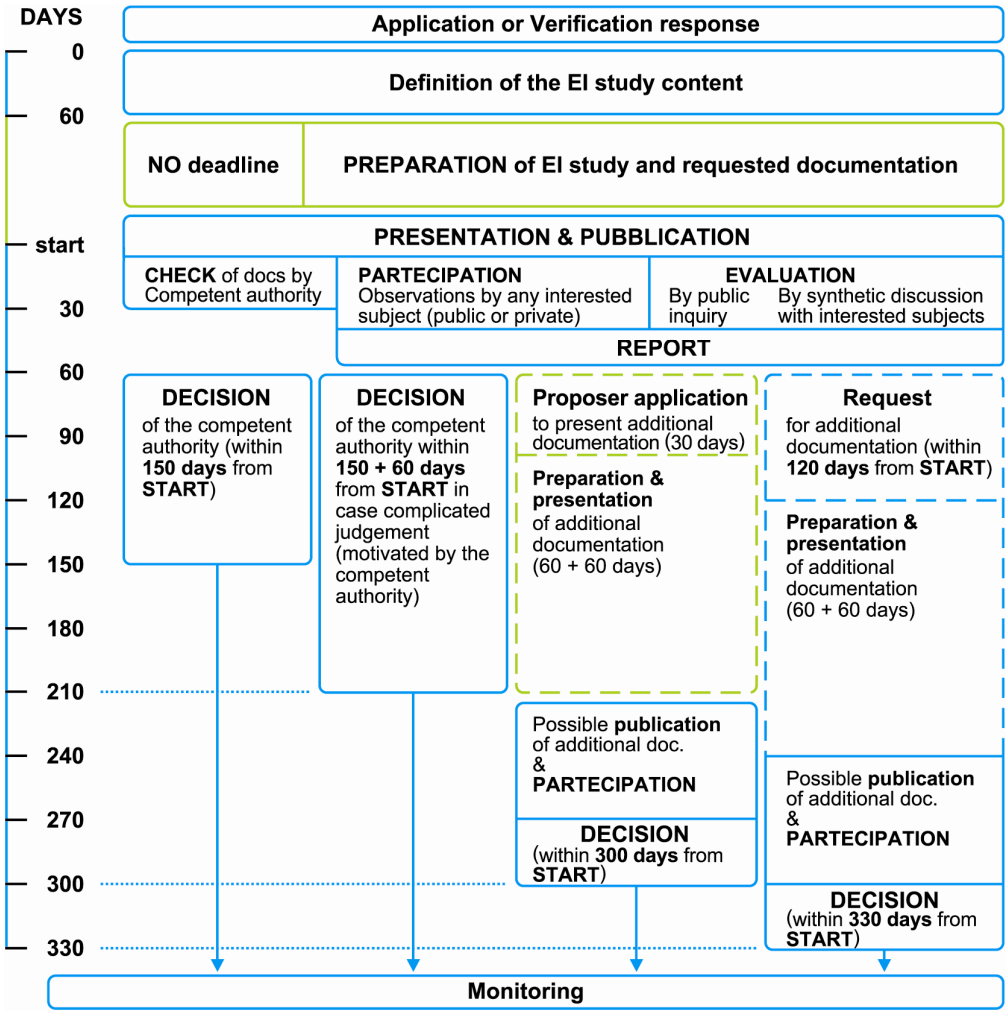
the publication of the new documentation and the subsequent participation phase (60 days from submission of integrations);

- after the conclusion of the precedent phases the Competent Authority can dispose of 90 days for the decision(min 150 days, or 210 or 300 or max 330 days from start);
- delivery of the Competent Authority judgement and monitoring.

The EI study is written according to standards of IV annex of the 4/2008 L.D. and taking into account the results of conference phase (in the case the project has already undergone the verification, the content of the environmental study might probably be enriched).

- a project description containing information about its features, localization and size;
- a description of measures to avoid, reduce or compensate its negative impacts;
- necessary data to identify and evaluate the most important impacts for environment and cultural heritage, which the project can produce either during its construction or during its running;
- a brief description of the alternative options considered by the project proposer, including the so called “zero option”, specifying the main reasons of the best (environmental) choice
- a description of monitoring measures.

As regards to the other environmental authorizations, the 4/2008 L.D. includes a clear reference regarding a need for coordination and simplification of procedures. Indeed the EIA procedure can replace or coordinate all authorizations, agreements, grants, licenses, mandatory advice, permissions and approvals, of environmental concern. To this end both the preliminary environmental study (requested for the verification procedure) or the full environmental impact study (requested for the EIA), must contain the technical annexes required for the Integrated Authorization provided by the Italian legislation (in acknowledgement of the Integrated Pollution Prevention and Control strategy, introduced by 96/61/CE).



3.1.3 Obtaining the concession for use of the water

Administrative decentralization in Lombardy

In Italy, the procedure for granting public water concessions is governed by the Royal Decree no. 1775 of 11th December 1933 (hereinafter "Consolidation Act"): it defines the modes and procedures according to which water is granted for use to private entities, businesses and operators.

Category	Competent Body
Concession for use of the water for Power plant under 3000 kW	Provinces of Lombardia's region
Concession for use of the water for Power plant over 3000 kW	Lombardia's Regional Offices

In Lombardia, Regional Law no. 120 of 5th January 2000, issued in execution of art. 4 of law no. 59 of 15th March 1997, identifies the functions that have been transferred or delegated to the local bodies or to the bodies with autonomous functions (autonomie funzionali), and the functions that have been retained by the Region, as regards the topics included in the legislative decree no. 112 of 31st March 1998. Paragraph 111, letter b) rules that the Provinces are in charge of functions such as the grant of concessions for small diversions referred to in the Consolidation Act, leaving the Regions in charge of granting concessions for large diversions, making use of the Province for the technical examination. Regione Lombardia, through Regional Law 26/2003, has regulated the matters it is in charge of, in obedience to national legislation and referring to European rules. Regional regulation no. 2 of 24th March 2006, issued under law 26/2003, is the regional rule that regulates the use of surface and underground waters, household water use, the protection of waters intended for human consumption, water conservation and water reuse. The regulation governs the administrative procedure of the diversion concession according to the following criteria:

- streamlining of the procedures and their completion time;
- explanation of the concession grant criteria for the examining office and the grantor (choice of the grantee among competing applications);
- introduction of a new regulation as regards incompatible and competing applications;
- coordination of the concession procedure with a possible procedure of Environmental Impact Assessment;
- coordination of the post-concession procedure (execution of works and use) with other relevant rules (legislative decree 387/2003);
- focus on water protection and on use regulations (in execution of the Water Use and Protection Plan);
- application of the Reserved Flow to surface water diversions in order to achieve/maintain the objectives of environmental quality by 2008-2016;
- compulsory installation of flow measuring devices and compulsory annual declaration of diverted water.

As regards the full implementation of the regulations, please refer to the subsequent provisions on the operational and technical criteria that substitute and are added to the provisions abrogated by art. 40, but that has not yet been dealt with, thus creating problems to the application of some rules enclosed therein.

3.1.3.1 Required application technical documents to be submitted

3.1.3.1.1 National

The ministerial decree of 16th December 1923 prescribed the rules to draw up outline and working plans that shall accompany the applications for water diversion, dividing them into large and small diversions. Here follows a summary of the contents of "small diversion" applications for hydroelectric use that is with an average capacity not exceeding 3000 kW to which this paper refers to:

[20] Regional Law no. 1 of 5th January 2000: Reorganization of the Self-Governments System in Lombardy. Implementation of legislative decree no. 112 of 31st March 1998

- **Detailed report:** the report shall demonstrate that the proposed works are innocuous, as regards public water regime and third parties' rights, and shall prove that diverted waters will damage other existing works or assets in general, neither due to overflows nor due to filtration. The report shall also include the description of the proposed works. It will also point out the nature, the shape and the dimensions of the weirs. It shall include the necessary geognostical and hydrographic information regarding the basins that may be used to collect water, and, the estimate of the volume of water expected to be stored, together with pluviometric data. It shall also indicate the capacity that can be obtained with the diverted water. An estimated cost for each type of work and for all works on the whole shall be added, as well as a financial plan;
- **Chorography:** Chorography shall be adequately extensive to allow a reliable positioning of the diversion with reference to the well-known neighbouring places; it shall include the waterway intended for diversion, its surroundings, the drainage basin or basins to use for water collection, the pieces of land to cross with the designed works and their location;
- **Topographic plan:** the topographic plan shall indicate which works are going to be executed in the river-bed and in the public water basin. This plan shall comprise the surroundings that may have links with the works;
- **Longitudinal and transverse profiles:** the longitudinal and transverse profiles of the waterway to be diverted shall represent the lines of the bottom and of the banks of the river-bed and of the embankment;
- **Plans of the main works of art** The main works of art shall be drawn to scale with the numerical indication of dimensions and altimetric elevations. The small works of art may be represented with drawings referring to their real dimensions, measured in relation to the plant to be carried out.

Royal decree 1285 states that the applications unprovided with the required documentation cannot be admitted, and as such they cannot be admitted to examination. If some of the technical documents listed needs to be completed or regularized, the examining office sets a thirty-day deadline for the submission of the required integrations, then the procedure follows the legal rules.

3.1.3.1.2 Lombardia

Regional regulations indicate the minimum compulsory contents of the concession application and if they are not included in the application, the examining office shall reject the concession application. The minimal information needed are:

- the legal person applying and its details;
- water body to divert;
- intake;
- average/maximum flow and annual derived volume;
- period of withdrawal;
- type of use;
- returned waters;
- technical and financial guarantees.

The regulations abrogated all the regional rules that governed the contents of concession applications, in particular the resolution of the regional council 2604 of 11th December 2000 relating to the examination of hydroelectric uses; according to the regulations, the Region shall issue provisions in order regulate the technical contents of the documents: we are still waiting for such provisions.Therefore, the Provinces, with a view to fully work with the new instrument, have continued to apply the previous technical instruments, trying to overcome their unsuitability connected to the introduction of the new rules. The rules will be dealt with in the specific field of hydroelectric concessions and according to the scheme that has already been proposed for national rules.

3.1.3.2 Timing of procedure

3.1.3.2.1 National

The procedure enforced by the national rules and described in this chapter **does not set the overall time** by which the concession shall come to completion, but simply identifies some times of the specific steps of the procedure. Such lack is further worsened by the fact that the concession is granted after hearing several external Bodies. Many of the Bodies involved must issue binding opinions. The national rules on

the administrative procedure tried to remedy and established that a procedure, except when explicitly provided for by specific rules or regulations, shall conclude within 90 days from application submission. The mentioned steps as follows:

Application publication

Starting the procedure *under Law no. 241/1990*

It aims at informing all those (institutions or private entities) who may be interested in the submitted application;

Publication *of the submitted application in the Official Gazette* of the Italian Republic and in the Journal of Legal Notices (Foglio degli Annunci Legali) of the Provinces where intake structures and tailraces are located. It also sets the terms (30 days) to submit competing applications that are technically incompatible with the first application.

Posting *the application and the relevant project in the municipal notice boards* of the Municipalities and of the Provinces concerned by the works. The notice shall include the terms for the submission of remarks or objections to the submitted diversion (max 30 days) and shall indicate when the site of the prospective diversion is going to be inspected

Inspecting places and collecting opinions

The places where the plants will be located shall be inspected; the date of such inspection shall be notified through a posting in the municipal and provincial notice boards; all those interested in the proposed diversion concession are invited to take part and to submit written remarks. Along with the site inspection, the opinions of the relevant public entities shall be collected. The Consolidation Act identifies the only three bodies whose opinion regarding the examination on large public water diversions has to be asked: the hydrographic office and the military authority in all cases, and the authority having competence on dams if a reservoir is to be built. As a matter of fact, the examining office has to ask opinions to a larger number of Bodies under non specific rules governing the grant of concessions, but according to which some types of works must be authorized by the competent institutions. Here follows a list of the bodies which must be asked their opinions as regards concession grant:

- **Hydrographic office:** the Italian Hydrographic and Marigraphic Service (Servizio Idrografico e Mareografico Italiano) was established in 1917 by the then Ministry of Public Works with the decentralization, the competences of the Hydrographic Service were transferred to regional bodies: the Regional Agencies for Environmental Protection (Agenzie Regionali per la Protezione dell'Ambiente - ARPA) or regional technical services, thus substituting the previous, very often supra-regional, Districts. The competences of the Hydrographic Service as the body in charge of expressing its opinion, not only on the reliability of the hydrologic data at the basis of the project, but also as regards the proposed use and its inclusion in the outline plan for the complete and rational exploitation of the catchment basin concerned. Moreover, art. 42 of the Consolidation Act grants this body the authority to establish if the measurement devices are suitable to measure flows and volumes at intake and tailrace points;
- **Military Authority:** the over-mentioned departmental circular invited the examining offices to take such opinion into consideration even in case of small diversions located in important military areas identified by specific rules. The identification of such areas is rather difficult, so the opinion shall be asked for all concession examinations;
- **Administration in charge of supervising the safety of reservoirs and weirs:** the R.I.D.21, established under article 91, paragraph 1, of legislative decree no. 112 of 31st March 1998, for the purpose of protecting public safety, deals with the technical approval of the projects regarding large dams22; it further supervises the construction of the dams it has competence on and the management and control operations resting with the grantee. Art. 89 of that same legislative decree no. 112 of 31st March 1998 states that the Regions and the local bodies shall be assigned the functions regarding the dams that are not included in article 91, paragraph 1 (large dams); so the examining office shall send the decentralized bodies the request to check on the carrying out of smaller weirs;
- **Basin Authority:** the environmental code states that the applications regarding both large and small diversions shall be sent to the Basin Authorities having competence on the territory; within forty days from application receipt (for small diversions), such Authorities must express their binding opinion to

[21] R.I.D. Italian Dam Register: established under article 91, paragraph 1, of legislative decree no. 112of 31st March 1998, it is a public, non economic body, having organizational, administrative, financial, patrimonial and accounting autonomy, located in Rome;

[22] They are defined large dams under Circular no. US/482 of 19th April l995 of the Ministry of Public Works - Storage dams – Competence on the supervision of planning, construction and operation: weirs higher than 15 meters with a storage capacity of more than one million cubic meters;

the competent Examining Office and state whether the use is compatible with the protection Plan, for the purposes of supervising the water or the hydrologic balance, also awaiting the approval of the over-mentioned Plan;

- **Bodies managing protected natural areas:** in order to complete the concession examination, the environmental code requires that the project is also submitted to the bodies that manage the protected natural areas established on the national territory. The official list of the protected natural areas currently in force is related to the 5th Update approved with a Resolution of the Region-State Conference on 24.7.200323. The Code of the Cultural and Landscape Heritage24 states that, in any case, the following items, among others, shall be subject to protection due to their landscape interest: rivers, streams, waterways registered in the lists of public waters ex Consolidation Act and relevant banks or dike toes for an area of 150 meters each, parks and national or Regional reserves, as well as external protection territories of parks. It also obliges the owners, the possessors or the holders, on whatever basis, of the over-mentioned assets to submit to the Region, or to the local body to which the Region has granted competence, the projects of the works they want to execute, together with the necessary documents, in order to obtain the landscape authorization;
- **Body in charge of hydraulic policing (polizia idraulica):** under “Hydraulic policing” we mean the supervision and authorization activities falling under the authority of the Public Administration in charge of protecting state waterways that can be spotted on cadastral maps as "waters", "state property for hydraulic works ", "water state property ", etc. The rules that govern hydraulic policing are still found in the 1904[25] Consolidation Act no. 523, which regulates any type of activity to be carried out next to waterways, setting distances and/or prohibitions. The functions of hydraulic policing were transferred to the Regions with the Legislative Decree 112/1998 (art. 89), and in some cases, they were, in turn, delegated to the Municipalities as regards minor waterways (minor water network). The hydraulic competence of reclamation ditches was delegated to the Consorzi di Bonifica (Land Reclamation Consortia), which had territorial competence under the national rule R.D. no. 368 of 8th May 1904. The general principle is: it is forbidden to carry out any activity, or to build any construction, that may damage hydraulic works, increase hydraulic risks, make hard or hinder activities such as inspection, ordinary and extraordinary maintenance, emergency operations by the hydraulic authority and by all other competent entities. There also two supra Regional Bodies: Magistrato per le acque di Venezia ed AIPO;
- **Authority in charge of protecting the ichthyofauna:** the national rules on ichthyofauna protection date back to the R.D. no. 1604 of 8th October 1931. The unified rules on fishery law state, in art. 10, that: “Water diversion concessions shall provide for the necessary works in the interest of the fishing industry (fish ladders, ramps, trash racks at intake mouth, etc.), according to the technical elements required by the Ministry of Agriculture and Forestry. In the same way, changes to the pre-existing works may be required, and, if it is not possible to build special works for fishery, the grantee may be prescribed to provide fries at his/her own expense on an yearly basis.” In 1977, through the Presidential Decree no. 616 of 24th July, the Regions were given competence on fishery, then, the new administrative bodies issued new laws and modified the regulatory framework. In particular, the regional rules have delegated some functions to the Provinces. Often, the Regions, in cooperation with the Provinces, have developed the Fishery Management Plan which contains the so-called “Carte ittiche” (fishery management charters), represent the fulfilment of the action plans that have been drawn up taking the Protection Plans into consideration. The opinion of the competent Body lists all the requirements to allow the free circulation of the ichthyofauna with reference to the concession under examination. The protection of the ichthyofauna cannot disregard the correct application of the Reserved Flow referred to in Chapter 2.
- **Concession Grant Criteria:** this step (that will be described over) is the final step when the authority give the permission to the water use**.**

[23] Resolution of the State-Region Conference of 24.7.2003 (published in the ordinary supplement no. 144 of the Official Gazette no. 205 of 4.9.2003) “Approval of the V update of the official list of protected natural areas, under the combined provisions of art. 3, paragraph 4 letter c, of law no. 394 of 6th December 1991, and art. 7, paragraph 1, of Legislative Decree no. 281 of 28th August 1997;

[24] Legislative Decree no. 42 of 22nd January 2004, Code of the Cultural and Landscape Heritage, under art. 10 of law no. 137 of 6th July 2002;

[25] R.D. no. 523 of 25th July 1904, Consolidation Act of the provisions of the law on hydraulic works of different types.

3.1.3.2.2 Lombardia

The regional rule had transposed the national low on the administrative procedure providing precise timing for the various steps: **the regional rule fixes in 180 days the conclusion of the procedure (240 days if EIA is needed).**

Publication of the application
Starting the procedure under the rules on administrative procedures (today Law 241/90 as amended and supplemented), Province's offices must examine the application within 60 days of receipt**.**
Publication of the application on the Official Gazette of Regione Lombardia (BURL). The notice indicates the term to submit technically incompatible applications **(30 days**), and to submit remarks and objections (**60 days**). Unlike the Consolidation Act, the regional regulations rule that the competing applications submitted after such terms are not rejected but kept on hold while waiting for the assessment of the applications under examination.
Posting on the municipal notice board of the Provinces and Municipalities concerned by intake works. It is the same notice published on the Official Gazette; it is posted **within 15 days from its publication and it is posted for the following 15 days**.

Inspecting places and collecting opinions
Unlike the national procedure, in Lombardy the regulations do not oblige to carry out the examination site inspection, but leave discretionary power to the examining office. If such site inspection is carried out, the applicants and the owners of the lands where the diversion stands are invited to participate, along with the bodies involved in the collection of opinions. The inspection and the conference of the concerned bodies, referred to below, may take place at the same time.

Collecting opinions Art. 12 of the Regulations identifies the Bodies that must be involved in the procedure. They receive a copy of the project in order to be able to express their opinion as regards the matter they are in charge of:

- compatibility with water and hydrologic balance (Basin Authority);
- compatibility with tools of territorial and city planning (Municipality);
- compatibility with military easements (Military Command);
- compatibility with interprovincial diversions (Neighbouring Provinces)
- compatibility with regard to the regulations on the construction and the surveillance of storage dams and storage basins (Regione Lombardia under regional law no. 8[26] of 23rd March 1998);
- compatibility with PTC (Territorial Coordination Plan) of the Park or natural area (Park*)*
- hydraulic compatibility (Po River Interregional Authority, Land Reclamation Consortia, Regione Lombardia, Municipality according to the regional regulations on hydraulic policing[27]);

The collection of opinions can be carried out through the conference of the concerned bodies summoned under law 241/90. In this way it is possible to collect, at the same time, the opinions of all concerned Bodies that participate in the conference with a specially appointed representative who can express the opinion of the body he/she belongs to. The opinion of Bodies who do not participate in the conference shall be considered as positive. The same conference is summoned also when the diversion is subject to the Environmental Impact Assessment. In this case, procedures are dealt with during a unified conference as regards the presentation of the Environmental Impact Study and the acquisition of opinions.

Concession Grant Criteria: this step (that will be described over) is the final step when the authority give the permission to the water use**.**

3.1.3.3 Costs

3.1.3.3.1 National

- **Extra-fee for Coastal Bodies:** it is due for plants with average rated capacity over 220 kW; it shall be paid to the Municipalities and the Provinces where "the territory overlooks a stretch of diverted

[26] Regional Law no. 8 of 23rd March 1998: "Rules on the construction and surveillance of storage dams and storage basins of regional competence
[27] Delegation of competences on hydraulic policing in Lombardy:

waterway from the end of the intake backflow up to the tailrace. The plant operator must pay an amount fixed by a decree of the director of the Italian Public Property Agency (Agenzia del Demanio) and updated every 3 years;

- **Extra-Fee for Mountain Catchment Basins (BIM):** it is due for plants with average rated capacity over 220 kW. The concept of **Mountain Catchment Basin** was introduced by Law no. 959 of 27/12/1953 and refers to "the territory bounded by a mountain or hilly belt that acts as a divide, located above a given absolute height set for each basin". The Municipalities comprised by the catchment basin enjoy all the benefits, singularly or in association. The quantification is carried out by the Ministry of Environment and is updated every 3 years.
- **Environmental compensation in protected natural areas and for the protection of the ichthyofauna:** In case of works that concern park areas, the Park Coordination Territorial Plans often require the drawing up of agreements with the concession holders; these agreements may also comprise compensation works or indemnification if the damages caused by the execution of works cannot be restored through compensation. Similar agreements are also required by the Municipalities or by the Consortia that manage the diverted waterway despite the lack of legal rules that authorize such request. The Fishery Management Plans often provide for contributions that must be borne by the holders of the concession for surface public water diversion in connection with the protection of the ichthyofauna. Such levy may turn into a further annual fee, collected by the offices in charge of the ichthyofauna protection.

After, there are the ordinary expenses from the administrative produres:

Examination expenses: it is a cost that of the applicant;

Hydrographic contribution: provided for by the Consolidation Act, it is 1/40th of the state fee. As it is a contribution, it is both a duty and a tax. The contribution is *compulsory*, like duties, and due for a *specific service*, like taxes. It is due from all those submitting a new application or a renewal for public water concession. Now it also falls within the competence of the Regions which may set a different rate.

Publication expenses: of the application on the Official Gazette and on the Journal of Legal Notices.

State fee: Concession holders shall, therefore, pay the relevant annual state fee, which, for hydroelectric use, is quantified according to the average annual rated capacity granted.

Caution money: the concession holder must prove that he/she paid it when signing the rules; it is a guarantee for the obligations that the grantee has assumed towards the Administration for the expenses that may occur in connection to the concession that has been granted, such as, for example, in case of executions ex officio.

Registration expenses: the rules oblige the grantee to pay registration expenses to the Italian Tax Agency (Agenzia delle Entrate). The amount is equal to 5‰ of the fee due for the whole concession term calculated in the grant year. This figure must be added with the fixed amounts of the Italian Tax Agency and the stamps necessary to prepare three copies of the documentation required for registration.

Testing charges: always borne by the applicant, these charges are necessary to test the diversion and its plant.

3.1.3.3.2 Lombardia

Also for the regional procedure you must refer to these national fees about: **extra-fee for Coastal Bodies, extra-fee for Mountain Catchment Basins (BIM) and environmental compensation in protected natural areas and for the protection of the ichthyofauna.**

The ordinary expenses from the administrative procedures:

State fee: Concession holders shall, therefore, pay the relevant annual state fee, which, for hydroelectric use, is quantified according to the average annual rated capacity granted (for 2009 year is 14,25 euro/kW, minimum 125,37 euros);

Examination expenses: Every Province has identified, with individual provision, the expenses of the technical examination for large diversions (only technical examination) and for small diversion applications (technical examination and concession grant) – for the Province of Cremona is 840,00 euros.

Hydrographic contribution: Art. 10 paragraph 3 of regional regulations 2/2006: it is 1/20th of the State fee, minimum 150,00 euros;

Caution money: Art. 19 paragraph 4 letter a) rules that caution money shall be equal to a year's payment of the fee and anyway not below 250,00 euros. Caution money remains locked up for the whole concession term;

Surety Policy: for hydroelectric diversions with average rated capacity above 30 KW, it is between 5% up

to 20% of the execution cost of the plant;
Registration of the rules: please refer to what has been said for national rules;
Publication expenses: of the application notice and of the concession ruling on the Official Gazette of Regione Lombardia – at the moment it is 63,76 euros for each publication);
Testing charges: they are always borne by the applicant; testing is required for hydroelectric diversions with rated capacity above 200 KW.

3.1.3.4 Evaluation criteria

3.1.3.4.1 Concession Grant Criteria

These criteria are included in the Consolidation Act amended by Legislative Decree 152/06 which focuses on resource conservation, water balance, environmental protection and **they are useable as for National procedure as for regional procedure for Lombardia.** The implementation of such principles often refers to subsequent administrative provisions that the relevant Ministries o Regions issue, according to their competence, but, at present, they have not been implemented yet, thus causing a slowdown of the adjustment to the European directives. The fundamental elements of concession grant are the creation of the water balance and the water economy analysis, but these can only be considered as essential points of reference for the review of concessions in relation with the compatibility among the multiple uses of waters. The more extensive review considers the compatibility of basin uses: water use cannot disregard an analysis of the water body conditions, which is not only a qualitative problem but also “environmental”.

The criteria are as follows:

- To check that the diversion to grant does not jeopardize the maintenance or achievement of quality objectives set for the waterway proposed for diversion;
- To check that the reserved flow and the water balance are maintained;
- To check that to use purified sewage or rainwater is not economically and technically sustainable;
- Focus on principles such as conservation, reuse and recycle of water resources (e.g. to return water used for hydroelectric purposes so that it can still be used in agriculture for irrigation) identifying, when possible, the qualitative characteristics of returned waters within the concession rules.

The regional rule defines also these criteria:

- Principle of a more rational use of available water resources and respecting the qualitative and quantitative characteristics of waterways and aquifers.
- To check the availability of water according to the current planning (Water Use and Protection Plan);
- To guarantee the achievement or maintenance of the objectives of environmental quality provided for by the planning (Water Use and Protection Plan);
- Guarantee of the Reserved Flow release.

3.1.3.4.2 Criteria for evaluating competing applications

3.1.3.4.2.1 National

Granting concession for state properties that can be exploited from the economic point of view shall always be preceded by regular competition, even though the law does not expressly provide for it. Competing applications are technically incompatible applications which mutually interfere due to overlapping or interception on naturally flowing waterways.

The Consolidation Act, with the amendments made by the new environmental code (Legislative Decree 152/2006), identifies the main criteria to consider when evaluating competing applications: the competent administration shall choose to grant concession to one application and shall reject one or more competing applications within the time set by the rules. The most important criteria for the chosen are:

- The application that, on its own or in connection with other granted or requested uses, represents the most rational use of water in relation to the following criteria will be chosen:
  - Qualified resources are used for drinking water;
  - Real possibility to better exploit the sources with relation to use;
  - Qualitative and quantitative characteristics of the water body subject to collection;
  - Quantity and quality of returned water compared to withdrawn water.
- The application that, for the same type of use, guarantees that more water will be returned in relation to the quality objectives of water bodies (identified by Water Protection Plans) will be chosen.

- The application that complies and is equipped with an environmental management system, recognized under the UNI EN ISO 14001 rule or registered under the EMAS regulation, will be chosen.
- If the applications share the over-mentioned conditions, the application that offers higher technical, financial and economic guarantees of immediate execution and use will be chosen.
- If conditions are absolutely equal, the first application submitted in chronological order will be chosen.

In this general framework adopted in order to make a choice, the national rule, nevertheless, provides for special cases, such as making two competing applications compatible, or choosing applications that have been submitted at a later date but that the examining office deems more relevant for the public interest.

3.1.3.4.2.2 Lombardia

The criteria identified by the Consolidation Act in art. 9 are still valid according to the principle of a more rational use of water resources. Regional regulations further state that, under equal conditions, the application that comprises a certified environmental management system and that maintains it for the whole term of concession is chosen, otherwise the concession may be revoked.

3.1.3.4.3 Conclusion of the procedure

All above criteria must be used for drawing up the examination report, which is produced by the offices and that sums up all the steps that have taken to the grant or rejection of the application. The examination report also explains the reasons that led the offices to choose one project among several competing applications.

3.1.3.4.3.1 National

Drawing up of the concession rules containing the obligations and the duties connected to the management of the granted concession: the contents of the rules are still those expressed by the royal decree no. 1285 of 1920 which, effectively, has remained in force as enacting regulation of the Consolidation Act; they are:

a) **the type of diversion**, **the quantity of water** to divert in case of constant volume and the maximum quantities that cannot be exceeded and **the average quantities** on which fees are established, in case of variable volumes;
b) **the drop of water** surface from intake to tailrace, heads according to which fees are established, the modes and conditions of water collection, regulation, diversion, main, tailrace and drainage;
c) **if temporary dams** or cross-dykes are to be built, the special conditions required by the nature of the work and of the waterway, and in particular the periods of time during which such works can be kept or must be removed and the periods of time during which they can be restored by means of a simple authorization issued by the Civil Engineers;
d) **the amount of the annual fees** and the starting date for the payment of such fees to the State, the amount of the extra-fee for coastal bodies and alpine communities;
e) **the term of concession**, he terms by which the grantee shall, in case of small diversions, the obligation to remove the works to restore the river-bed, banks and embankments when, at the termination of the concession, for any reason, the State does not intend to make use of its right of keeping them without consideration;
f) **in case it is deemed advisable**, the characteristics of the electric current to generate;
g) **the caution money to deposit**, as well as the amount necessary for surveillance and testing charges of the relevant works. Both the caution money and the total expenditure must be deposited before the rules are signed;
h) **the choice of domicile in the municipality** where the diversion mouth is located or the stretch of public water where the grantee wants to locate the factory, that is in one of the municipalities where he/she will use the water to divert;
i) in case it is deemed advisable, the rules relating to the sale tariffs of diverted water or of the energy generated with it.

The examination report, together with the proposed concession rules, is sent to the financial body in charge of the collection of state fees; Law 112/98 identified the Regions and the hydraulic authority as such body. These two bodies finally make sure that the examination has been carried out correctly, both from the financial point of view, with the imposition of the fee, and from the technical point of view as regards the hydraulic compatibility of the proposed work. If the Region and the hydraulic authority express a positive opinion, the competent Administration that issued the conditions of assignment must register

them at the Agenzia delle Entrate (Italian Tax Agency) within 20 days from signing. The competent administration, after registering the rules, issues the **concession decree,** that approves the rules agreed by the grantee, and puts it into force. The examination for public water concession granting ends with the **test** of the works and with the simultaneous authorization of use.

3.1.3.4.3.2 Lombardia

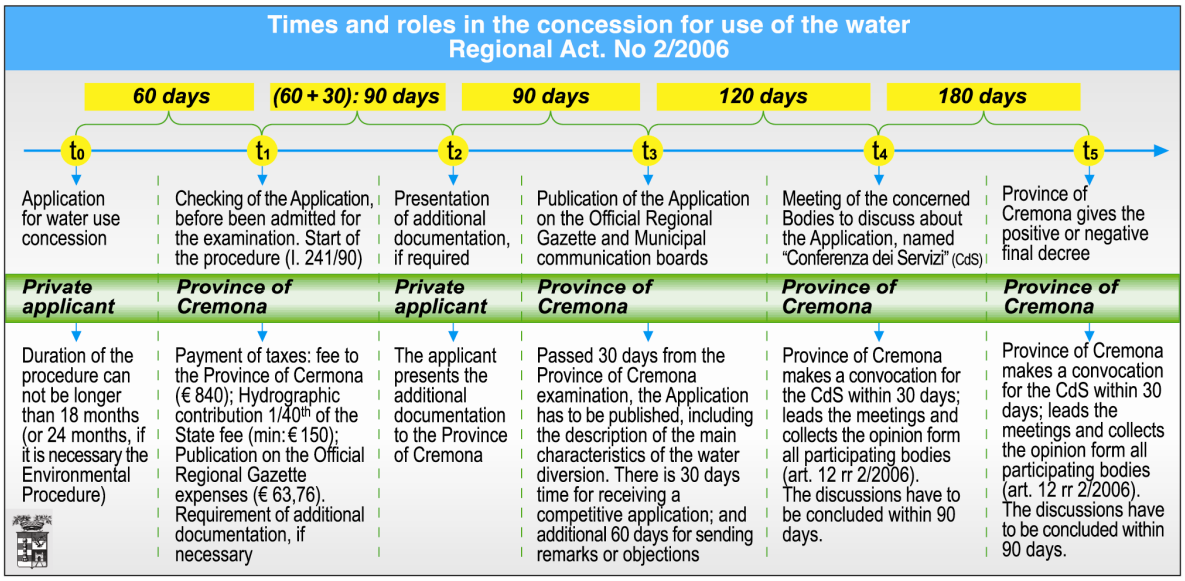
The Art. 13 of regional regulations 2/2006 lists the minimum contents of the examination report:

- Water quantity that may be granted, with reference to local conditions, pre-existing uses (protection of third parties' rights) and type of diversion;
- Works to carry out in relation to environmental and hydraulic interests and third parties' interests;
- Precautions and limitations to impose on the grantee in the public interest;
- Actions and participation of third parties during the examination, possible counter-deductions of the applicant regarding all local characteristics that may be relevant to concession granting;
- Purposes the diversion and its use are intended for Fees and extra-fees to claim with the relevant calculations.

In particular, besides what has been already said as regards national rules, the rules will explicitly comprise what is provided for by regional regulations 2/2006 as regards:

- Release of the reserved flow according to the rules in force upon concession grant, also including the examining office's possibility to carry out subsequent reviews (every 6 years) with possible modification of the flow granted and adjustment of the relevant fee;
- Waters returned after use (including hydroelectric use) shall have chemical-physical characteristics that do not cause modifications to the parameters of the receiving water body, modifications that may jeopardize the achievement of the quality objectives provided for by the regional planning
- Identification of a specific protocol for the management of water returns for hydroelectric uses in run-of-river plants in order to avoid sudden variations of the flow of the receiving water body and localized erosion of the bottom and of the banks of the water body concerned
- Identification of a specific protocol for the management of water returns for hydroelectric plant with storage basin; such protocol shall provide, where possible, for the regulation of returned flows focusing on water environment conditions and on downstream uses.

3.1.3.5 Flowchart of the procedure



3.1.4 Authorization to build the plant and procedure to connect it to the electric grid

3.1.4.1 Required application technical documents to be submitted

After obtaining the over-mentioned water diversion concession for hydroelectric purposes, the concession holder shall submit, to the Provincial Administration of Cremona (please refer to Chapter 2 for delegations), a written application for the authorization to build the hydroelectric power plant under decree no. 387/2003. Documents which have to be contained in the application are not described in the decree but are decided from the Province of Cremona on the basis of the passed experiences:

a) the Legal person applying and its details;
b) the final project of the small hydro power plant that encloses the working plan of the works, all the requirements arisen during the prior concession examination to water diversion and the technical characteristics of the infrastructures necessary to operate the power plant, the type of the turbines and the electrical parameters about power and energy production;
c) a report that shall demonstrate the proposed works are innocuous, as regards public water regime and third parties' rights, and shall prove that diverted waters will not damage other existing works or assets in general, neither due to overflows nor due to filtration. The report shall also include the description of the proposed works and environmental impacts of the area;
d) a chorography that shall be adequately extensive to allow a reliable positioning of the diversion with reference to the well-known neighbouring places; it shall include the waterway intended for diversion, its surroundings, the drainage basin or basins to use for water collection, the pieces of land to cross with the designed works and their location (scale 1:10.000 and 1:2000);
e) the power electric pipelines and the substations layout (scale 1:10.000 and 1:2000) with electrical parameters about power and energy production;
f) a tax receipt related to the payment of 1.000,00 euro to the Province of Cremona.

Electric pipeline are functional works and directly connected to the power station and, thus, fall under the authorization procedure of decree no. 387/2003, but **the problem is private applicants do not know this possibility; in fact, they always think electric pipelines applications could be presented only from the Local Distribution Network Operator**; more, private applicant prefer that the electric pipeline's project shall be presented from the Local Distribution Network Operator.

3.1.4.2 Timing of procedure

Under Decree no. 387/2003, **authorization time shall not exceed 180 days**, time for additional documents excluded, so the real time to give the authorization to build the power plant **is on average 1 year**.

3.1.4.3 Costs

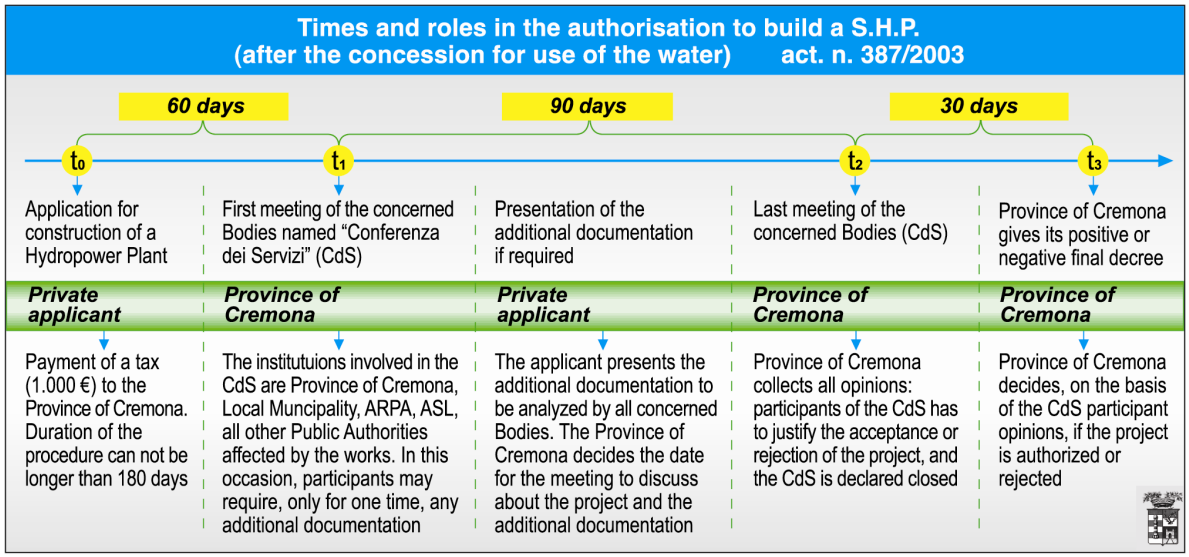
Cost for the authorization is 1.000,00 euro and it is a tax to pay to the Province of Cremona. Eventually compensation costs are already decided in the procedure to get the diversion permission; otherwise new compensation cost can be requested from a public body during the conference but they have to be well justified.

3.1.4.4 Evaluation criteria

Unfortunately, there aren't clear evaluation criteria fixed in the decree n. 387/2003, because we still waiting a national or regional guide to evaluate the different renewable source's power plants. The only tools fixed from the decree is the Conference of Concerned Bodies (named "Conferenza dei Servizi") that is a way to ask to all competent bodies what they think of the project and which are their questions, in a clear and fixed limit of the time. The meetings of the conference of the concerned Bodies is attended by the Mayor of the municipal territory hosting the power station, the same Bodies that took part in the procedure for diversion concession, the Regional Agency of Environmental Protection (A.R.P.A.) and the Local Health Authority (A.S.L.). A.R.P.A. and A.S.L. are summoned as bodies of technical consultation in charge of environmental protection, safety in the workplace and of assessing the fitness for use of buildings. Other entities are also summoned: the public entities that operate or hold railways, waterways, pipelines, roads, natural areas, parks, etc. that physically interfere with the electric line, as well as the holders of public properties crossed by the line. **The authorization depend from the opinions of the Bodies that attend**

the meetings of the conference, opinions that have to be best objective and related to the project in examination. Under Decree no. 387/2003, the works related to plant construction, as well as the works connected and the infrastructures necessary for the construction and operation of said plants, shall be considered of public usefulness; they cannot be deferred and are urgent; this allows to start the procedures for land expropriation. The authorization shall comprise the obligation to restore the prior conditions of the area; this is to be carried out by the managing entity following plant dismantling.

3.1.4.5 Flowchart of the procedure



3.1.5 The authorization to build the electric line of SHP

3.1.5.1 Required application technical documents to be submitted

The power lines and the substations projects, in general, if are presented from Local Distribution Network Operator, fall under the authorization procedure of decree no. 327/2001 – article 52-quarter and also this procedure uses the Conference of Concerned Bodies ("Conferenza dei Servizi"), like the procedure as decree no. 387/2003. Documents which have to be contained in the application are not described in the decree no. 327/2001, but are decided from the Province of Cremona on the basis of the passed experiences:

a) the Legal person applying and its details;
b) the final project of the electric pipeline that encloses the working plan of the works, the technical characteristics of the infrastructures necessary to connect the power plant to the electric grid, the type of the wires, all electrical parameter about power and energy transport, environmental impacts on the area;
c) a chorography that shall be adequately extensive that contains the layout of the electric pipeline with reference to the well-known neighbouring places, also, it shall include railways, waterways, pipelines, roads, natural areas, parks, etc. all things that physically interfere with the electric line, as well as the holders of public properties crossed by the pipeline (scale 1:10.000 and 1:2000);
d) a tax receipt related to the payment of 500,00 euro to the Province of Cremona;
e) ever if the voltage of the pipeline is > 15.000 volt or when the pipeline is very near to some building, we ask a report that shall demonstrate the proposed works are innocuous for the human health about the electromagnetic fields.

3.1.5.2 Timing of procedure

Under Decree no. 327/2001, **authorization time shall not exceed 180 days**, time for additional documents excluded. The limit of the **time is always respected** about electric power line with voltage <= 15.000 volt (that are in majority), over 15.000 volt, the real time to give the authorization to build the electric pipeline is on average 1 year.

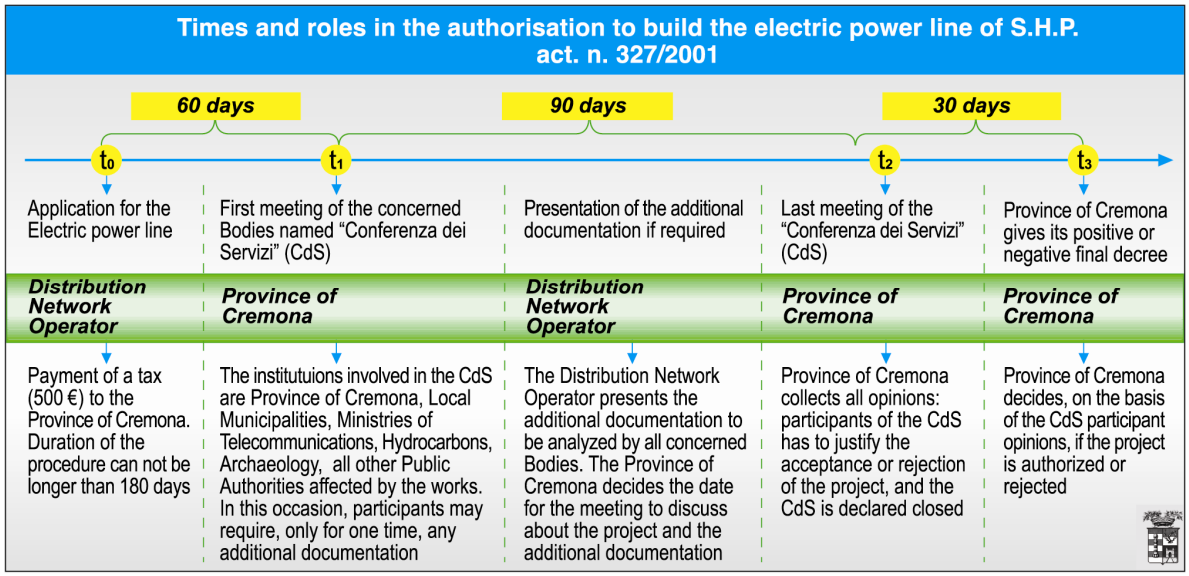
3.1.5.3 Costs

Cost for the authorization is 500,00 euro and it is a tax to pay to the Province of Cremona. Eventually compensation costs are not fixed from the decree no. 327/2001, but it is possible a public body, during the meetings of the conference of concerned bodies, ask for it with a clear justification.

3.1.5.4 Evaluation criteria

Unfortunately, there aren't clear evaluation criteria fixed in the decree n. 327/2001, because we still waiting a national or regional guide to evaluate the impact from different electric pipelines. The only tools that Province of Cremona apply ever in its evaluations is fixed from the article no. 121 of old Royal Decree no. 1775/1933 **that requires electric pipeline layout has to preserve the lands crossed in the best possible way**. Also in this case, procedure of evaluation starts after the application is presented, in fact, on average, within 60 days from application submission, provincial offices, upon examination of the submitted documentation, shall summon the first meeting of the conference of the concerned Bodies by means of written notices sent to all the relevant bodies, together with a copy of the technical documentation. The following competent bodies are summoned: the Local Municipality, the Ministry of Communications, the Ministry of Economic Development (National Agency for Hydrocarbons and Geothermal Energy) and the Superintendency of Archaeological Heritage and the Local Distribution Network Operator. The Ministry of Communications is summoned under art. 111 of the Consolidation Act no. 1775/1933. The Ministry of Economic Development (National Agency for Hydrocarbons and Geothermal Energy) is summoned under art. 3 of Law no. 9/1991, as it must express its opinion on the authorization to interfere with areas directly granted for hydrocarbons mining. The Superintendency of Archaeological Heritage is summoned under the Legislative Decree 42/2004, as it has been deputed to check if the plants to build are actually consistent with the several archaeological-risk areas of the Italian territory mainly as regards underground lines, due to the widespread presence of finds of historical interest. Other entities are also summoned: the public entities that operate or hold railways, waterways, pipelines, roads, natural areas, parks, etc. that physically interfere with the electric line, as well as the holders of public properties crossed by the line. Moreover, a copy of the technical documentation is also sent to all private owners concerned by the power station or its infrastructures, so that they can express their comments within 15 days from documentation receipt. **Also in this case, the authorization depend from the opinions of the Bodies that attend the meetings of the conference, opinions that have to be best objective and related to the project in examination**. Under Decree no. 327/2001, the works related to plant construction, as well as the works connected and the infrastructures necessary for the construction and operation of said plants, shall be considered of public usefulness; they cannot be deferred and are urgent; this allows to start the procedures for land expropriation.

3.1.5.5 Flowchart of the procedure



3.2 CROATIA

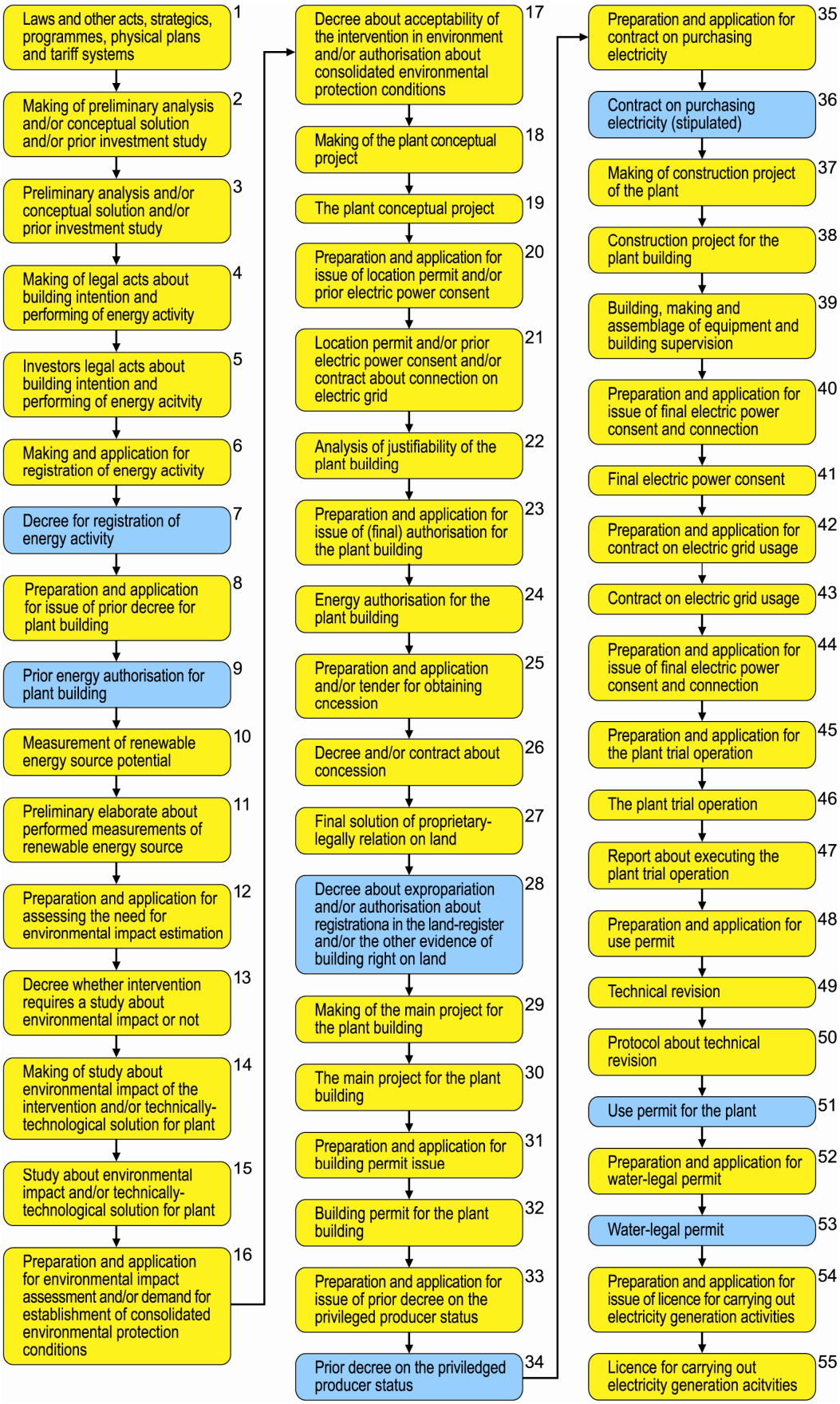
The process of preparing and constructing the facilities using renewable energy sources and cogeneration in the Republic of Croatia is a complex organizational process (hereinafter: Process), determined by social, economic, legal, environmental, technical-technological and other factors.

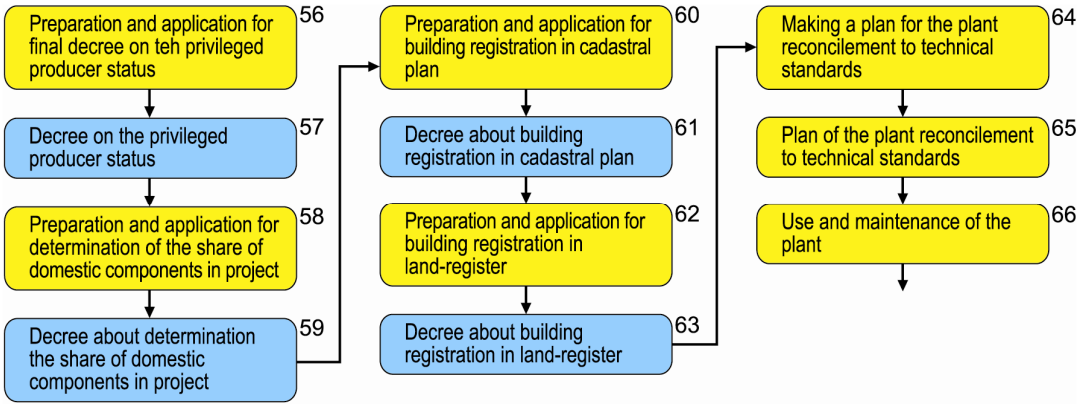
The whole Process can be divided in various phases, each phase comprising the basic legal acts resulting from activities carried out in a particular phase. These phases can be marked as:

1. Preparation phase – assembling and studying of input information and preparing of preliminary documents for facility construction;
2. Procuring decision on registration of energy activity;
3. Procuring preliminary energy approval for construction of energy facility;
4. Procuring decision on environmental impact assessment of intervention and/or decision on integral environmental protection conditions;
5. Procuring location permit and/or preliminary energy consent and/or concluding contract on connecting to energy network;
6. Procuring energy approval for facility construction;
7. Procuring decision and/or concluding concession contract;
8. Procuring decision on expropriation and/or decision on entry in the land register of the real estate
9. Procuring building permit;
10. Procuring preliminary decision on acquiring the status of eligible electricity producer;
11. Concluding contract on purchase of electricity (conditioned);
12. Procuring energy consent;
13. Concluding contract on the use of the network;
14. Procuring the use permit;
15. Procuring water permit;
16. Procuring the license for carrying out energy activity;
17. Procuring decision on acquiring the status of eligible electricity producer;
18. Procuring decision on determining of domestic component in the project;
19. Procuring decision on entry of the building in the cadastral operate;
20. Procuring decision on entry into land register.

As it is shown in the next flow chart, each phase consists of several activities resulting in the fact that 19 basic legislative acts (red fields) request a total of ca. 48 activities (yellow fields).

The flow chart also shows that Environmental impact assessment, Obtaining the concession for use of the water, Authorization to build the plant and Authorization to build the electric line of SHP – procedure to connect it to the electric grid are 4 from 19 basic legislative acts and they represent a smaller part of activities of the process of preparing and building the plants which use renewable energy sources and cogeneration in Croatia.


1 Laws and other acts, strategics, programmes, physical plans and tariff systems
2 Making of preliminary analysis and/or conceptual solution and/or prior investment study
3 Preliminary analysis and/or conceptual solution and/or prior investment study
4 Making of legal acts about building intention and performing of energy activity
5 Investors legal acts about building intention and performing of energy acitvity
6 Making and application for registration of energy activity
7 Decree for registration of energy activity
8 Preparation and application for issue of prior decree for plant building
9 Prior energy authorisation for plant building
10 Measurement of renewable energy source potential
11 Preliminary elaborate about performed measurements of renewable energy source
12 Preparation and application for assessing the need for environmental impact estimation
13 Decree whether intervention requires a study about environmental impact or not
14 Making of study about environmental impact of the intervention and/or technically-technological solution for plant
15 Study about environmental impact and/or technically-technological solution for plant
16 Preparation and application for environmental impact assessment and/or demand for establishment of consolidated environmental protection conditions
17 Decree about acceptability of the intervention in environment and/or authorisation about consolidated environmental protection conditions
18 Making of the plant conceptual project
19 The plant conceptual project
20 Preparation and application for issue of location permit and/or prior electric power consent
21 Location permit and/or prior electric power consent and/or contract about connection on electric grid
22 Analysis of justifiability of the plant building
23 Preparation and application for issue of (final) authorisation for the plant building
24 Energy authorisation for the plant building
25 Preparation and application and/or tender for obtaining cncession
26 Decree and/or contract about concession
27 Final solution of proprietary-legally relation on land
28 Decree about exropariation and/or authorisation about registrationa in the land-register and/or the other evidence of building right on land
29 Making of the main project for the plant building
30 The main project for the plant building
31 Preparation and application for building permit issue
32 Building permit for the plant building
33 Preparation and application for issue of prior decree on the privileged producer status
34 Prior decree on the priviledged producer status
35 Preparation and application for contract on purchasing electricity
36 Contract on purchasing electricity (stipulated)
37 Making of construction project of the plant
38 Construction project for the plant building
39 Building, making and assemblage of equipment and building supervision
40 Preparation and application for issue of final electric power consent and connection
41 Final electric power consent
42 Preparation and application for contract on electric grid usage
43 Contract on electric grid usage
44 Preparation and application for issue of final electric power consent and connection
45 Preparation and application for the plant trial operation
46 The plant trial operation
47 Report about executing the plant trial operation
48 Preparation and application for use permit
49 Technical revision
50 Protocol about technical revision
51 Use permit for the plant
52 Preparation and application for water-legal permit
53 Water-legal permit
54 Preparation and application for issue of licence for carrying out electricity generation activities
55 Licence for carrying out electricity generation acitvities



3.2.1 Legal definition of small hydroelectric plants

In Croatia the maximum size for small hydropower is an installed capacity of ≤ 10 MW.

3.2.2 Environmental impact assessment (EIA)

The environmental impact assessment is carried out in line with the provisions of the Environmental Protection Act (hereinafter EPA) within the preparation of the planned intervention, prior to issuing of location permit for implementation of intervention or other approval for intervention for which the issuing of a location permit is not required. If the intervention, for which the environmental impact assessment is carried out, refers to the plant intended for activity which may result in emissions polluting the ground, air, water and the sea, pursuant to Article 82, Paragraph 2 of the EPA and Regulation referred to in Article 71, Paragraph 2 of the EPA, the integral environmental protection conditions shall be defined; the decision on the requirement for assessment of environmental impact of intervention and the request for defining the integral environmental protection conditions shall be rendered in a single procedure. **The Regulation on Defining the Integral Environmental Protection Conditions** (OG 114/08; hereinafter: **RDIEPC**) sets forth the activities which may result in emissions, as well as the procedure for defining the integral environmental protection conditions.

The Regulation on Environmental Impact Assessment (OG 64/08; hereinafter: **REIA**) sets forth the interventions for which the environmental impact assessment is carried out; the interventions which are subject to the estimate of the need for the environmental impact assessment; methods of implementation of environmental impact assessment; methods and obligatory contents of the opinion to be provided by the Committee; aspects of participation of the assignee; methods of implementation of the procedure of environmental impact assessment, methods of the procedure of providing instruction on contents of the study upon request of the project developer; methods of public information and participation in the procedures; criteria and methods of particular investigations, on the basis of which the decision is rendered on the need of environmental impact assessment and interventions which fall within the scope of responsibility of the Ministry or the competent administrative body in the county, i.e. the City of Zagreb.

The environmental impact assessment is carried out for interventions planned by the corresponding physical planning documents and defined in the list of interventions, which are integral part of the Regulation on Environmental Impact Assessment (REIA). The interventions for which the environmental impact assessment is obligatory are defined in Annex I, and the interventions for which the estimation of the need for environmental impact assessment is carried out are listed in Annexes II and III of the REIA. The power plants and power facilities **exceeding 30 MW_{el}**, as well as the extraction of mineral raw materials, i.e. mineral and geothermal water whose accumulated heat can be used for energy purposes, are considered as interventions for which the environmental impact assessment is obligatory; the competent body for assessment is the Ministry of Environmental Protection, Physical Planning and Construction (hereinafter MEPPPC). The power plants for electricity, vapour and hot water production from

renewable energy sources (water, Sun, wind, biomass biogas, geothermal energy, waves, etc.) **exceeding 1 MW_{el}** are considered as interventions for which the evaluation of the need for environmental impact assessment should be carried out. The competent body for the assessment is the MEPPPC.

The following obligatory contents of the study are listed in Annex IV of the REIA:

- description of intervention;
- variant of intervention solution;
- data and description of the intervention site and environmental data;
- description of the environmental impact during the construction and/or implementation of intervention;
- proposal of environmental protection measures and environment monitoring programmes, during the construction and/or implementation of intervention;
- study summary;
- indication of any difficulties;
- list of literature;
- list of regulations;
- other data and information.

The environmental impact assessment is the assessment of possible significant environmental impacts of the intervention defined by the Environmental Protection Act (EPA) and the REIA. In the environmental impact assessment the impact of the intervention on the environment is recognized, described and assessed in an appropriate manner, defining the possible direct and indirect impact of the intervention on the: ground, water, sea, air, forest, climate, people, plants and animals, landscape, tangible assets, cultural heritage, taking in account their interactions (Article 69, Paragraph 2 of the EPA).

If the environmental impact assessment comprises the assessment of environmental acceptability of intervention, in line with the special environmental protection regulation no separate procedure shall be carried out in compliance with the **Nature Protection Act** (hereinafter: **NPA**). In such case in the procedure of the environmental impact assessment of the intervention the compensation conditions for endangering protected plants and animal species and habitats, protected by a special regulation, shall be defined in line with the opinion of the body competent for environment protection (Article 69, Paragraph 3 of the EPA).

The procedure for performing of environmental impact assessment and the procedure for performing an evaluation of the need for environmental impact assessment shall be carried out upon written request of the intervention developer. The request for environmental impact assessment shall comprise the environmental impact study and other stipulated document in line with the REIA (Article 73 of EPA)

The request for evaluation of environmental impact assessment shall be submitted in the way provided by the REIA.

The environmental impact study is a professional background document comprising all the required data, documents, argumentations and descriptions in textual and graphical form, proposal of acceptability assessment of an intervention and the environment protection measures with respect to the intervention and, if appropriate, the environment monitoring programme. The environmental impact study shall be prepared on the base of the recent, reliable and available data. The intervention developer shall be responsible for preparing the environmental impact study and all the costs, referring to the procedure of environmental impact assessment shall be borne by the intervention developer. The assignee, preparing the environmental impact study shall be responsible for authenticity, accuracy and professional foundation, as well as for the compliance with the required regulations with respect to the drafting and contents of the study (Article 75 of the EPA).

The intervention developer may, prior to preparing the environmental impact study, submit a written request to the Ministry of Environmental Protection, Physical Planning and Construction (MEPPPC), i.e. competent administrative body in the county or in the City of Zagreb, requesting **instruction on the contents of the** study with respect to the planned intervention, which is not an administrative act (Article 75 of EPA). The request for providing instruction on contents of the environmental impact study shall be submitted in a manner provided by the REIA.

In the procedure of **environmental impact assessment,** including the **defining of integral environmental protection conditions,** in cases when it is carried out in an **integral procedure,** the opinion of the professional counseling committee (hereinafter: Committee) shall be requested, to be appointed for each particular intervention by the Minister of the MEPPPC, i.e. the head of the competent administrative body in the county or in the City of Zagreb. In the integral procedure referred to in Article 70, Paragraph 1 of the EPA the Committee assesses the possible environmental impact of the technology and technical equipment proposed for the plant and proposes to the MEPPPC the integral environmental protection measures with respect to the plant (Article 77, Paragraphs 1-2 of the EPA).

The procedure of environmental impact assessment shall be carried out not later than four months from the receipt of the proper request of the intervention developer. Exceptionally, the term for performance of the environmental impact assessment procedure can be extended for two months, if it was assessed as necessary for additional activities during the procedure. **The environmental impact assessment procedure** shall be performed not later than three months from the receipt of a proper request by intervention developer. The instruction on contents of the environmental impact study shall be issued within the term not longer than three months from the receipt of a proper request for issuing instruction. Exceptionally, when the environmental impact assessment procedure is performed as integral procedure within the meaning of Article 70, Paragraph 1 of the EPA, the procedure shall be accomplished within the term of six months from the receipt of the latter proper request in this procedure in line with the EPA (Article 78 of the EPA).

When deciding on the request for environmental impact assessment the **decision on environmental feasibility study of the planned intervention** shall be issued, if the decision is not rendered in an integral procedure within the meaning of Article 70, Paragraph 1 of the EPA. By decision on environmental acceptability of the intervention the environmental of acceptability of the planned intervention, with application of environment protection measures, shall be determined and whether the intervention comprises the required environmental protection measures pursuant to the act, other regulations, norms and measures contributing to reducing the environmental pollution, and, if appropriate, the environmental status monitoring programme shall be defined. If the conditions provided by the EPA are not complied with, the decision shall stipulate that the intervention is environmentally not acceptable. The decision on evaluation of the need for environmental impact assessment shall be provided by decision stipulating, whether the environmental impact assessment is required or not (Article 79, Paragraphs 1-2 of EPA).

The Decision on integral environmental protection conditions, deciding in integral procedure within the meaning of Article 70, Paragraph 1 of the EPA and the decision referred to in Paragraphs 1 and 2 of this Article may be issued to the intervention developer, i.e. the company which submitted proper request/requests, upon accomplishing the procedure in line with the provisions of the EPA and regulations adopted pursuant to EPA. Prior to rendering a decision on environmental acceptability and the decision on integral environmental protection conditions the outcomes of the environmental impact study for the said intervention shall be taken into account, as well as the opinions of the bodies and/or persons stipulated by special regulation; the comments, proposals and opinions of the public and of the stakeholders, together with the outcomes of any trans-border consultations if they are required in line with the EPA (Article 89 of EPA, Paragraphs 3-4).

The decision on environmental acceptability and the decision on integral environmental protection conditions shall expire if the intervention developer fails to submit the request for issuing the location permit, or other act in line with the special act not later than two years from the date of finality of the decision. The validity of the decision on environmental acceptability may, upon request of the intervention developer, be extended once for the period of further two years, provided the conditions pursuant to the EPA and other conditions pursuant to which the decision was issued, remain unchanged. The decision upon request for extension of the decision on environmental acceptability shall be rendered in a form of a decision.

For each amendment referring to the planned intervention with respect to the status of the facility, i.e. plant, defined by the decision on environmental acceptability, i.e. technical-technological decision as integral part of the decision on integral environmental protection conditions, the intervention developer and the company shall, prior to submitting the request for issuing the location permit or other act pursuant to the special act, procure a special decision on the evaluation of the need for environmental impact assessment with respect to the emerging changes, i.e. the decision on the evaluation of the need for defining new integral environmental protection conditions. (Article 80 of the EPA).

Before the commencement of plant construction and putting it in operation, as well as before any significant change in the operation or reconstruction of the plant planned for performing the activities which may result in emission polluting the ground, air, water and the sea, the company shall procure **the integral environmental protection conditions** in line with this Act and the REIA. The integral environmental protection conditions are defined with a aim of providing integral environmental protection by maximally preventing, reducing and eliminating the extent of pollution, particularly at the source and providing reasonable natural resources management through pollution monitoring, as well as introducing sustainable balance between the human interventions and socio-economic development on the one hand, and of the natural resources and nature's regeneration capacity on the other hand.

3.2.3 Obtaining the concession for use of the water

3.2.3.1 Required application technical documents to be submitted

The group of activities referring to procuring of the decision on granting the concession and/or concluding the contract on concession is considered as phase six of the Process.

The general concession regime is provided by the ***Concession Act*** (hereinafter: CA; OG 125/08). This Act sets forth the procedures of granting concession, concession expiry, and legal protection in procedures of granting and expiry of concession, as well as other concessions-related issues.

The concession can be granted for various areas and various activities and in particular for the following:

1. extraction of mineral raw materials;
2. use of waters and public water estate;
3. right to hunting on the state hunting ground and game breeding sites;
4. maritime domain;
5. agricultural land;
6. particular activities within the protected nature areas and for the use of other protected natural assets and speleological facilities;
7. games of fortune;
8. energy sector;
9. performance of regular liner services, coastal maritime and river transport;
10. ports;
11. public transport communications;
12. public transportation;
13. airports;
14. sports sector;
15. cultural facilities;
16. utility services;
17. railways sector;
18. economic utilization of cable railway;
19. waste management activity, and
20. tourism sector.

The conditions, procedure, methods and other issues significant for granting concessions over certain areas or activities referred to in Paragraph 1 of this Article shall be regulated by special act.

The granting of concession requires preparing of request and/or proposal/tender for granting concession, if the concession is subject to invitation for tenders. The procedure of granting concession differs depending on the scope of concession. The input documents for this group of activities are physical planning documents and location permit, feasibility study referring to the scope of concession, decision on initiating the procedure for granting concession with conditions for granting concession, i.e. bidding documents.

The CA shall be considered as a legal act with dual character, that is, having both a normative and a contractual character. The authorities shall rule upon the concession by normative act and the Concession Contract shall be an agreement between the Republic of Croatia or local self government units or statutory authorized legal persons as concessor and the concessionaire.

Pursuant to the ***Water Act*** (OG 53/90, 107/95 and 150/05; hereinafter: WA) by the concession the concessionaire shall acquire the right to use the waters and public water estate, i.e. the right to carry out economic and other activities on the waters and public estate (Article 142 of WA). The WA does not refer to mineral and geothermal waters, which can be used for extraction of mineral raw materials or for the use of accumulated heat for energy purposes to which the Mining Act applies (Revised text OG 190/03; hereinafter: MA).

Pursuant to WA the concession over the waters and public water estate shall be required for the following:

- use of water power for the purpose of electricity production;
- use of water power for plant operation (except for electricity production);
- water capture for the purpose of its use in the production;
- extraction of mineral and thermal waters;
- construction of permanent buildings and/or installation of facilities on public water estate etc. (Article 143).

The concession shall be granted by means of **invitation for tenders** for:

- for use of water power for electricity production;
- for extraction of mineral and thermal waters;
- for construction of permanent buildings and/or installation of facilities on public water estate, etc.

Concessions for other purposes shall be granted by means of tendering procedures or direct request, unless the body competent for deciding on concession decides that the invitation for tenders shall be required for granting the concession. By way of derogation from the rule on the invitation for tenders, the concession may be granted for the said purposes by means of direct request, if the only possible concessionaire is the owner or other legal holder of the real estate (Article 144 of WA).

The decision on granting the concession shall specify in particular: the scope of concession, anticipated scope of the use of water, i.e. water estate, concessionaires, purpose for which the concession is granted, duration of concession, fee or basis for determining the fee.

The **decision on granting concession** shall be rendered by:

1. the Croatian Parliament – for electricity production plants of 20 MW capacity and above;
2. the Government of the Republic of Croatia – for electricity production plants of capacity from 5 to 20 MW, for water capture for the purpose of public water supply, capacity exceeding 100 l/sec, for extraction of mineral and thermal water and capture of drinking, mineral and thermal water for the purpose of sales (in original or processed form, or in the form of other beverages) on the market in bottles and other packaging;
3. the ministry in charge of water management - for all other purposes referred to in Article 143, Paragraph 1 of WA,
4. body or person in charge of port management – for installation of floating or navigating facilities on waters for the purpose of carrying out of catering or other market activity in the port area (Article 145 of WA).

The decision on granting concession shall be rendered upon previously issued water conditions by the company “Hrvatske vode” (Croatian Waters) The **water conditions** shall be issued upon request of the body, which is pursuant to physical planning regulations, in charge of issuing the location permit (hereinafter water conditions for the purpose of location permit issuing), i.e. upon request of the party, irrespective of the location permit issuing procedure (Article 145 a) of WA)

Pursuant to **Regulation on Conditions and Procedure of Granting Water and Water Estate Concession** (OG 99/96 and 11/98), the concessionaire of the concession granted on the base of direct contracting shall previously perform all investigation works or commit to bear the costs of its performance. In case when the concession is granted by means of invitation for tenders or tendering procedure the costs of the previous investigation works, covered by the concessor, shall be borne the concessionaire in the amount and in the way agreed under the concession contract.

The conclusion on initiating the concession granting procedure, for which the decision of the Croatian Parliament or the Government of the Republic of Croatia is required, shall be issued by the Government of the Republic of Croatia upon a proposal of the Water Management Directorate. The decision on initiating the concession granting procedure, for which the decision of the Water Management Directorate is required, shall be rendered by the director of such a body. The decision on initiating the concession granting procedure, for which the decision of the county government is required, shall be rendered by such county government in technical cooperation with the water management office of the Croatian Waters (Article 18 of the Regulation).

If special technical knowledge is required for performing of particular tasks with respect to granting concession (investment assessment, purpose efficiency assessment, determining of the value of preliminary investigation works, determining of works required for eliminating of deteriorated living and working conditions of citizens and other possible adverse impacts referred to in Article 15 of the Regulation and similar) special expert groups may be established or such tasks may be assigned to professionally qualified persons by the Director of the Water Management Directorate in case of concessions within the scope of competence of the state level bodies, or by the county mayor for concessions within the scope of competence of the county government (Article 19 of the Regulation).

Unless the granting of concession on the base of invitation for tenders is provided by the Water Act or unless the competent body, in other cases, decides to carry out the invitation of tenders (Article 144, Paragraphs 1 and 2 of WA), it shall be determined by conclusion referred to in Article 17, Paragraph 1 of the Regulation whether the concession will be granted on the base of a tendering procedure or direct request, taking in account the anticipated number of interested concessionaires and the special purpose for which the concession is to be granted.

The concession shall, as a rule, be granted upon **direct request** of the interested person:

1. on account of new investments referring to modernization or increased scope of activities of the concessionaire to whom the concession has already been granted;
2. on account of investments of local self government units for the purpose of utility services or municipal infrastructure (water supply, waste water drainage and treatment, local traffic communications, parks etc.);
3. for use of waters and public water estate, being of direct importance for defence and public security purposes (Article 20 of the Regulation).

In case of concession expiry due to the expiry of the term for which it has been granted, except for the concession for sand and pebbles quarrying, the concessor may decide to grant the concession by direct contracting to the former concessionaire without a tendering procedure, under the condition that such concession provides for follow-up of the earmarked concession and is not against public interest (Article 21 of Regulation).

The tendering committee shall be established for performoffing the tasks referring to the tendering procedure in the body in charge of such procedure. Several tendering committees may be established if required, according to the purposes for which the concessions are granted (Article 23 of the Regulation).

The maximal validity of concession shall be the following:

1. for water capture for the purpose of water supply:
   a) for regional water supply systems, water supply systems of towns and other bigger settlements or groups of settlements - up to 60 years;
   b) for other water supply systems with devices for conditioning and measuring of water supplied - up to 30 years;
   c) for other smaller water supply systems and rural water supply systems without water conditioning devices - up to 10 years.
2. for capture and pumping of water for technological and similar purposes in industry and other activities (water as raw material, cooling, rinsing and similar purposes) - up to 60 years.
3. for extraction of mineral and thermal waters:
   a) for the purpose of health therapy and recreation (thermal baths and similar) - up to 60 years;
   b) for table mineral water - up to 40 years.
4. for water capture for the purpose of land improvement irrigation:
   a) for land improvement systems comprising the area of one or several cadastral municipalities with built accumulation devices and devices for distribution and measuring of supplied water quantity - up to 60 years;
   b) for smaller land improvement systems with devices for measuring of supplied water - up to 30 years;
   c) for all other purposes of water use for the purpose of land improvement - up to 10 years.
5. for water power utilization:
   a) for electricity production plants exceeding 20 MW - up to 99 years;
   b) for electricity production plants exceeding 5 to 20 MW - up to 60 years;
   c) for electricity production plants up to 5 MW - up to 30 years;
   d) for other plant operation purposes - up to 40 years.
6. for shaping of waterways on rivers and lakes, construction of artificial channels and other water transport facilities - up to 99 years.
7. for construction of river ports and port facilities - up to 99 years.
8. for fish breeding - up to 40 years.
9. for economic and other utilization of public estate, comprising the establishing of permanent buildings, i.e. installation of facilities - up to 30 years.
10. for utilization of public water estate for sports and recreation, comprising the establishing of permanent facilities (basins, stands, business and other buildings) - up to 40 years.
11. for sand and pebbles quarrying - the concession shall be granted for a specific quantity of substances. Apart from determining the substance quantity the concession may be timely restricted, however the time limit may not exceed five years (Article 6 of the Regulation).

3.2.3.2 Timing of procedure

The timing of phase obtaining the concession for use of the water which consists of four activities (please see chapter 3.2.3.5. Flow chart of procedure) is not defined. Only the maximal validity of the concessions is defined as it is mentioned in the previous chapter.

Because the entire procedure is performed only on two SHPs with 10 kW power, the practical experience about real timing of the procedure is very unreliable: it seems to be long.

3.2.3.3 Costs

This water usage fee in Croatia shall be paid for the abstraction and exploitation of water from its natural deposits and for its use for various purposes. The fee shall be paid for the use of water power for the production of electricity and for the operation of various facilities. The charge is always paid by the persons who are immediate users of such water power. These are companies or other persons engaged in electricity production or some other activity for which the driving water power is used, i.e. which use water power to operate devices for the needs of their own households.

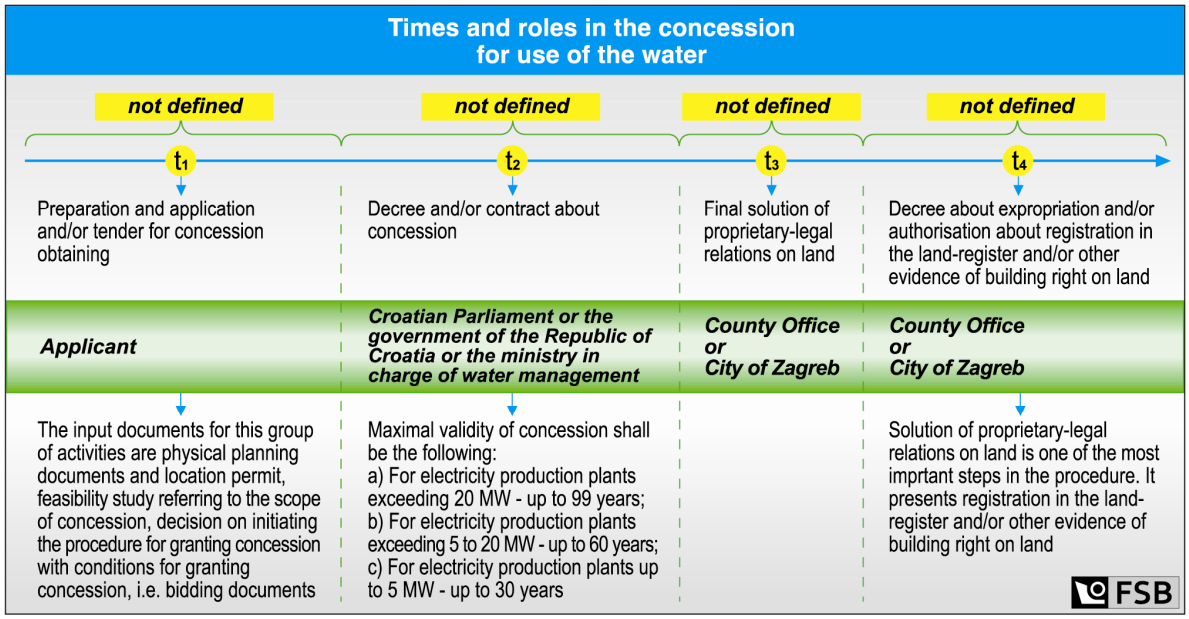
According to the **Decision about fees for water usage (OG 94/2007)** the fee for water usage for electricity production is obligatory and the same for the whole territory of Croatia. The water usage fee is 7.5% of the price of 1 kWh achieved average price of electricity produced at the threshold of all hydro power plants owned by the same owner.

The costs arising from the procedure of issuing the water rights acts and the validation thereof, which pertain to travel costs and per diems related to on-site inspection of the site for which the water rights act is requested, costs associated with the issuance of a water rights permit for the electricity production, as well as other specific costs are in their entirely borne by the applicant under the General Administrative Act. These costs depend on many different factors and can not be given numerically.

3.2.3.4 Evaluation criteria

Based on the concession decision the **concession contract** shall be concluded. By the concession contract the following shall be provided, in line with the concession decision: detailed purpose for which the concession is granted, special conditions with which the concessionaire shall comply during the concession, amount of concession compensation, conditions and method of compensation payment, guarantees of the concessionaire, other rights and obligations of concessionaire and concessor, method of regulation of relations in case of concession cessation before the scheduled term for which the concession has been granted. The water conditions referred to in Article 145, Paragraph 1 of WA shall be integral part of concession contract. The concessionaire's failure to comply with the conditions shall be the reason for unilateral termination of concession contract. The concession contract for purposes referred to in Article 145, Paragraph 2, Items 1, 2 and 3 of WA shall be concluded between the ministry in charge of water management on behalf of the Republic of Croatia and the concessionaire. The concession contract for the purposes referred to in Article 145, Paragraph 1, Item 4 of this Act shall be concluded by the body or legal person in charge of port management on behalf of the Republic of Croatia and the concessionaire (Article 146 of WA).

3.2.3.5 Flowchart of the procedure



3.2.4 Authorization to build an SHP

3.2.4.1 Required application technical documents to be submitted

The group of activities referring to procuring of building permit is considered as phase eight of the Process. The conditions and the procedure for procuring building permit are provided by the Physical Planning and Building Act (OG 76/07, hereinafter PPBA).

The construction of buildings having a construction (gross) area **not exceeding 400 m^2** and the buildings for exclusive performance of **agricultural activities** having a construction (gross) area **not exceeding 600 m^2,** may be commenced based on the final **decision on building conditions.** The construction of buildings provided by the Regulation on Determining Spatial Interventions and Buildings for which the Ministry of Environmental Protection, Physical Planning and Construction is in charge of issuing the location or building permit (OG 116/07), may be commenced based on the final **building permit** (Article 209, Paragraphs 1 and 2 of PPBA).

Pursuant to the said Regulation the MEPPPC shall issue the location and building permit for taxatively determined buildings.

Such buildings comprise among others:

- power plants of 20 MW capacity and above with the pertinent facilities;
- power transmission line of 220 kV and above with transformer station and switching equipment on that power-transmission line;
- international and main pipeline for transport of oil, gas, petroleum products, including the terminal, dispatch and measuring-regulation (reduction) station technologically connected with such pipeline,
- dams with accumulation or retention area with the pertinent facilities meeting the criteria of large dams (Article 2 of the Regulation).

Apart of the above mentioned spatial interventions and buildings the Ministry is in charge of issuing the location and building permit **for spatial interventions and buildings** as well, **for which the defining of integral environmental protection conditions is required**.

The decision on building conditions and building permit are administrative acts. The construction of other building may be commenced based on the confirmed main design (Article 209, Paragraphs 3 and 4 of PPBA). The simple buildings and works, construction, i.e. performance of which may commence without the act approving construction, is provided for by the **Ordinance on Simple Buildings and Works** (OG 101/07).

The competent administrative body of the county shall issue the decision on building conditions and the confirmation of the main design for buildings outside the area of big towns and for building located in the territory of two or several self government units, and the competent administrative body of the City of

Zagreb, i.e. big towns for buildings on their territories. The MEPPPC shall issue the building permit for buildings referred to in the Regulation on Determining Spatial Intervention and Buildings for which the MEPPPC is in Charge of Issuing Location or Building Permit.

The request for issuing the **decision on building conditions** in written form shall be submitted by the client. The request for issuing the decision on building conditions shall be accompanied by:

- three copies of the conceptual design with situation indicated in special geodetic surveying map;
- special conditions of the state administration body in charge of cultural assets for buildings located in the settlement or part of the settlement, entered in the Cultural Asset Register of the Republic of Croatia as cultural-historic entity, or the building has been entered in the register as cultural asset;
- written report and validity confirmation of the conceptual design if the design has been drafted in line with the foreign regulations;
- evidence of the building right on the land in which the building parcel will be shaped, i.e. on the existing building (Article 213 of PPBA).

3.2.4.2 Timing of procedure

If the conditions provided by this Act have been complied with and if the client has submitted the evidence on paid municipal service tax and water taxes, as well as building fee pursuant to the special act, the competent administrative body shall issue the decision on building conditions not later than thirty days from the date of receipt of the proper request (Article 219 of PPBA).

The decision on building conditions expires if the client fails to commence the construction within the term of **two years** from the date of final decision. The validity of the decision on building conditions shall be extended upon request of the client for one two-years period if the conditions determined in line with the provisions of this Act and other conditions pursuant to which the decision was issued, have not changed. The competent administrative body shall keep the conceptual design and decision on building conditions (Article 221 of PPBA).

However, it should be mentioned that the entire procedure consists of several phases and activities (please see Chapter 3.2.4.5. Flow chart of procedures) and the timing of procedure is 240 days but the timing of some activities is not defined (denoted with ?).

Because the entire procedure is performed only on two SHPs of about 10 kW power, the practical experience about the actual timing of this procedure is very unreliable: it seems also to be longer.

3.2.4.3 Costs

The costs for authorising the building of an SHP can be generally divided into:

- costs for SHP environmental conditions;
- costs for SHP building conditions.

These costs are defined at the national level and are the same for the whole Croatian teritory.

The SHP **exceeding 1 MW_{el}** are considered as interventions which require an evaluation of the need for environmental impact assessment. The competent body for assessment is the Ministry of Environmental Protection, Physical Planning and Construction. The initial fee for the request for the evaluation of the need for environmental impact assessment is about 100 kuna (15 euro). If the Ministry decides that Environmental impact assessment is obligatory, the costs for its preparation depend on the current market price as well as SHP performances and should be as high as 300,000 kuna (ca. 41,000 euro).

The costs for SHP building conditions consist of the costs for:

- location permit - 750 kuna (ca. 102 euro);
- special geodetic surveying map – 7,000 kuna (ca. 960 euro);
- building permit – 0.25‰ of the total price of plant building;
- usage permit – 0.25‰ of the total price of plant building.

3.2.4.4 Evaluation criteria

In the procedure of issuing the decision on building conditions the following shall be determined:

- that the building plot is developed within the meaning of Article 125, Paragraph 2, i.e. Article 126, Paragraph 2 of PPBA;
- place and method of connecting to traffic and municipal infrastructure as well as other infrastructure;

- that the request for issuing the decision is accompanied by documents referred to in Article 213 of PPBA.

For the purpose of ascertaining the fact that the building plot is developed, the competent administrative body shall, prior to issuing the decision on building conditions, carry out on-the-spot investigation on the building plot.

The request for issuing **the confirmation of the main design** in the written form shall be submitted by the client.

The client shall accompany the request for issuing the confirmation of the main design by the following documents:

- thee copies of the main design with the bound copy of the text of the final location permit;
- written report on the inspection of the main design, if the design control is required;
- written report and validity confirmation if the main design was designed in line with foreign regulations;
- survey on geotechnical and other research works, as well as technological, traffic and other surveys, if the data referred to in such surveys were used for drafting of the main design;
- parcelling survey, verified by the body in charge of state measuring and real estate cadastre and confirmation of the competent administrative body which issued the location permit on conformity with the location conditions for the form and the size of the building plot;
- evidence of the building right on the building plot, i.e. in scope of the building intervention, i.e. on the existing building (Article 223 of PPBA).

In the procedure of issuing the confirmation of the main design the following shall be determined that:

- the main design is drafted in line with the location permit;
- the main design is drafted in line with the provisions of the PPBA, regulations adopted pursuant to PPBA and other regulations;
- the building plot is developed within the meaning of Article 125, Paragraph 2, i.e. Article 126, Paragraph 1 of PPBA;
- the request for issuing the confirmation is accompanied by the documents referred to in Article 223 of PPBA (Article 225 of PPBA).

If the conditions provided by PPBA have been complied with and if the client has submitted the evidence on paid municipal utility and water charges, as well as building fee provided for by the special act, the competent administrative body shall issue the confirmation of the main design within the term not longer than thirty days at the latest from the receipt of proper request.

The confirmation of the main design expires if the client fails to commence the construction within the period of **two years** from the date of issuing such confirmation.

The request for issuing the **building permit** in a written form shall be submitted by the client, who is party in the procedure of issuing the building permit. The client's request on issuing the building permit shall be accompanied by the following documents:

- three copies of the main design with the bound copy of the text of the final location permit and special conditions which are integral part of the location permit;
- written report on inspection of the main design;
- written report and validity confirmation if the main design was designed in line with foreign regulations;
- survey on geotechnical and other research works, as well as technological, traffic and other surveys, if the data referred in such surveys were used for drafting of the main design;
- parcelling survey, verified by the body in charge of state measuring and real estate cadastre and confirmation of the MEPPPC, which has issued the location permit, on conformity with the location conditions for the form and the size of the building plot;
- evidence of the building right on the building plot, i.e. within the scope of the building intervention, i.e. on the existing building (Article 228 of PPBA).

The following shall be determined in the procedure of issuing the building permit:

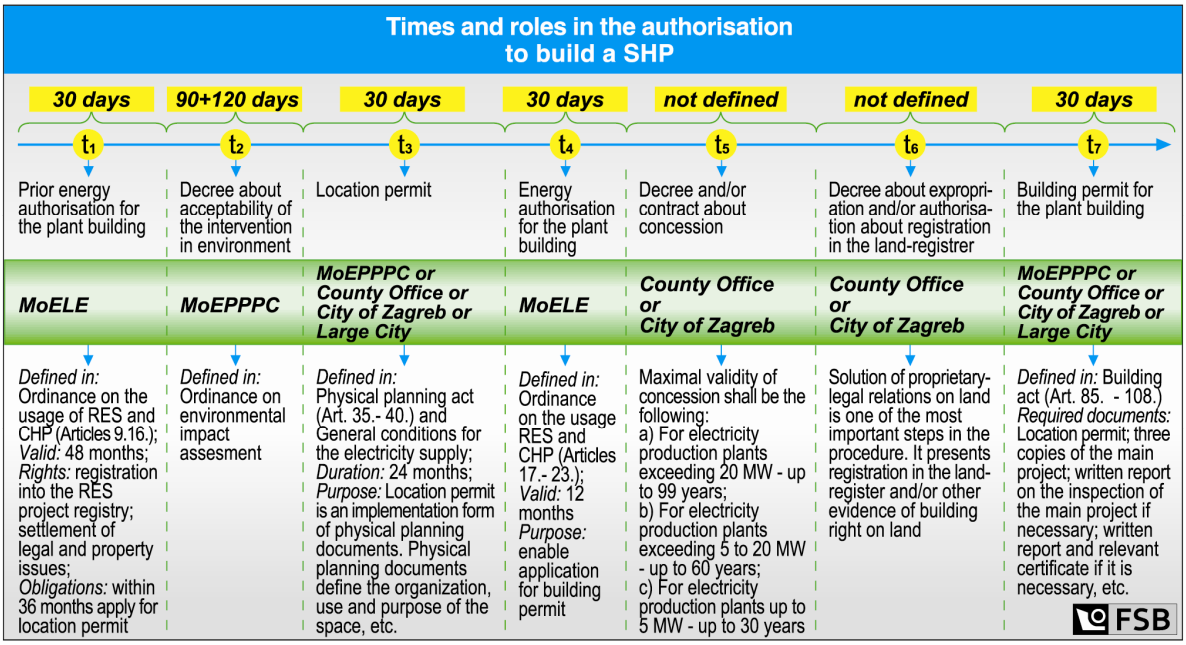
- that the main design is drafted in line with the location permit;
- that the main design is drafted in line with the provisions of the PPBA, regulations adopted pursuant to PPBA and other regulations;
- that the building plot is developed within the meaning of Article 125, Paragraph 2, i.e. Article 126, Paragraph 1 of PPBA;
- that the confirmations of the bodies and/or persons provided for by special regulations referred to in Article 208, Paragraph 3 of PPBA have been procured;
- that the request for issuing the confirmation is accompanied by the documents referred to in Article

228, Paragraph 2 of PPBA.

If the conditions provided by PPBA have been complied with and if the client has submitted the evidence on paid municipal service tax, water taxes and construction fee, provided for by special act, the MEPPPC shall issue the decision on building conditions not later than sixty days from the date of receipt of proper request.

The building permit expires if the client fails to commence the construction within the term of **two years** from the finality of that permit.

3.2.4.5 Flowchart of the procedure



3.2.5 The authorization to build the electric line of SHP – procedure to connect the plants to the grid

3.2.5.1 Required application technical documents to be submitted

Procuring the location permit and/or preliminary energy consent and/or concluding contract on connection to electricity network is a group of activities to be carried out in a sequence; however, these can be considered as one unit, i.e. as the phase four of the Process.

Pursuant to ***Electric Power System Network Rules*** (hereinafter: ***Network Rules***; OG 36/2006), adopted by the minister in charge of energy, Chapter 5.3.5.1 "Categories of Production Units", the production units, i.e. power plants to be connected to the distribution network within the meaning of Network Rules shall be classified in the following categories:

1. according to the nominal voltage of the connection:
   - connected to the low voltage network;
   - connected to the medium voltage network.
2. according to the nominal voltage of power plant:
   - power plants exceeding 5 MW;
   - power plants below or equal to 5 MW;
   - micro power plants.
3. according to the primary energy form:
   - hydro power plants;
   - solar power plants;
   - biomass power plants;
   - power plants using municipal waste;
   - wind power plants;
   - other power plants and power plants-heating plants.

The power plants **up to and including 500 kW** shall be connected to **low voltage network.** The connection may be realized to the low voltage line or low voltage transformer stations (10(20)/0.4 kV). The power plants up to and including 100 kW may be connected to low voltage lines.

The power plants exceeding 500 kW up to and including 10 MW may be connected to **medium voltage network** (10, 20, 30 and 35 kV); however, power plants with lower capacities may be connected as well.

Consequently, the power plants **exceeding 10 MW** shall be connected to **high voltage network** and shall regulate their relations with the transmission system operator, whereas the lower capacity power plants shall regulate their relations with the Distribution system operator.

Based on the preliminary energy consent the **network connection contract** shall be concluded. The transmission system operator and distribution system operator shall inform each buyer and producer prior to concluding the network connection contract on their rights and obligations pursuant to provisions of General conditions referring to connecting of the building to network (Article 6 of General conditions).

Network connection contract shall be concluded between the transmission system operator or distribution system operator and the buyer or producer within the procedure of connecting to network or increase of connection power. The said contract regulates the conditions of connection to transmission or distribution network, as well as all the details referring to the construction of connection, which fall within the scope of General conditions, and define the connection fee.

The above contract shall comprise:

a) data on contractual parties;
b) scope of the contract;
c) number of preliminary energy consent and its issuing date;
d) network connection fee;
e) term and payment dynamics of connection fee;
f) term of completing the works within the scope of the contract;
g) connection deadline;
h) conditions for executing the connection;
i) method and persons responsible for regulating the property law relations;
j) conditions for putting the connection in operation;
k) responsibility for damage and the amount of penalty in case of failure to execute the contract;
l) contract validity tem;
m) reasons for contract termination;
n) other conditions;
o) methods of settling the disputes.

On the base of the preliminary energy consent the contractual parties may conclude a pre-contract, regulating the mutual relations referring to preparing the network conditions and connection for connecting the building up to and including the building permit.

The Ordinance on Fees for Connecting to the Electricity Network (hereinafter: **Ordinance on Fee**; OG 68/01 and 177/04), adopted by HERA, provides for the methodology of determining fee for connecting of the producer's or buyer's building to the transmission or distribution network, as well as for increase of connection power (hereinafter: connection fee). The connection fee is the amount to be paid by the producer or the buyer to the transmission system operator or distribution system operator for the connection to the network or increase of connection power (Article 1 of the Ordinance on Fee).

The buyer with his own power plant capacity of **up to and including 30 kW**, anticipated for parallel operation with the network, intended primarily for his own use, **shall not be considered producer** within the meaning of the Ordinance on Fee. In case of a buyer with his own power plant with capacity exceeding **30 kW** the network connection fee shall be billed in line with the methodology for connecting the buyer to the network and in line with the **methodology of connecting** the producer to the network and the buyer shall pay only one, that is the higher fee for connection (Article 3 of the Ordinance on Fee).

The connection fee is aimed at financing of execution of the connection and establishing particular technical conditions in the network. The construction of the buyer's or producer's building connection and establishing of technical conditions in the network is based on the application of standard equipment and standard technical solutions and falls within the scope of competence of the transmission system operator or distribution system operator. For the calculation of the actual costs of connection the unit prices of goods, works and services shall be used, determined on the base of public invitation for tenders and standard general rules for works, which shall be **disclosed to the public** by the transmission system operator and distribution system operator. The costs incurred in the procedure of acquiring the building right and servitude right, connected

with construction of connection of the buyer's or producer's building to the network and establishing technical conditions in the network, are not integral part of the connection fee pursuant to this Ordinance and shall be paid by the buyer or the producer. The transmission system operator and/or distribution system operator shall conduct the procedure of acquiring the building right and servitude right in the interest of the buyer or producer and the costs shall be indicated transparently. (Article 6 of the Ordinance on Fee)

Establishing the technical conditions in the network comprises the construction of the new sections of network and/or reconstruction of the existing network sections for the purpose of using the network within the approved connection power; it shall be partially financed from the connection fee and partially from the fee for the use of the network. Establishing of technical conditions of the network shall be provided by investments in the network of the same voltage level and/or the first superordinate voltage level category above the connection voltage (Article 7 of the Ordinance on Fee).

Establishing technical conditions in the network comprises*:*

a) preparing of a survey of optimal technical connection solution, except for connecting to the low voltage network;
b) preparing of required investment-technical documents;
c) acquiring the building right and servitude right for use of the energy facilities,
d) procuring required permits for construction;
e) carrying out of construction works with the required material and equipment;
f) carrying out of electrical assembly works with required material and equipment;
g) required investigation and putting in operation.

Execution of connection shall comprise:

a) preparing the survey of optimal technical connection solution, except for connecting to the low voltage network;
b) preparing the required investment technical documents;
c) acquiring the building right and servitude right for use of the energy facilities;
d) procuring required permits for execution of connection;
e) carrying out of construction works with the required material and equipment;
f) crrying out of electrical assembly works with required material and equipment;
g) istallation of the metering equipment in the billing metering point (except for the producer)
h) required investigation, and
i) connection to the network (Article 8 of the Ordinance on Fee).

The fee for connection of the producer's building comprises:

- actual costs of the network connection execution, and
- actual costs of establishing the technical network conditions for taking over of the produced electricity, including the costs of installation of security equipment protecting the network from reverse effect.

In case of connecting to the **low voltage and medium voltage network** the costs of establishing technical network conditions shall be entirely borne by the producer; however, in the case of connecting to the **high voltage network** the producer's share in financing the establishing of network conditions referred to in Article 7, Paragraph 5 of this Ordinance on Fee shall be determined in line with the **following principles**:

- in case of construction or reconstruction of 110 kV line, in line with the proportion between the producer's connection power and thermal transmission power of the newly constructed or reconstructed line, taking in account the criterion (n-1), and
- in case of extension of a new transformation 400(220)/110 kV in the existing transformer station or construction of a new transformer station 400(220)/110 kV for the purpose of installation of the new transformer, in line with the proportion between the producer's connection power and the nominal power of the new transformer, taking in account the criterion (n-1).

3.2.5.2 Timing of procedure

The Distribution System Operator (DSO) or the Croatian Transmission System Operator (HEP Operator prijenosnog sustava - (HEP-OPS)) should issue the authorization to connect the plants to the grid not later than thirty days from the date of receipt of proper request.

But it should be mentioned that the entire procedure consists of several phases (please see Chapter 3.2.5.5 Flowchart of procedures) and the timing of the procedure is about 240 days.

Because the entire procedure is performed only on two SHPs about 10 kW power, the practical experience about actual timing of this procedure is very unreliable: it also seems to be longer.

3.2.5.3 Costs

The technical conditions and the connection costs of the producer's building to the medium voltage or high voltage network shall be determined by the distribution system operator or transmission system operator based on the survey of optimal technical connection solution. **The survey of optimal technical connection solution** for connection to high voltage network shall comprise the calculation of power flows in the part of the high voltage network to which the producer is to be connected, which calculation shall be made for the year of the producer's planned connection to the network**,** taking in account the production of hydro power plants in average hydrological conditions, average loads in high voltage network nodes and meeting the criterion (n-1). Preparing of survey shall be within the competence of the distribution system operator or transmission system operator. The costs of preparing the survey shall be borne by the producer and in the case of connecting the producer's building to the network the costs of preparing the survey shall be compensated by the connection fee.

All procedures required for acquiring the building right and servitude right for the purpose of connecting the producer's building on the network, referring to the execution of connection or establishing technical conditions in the network shall be carried out by the distribution system operator or transmission system operator, and the costs shall be entirely borne by the producer. Exceptionally, in case of connecting the producer's building to the high voltage network, the costs incurred in the procedure of acquiring the building right and servitude right for the purpose of connecting, referring to establishing technical conditions in the network, shall be paid by the producer in proportion to his share in their financing, upon the above mentioned principles (Article 26 of the Ordinance on Fee).

By Decision on Fee for Connecting to Electricity Network and Increase of Connection Power (OG 68/2001 and 177/2004), adopted by the Government of the Republic of Croatia, the unit price was determined, excluding the value added tax (VAT), for calculation of the fee for connecting to the electricity network.

The unit price, excluding the VAT, for calculation of the fee for connecting to the electricity network and increase of connection power on the overall territory of the Republic of Croatia, excluding the area of the City of Zagreb, shall be the following:

1. Connecting to low voltage network
   a) Connection power up to and including 30 kW — CNN1 = 1.350,00 kuna/kW
   b) Connection power exceeding 30 kW — CNN2 = 1.350,00 kuna/kW
2. Connection to the medium voltage network — CSN = 1.350,00 kuna/kW
3. Connection to high voltage network — CVN = 1.350,00 kuna/kW

The unit price, excluding the VAT, for calculation of the fee for connection to electricity network and increase of connection power in the area of the City of Zagreb shall be the following:

1. Connecting to low voltage network
   a) Connection power up to and including 30 kW — CNN1 = 1.700,00 kuna/kW
   b) Connection power exceeding 30 kW — CNN2 = 1.700,00 kuna/kW
2. Connection to the medium voltage network — CSN = 1.700,00 kuna/kW
3. Connection to high voltage network — CVN = 1.700,00 kuna/kW

(1 euro ≈ 7.3 kuna)

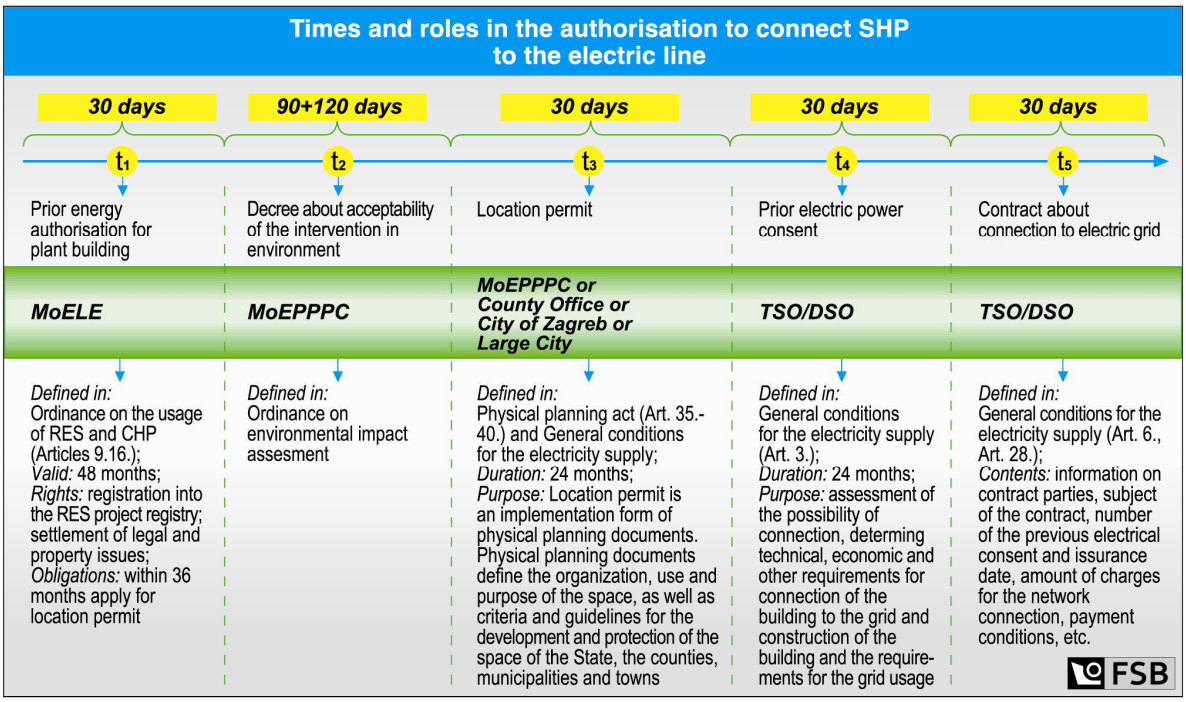
3.2.5.4 Evaluation criteria

The buyer or producer intending to connect to the network shall grant the servitude right to the transmission system operator or distribution system operator over a part of real property in his ownership and provide for undisturbed **construction and maintenance of the connection.** The transmission system operator or distribution system operator shall:

- prepare and procure the required connection documents;
- establish the technical conditions in the network;
- execute the connection;
- equip the buyer's metering point;
- carry out the required investigation;

- carry out connecting to the network;
- maintain the connection at his expense;
- where necessary, replace the connection at his own expense, except in case when the replacing is required by the buyer or the producer (Article 15 of General Conditions).

3.2.5.5 Flowchart of the procedure



3.3 GREECE

3.3.1 Legal SHP definition, delegated and concerned authorities

The limit for a small hydro plant is 15MWe. Such installations have quranteed feed tariffs.
Practically, all levels of government are involved in this process:

- the licence to produce electricity is issued by the Minister of Development based on an opinion from the Regulatory Authority for Energy (RAE);
- the operation permit is granted by the Regional Authority;
- building permits by the **Town-Planning Directorate of the project area Prefecture.**

If there is any conflict during the process, the final decision is taken by the Ministry of Development.

3.3.2 Obtaining licence to produce electricity

In accordance with **Article 3 of Law 3468/2002** a special authorization will be issued by the Minister of **Development based on an opinion from the Regulatory Authority for Energy (RAE) adhering to the following criteria:**

a) the national security;
b) the protection of public health and safety;
c) the overall safety of the facilities and the relevant equipment of the System and Network;
d) the energy efficiency of the project for which a relevant application is filed as that efficiency is established for RES projects from measurements of the RES potential and for high-efficiency cogeneration of electricity and heat, from their energy balances;
e) the degree of maturity of the project implementation process as indicated by the relevant permits or approvals granted by competent authorities, the studies needed as well as any other pertinent data;

f) the right of using the land where the plant will be installed;
g) the right of use of the land where the plant will be installed;
h) the ability of the applicant to implement the project on the basis of its financial, scientific and engineering competence;
i) the safeguarding of supplying public utility services and the protection of customers;
j) the protection of the environment according to the laws in force and the special planning framework for RES and sustainable development.

Prior to delivering its recommendation to the Ministry of Development, RAE may cooperate with the Operator of the System, the Network and mode of connection of the station to the System or the Network. In other words, an opinion will be rendered to RAE based on the Preliminary Environmental Impact Assessment Study. RAE shall deliver its own opinion to the Minister of Development. The Ministry of Development must issue a relevant decision based on RAE's opinion.

Moreover, the production authorization for a SHP will take into consideration the following requirements:

a) its holder, being an independent producer or auto-producer, legal or natural person;
b) the installation location of the power plant;
c) the installed capacity and the maximum generation output;
d) the technology applied or the type of RES in case the granting is done for a RES plant;
e) its duration;
f) the person or persons who have the financial capacity to fund and implement the project.

The production authorization shall be granted for a period of up to twenty five (25) years and may be renewed for up to an equal time. **The production authorization shall be revoked within twenty four (24) months and within thirty six (36) months**, from granting the production authorization, if an installation permit has not been granted.

In the period of twenty four (24) months there shall not be included:

- the time-period during which an injunction has barred the performance of any permit or approval required for the granting of the installation permit;
- the delay associated with the issue of the installation permit, provided that the delay cannot be attributed in a confirmed way to an omission or fault of any kind of the holder of the production authorization.

In the above cases, **the twenty four (24) month period may be extended for as long as the reasons stated above continue to exist**, provided that an application of the holder of the production authorization will be submitted to RAE before the lapse of that period. During the examination of the production authorization, RAE may collaborate with the Centre for Renewable Energy Sources for the supply of technical consultant services. **A production authorization must be accompanied by the preliminary environmental impact assessment study.** RAE shall notify the relevant Operators and the Ministry of Development at the end of a two-month and will issue the relevant permit.

It must be emphasized that the investor has to submit copies of the Preliminary Impact Assessment Study, together with his application to RAE, to the following relevant authorities for approval:

1. The **Special Environment Unit of the Ministry of the Environment, Physical Planning and Public Works for all RES projects**, irrespective of category established by Law 3010/2002, which are proposed to be built in protected areas (Ramsar, Natura 2000, national parks, forests with scenic beauty and natural heritage sites).
2. **The Directorate of Environment and Physical Planning of the relevant Region.**
3. **The competent Environmental Service of the prefecture-level local government.**
4. Approvals are requested by the following authorities and bodies:
    - the competent Chief Forester's Office or the Forestry Directorate of the relevant prefecture-level local government if a Chief Forester's Office does not exist;
    - the General Directorate of Forestry, only for approvals of environmental terms and conditions which are issued by the Special Environmental Service of the Ministry of the Environment, Physical Planning and Public Works;
    - the City Planning Service having jurisdiction over the project area;
    - the Curators of Prehistoric and Classical Antiquities, the Curators of Byzantine Antiquities and the Curators of Modern Monuments having jurisdiction over the project area;
    - the Hellenic Telecommunications Organization;
    - the Civil Aviation Authority;

- the General Staff of the Ministry of National Defence;
- the relevant services of the Ministry of Tourism;
- water authority and/or any other authority relevant for the project.

3.3.3 Environmental impact assessment (EIA)

The EIA takes place at two stages. In order to obatain the licence to produce electricity the **Preliminary Environmental Impact Assessment** is required. The idea is that thime and money is not wasted if the application is rejected. In order to obtain the installation and operation licence the full EIA is required.

The **Preliminary Environmental Impact Assessment** file shall contain the following subfiles of documents:

- technical description of the project;
- preliminary environmental impast study;
- maps and photographs.

In more detail, the **Technical Description of an SHP Project** will includes:

- name and type of project (size, technology);
- geographical location, existing state of the environment;
- short description of the project (area, type of construction and preventative measures and means of dealing with the impacts).

The **Preliminary Environmental Impact Assessment Study of an SHP Project** encompasses:

- general description of the project (site, type, extent);
- type, technology applied, general technical features of the project or activity;
- conditions in the area where the project or activity will be implemented;
- topographical conditions;
- reference to approved master plans and zoning, town planning schemes and land uses, if any, applicable to the proposed installation area of the work or activity;
- geological, hydrological and soil conditions;
- climatic conditions;
- vegetation - fauna – biotopes;
- landscape - aesthetic appraisal;
- existing management, if any, of forest expanses;
- exploitation schemes for natural resources;
- synergetic impact with other projects or activities;
- waste matter produced;
- pollution and annoyance caused;
- changes in geomorphology and impact on the landscape;
- prevention of accidents, especially due to the use of substances or technology;
- description of measures foreseen to be taken in order to avoid, abate and, if possible, restore significant negative impact;
- restoration of geomorphology;
- measures for the preservation of types of biotope habitats;
- preservation - restoration of landscape features - aesthetic improvement;
- measures for the preventative and corrective protection of vegetation;
- summary description of the main alternative solutions being studied by the owner of the project or activity with indications of the main reasons they were chosen by himself, taking into consideration their impact on the environment;
- benefits accrued to the national economy, national security, public health, and the serving of other matters of public interest;
- positive impact on the natural and man-made environment in an area broader than that directly affected by the project or activity;
- measures necessary after the final cessation of operations.

In addition, the Preliminary Environmental Impact Assessment File will include **maps and photographs** in the following form:

- survey maps at a suitable scale (1:50.000 and 1:5.000) which will show the site and extent of the project as well as the existing infrastructure and land uses in the area, and

- photographs of the installation site, taken both from its interior, as well as from typical vantage points in the wider area.

3.3.4 Bulding permit

The next step is to apply for a **building permit to the Town-Planning Directorate of the project area Prefecture** submitting the following documents:

a) application signed by the interested party (in a special form);
b) declarations (warranties) for the relegation and the undertaking of the supervision study;
c) technical reports and budget (in a special form);
d) installation permit;
e) topographical chart together with diagram of coverage, in accordance with the stipulations of Presidential Decree 3.9.83 (Official Journal 394/D/8.9.83);
f) architectural design;
g) civil-engineering structural design;
h) heating and insulation design;
i) plumbing and sewage design, where required;
j) electrical/mechanical design, where required;
k) approval of the architectural design by the Town Planning and Architectural Control Committee;
l) passive fire fighting design;
m) active fire fighting designs, where required;
n) gas and fuel handling study, where required;
o) title deeds and recent certificate of ownership from the Land Registry for each terrain/property which may obtain a building licence by exception, or which is located outside the town planning zone.
p) proof of deposit of consultant engineer's fee;
r) reasoned report by the consultant engineer, in accordance with para. 1 of article 3 of the General Building Code;
s) mapping out of the coastline (if the location is situated at a distance less than 100 metres from the shore);
t) approval by the Public Power Corporation for building constructions exceeding 2,500 cubic metres;
u) approval of the Forestry Department in case that the installation is situated in a forest area or in an area outside the town-planning zone;
v) approval of the Ministries of Agriculture and Development in case that state, municipal or communal land is being ceded;
w) approval of the Archaeological Service in case that the installation is situated in areas controlled by the Ministry of Culture;
x) approval by the General Air Staff if the terrain is situated in the vicinity of military airfields or civilian airfields used also by the Air Force and at a distance less than 5,000 metres from the centre of the runway of the airport;
y) approval by the Civil Aviation Authority if the terrain is situated in the vicinity of civilian airfields at a distance less than 4,000 metres from the centre of the runway of the airport;
z) approval by the Ministry of Defence if the terrain is situated in a border region.

3.3.5 Installation and operation permits

Next, the investor will have to apply for the **Installation License** based on the following files and documents:

- a file containing the application for the approval of environmental terms of the plant accompanied by the complete Environmental Impact Assessment Study adhering to the laws in force;
- a file containing the application for the approval of environmental terms of the connection works if required;
- a file containing the supporting documents for the approval of use of forested land if so required by the provisions in force of the forest legislature;
- a file containing the following data: i) a copy of the production permit, and ii) a short technical description of the works not exceeding 10 pages signed by the design professional who prepared it and which shall include basic engineering data of the project, as well as its cost;
- the connection terms of the SHP plant to the System or Network;

- the surveyor's diagrams authenticated by the responsible Operator;
- the **decision approving the Environmental terms**;
- the connection terms of the plant to the System or Network;
- a legal certificate proving the exclusive use of the installation land plot and any other property in conjunction to the construction and operation of the plant, as the connection works, according to article 7 of Law 3468/2006;
- a solemn declaration of the plant's owner regarding the award of the design of the plant, as well as a solemn declaration of the design professional stating the undertaking of the design of the plant.

The provisional connection and tentative operation of an SHP plant requires the completion of the plant and **prior to the filing of the application for being granted an Operation Permit**. In this case, the holder of the installation permit will submit an application to the responsible Operator with whom the connection contract was concluded, for the provisional connection of the plant to the System or Network in order to be carried out the tests necessary for putting the facilities into operation.

The SHP project related **Regional Authority** is responsible for the issue of the operating permit, requiring the following supporting documents:

a) a certified copy of the relevant connection contract having been concluded by and between the Producer and the responsible Operator;
b) a certified copy of the relevant electricity sale contract having been concluded by and between the Producer and the responsible Operator;
c) a certificate issued by the Operator, stating that the relevant connection works of the station to the System or Network as well as the other necessary facilities of the producer have to be completed with the observance of the minimum specifications provided for in the System Operation Code and the Network Operation Code;
d) a certified copy of the building permit if such a permit is required under the provisions of the laws in force;
e) a certificate of the responsible Fire Brigade Service stating that all necessary fire-protection measures have been taken following suggestions thereof;
f) a solemn declaration of the holder of the installation permit stating that:
   - the terms laid down in the environmental permit have been met during the construction stage and that these terms shall be observed during the operation of the plant. Should any violations of the terms and restrictions be revealed, a new approval of environmental terms shall be necessary;
   - the oversight of plant operation has been assigned to an engineer being under law responsible therefore;
   - a solemn declaration of the engineer entrusted with the task of plant operation oversight, stating the acceptance of these duties and also pledging observance by the operation of the plant of the terms and regulations pertinent to the protection of the environment and the safety and health of those employed in the plant.

3.3.6 Connecting to the grid permit

Finally it is required to obtain a permit to conect to the grid.

The investor will have to submit an **application to the Hellenic Power Transmission System Operator S.A. (DESMIE)** for the SHP connection terms with the GRID or the System or Network. The following support documents are needed:

a) Surveyor's diagrams on a background prepared by the Hellenic Army Geographical Service (GYS) at scales 1:5,000 and 1:50,000, clearly indicating the location of the plant;
b) Land plot coverage diagrams at a scale 1:200 up to 1:500 of the proposed facilities, indicating the position of the units, the connection/stepping-up substations and control buildings;
c) One-line electrical diagram showing the main equipment of the plant and especially the production units each of them identified by unique numbering, the voltage stepping-up transformers, the power-factor compensation devices and the disconnection and protection gear;
d) Description of the central reactive power compensation of the plant devices, if any, as well as of their control system;
e) Description of the protection gear including settings being either the possible and/or those suggested by the manufacturer for every kind of generator used;
f) Description of the starting/synchronization arrangement for any kind of generator. The description shall include the starting/synchronization mode, the specific values for time duration and speed of

revolution by the connection, as well as the voltage and frequency deviation limits controlled by the synchronization arrangement. In case the supervision and control system of the units and the plant restricts the frequency of controls or/and the stated in point 7.1 of the appendix hereto number of units which start simultaneously, then more detailed data should be provided;

g) Description of power factor compensation for any kind of generator provided with individual power factor compensation gear, as well as information data for central compensation gear, if any, covering the overall plant;

h) The data regarding the technical characteristics of the generation units.

3.3.7 Timing of procedures (from application to license granting)

The Joint Ministerial Decision **(JMD) 1726/2003** marked a breakthrough in Greece in terms of intensifying efforts to rationalise and simplify the complex and very lengthy licensing procedures for RES-to-power projects. To this date, these procedures constitute today the single, most difficult obstacle in the effective materialisation of commercial-scale RES investments in Greece. JMD 1726/2003 was signed by the ministers of all six (6) Ministries that are co-responsible for the RES licensing procedure (Figure 1.), namely the Ministries of : 1) Development, 2) Environment, Land Planning & Public Works, 3) Agriculture, 4) Culture, 5) Transportation & Communications and 6) National Defence.

The JMD covers all three basic (and time consuming) stages of the RES licensing procedure, and more specifically those of:

- preliminary environmental impact assessment;
- approval of environmental terms and conditions;
- approval of intervention on public land.

First, the JMD defines clearly and unambiguously the specific public authorities, agencies and directorates that are required to give an opinion (or to make a decision) regarding the licensing of a RES project. Second, the JMD describes in detail the contents of the opinion, to be given by each one of the above authorities or agencies. Third, the JMD sets strict deadlines for the licensing authorities or agencies, within which they are required to give their opinions about the RES project under consideration. These deadlines have an irrevocable character, i.e. beyond them, the respective authorities, agencies, committees, etc., that have not responded, are counted as having positive opinions (answers) towards the given RES project, and the licensing procedure moves on to the next stage.

The licensing deadlines, set by JMD 1726/2003, are as follows:

1. preliminary environmental impact assessment: 30 working days (total);
2. approval of environmental terms and conditions: 60 working days (total);
3. approval of intervention on public land: 40 working days (total).

Finally, license for connecting to the grid should be granted within 15 days.

3.3.8 Costs of procedures (taxes, procedure fees, other compensation costs)

The following supporting documents evidencing payment of taxes, deductions, and dues.

1. Deduction 1‰ of the budgeted cost of the works in favour of the Engineers and Public Works Contractors Pension Fund and 0,5‰ in favour of the National Technical University of Athens according to the provisions of Law 2326/1940 (Official Gazette A 145) with an upper limit of the above amounts €2.93 and €1.47 respectively, according to the provisions of article single of Law 1889/1951 (Official Gazette A 211);
2. Deduction 2% of the design fee supporting the Engineers and Public Works Contractors Pension Fund and 1% supporting National Technical University of Athens;
3. Payment of 10% of the design professional's fee and especially in the case of the design of provisions of article 11 of Law 915/1979 (Official Gazette A 103) without an upper limit to the amount hydraulic works and surveying jobs 4% to the competent Public Revenue Office as partial advance payment of the income tax according to article 52 of Law 2238/1994 (Official Gazette A 151);
4. Deposit voucher with the National Bank of Greece of the design fee in the name of the design professional;
5. Stamp duty 2‰ on the design professional's fee, deposited to the competent Public Revenue Office instead of affixing adhesive stamps on drawings, cost estimates, designs and the copies thereof, if any, according to article 25 of Law 2873/2000 (Official Gazette A 151);
6. Deposit of €27.88 State tax (account No. 1459) for the electrical and mechanical installation of the plant

owner issued by the Public Revenue Office according to article 2 of Legislative Decree 1150/1949 (Official Gazette A 249), article single of Law 1889/1951, joint ministerial decision 13959/22.2.1952.

In Greece there is an RES Special Planning Framework which controls the **spatial policies** for RES per category of activity and space and establishes the rules and criteria which will allow on the one hand the set up of viable RES facilities and on the other hand their harmonious incorporation in the natural and man-made environment, i.e. through the endorsement of the framework it is sought, in addition to other benefits, a more clear-cut guide to the licensing authorities and the investors, so that the latter will be oriented to installation locations in the first place following the spatial planning perspective. This way, an investor may avoid common ambiguities and conflicting land uses.

3.3.9 Flowchart of the procedures

The overall process should take less than a year:

- the first step is an application for generation of electricity;
- the second step is the Environmental Impact Assessment;
- the third step is the installation licence;
- the forth step is the operation licence.

Less than 200 days			**60 days**	**60 days**
Application for generation of electricity	Initial Environmental Impact Assessment	Ministerial decision for generation of electricity	Installation license	Operation license
PRIVATE	**GOVERNMENT**	**GOVERNMENT**	**PRIVATE**	**PRIVATE**
Application to RAE RAE evaluates feasibility of project	RAE submits environmental file to Region or Ministry for evaluation File returns to RAE	RAE recommends to the Ministry	Application to Ministry of Development or Region Requires: License to generate, EIA. Offer from the grid operator	Application to Ministry of Development or RegionRequires Completed construction, connection to the grid, contact with the grid operator

3.4 NORWAY

3.4.1 Legal SHP definition, delegated and concerned authorities

In Norway the following definition regarding small hydro power yields:

- 0-100 kW, Micro hydro power;
- 100- 1 000 kW, Mini hydro power;
- 1 000- 10 000 kW, Small hydro power.

Hydropower developers/applicants are mostly companies owned by municipalities or counties alone or some combinations thereof. "Statkraft" which owns 25-30% of the developed hydropower in Norway, was separated from NVE in 1986 and is now organised as a state company. The state company is required to meet the same licensing procedures as other companies. Private companies may also be granted licenses, but may be faced with special regulations in the acquisition act regarding approval of the purchase of waterfalls.

3.4.2 Environmental impact assessment (EIA)

Competent authority (NVE/OED) shall decide whether or not Environmental Impact Assessments (EIA) shall be required for projects. The EIA procedures include the following phases:

1. verification to assess if an EIA procedure is needed, and
2. the environmental impact assessment.

The applicant delivers the preliminary project and the environmental preliminary study to the competent authority (NVE). The documentation should as a minimum include the following documentation:

- a project description containing information about its features, localization and size;

- a description of necessary measures to avoid, reduce or compensate its negative impacts;
- necessary data to identify and to evaluate the most important impacts on environment and cultural heritage, that the project can produce either during its construction or during its operation;
- a brief description of the alternative options considered by the design proposer, including so called zero option, specifying the main reasons of the best choice from environmental impact point of view;
- a description of specified impact monitoring measures, to offset unexpected negative impacts at the right time and to allow competent authority to be able to take right corrective measures;
- a non-technical abstract about size and operation features of the project and about data and information of the EI study. This abstract must be written to allow non-technical people, which is called to participate to work conference for EIA, to understand easily and to print documentation readily;
- within 60 days from publication any interested subject can present remarks and objections;
- the results of consultation, the competent authority has 3 months to express a positive or negative opinion;
- in case competent authority decides the project must not be subjected to EIA procedure, the verification procedure is finished and EIA is not necessary; otherwise, starts the EIA procedure.

The competent authority shall process the notification and the EA- statement. This includes determination of the content of the study programme and approval of the EA-statement. The competent authority shall co-ordinate processing pursuant to EIA regulations in line with special legislation: Provide correct information to the developers, the related authorities and the public, make the overall evaluation and determine the conditions.

Related authorities such as municipalities make the plans and the EIAs available for the local population. The municipality shall conduct an evaluation process involving local experts and politicians submit their comments to NVE and the county. The county shall conduct on the process involving local experts and politicians. Directorates and Ministries (environment, pollution, cultural heritage, mining, roads, sea fishing, agriculture) shall provide expert comments and propose conditions. The public (NGOs, local people, landowners) is given the opportunity to comment on the plan/notification and application/EIAs.

Roles/Participants regarding development of small hydro power, summarized:

Applicant

- farmers, landowners of private waterfalls;
- private companies: Landowners, hydro power companies;
- public owned companies.

Competent authority

- NVE, responsible for the licensing.

Related authority

- municipality: provide local comments;
- counties: provide regional expertise;
- directorates: provide expert comments on environment, cultural heritage, fishery, etc.

Public

- local people, neighbours, affected people;
- NGOs.

3.4.3 Obtaining the concession for use of the water

The concession for use of the water and concession to build the SHP and its grid connection line is linked together in the same application in Norway. The fact that the application for concession to build a SHP is linked with use of the water and its grid connection line is due to the practical handling of such an application. The Norwegian Government has decided that they want to have information about all aspects of the project before a concession is given. The process of working with the application will not start before all information is given to the authorities. This is due to the fact that the three aspects are necessary to build an SHP.

The water rights rest with the landowners in Norway and therefore the landowner has to be a part of the application for the use of water. The application for concession to the government that relates to a SHP must include all information related to water, grid lines, grid connection, dam, pipes, power house, mechanical equipment, electrical equipment and other buildings. Therefore, Chapters 3.4.3, 3.4.4 and 3.4.5 will be very much the same.

3.4.3.1 Required technical documents to be submitted

Application

In order to achieve an efficient evaluation process it is vital that the application is well organized and contains the necessary information to make professional decision of the current project. NVE has derived a template which illustrates how the application should be organized and what information which must be included. The application template is divided according to the following main chapters:

a) Introduction: Location of the project, list of all the involved landowners, existing interventions, comparison of adjacent drainage basins and river course;
b) Description of the initiative: Main data, technical plan, cost estimate, advantages and disadvantages, tenure, relation to public and national plans, alternative solutions;
c) Effect on environment, nature resources and society/community: Hydrology, Biological diversity, Fish and fresh water biology, Flora and fauna, Landscape, Culture heritage, Agriculture, Water quality, User interests, Power lines and grid connection, Lapp interests, Keeping reindeer, Consequences related to dam and pipe line rupture, Consequences related to alternative project solutions;
d) Initiative for diminishing damage;
e) References;
f) Attachment to the application (Maps, durations curves, photographs, overview of the affected land owners, agreement with the current grid company if existing and an environmental report which sheds light on the biological diversity/fauna/fish).

Furthermore, the following documents must follow the application: “Documentation of the hydrologic conditions” and “Classification of dams and pipelines”. If the projects attains a classification other then 0, it requires that certified consultants are involved in the projecting.

“Documentation of the hydrologic conditions”-Involves a thorough description of the hydrology before and after the development in order to emphasize the impact.

“Classification of dams and pipelines” - Involves a calculation and description of the consequences in case of dam and/or pipe line rupture. This is important in order to emphasize the safety aspects and environmental impact in case of rupture.

Certain measures must be carried through if the consequence of a rupture is substantial i.e damage on railways, roads, houses etc.

Figure 3.1 outlines the application procedure in Norway, and one should emphasize that in some cases it is not necessary with a license and the municipality is responsible of the construction permit. Projects not submitted to a license are usually smaller projects with minor impacts on the environment.

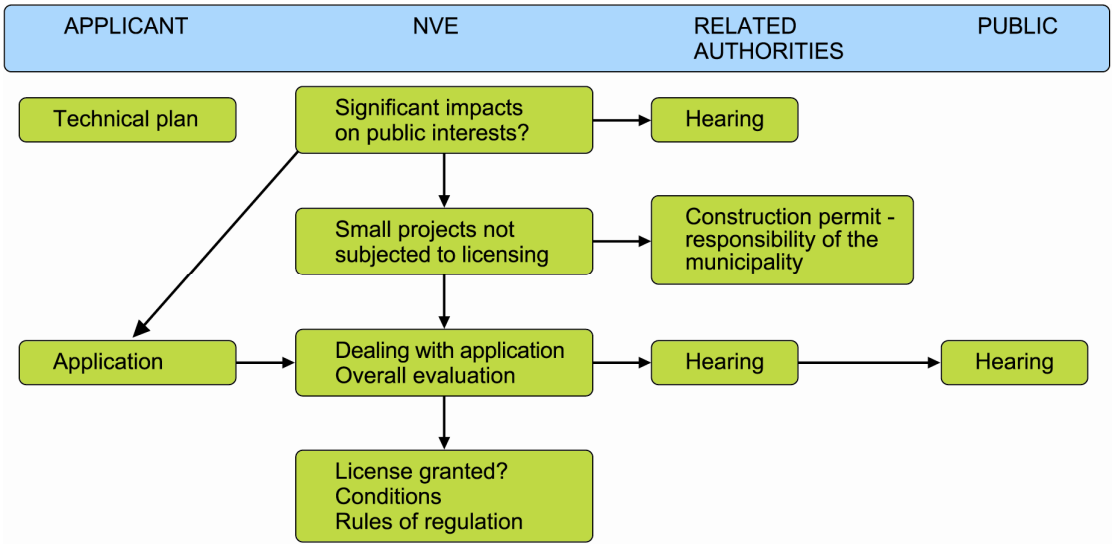


Figure 3.3. The application process in Norway

Pursuant to the Energy Act, an application shall be submitted to the licensing authority. For applications that are covered by Chapter VII- of the Planning and Building Act no. 77 of 14th June 1985, an

environmental impact assessment shall be submitted with the application.

The application shall provide the information that is necessary in order assess whether a licence should be granted and which conditions shall be specified. The Ministry may specify the information or studies that the applicant must provide.

An application for the construction of an installation for the generation, conversion and transmission of electrical power shall usually be submitted simultaneously with the application for power plant development in accordance with the water resources legislation.

Applications that meet the requirements specified in this Energy Act shall be distributed for comment in the Norwegian Water Resources and Energy Directorate and in affected municipalities or some other appropriate place in that district. When the application is distributed for comment, a deadline will be set for submitting comments to the licensing authority. When it is deemed unobjectionable, the distribution of an application for comment may be omitted. A public announcement of the application, a brief description of the plans, information about where the application has been distributed for comment and the deadline for submitting comments shall be posted in the Official Norwegian Gazette and in one or more newspapers that are commonly read in the district. The applicant pays the costs of distribution for comment and public announcement of the application. When it is deemed unobjectionable, the public announcement may be omitted. Public bodies and others to whom the measure directly applies shall have a copy of the application sent to them for comment. When the application is sent out for comment, a deadline will be set for submitting comments to the licensing authority. When it is deemed unobjectionable, a public consultation may be omitted. The processing of an application may be postponed pending an energy plan.

Decisions in accordance with the Energy Act are made by the Ministry. A licence is issued for a limited period of up to 30 years starting on the date when the licence was issued. A licence is issued to a specific person, company, cooperative, municipality or county.

The water authorities may by regulation or individual decision stipulate whether measures in a river system require a licence or issue regulations to the effect that certain measures in a river system shall be notified to the water authorities. The water authorities shall issue individual decisions pursuant to paragraph one if the developer, affected competent authority or others with a legal interest request it and may prohibit implementation before the decision is reached. An appeal of a decision stipulating that the measure requires a licence will not delay the decision's entry into effect.

A licence for hydropower development that includes watercourse regulations shall be granted pursuant to the rules in the Watercourse Regulation Act relating to regulation of watercourses.

The water authorities may lay down in regulation or in the individual case that no licence is required pursuant to the Watercourse Regulation Act for measures that:

a) require a permit pursuant to section 7, paragraph two or three, or section 10 of Act No. 47 of 15. of May 1992 relating to salmonids and fresh-water fish, etc.;
b) require a permit pursuant to section 11 of the Pollution Control Act or to regulation in pursuance of the Pollution Control Act;
c) require a dispensation from a conservation decision pursuant to Act no. 63 of 19 June1970 relating to nature conservation or are implemented as a management measure pursuant to the Nature Conservation Act;
d) are permitted in a zoning plan or building development plan pursuant to the Planning and Building Act;
e) are approved pursuant to a regulation in pursuance of section 17 of the Act of 21 May 1965 relating to forestry and forest protection or of section 11 of the Land Act. The King may issue regulations to the effect that licensing pursuant to this Act may in certain types of cases replace licensing pursuant to certain other Acts.

The reconstruction of watercourse installations with a licence pursuant to section 8 may take place without a new licence if the work is initiated within five years of the time the installation became inoperative and is completed with reasonable speed. The water authorities may extend the deadline once.

Once central public authorities have instituted preparation of a master plan for the use or protection of river systems for a larger area, the water authorities may without further consideration delay or reject an application for a licence that pertains to a river system included in the scope of the plan. A licence may be granted only if the measure is without appreciable importance for the plan.

When a plan as mentioned in paragraph 1 is completed, the processing of applications for licences shall be based on it. An application that is at variance with the plan may be rejected without further consideration. Only the Ministry may grant a licence for measures in a river system that may reduce the hydropower in river systems that are assigned to power development in the plan.

A master plan for various measures within a single river system should preferably be drawn up pursuant to the rules in the Planning and Building Act. Measures in a river system subject to a licensing requirement must have a licence pursuant to this Act, and legally binding plans pursuant to the Planning and Building Act may not substitute for a licence.

An application for a licence pursuant to section 8 must, in accordance with regulations pursuant to section 65, provide the necessary information about the planned measures and the advantages and disadvantages connected therewith and about the relationship to legally binding plans pursuant to the Planning and Building Act. The water authorities may require further information from the applicant and may decide that the applicant must undertake or defray the cost of studies or reports required to ascertain the advantages or disadvantages of the measures. For measures that fall under the rules relating to environmental impact in the Planning and Building Act, these rules apply instead.

If measures in a river system can cause substantial damage or nuisances, the impact assessment must consider relevant alternatives such as a different site, different technical solutions or a different design. If the measures will have an impact on the use of the river system in other respects, the assessment must clarify such impacts.

The application is subject to public disclosure in accordance with the rules in the Freedom of Information Act. Public notice of the application must be made at the applicant's expense according to the rules in section 27-1, no. 2, of the Planning and Building Act. The water authorities may exempt the applicant from the public notice requirement if:

a) The matter can be completely notified in some other way;

b) It is evident that consideration must be postponed pursuant to section 22, or

c) It is evident that the application must be rejected.

A licence may be granted only if the benefits of the measure outweigh the harm and nuisances to public and private interests affected in the river system or catchment area. When measures are of a permanent nature or may for other reasons have longer-term impact, the requirement in paragraph one must be met in the longer term.

In a licence, terms and conditions may be set for counteracting harm or nuisances to public or private interests. The emphasis must be on promoting safeguards against harm to people, property or the environment, ensuring that the measures are as well adapted to the landscape as possible and maintaining the natural aquatic life. Terms and conditions may be set for *inter alia:*

- safeguarding against harm through design and functional requirements and requirements for the necessary maintenance of watercourse installations;
- ensuring clean-up or restoration when the measures are closed down;
- adapting the measures to another relevant use;
- allowing others to be participants in the measures in the river system;
- mitigating damage and nuisances connected with older measures in the river system, including the reopening of streams, re-establishment of edge zones and other restoration of natural areas, if this is reasonably connected with what the licence pertains to.

If measures in a river system can impact the rate of flow and water level, limits shall be set for the water level and rate of flow in accordance with section 10, with the necessary mandates for compliance monitoring, and, if necessary, instructions shall be issued for how reservoir operation is to take place. In a licence for measures in a river system that may impose substantial inconvenience on other utilisation of the river system or catchment area, terms and conditions may be set for the developer to facilitate such utilisation elsewhere or provide subsidies for this purpose.

The licence is limited in time and after 60 years the government acquires the power plant, free of charge, if it is owned by private enterprises. The licensing authority may decide that the licence shall be revised after a certain period of time. Terms and conditions may be set for security for any liability to pay compensation for damage or nuisance that the measures cause. If the developer himself owns and controls the land on which the measures are to be implemented, and the measures will obviously not cause losses or damage, the water authorities may exempt the developer from having to request appraisement to determine possible compensation.

The licence lapses if construction work is not initiated by later than three years after the licence was granted. The same applies if construction work is subsequently stopped for more than two years. The water authorities may extend the time limit once by up to three additional years.

In special cases, the water authorities can rescind or amend terms and conditions or set new terms and conditions in the public or private interests. Consideration shall be given to the losses that an

amendment will impose on the licensee and the advantages and disadvantages that the amendment will otherwise entail. This provision does not apply to measures dealt with pursuant to Act No. 17 of 14. of December 1917 relating to regulations of watercourses.

For the consideration of cases pursuant to section 28, the rules in section 23 will apply insofar as they are applicable. Changes of rules for reservoir operation that permit the licence holder to vary the water level or rate of flow must be submitted for consultation pursuant to the rules in the Public Administration Act regarding regulations and made public pursuant to the rules in section 27-1, no. 2, of the Planning and Building Act. The water authorities shall hold public meetings on the case at the applicant's expense, unless the Ministry exempts him from this.

If a license is granted, NVE will impose rules of operation related to the following subjects:

- highest and lowest regulated level;
- seasonal restrictions on regulation levels;
- minimum water supply to the rivers;
- regulation during floods;
- 5 years experimental period to optimize the rules of operation.

3.4.3.2 Timing of procedure

It is vital that the process focuses on the project's most important aspects: whether or not to grant a license, choice of the right alternative and stipulation of conditions including the rules of operation. The procedures require that the relevant authorities and public are involved in the process at different stages. For smaller projects without notification time for the licensing process takes from one year to five years, with two/three years on average. For larger projects with notification the procedures take from two to six years or more. The time needed for approval depends on how controversial the project is, the time used on EIAs, the working capacity of the competent authorities and whether the fixed time limits for comments on the notification and the EIA can be met. Some steps during the process are also dependent on initiatives from the developer.

3.4.3.3 Costs

Concession fee: Regulation of a river system involves economical obligations for the affected municipalities. Hence, the owner of the power plant will be charged a so-called concession fee to the municipalities affected by the development.

Ordinary Taxes: Ordinary taxes related to the trading profit.

Installation fee: A payment to the current grid company to cover any costs related to the new grid connections or reinforcement of the grid.

Variable production cost: A cost which constitutes of feeding cost, grid cost and sales cost to the current grid company.

Economic rent taxes: In 1997 the economic rent taxes related to hydro power was introduced in Norway, and amounts to 30 %. The economic rent is a taxation paid to the government. It is a calculated standardized market value of the production during one year of operation, where operating expenses, concession fee, property tax and depreciation are deducted. In addition, a part of the revenue is deductable to prevent that normal profit is charged with economic rent. Also, the economic rents only yields for installations larger than 5 MW.

Other compensation: Land owners affected by the development may also be compensated because their property has been exposed to intervention, e.g. roads, rig area, etc.

3.4.3.4 Evaluation criteria

In Norway, since the water rights rest with the landowner, competing applications related to the same river is not often a subject.

However, if there exist applications for several rivers in the same region, the authorities have to evaluate which of the projects that will have the greatest benefits (Socio-economic, social etc) with smallest interventions in the nature. The effects of all the SHP together must be evaluated, and in most cases only a selection of the projects will be authorized.

Also, it is possible to apply for transferring of water from one drainage basin to another to increase the available water in the current river, and this may be in conflict with other SHP projects and/or irrigation system by reducing the inflow in adjacent water falls. However, also for this scenario the authorities have to consider the benefits versus the disadvantages.

Furthermore, SHP which involves special conflicts related to the following subjects will not be prioritized:

- fish, especially salmon;
- cultural heritage;
- preserved area;
- agriculture;
- biologic diversity;
- vulnerable species, etc.;
- visual effects and outdoor recreation.

In order to promote development of small hydro power it is vital to increase the financial support to R&D and provide comprehensive information to both public and private participants. Today there is no financial support related to electricity production from hydro power.

Thus, introduction of financial support for hydro power will act as a catalyst for future development.

Furthermore, the following topics will be important when considering evaluation criteria:

- time aspect, from application to license granting;
- technical considerations with respect to the quality of the equipment, not only focus on safety and environmental aspects;
- requirements versus the degree of intervention;
- costs related to composing of the application;
- Feedback from NVE and the body entitled to comment.

3.4.3.5 Flowchart of the procedure

As mentioned in Chapter 3.4.3.1 in some cases there may not be necessary with a license, and the applicant applies to exemptions of a license, and the following procedure yields:

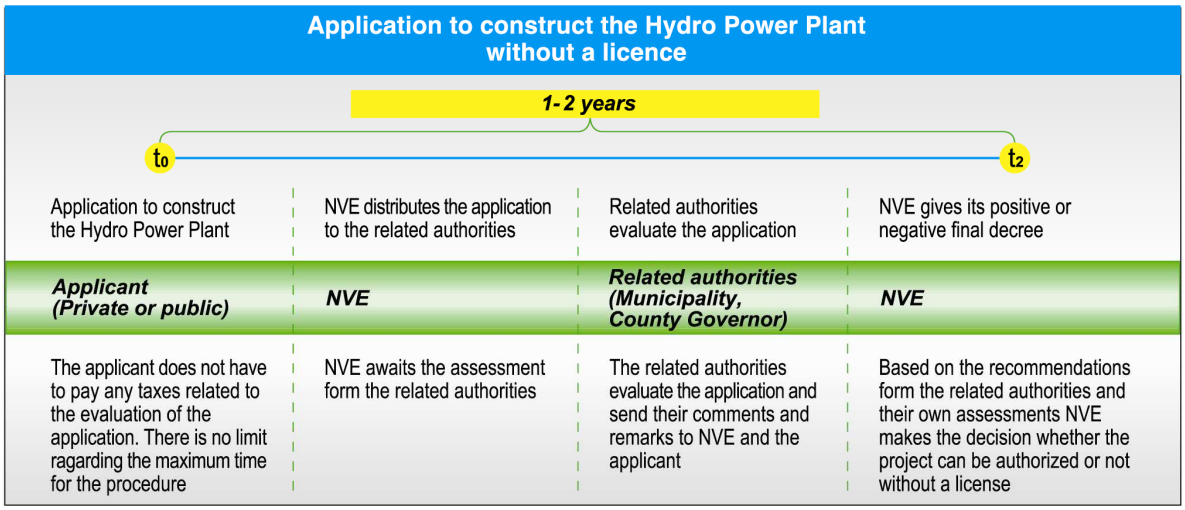


Figure 3.4. Flowchart of procedure, without a license

However, if the authority does not authorize the development of hydro power without a license the applicant must decide if he wants to go further with an application for a license, and if so the following procedure yields, presented on Figure 3.5.

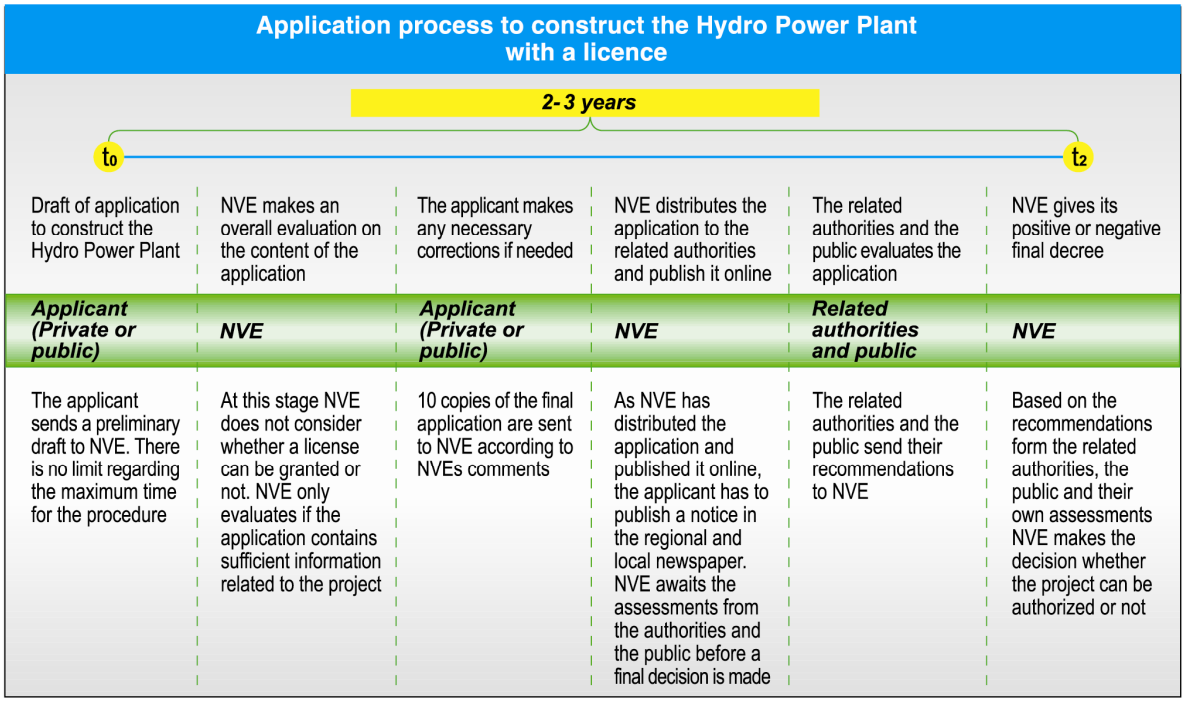


Figure 3.5. Flowchart of licensing procedure

As for the simplified application process as described in Figure 3.2, there is no taxies involved in this process either. Also, the authorities are not committed to give their final decree within a certain time frame.

3.4.4 Authorization to build an SHP

As the application to use the water and build a SHP is the same application in Norway, the content in chapter 3.4.4 is the same as for Chapter 3.4.3.

3.4.4.1 Required technical documents to be submitted

Please see Chapter 3.4.3.1.

3.4.4.2 Timing of procedure

Please see Chapter 3.4.3.2.

3.4.4.3 Costs (taxes, procedure fees, other compensations)

Please see Chapter 3.4.3.3.

3.4.4.4 Evaluation criteria

Please see Chapter 3.4.3.4.

3.4.4.5 Flowchart of procedure

Please see Chapter 3.4.3.5.

3.4.5 The authorization to build the electric line of SHP - procedure to connect the plants to the grid

As the application to use the water, build a SHP and build the electric line of SHP is the same application in Norway, the content in Chapters 3.4.3 and 3.4.5 is pretty much the same. However, some additional specifications are described in the following chapters.

In Norway, Statnett is responsible for co-coordinating supply and demand in the power system. When new installation is connected or old disconnected or changed, Statnett must be notified. Being a transmission system operator, Statnett owns and operates large sections of the main Norwegian power grid and the Norwegian section of power lines and subsea cables to other countries.

The grid company has a special responsibility to ensure that the grid capacity and technical demands, which influences the economy of the current project is revealed in the early stages of the application process. The principal rule is that as long as it is available capacity on the electric grid, the current grid company is obligated to accept new or increased production. However, according to present regulation, if there is no available grid capacity, the grid company is not explicit obligated to connect new producers to the grid.

There are three main alternatives to develop, operate and own the connection line between the power station and the existing grid:

- the developer owns, builds and operates the grid line;
- the developer owns the grid line, and the current grid company builds and operates the grid line;
- the grid company owns, builds and operates the grid line.

3.4.5.1 Required technical documents to be submitted

The following information must be described in the application:

- power line or cable and the dimensions of the line or cable must be described;
- voltage level at the grid connection;
- length of line or cable;
- agreement between the current grid company and the applicant.

3.4.5.2 Timing of procedure

Please see Chapter 3.4.3.2.

3.4.5.3 Costs

The concessionaire is obligated, free of charge, to inform whether it is recommendable or not to connect new or additional production to the existing grid.

If, in an operational point of view, it is not recommended to connect new production in the existing grid, the grid company is not obligated to cover the costs related to reinforcement of the grid. The costs related to the upgrade of the grid must then be covered by the applicant. Furthermore, if several plans for development of SHP are existing in the same area, a solution may be that all the developers split the costs among each other.

The grid company can determine an economical contribution to cover the costs related to new grid connections or reinforcement of the existing grid.

The developer is responsible for the connection between the power station and existing grid, and basically the developer is responsible for the evaluation and calculations of costs related to the connection.

The concessionaire is also obligated, upon request, to suggest the most adequate point of grid connection.

Everyone who is building and operating electrical units corresponding to voltage above 1 kV must be assigned an installation concession. Furthermore, if one is involved in power trade, power production etc one must be assigned a trade concession.

3.4.5.4 Evaluation criteria

In theory, development of SHP is prioritized in regions where there is a deficiency on electric power. However, in Norway it is a substantial problem related to the fact that the grid capacity is insufficient, and the grid needs reinforcement to connect new production of electricity.

In many cases, the costs related to the reinforcement of the grid is quite substantial, thus this may in fact prohibit development of SHP as the applicant is not able to finance the necessary reinforcement.

Please see Chapter 3.4.3.4 for further details.

3.4.5.5 Flowchart of the procedure

The authorization to build the electric line is given as a part of the main concession for the SHP. Before the application for the concession is handed over to the authority the following steps has be carried out:

- the capacity of the electric grid must be clarified with the current concessionaire when new or increased production is under consideration;
- common agreement between the current grid company and the applicant;
- an survey to find the best point of grid connection;
- if the SHP has a voltage above 1 kV, an installation concession must be applied for as well. Still, You only have to compose one application as long as a chapter describing the high voltage installation is included. However, one should emphasise that it is not common that the voltage level exceeds 1 kV for SHP;
- if the SHP is involved in power trade, a trade concession must be applied for. Still, You only have to compose one application as long as a chapter describing the power trade is included.

Please see the flowcharts in Chapter 3.3.5 for further information.

3.5 AUSTRIA

3.5.1 Definition of small hydropower in Austria

According to § 5(1) of the Green Electricity Act ("Ökostromgesetz"), the maximum size for small hydropower is an installed capacity of ≤10 MW.

3.5.2 Environmental impact assesment

The Environmental impact assessment (EIA) for SHP projects in Austria is in the competence of the 9 federal lands. The procedures are to be proceeded by the district authorities with specialist assistance through experts from the central administration. For example the federal land Lower Austria is divided into 21 districts. The employees of these district authorities belong directly to the administration of the Lower Austrian government.

- Pre-phase to assess if an EIA is needed – without temporal limitation;
- Environmental impact assessment – this is necessary in any case for Hydro power stations with bottle neck capacity of 15 MW (in Austria no SHP) and in case of a chain of SHP stations for plants with bottle neck capacity of 2 MW. Such a chain of SHP stations comprises 2 or more plants without a intermediate free flow section of at least 2 km.

Pre phase

The pre phase takes place before filing the application for the permission. To use this pre phase as an opportunity for al pre procedure is not obligatory for the applicants but in any case very recommendable.
For a pre procedure the applicant has to apply at the district authority (special consultation days for water issues). The pre procedure is for preliminary discussions about the project – once or oftener – depending on the complexity of the case. During this phase it is to clear if the project needs an EIA or not. For this clarification the applicant has to deliver a list of documents:

- short project description, and
- conception for an environmental impact declaration – has to describe what, where, when, who shall be analysed and assessed in the declaration.

The authority will also call other specialist departments to check the documents and to make a common statement about the project and the conception. It is in the decision of the district authority if also other stakeholders will be involved into the pre procedure – like citizens advisory board and/or official Lower Austrian environmental advocacy. There is no legal title of the public to be involved in pre procedures.

Environmental impact assessment (EIA)

The EIA is to be started through an application (by the applicant) for implementation of a permit procedure. The application has to be added through the needed documents.

Environmental impact declaration (EID):

- project description;
- description of alternative options – as far as checked by the applicant and the causes for this choice;

- description of the considerable affected environment (current state description);
- description of the project impact on the environment (forecast);
- description of measures to avoid or reduce the impact;
- abstract – understandable also for non-specialists;
- optional – a summary of problems at the compilation of the documents.

The documents are at least for 6 months visible at the local municipal office and the EIA-authority for everybody – to bring in statements.

The authority examines the EID (completeness, traceability, correctness) and makes an environmental impact expertise about it. This examination has to be done with redard to concession criteria of the EIA-law 2000.

The involved authorities give their opinion. Also the official environmental advocacy and the local municipal office and the competent national ministry (ministry for agriculture, forestry, environment, water affairs) may give their opinion about the EID.

In big procedures (usually if more than 100 people involved) there is also the possibility of a public discussion. The decision if a procedure is a big one or not is to be made by the authority.

In any EIA procedure there is also a oral proceeding obligatory – in big procedures in public way, otherwise only with the involved parties.

In case of conflicts the permit procedure can be interrupted for carrying out a mediation procedure. The authority has to decide about this possibility – the applicant has to apply for it.

Finally the authority will make its decision based on the EID, the environmental impact expertise, the expertises and statements as well as the results of an eventual public discussion and the oral proceeding. At making the decision there is to be paid attention that under consideration of all environmental aspects the best overall result is to be achieved.

The decision is to be published for at least 8 weeks in the local municipal office and at the EIA authority - and the population is to be informed.

The decision in an EIA procedure is intended within 9 months – beginning from the moment of application.

3.5.3 Obtaining the concession for the use of water

The permit procedure for water utilization is usually carried out together with the permit procedure for the construction of the SHP – “concentraded procedure”. That means that the complete course of both permissions is combined in one integrated procedure and carried at the same time - coordinated by the district authority. This is a very helpful simplification of the procedure for all involved parties and other interested groups and also for the authorities.

Therfore the following specifications about time response and costs as well as the flow chart are for both blocks (water utilisation and SHP) the same.

3.5.3.1 Required application technical documents to be submitted

For institution of the permit procedure are at first to bring forward an advising and than an application to the authority.

Required project documents are normally plans, descriptions and expertises. How these documents have to be designed and if eventually also certificates, protocols or something like this is necessary, is to be decided by the authorised experts of the individual procedure – in the course of the expertise. There are no general parameters for that.

3.5.3.2 Timing of procedures

- in normal case for the whole concentrated procedure – max. 6 months, and
- in case of an EIA – 9 months.

3.5.3.3 Costs

For the whole concentrated procedure (use of water and build the SHP):

- application 13,20 €
- plan 7,20 € per Plan
- attachments 3,60 € per A4
- negotiation 9,45 € for 30 minutes
- national fee 27,20 to 327,00 €
- check of implementation 9,45 € for 30 minutes
- decision after checking 6,50 €

These are single amounts that have to be combined depending on the individual case – for example:

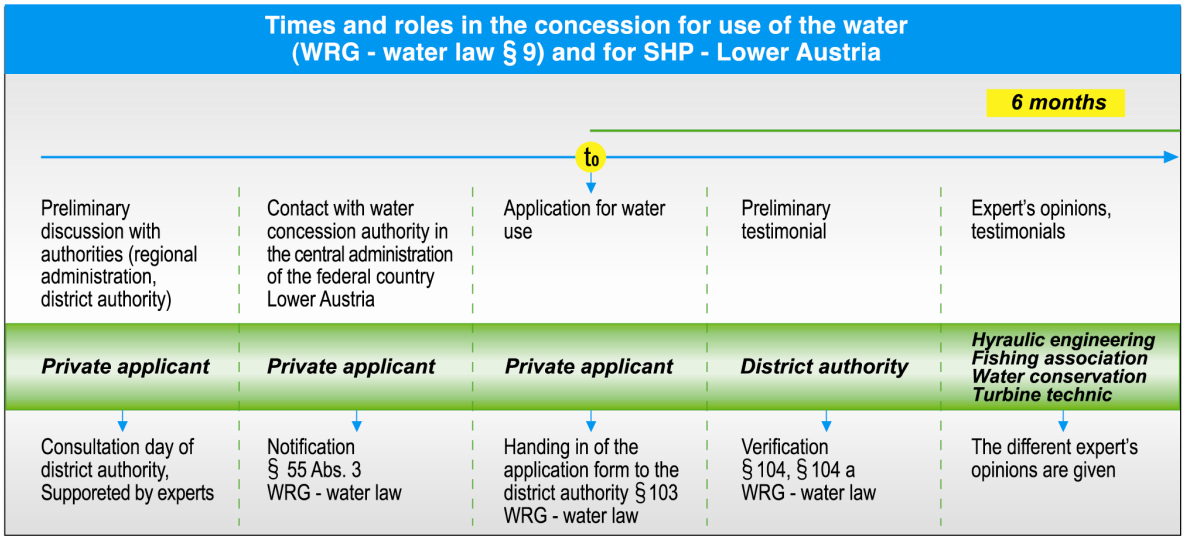
- 1 application form 13,20 €
- 5 plans 36,00 €
- 28 A4 100,80 €
- negotiation – 3 authority staffs 2 hours 113,40 €
- national fee 85,00 €
- check - 2 authority staffs 2 hours 75,60 €
- decision 6,50 €
- amount 430,50 €

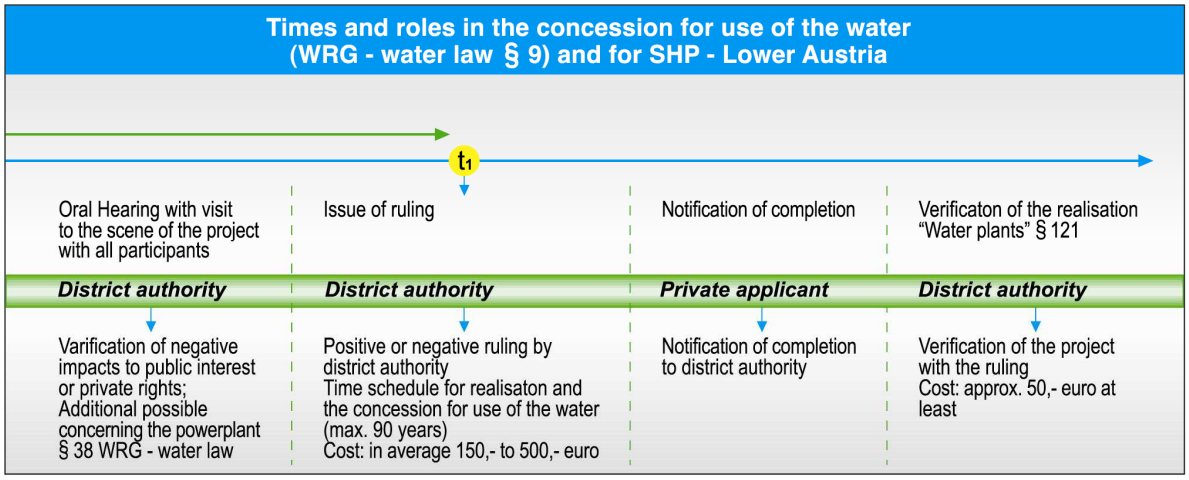
3.5.3.4 Evaluation criteria

Basic criteria for permit are:

- ecologic situation (§105 water law);
- public interest concerning water utilisation (§12 water law);
- ecologic efficiency (§ 7 nature and landscape conservation law);
- landscape conservation (§ 8 nature and landscape conservation law).

3.5.3.5 Flowchart of the procedure





3.5.4 Authorisation to build an SHP

The permit procedure for water utilization is usually carried out together with the permit procedure for the construction of the SHP – "concentrated procedure".

Therefore the following specifications about time response and costs as well as the flow chart are for both blocks (water utitlisation and SHP) the same.

3.5.4.1 Required application technical documents to be submitted

For institution of the permit procedure are at first to bring forward a advising and than an application to the authority.

Required project documents are normally plans, descriptions and expertises. How these documents have to be designed and if eventually also certificates, protocols or something like this is necessary, is to be decided by the authorised experts of the individual procedure – in the course of the expertise. There are no general parameters for that.

Conditions for establishment of barrage and weir facilities

1. Construction measures have to be undertaken in consensus with the land-owners and the department of riparian construction (WA3) of the Lower Austrian Land administration.
2. At least a fortnight before inception of construction works the holders of riparian rights (those located nearest downstream and upstream) and the holder of fishery rights. In case construction works will possibly be of temporary influence for these right holders, consensus with them has to be reached and eventual damage has to be repaired.
3. During the course of construction works one has to prevent any sort of substance harmful to fishery and water quality from flowing into the watercourse.
4. Construction management has to secure that even in case of flooding all the water can flow away without causing any damage.
5. The erection of all kinds of facilities necessary for the construction site and the storage of construction and excavation material are forbidden, and so is the parking of construction vehicles within the boundaries of the flooding danger zone. In case of upcoming floods necessary measures need to be taken immediately.
6. After termination of construction works, the flood profile zone has to be abandoned entirely and without delay.
7. Eventual field damage have to be re-compensated following the guidelines of the Lower Austrian Chamber of Agriculture.
8. Banks and bottom have to be put in good order again taking into account frictionless integration into existing landscape structures with the least possible flow-resistance.
9. Embankments which are not secured in a special way, are to be equipped with humus and grass needs to be planted on them.
10. Existing parts of barrages and wooden pilots either have to be removed, or they must be cut at the level of the river-bottom.

11. The barrages have to be tightly and deeply connected to the ground and the appearance of potholes has to be prevented.
12. One has to deliver a proof of the stability of the barrage construction and a civil engineer authorized for this field has to approve it. The opinion has to be handed to the authorities which will keep it in public evidence.
13. All facilities must be prevented from access of unauthorized persons and secured against manipulations by such persons.
14. Only authorized enterprises may carry out the relevant work.
15. The relevant security instructions have to be followed during construction and operation.
16. Operation piers, side walls in the vicinity of the barrage and other places of hill-slide danger have to be secured by railings or safe coverings.
17. All required height level marks have to be installed according to the water storage level regulation. A protocol on the installation of the storage water height mark has to be presented to the authority.
18. For each facility, an operation guideline has to be elaborated containing a list of maintenance measures and of measures against icing and their intervals, too. Reference to the regulation and alarm equipment has to be given. This guideline also has to comprise an instruction about the opening of the bottom drain and the barrage flaps for the purpose of bed load transport. The instruction has to be presented to the Riparian Rights' Authority prior to putting into operation of the plant.
19. In case of any alterations during the construction phase, all such changes have to be documented in the documentation for technical acceptance together with a technical description and some plans.
20. The plant operator has to nominate a reliable person in charge of operation and a deputy person as well. They must be permanently available; the authorities must be given their phone number.
21. The barrages have to be kept free from ice and log jam.
22. An unlockable opening has to be foreseen in order to guarantee a required minimum flowing water throughput which must remain in the river-bed. It must be safe from log-jamming. A hydraulic proof for this opening has to be presented in the acceptance protocol.
23. All part of the plant have to be maintained in an impeccable and statically stable state.
24. The applicant for a permit is in charge of the maintenance of the banks in the storage zone and in the area of in-built equipment as well as of measures for the protection of equipment. Moreover he has to secure that the drain bottom remains free from log-jams and sand-banks. He has to remove flood disaster damage immediately.

Conditions for hydropower-plants (water ecology)

1. A construction surveyor for riparian affairs has to be nominated for implementation and controlling of all measures of projects for minimization of hydro-ecological impacts, as there are for instance
   - Construction of the fish bypass;
   - Erection of the bottom-deepening area in downstream direction;
   - Measures in the intersection between upstream flowing watercourse and storage area;
   - Design of storage area;
   - Measures for stabilization of banks.

   He has to document his activities.
2. Whenever the SHP station is to be built in a watercourse bypass, it has be ensured that in the remaining water-body beside the by-pass a minimum water throughput (indicated in liters per second) will be maintained all year long. According to the specific needs of the dominating fish species and their ovulation periods, the amount of water throughput to be left within the original watercourse has to be specified individually for different periods of the year. All the quantity of watrer which has to be left in the original river-bed has to be led through the fish-bypass in order to create sufficient current attracting fish to use it.
3. Fish-bypasses have to be installed in line with the project documentation and the plans contained in it, respectively according to specifications in expert literature. After its construction an expert has to assess its functioning and if necessary, the construction has to be changed according to practical needs – for instance effective height has to be changed.
4. For regular control of the operators' abiding by the prescribed minimum amount of remaining water, alongside the barrages measuring and controlling devices need to be installed (e.g. Thompson-weir or similar).
5. After completion of the construction works, the Riparian Rights Authority is to be presented with plans

based on constructed reality, giving details on:
- Deepening of river-bed downstream;
- Design of storage area;
- Measures for stabilization of banks.

6. The operation guideline oft the SHP plant has to contain a chapter on the regulation of the river-bottom outlet created for easy transportation of bed-load resp. on eventual leaching away of bed-material in case of water throughput exceeding medium quantity (from Q > MQ onwards). This prescription serves in particular fort he maintenance of bed-load transport and the avoidance of potentially harmful outleaching of the storage area.
7. In run-of-river-hydropower stations all downstream sand deposition has to be restricted to the area of the turbine outlet on one hand so as to guarantee the keeping of the required effective height, and on the other hand in order to avoid large-scale interventions into the river-bottom substrate in downstream direction.
8. Material taken out when cleaning the upstream grid has to be disposed of properly. The proper disposal has to be proven. By no means the material may be disposed of in the outlet section or in downstream river sections. If another procedure is chosen, good reason for doing so has to be provided.

Conditions for the operation of hydropower plants

1. By installation of appropriate equipment it has to be guaranteed, that at no time less than an amount of liters per second will remain in the watercourse, with priority given to this.
2. The fish-bypass must be permanently watered with a minimum quantity of l/s.
3. The feed-in drain leading to the power station must be equipped with a fine grid avoiding the passing through of fish.
4. Pressure in the pressure pipeline has to be carried out exerting the maximum pressure which according to the hydrodynamic concept may happen during operation.
5. Both feed-out and feed-in facilities must be built adapting them well to the adjacent slopes and so that potholes cannot form. If necessary, in the water-outlet zone leading the water back into the watercourse also at the opposite river-side a pothole protection has to be installed.
6. Eventually produced excavation material must be stored beyond the zone of flooding danger.
7. The entrance door to the turbine room must be permanently locked when not in use. A warning sign saying ”no access to unauthorized person” must be mounted.
8. All service catwalks must be secured against entrance of unauthorized persons and have to be equipped with a banister.
9. Sliding lock-gates and panels need to be produced in a way that ensures their functioning even at very low temperatures.
10. Material removed at the grid has to be disposed of properly, and when required by the Riparian rights’ Authority, proof on this needs to be presented.
11. Swell-Operation (= operation under fluctuating water levels adapted to changing electricity demand) is prohibited.
12. Slopes erected during the course of plant construction need to be equipped with topsoil and planted with location-adequate trees and bushes.

3.5.4.2 Timing of procedure

- in normal case for the whole concentrated procedure – max. 6 months, and
- in case of an EIA – 9 months.

3.5.4.3 Costs

For the whole concentrated procedure (use of water and build the SHP):

• application	13,20 €
• plan	7,20 € per Plan
• attachments	3,60 € per A4
• negotiation	9,45 € for 30 minutes
• national fee	27,20 to 327,00 €
• check of implementation	9,45 € for 30 minutes
• decision after checking	6,50 €

3.5.4.4 Evaluation criteria

As the procedure is carried out in a concentrated form, the evaluation criteria the permit to use water also apply accordingly for the permit to build a SHP (see 3.3.4)

Additional to that there are also the appointments from the electricity law of the federal land that have to be considered for the permit to build a SHP.

§ 5

Obligation to obtain a permit

1. Irrespective of permits or approvals that are required by other directives, the construction and the essential modification and the operation of a generation plant with a bottleneck capacity of more than 20 kW – according to the requirements of the following appointments – needs a permit according to the electricity law (approval of installations) – as far as nothing else results from the sections 2, 3, 4 of this paragraph.
2. Generation plants, that need for construction and operation a permit or approval according to waste law, mining law, telecommunication law, industry law, air monitoring law or traffic law, are not subject of the main section II (§ 5 to § 29)
3. Installation, provision, operation of mobile generation plants are not subject of the obliation obtain a permit according to section 1.
4. Generation plants, that in economic and functinal context with this activity also produce and release heat, are not subject of the main section II, if for these generation plants an obligation to obtain a permit according to the industry directive (1994) is existing.
5. In doubt the authority has on application to declare through notification, if a modification in sense of section 1 requires a permit. Essential are in any case modifications of purpose, mode of operation, volume of the generation plant, of used primary energy, of facilities and equipments, if these are suited to cause bigger or other dangers or disturbances. The exchange of similar machines and instruments as well as measures for maintenance or repair are not considered as essential modifications.
6. If a generation plant that is permitted according to section 2 has no more the character of a plant according to waste, mining, telecommunication, industry, air monitoring, traffic law, than the operator has to indicate this at the now competent authority. From the arrive of this indication the permit or approval according to section 2 is considered as permit according to this law.

§ 11

Conditions for the granting of the Permit according to electricity law

1. Generation plants are according to the stat of the art to construct, to modify, to operate that way, that through construction and operation of the plant or through storing of operating resources or residues and such like:
    - the life or the healthiness of the operator of the generation plant;
    - the life and ort he healthiness of neighbours or the property or other real property rights of the neighbours are not endangered;
    - neighbours are not bothered unacceptably by noise, smell, abrasion, heat, vibration, blinding or in other way;
    - the applied energy is applied in an efficient way, and
    - the location is dedicated
2. As endangering of property in sense of section 1. figure2 is not meant the possibility of a mere decrease in value of the current market value of the property
3. If annoyances in sense of section 2 figure 3 are acceptable is to appraise accordingly to the question, how the modifications of the real local circumstances caused by the generation plant affect a healthy, normal sensitive child and a healthy, normal sensitive adult.
4. The location is in any case not appropriate, if the construction or the operation of the generation plant are forbidden through directives from the land use planning at the date of appraisal or if the justified public interests from § 56 “building law” are considerably affected.
5. If a permit according to the building law is not required for any generation plant, then the appointments with regard to structural engineering and the appointments for total energy efficiency in buildings of the building law are to be dispensed correspondingly.

6. The authority is empowered, to enact more detailed appointments about the permit conditions according to section 1.

§ 12
Grant of the permit

1. The generation plant is to permit via written notification, if the conditions according to § 11 section 1 are fulfilled - particularly, if according to the state of technology and to the state of medical and else relevant sciences, it is to anticipate, that generally or in case of compliance of the certain appropriate obligations (that are to stipulate if necessary) the endangerings (that are foreseeable according to the circumstances of the particular case) are avoided or disturbances are limited to a acceptable quantum. If the conditions can also through such obligations not be fulfilled, the permit according to electricity law is to deny.
2. The authority can order in the permit notification, that the operator has to authorise an able site supervisor, if this is necessitated by type and volume of the project or if it proves necessary for keeping the interests that are determined in § 11 section 1 figure 1 to 3. The authorised site supervisor has to control the construction of the generation plant.
3. The authority has to limit emissions accordint to the state of technology through appropriate obligations. If there are no concerns from the viewpoint of the protection of the interests (described in § 11 section 1), the authority can allow, that specific obligations do not have to be observed until a specific date after commissioning of the plant or of plant components. This date is to be appointed corresponding to the expenditure of time for the necessary measurements.
4. State of technology is the development status of technological procedures, equipments, construction methods, operation methods, that are based on respective scientific awareness and that have proved and tested operational reliability. At the definition of the state of technology there are particularly to be drawn such comparable procedures, equipments, construction methods, operation methods, that are most effective for achievement of a general high protection level for the environment.
5. Through a change of the operator of the generation plant the valildity of the permit is not touched. The permit has real effective, since rights that result out of it also can be asserted by the legal successor and obligations resulting out of it also have to be fulfilled by the legal successor. The legal successor has to inform the authority promptly about the change.
6. As far as modifications require a permit, this permit has also to comprise the already permitted generation plant thus far, as this is because of the modification necessary for the protection of the in § 11 section 1 described interests against the already permitted plant.
7. The agreements, made in the course of proceedings, that were carried out according to this law, are upon request of one of the involved parties to certificate in the notification by the authority.
8. The completion of the generation plant is to advise to the authority by the operator. With this advice the operator obtains the right to start the operation, unless something else is arising from § 14 section 1. The completion of a part of a permitted generation plant may be advised, if this part on its own answers the permitted purpose and the obligations or contracts that concern this part. There is to add a certificate by an accredited body (consulting engineer, engineering office or another technical qualified body) to the completion advice. In this certificate is to make a statement about the completion according to the project and about the fulfilling of the required obligations and contracts.
9. The authority can officially make inspections and is particularly entitled to inspect the compliance between the completions with the permit. If in course of the inspection deficiencies are established, the authority has to order the removal within adequate deadline and if necessary to enjoin the completion of the work on the concerned part.

3.5.4.5 Flowchart of the procedure

The flow charts for obtaining the concession for the use of water and authorisation to build a SHP are in one pice because these two approval procedures are being dealt together in one procedure by the authorities in region Lower Austria – please see chapter 3.5.3.5.

3.5.5 Authorisation to build the electric line of SHP - procedure to connect the plants to the grid

3.5.5.1 Required application technical documents to be submitted

For plants with more than 20 kW bottleneck capacity has to be filed an application for appreciation as a “green electricity plant” (for water-based plants), to get a fix feed in tariff by ÖMAG (Green Electricity Settlement Center inc.)

Positive decisions to the following required permits are basic requirements:

- decision according to water law;
- decision according to nature and landscape conservation law;
- decision according to electricity law or installations permit according to the industry regulation act;
- nomination of the counting point – is to request from the grid operator;

With these documents you can file an application at the federal land government for acceptance as a “Green electricity plant”

3.5.5.2 Timing of procedure

Total maximum time is 6 months

- from application filing until public announcement by the authority 30 days
- time for inspection by neighbours 30 days
- time for decision by the authority (oral proceedings for plants with less than 250 kW not compulsory) 4 months

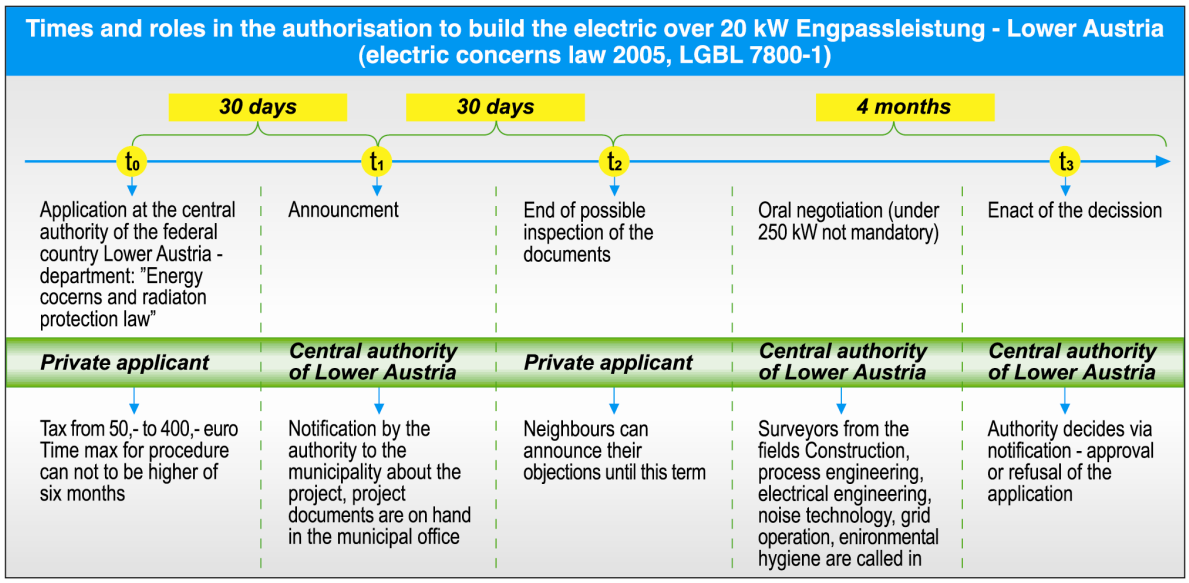
3.5.5.3 Costs (taxes, procedure fees, other compensation costs)

Fee is from 50 to 400 €.

3.5.5.4 Evaluation criteria

Condition is that the required permits according to water law, nature and landscape conservation law, building law, electricity law and also the counting point by the grid operator are given.

3.5.5.5 Flowchart of the procedure



CHAPTER 4

CRITICAL REVIEW OF DIFFERENT REGULATIONS REGARDING THE POINTS OF CHAPTER 3

This chapter gives critical review of different regulations regarding the points in Chapter 3. Both the weak and the strong points of different regulations and most important conflicts related to the use of water in partner countries are presented.

4.1 ITALY

4.1.1 Weak points of different regulations

Water use concessions	a) No substantial differences exist between the concessions for micro/mini diversions and large diversions; b) The thresholds for the regional checking of EIA are too low; c) Compensation costs are not defined; d) Uncertainties on the data regarding water resources; e) Uncertainties on the minimum flow rate to release in the river bed; f) Non-implementation of the obligation to install flow meters;
Authorization to build a power plant	g) Legislative decree no. 387/2003 has not been fully enforced yet; h) The relevant authorities are not well identified;
Authorization to build a power line	i) Fixed prices regarding Grid connection;
Points in common	j) Duplication of procedures; k) The guide lines regarding the documents to submit are non-existing.

a) No substantial differences exist between the concessions for micro/mini diversions and large diversions: this is the first non-technological barrier to the development of mini hydropower plants because the general procedure for granting water use concession is rather complex both as regards the documents to submit and the procedures to go through; the applicant is thus required to bear a considerable economic commitment which makes some types of plants (mainly micro hydropower plants up to 100 kW) economically unsustainable. Among them are the micro hydropower plants, located along secondary water networks created for irrigation purposes, that do not take water away but return it at an elevation useful for irrigation. Often, micro power plants are only aimed at self-generation and are connected to the power box of the house located in the area of the power plant; the low levels of energy generation added to the considerable difficulty to obtain water use concession lead the people interested to give up the idea regarding it as economically unsustainable.

b) The thresholds for the regional checking of EIA are too low: as regards the EIA procedure, it would be interesting to propose thresholds that are different from the existing ones, which subject the plants to the environmental impact assessment procedure. Currently, the threshold for the checking procedure is equal to 200 l/s, if the plants is located into a protect natural area, the 200 l/s threshold is halved and power plant project goes directly to the EIA; the respective procedures require the submission of a considerable amount of documents aimed at assessing the impact of, often, small-sized plants, run-of-river types, that immediately return water downstream of the water diversion barrier; it is clear that, as regards water exploitation for energy generation, the advantage for the firm is much greater than the impact of plant construction. **The criteria according to which the plants are subject to checking should be changed and, in this case, connected not only to water quantity but also to how water is derived and returned.**

c) Compensation costs are not defined: such costs, connected to the examinations, consist of a

payment of a fee related to the granting of water use concessions (extra-fees), and of a compensation for the environmental “damage”, less explicitly provided for within the regulations concerning the competence of the managing bodies of Parks and Municipalities. Precisely, the Bodies and the Municipalities cause the increase of the costs of plant construction, as they require considerable and unexpected compensation costs, both in terms of amounts and application rules. The lack of a real definition of the compensation costs required by the Bodies and the Municipalities may make similar plants on the same site more or less feasible, in terms of soil occupation and impact caused by the construction of the plant.

d) Uncertainties on the data regarding water resources: one of the aspects that limits the development of mini hydropower is due to the uncertainties regarding water resources: Italy lacks a technical data bank capable of supplying data regarding the flow rates of exploited water resources, which are fundamental in order to take a technically and economically sustainable decision. The available data are not always certified, they are often disagreeing and almost never supported by a precise reference to their origin; in this respect, it should be emphasized that the Italian national regulations consider ISPRA (Institute for Environmental Protection and Research) the national agency in charge of technical-scientific tasks and activities at national level as regards environment, water and soil protection. Among such activities are the competences originally entrusted to ANPA (National Agency for Environmental Protection established under law 61/94) and then merged, along with the national technical services, in APAT (Agency for environmental protection and technical services) first and recently in ISPRA. Among its tasks are the regular collection and publication of all environmental data, also through the carrying out of the environmental monitoring and information system. However, ISPRA only provides the environmental yearbook which comprises the data resulting from the monitorings supplied by regional agencies (ARPA, APPA, Regions, Autonomous Provinces, Land Reclamation Consortia); giving a look at the flow rate reports, you realize that, all over Italy, only 5 flow monitoring stations of the main rivers are, in fact, examined; thus, this information cannot be used due to the need for accurate analyses regarding the optimal sites to build the plants. If you want to refer to the data available at local territorial Bodies (ARPA, APPA, Regions, Provinces and Land Reclamation Consortia), you have to cope with the not homogeneous data archives and administrative management of such bodies, which, in many cases, have not yet achieved the power to fully carry out their peculiar functions as prescribed by law. The consequence is a not homogeneous and not in the least clear national framework, mainly to those private entities who intend to work on the territory.

e) Uncertainities on the minimum flow rate to release in the river bed (Reserved Flow – hereinafter DMV): the lack of reliable data on the real availability of surface and underground water directly causes difficulties in carrying out proper quantitative assessments on the required site (definition of the reserved flow) and the relevant subsequent monitoring of releases. In particular, having reliable flow data is deemed necessary in order to correctly determine the hydrologic component of the DMV, bearing in mind all the serious consequences for grantees in case of overestimate. In some regions, the extreme consequence of such lack of technical knowledge has led to the delay of diversion authorizations, thus transferring to the PTA (Water Protection Plan - WPP) the theoretical assessments regarding the definition of the DMV of a waterway; on the contrary, in other regions (Valle d’Aosta), the regulations for granting new mini hydropower plants state that the applicant is in charge of carrying out the monitoring of the volume of flowing water in the river bed for at least two years.

f) Non-implementation of the obligation to install flow meters: under the Consolidation Act on water no. 152/06, the Ministry of the Environment should issue the guide lines and the regions should define the technical specifications for the installation and maintenance of (compulsory) devices to measure flow rates and derived public water volumes next to withdrawal spots and, where existing, next to the spots where water is returned, as well as the methods to pass on the results of the measurements carried out by the granting Authority. As these provisions, which would surely reduce the existing uncertainties regarding the availability of basin water resources, have not been issued yet, water concession grantees currently stick to the technical directions contained in the rules and regulations of the individual concession order as regards flow rate measurements, or, on their own initiative, they propose technologically advanced projects which are welcomed by the granting Authority; the guidelines are needed as soon as possible.

g) Legislative decree no. 387/2003 has not been fully enforced yet: the decree at issue has been approved in order to rationalize the authorization procedures to build and operate power plants for the generation of energy from renewable sources, including hydropower plants of any capacity. The decree has introduced an innovative tool – the use of the Conference of the Concerned Bodies, meant as a useful opportunity to gather all the bodies involved in expressing their opinion. The art. 12 of the over-mentioned decree gives the possibility to authorize also the construction of the works directly connected to the power

plant, such as the long-distance power lines necessary for Grid connection. So, in most of the cases dealt with so far, the Conferences of the Concerned Bodies have only authorized the hydropower plant and have referred the authorization for the necessary long-distance power lines to subsequent examinations. This happened because in the cases dealt with in past years, the firm had submitted only the project regarding the power plant and only later had it submitted the application for the authorization to build the long-distance power lines; in that way, it transferred such burden to the local power company (e.g. ENEL). In the past years, such behaviour has led to wait at least 180 days in order to obtain the authorization to build the power plant and further 180 days to obtain the authorization to build the long-distance power line, without considering the so-called "dead" time for the submission of possible integrations which have allowed the applicant to build the plant at least 1 and a half year after the submission of the authorization application.

h) The relevant authorities are not well identified: decree no. 387/2003 has been approved in order to rationalize the authorization procedures to build power plants for the generation of energy from renewable sources, but it has not precisely indicated the relevant bodies in charge of expressing an opinion according to the technology to authorize. The risk is to involve the useless bodies and not to involve relevant authorities.

i) Fixed prices regarding Grid connection: the recent resolution no. 99/08 of the Regulatory Authority for Electricity (hereinafter A.E.E.G.) has introduced some important innovations as regards the private entities who apply for the authorization to build both the power plant and the long-distance power line. The private entity can also submit the authorization application to modify the existing public Grid to the provincial offices, whereas such application is usually submitted by the power company. The power company and the private entity can reach an agreement so that the private entity submits both the applications to modify the Grid and to build the power plant. After obtaining both authorizations, the private entity refers back to the power company and requires the construction of the authorized works and a detailed quotation. The initial assessment of the formulas comprised in the over-mentioned resolution reveals that the quotation required by the power company is, on average, higher than the quotation that was required before the introduction of such resolution.

j) Duplication of procedures: the applicant who wants to build a hydropower plant shall go through at least three different examinations: obtaining the water diversion concession, building and operating the hydropower plant and the authorization to build the long-distance power line; each of the over-mentioned examinations requires different costs, time and documents. The damaging aspect of such situation is mainly due to the involvement of the Bodies: as regards each of the three over-mentioned examinations, the bodies involved and required to express their opinion are almost always the same, such as the relevant Municipality, ARPA, Land Reclamation Consortia, ASL (Local Health Authority) and the Managing Body of the Park, if applicable, and every time, they are asked to analyze a single step of the general project. It is clear that the general project shall include references to the works connected to the operation of the plant, the environmental impact and the administrative and legal implications connected to its construction. Even though they will be differently investigated by the three examinations, such aspects must be already included as fundamental elements of the project and thus they must be already assessable in advance by such Bodies. The Bodies involved are required to express their opinion on the same project but in different examinations, thus duplicating the activities of the bodies required to express their opinion regarding other procedures; so, in Lombardy, the Region has made an effort to coordinate the procedure of concession granting with the environmental impact assessment procedure, identifying common stages for the two examinations; thus, we believe there may be the conditions for an improvement of the state of the art. **Procedure 387/2003 may also be used for water diversion concession in order to standardize the procedures, and, thus, it may be updated with regard to mini hydropower.**

k) The guide lines regarding the documents to submit are non-existing: the existence of several procedures, that despite assessing the same project, are characterized by such regularly marked administrative steps and time, forces the applicants to continually submit integrations to the documents. The aspects assessed each time not only extend the time and make costs heavier, but they may also trigger a vicious circle within which there is an ongoing request for integrations in order to correctly assess one of the several aspects tackled. This often leads to carry out changes to the initial project such that two problems may arise: the first problem is that the Bodies assess and express their opinion on projects that are different from one another because they have been integrated following examinations carried out at a different time, and the second problem is that it may be the case that the changes carried out each time lead to a considerable alteration of the original project, which, according to the regulations, shall be subjected once again to the whole procedure. Thus, it would be extremely advantageous to identify a guide line for the

drawing up of the applications which, as far as possible immediately, take into consideration all the aspects that can be assessed by the Bodies involved. The lack of a guide line concerning the documents to submit regards not only the procedure for the granting of the water diversion concession for hydroelectric purposes, but also the procedure regarding the granting of the authorization to build and operate the plant (Legislative Decree 387/03); currently, the offices that are relevant in each case are left in charge of deciding which documents they require. Clearly, this aspect, emphasized by the not homogeneous national framework with regard to the distribution of functions, leaves room for unequal treatment of similar applications.

4.1.2 Strong points of different regulations

Water use concessions	a) Water is considered a public resource; b) Existing regional regulations that can be improved;
Authorization to build a power plant	c) Public use of authorized works; d) Below 100 kW the D.I.A. applies;
Authorization to build a power line	e) Penalties are established for the power company: f) The owner of the plant can also receive authorization as regards the power line; g) Changes to the current urban building plan;
Points in common	h) A transparent administrative procedure.

a) Water is considered a public resource: this principle, already often mentioned in the previous chapters, assures that water exploitation is connected to the principles of public administration: sustainability, conservation, efficiency and rationality. The over-mentioned aspects cannot be pursued if water use turns into a good to be purchased which, as such, would be exploited in order to create profit for the only benefit of its owner. Considering water a resource necessarily requires a broader management that can only be carried out by the public administration. That is why water use concession does not modify the public nature of water; the public administration may coordinate further uses of water and endorse the principle according to which in case of conflicting applications the project that provides for the most rational use of water resources shall be chosen.

b) Existing regional regulations that can be improved: the State has devolved the functions described in chapter 3 to the Regions; some Regions, in turn, have devolved such functions on the Provinces, also by approving regional regulations. As regards Regione Lombardia, the regional regulations have introduced some procedural facilities that deserve being mentioned and, in case, adopted by the national legislation:

- Coordination of the procedure granting water use concessions with the environmental impact assessment procedure. Some steps can be shared by both procedures: this means saving time, coordinating the granting of final documents and saving the costs of publication and documents;
- The procedure of Regione Lombardia defines which Bodies are required to participate in the examination for granting public water concession. The Examining Body does not hold the discretionary power to choose anymore: this assures more fairness to the procedure, which turns into greater protection towards the private entities submitting application and greater transparency as regards the carrying out of the examination;
- The exemption from the compulsory testing of the works that generate less than 220 KW turns into a reduction of time and costs as regards the construction of micro hydropower plants;
- Definition of the percentages (between 5% and 20% of the investment fund) related to the guaranty fund that the grantee must pay for plants over 30 kW. Such further cost is necessary in order to ensure the complete dismantling of the power plant in case it should cease operation. This protects the territory, that, even though it undergoes considerable changes, can be restored to its original conditions, if the plant stops working.

c) Public use of authorized works: legislative decree no. 387/2003 entitles to declare the hydropower plant and its associated works of public use, urgent and undelayable, such as, for example, the long-distance power line. If necessary, such terms may speed up the procedures to expropriate the estates concerned by the works, avoiding delays and long-term lawsuits; however, it is desirable that the firm reaches a positive agreement with the owners before applying for the authorization to build the power plant;

d) Changes to the current urban building plan: the final action that authorizes the construction of the

hydropower plant for public use directly modifies the town plan, even though the power plant is not envisaged;

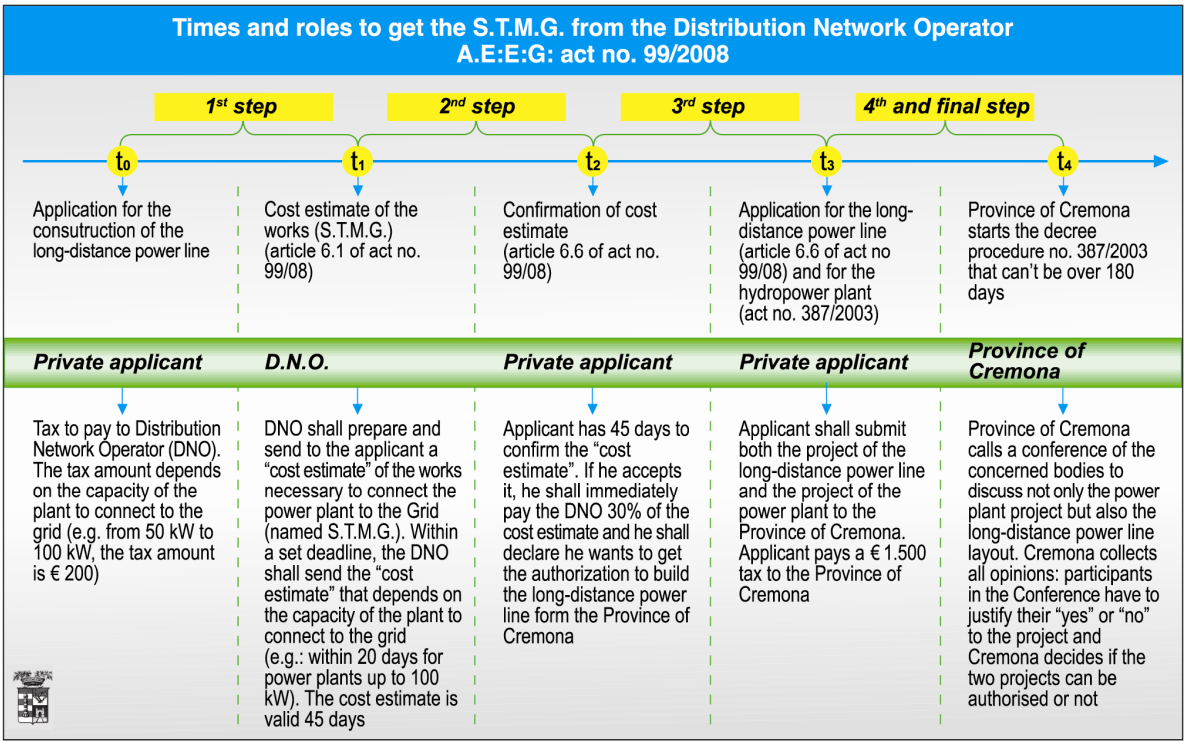
e) Below 100 kW the D.I.A. applies: under art. 2 par. 158 of law no. 244/2007 that has amended art. 12 of legislative decree 387/2003, hydropower plants up to 100 kW are subject to the rules and regulations governing the Declaration of Work Onset (hereinafter DIA); thus, as regards such plants, the Municipal Administrations can neither demand the applicant to apply for a construction authorization, nor can they claim complex and burdensome requirements;

f) Penalties are established for the power company: as regards decree 99/08 of AEEG, for the first time penalties and infliction methods are established if a power company is inactive or is late in supplying the General Minimum Technical Solution - STMG to the applicant. This will spur the local power company to reduce the time necessary to produce a quotation related to the Grid connection of a hydropower plant and to carry out the complete connection.

g) The owner of the plant can also receive authorization as regards the power line:

there is a third way to receive authorization for both the mini hydropower plant and its long-distance power line: the private applicant shall submit both the hydropower plant project and the long-distance power line project under decree no. 387/2003. So, before submitting the two projects (regarding the power plant and the long-distance power line) to the Province (of Cremona), the private applicant ("the firm") shall reach an agreement with the Distribution Network Operator (hereinafter "DNO") regarding the layout of the long-distance power line. In order to favour such agreement, when the firm submits the concession application for water diversion and, thus, long before the submission of the power plant application to the Province of Cremona, it should also ask the DNO for a solution regarding the connection to the grid. Following such request, and within 20 to 60 days under the resolution issued by the Regulatory Authority for Electricity (hereinafter "AEEG") no. 99/2008, the DNO suggests a technical solution named Soluzione Tecnica Minima Generale (General Minimum Technical Solution – hereinafter "STMG") for the connection to the grid, which also comprises a cost estimate of the works to be carried out and to be borne by the applicant firm. The STMG comprises a general list of minimum works regarding modifications to existing plants or the construction of new plants, in order to connect the hydroelectric power plant to the grid. Then, the applicant firm has 45 days to confirm the suggestion and can choose between two different solutions to start the authorization procedure for electric lines construction:

- the firm may inform the DNO that it intends to include the power line directly into the power plant project that is awaiting authorization, under decree no. 387/2003, and that it intends to comply with all the over-mentioned regulatory provisions;
- the firm may depute the DNO to deal with the power line authorization under the over-mentioned resolution AEEG no. 99/2008, so the DNO shall submit the power line plan no longer under decree no. 387/2003, but under Presidential Decree no. 327/2001 which deals with authorizations regarding energy infrastructures. In case of 1), a single decree shall be issued which shall grant authorization to the line and to the power plant for the benefit of the firm and, afterwards, the firm shall ask for a transfer of authorization for the benefit of the DNO. In case of 2), two authorization decrees shall be issued, one relating to the line for the benefit of the power company and the other relating to the power plant for the benefit of the firm. The time and roles to get the STMG are as follows:



h) A transparent administrative procedure: law no. 241/1990 has introduced the principles of transparency and participation into the work of the public administration; such principles have, then, been adopted within special field rules. One of the most significant elements of the over-mentioned law is the calling of the Conference of the Concerned Bodies: by summoning a single meeting, all relevant parties are required to express their opinion. This makes the administrative procedure more efficient for the benefit of the applicant who interacts with only one authority. This is a considerable advantage in that procedure time decreases and projects are subject to a more thorough and transparent assessment; gathering the Bodies around the same table, where they can make their comments on the submitted project, allows each participant, who nonetheless is required to assess aspects connected to its expertise, to have a broader and more general view on the problems connected to the carrying out of the work. At the same time, you do not run the risk that one Body requests integrations that are not within its competence, but within the competence of another Body, which, however, being at the meeting, can intervene and find an agreed solution.

4.1.3 Most important conflicts related to the use of water

The Italian regulations are centred around the public use of water, so it is responsibility of the public administration to manage and coordinate cases of joint use, meant as the technical, administrative and legal effort necessary to allow the coexistence of different uses, or uses pursued by different parties, of the same water.

In order to talk about joint use, it is fundamental that such joint use is technically feasible, even though through *ad hoc* solutions; this excludes the conflicts caused by competing uses, which, as already previously stated, concern the management of technically incompatible applications. The public administration is required to make a choice, that will inevitably lead to granting one concession and rejecting one or more projects considered unsuitable to exploit the resource properly.

Over the years, the use of water, triggered by various economic needs, has made the context difficult, and has developed strong conflicts between hydropower and irrigation exploitation, such as in the case of Lombardia which has a high agricultural and industrial development; that conflict already existed in the beginning of the Twentieth century (Consolidation Act no. 1775/33 was specially drawn up in order to regulate the increasing demand for energy generation), but it was generally sensed less than today due to the greater abundance of water of those days and a less monocultural agriculture, which on the opposite, concentrates irrigation needs in a short period of time during the year.

In a territory such as Lombardia, water is the real driving force of development, both agricultural and

industrial: managing water meant and means having a real political/economic power, which, as such, must be managed through solidarity and protection criteria, and making sure that the general public interest, above any other private interest, becomes the driving force of its exploitation. In Italy, such concept was acknowledged by law through a declaration according to which water is a public resource; as a consequence it is clear that the public administration is in charge of regulating the proper use of water through concession granting.

In such context, the irrigation consortia, provided for by the rule and also through forced action, are intermediaries between the public administration and the final user, and they are in charge of the technical management of the resource according to what is stated in the concession.

Until 1996 (when water was declared a public resource) there were public and private waters: public waters were controlled by the public administration and private waters were governed by private notarial deeds. Today things are different but the Bodies in charge of granting concession still have problems in realigning the situation.

The long lasting situation described above gave to some irrigation consortia the possibility to exert such a rooted power over water that they have replaced the relevant body as regards the public management of the resource.

As long as the resource was sufficient and available to meet the needs of the users, the public administration has indulged such situation and has renounced to become the only reference point for the proper management of water.

At local level, a glaring example is the concession of a large water diversion of Oglio River, of which irrigation consortia were in charge, granted by the Ministry of Public Works in 1934 and then renewed in 1960. In the introduction, that deed states: *"…omissis…Having established that the definition of (irrigation) competences is feasible only for Brescia and Bergamo which have a land register of the territory of the Lombardo-Veneto state executed in 1852, but not for Cremona, both because the 1854 land register is non-existing and because the territory is heterogeneously irrigated by the waters of the Oglio River, of the Serio River, of the drain ditches, by underground waters and by the Adda River through the Marzano Canal…omissis…and thus, due to the uncertainty on the elements produced by Cremona as regards the definition of the flow rate on which they have competence, …omissis… omissis…the Administration of the Naviglio Civico (Municipal Waterway) of Cremona and the Consortium for Irrigation Management of the Cremona Territory are acknowledged the right to irrigate the whole territory of ha 57,000 that the two bodies own in common".* The over-mentioned ha 57,000 are a relevant piece of the Cremona territory, where there are other irrigation concessions and the distribution of water is not described, which makes it impossible to understand how it is truly managed.

The over-mentioned situation has been going on from 1934 to 2009 and the lack of knowledge dating back to 1934 has not been filled yet. Nowadays, the Region, body in charge to grant the renewals for large diversions (under examination since the 1980s of the past century), has not yet been able to obtain the technical, as well as basic, elements necessary to define the real framework of water distribution. As a consequence, the province, which should grant small diversion concessions also on the above-mentioned ha 57,000, does not have the elements to define which bodies of water are already under concession and according to which criteria but with huge difficulties, that once again slow down the procedures and inevitably weaken the final deed. The joint use of the resource is thus thwarted by the poor technical content of the existing concessions. As a consequence, difficult litigations are started which can only be settled by the legal institutions in charge (courts of water) in such a long time that makes the investment by private entities not attractive anymore. **The only possible solution is to unify all competences under only one body that does not have direct interests: a single public body.**

4.2 CROATIA

4.2.1 Weak points of different regulations

The weak points of different regulations are:

- The process of preparing and construction of SHP is a very complex organizational process. The whole process can be divided in various phases, each phase comprising the basic legal acts resulting from activities carried out in a particular phase. Each phase consists of several activities resulting in fact that 19 basic legislative acts request a total of ca. 48 activities. It is necessary to

procure and pay about 67 different documents in several institutions. Part of the process is additionally complicated by the duplication and repetition of documents;
- The proces is the same for all renewable energy sources and for different powers of plants (from a few kilowatts to 10 megawatts);
- For location permit it is necessary to demand a grade about the need to carry out a study about environmental impact and a study about nature impact. It is not clearly defined what these demands need to contain and who is responsible for them. Neither have the criteria determine whether these studies are necessary or not been clearly defined;
- For location permit it is necessary to contribute an SHP conceptual project whose contents and volume are not known;
- Resolution of proprietary-legal relations on land is not stipulated at all to request a building permit. Thus the applicant may invest a lots of money and have not guarantee of a positive solution of proprietary-legal relation;
- A tax of 7.5% exsists only on net profit from SHP (out of all plants on renewable energy sources);
- For SHPs exceeding 5 to 20 MW Water Law determine a concession of up to 60 years while for SHP up to 5 MW the concession is up to 30 years;
- Lack of reliable data about water resources – incomplete SHPs cadastre.

4.2.2 Strong points of different regulations

Strong points of different regulations are:
- water is considered as a public resource;
- all regulations are on the national level, not on regional level;
- by work of the Ministry of Economy, Labour and Entrepreneurship (MoELE) through different projects, work-shops and publications (in this number also the web site: www.mingorp.hr), so the complex process is more understandable, transparent and straight.

4.2.3 Most important conflicts related to the use of water

It seems that in Croatia there are no conflict now about the use of water for SHP, but conflicts are possible in the future in the following fields:
- between the public administration and applicant (granting one concession and rejecting one or more projects considered unsuitable to exploit the resource);
- among different current and potential users;
- in preserved area i.e. with regard flora and fauna;
- fishing and farming;
- water supply for different purpose;
- tourism and recreation;
- cultural heritage, etc.

4.3 GREECE

4.3.1 Weak points of different regulations

The main scope of Law 3468/2006 was to simplify the licensing system for RES investments in Greece (i.e. licensing procedures). The Law reinforces a strong interest is the new electricity feed-in-tariffs system, applicable for the sales of RES-produced electricity to the grid. Thus, the Operators of electricity grids are required to connect SHP plants to the grid and purchase all of their electricity at legally-fixed minimum prices. However, grid availability is an important issue in Greece, since the areas of high wind potential are usually isolated and far from the existing grid infrastructure. So an important part of achieving the RES target is connected with the grid development projects.

According to ESHA, the licensing procedure of private small hydro plants in Greece requires consultations of various public services. Authorisations for production licenses are granted by the Ministry of Development following a positive consultation of the newly established RAE, the advisory body of the Ministry. Nevertheless, a multitude of other relevant licenses is granted by various other authorities. In

addition, multitudes of laws and of ministerial orders in particular, which are continuously modified every 6-12 months, have to be obtained by the licensee. The existing legislation is not so clear regarding the allocation of duties among the various public services.

Moreover, the tax legislation is also unfavourable to the small hydropower, by accepting an annual amortization rate for such investments of only 2%. Also, the interconnection cost with the public utility networks of a private small hydroplant is normally prohibitive, provided that most of such plants are located within mountainous remote areas. The environmental terms required for the issue of a private SHP license are issued by the Ministry of Environment-Planning & Public Works. The environmental licensing procedure faces frequently various local economic interests. Many SHP plants are located within forested areas, a fact that rather hampers the licensing procedure on behalf of the various services of the Ministry of Agriculture.

More importantly, the Greek legislation has not been fully harmonized with the Water Framework. The management of the water resources still belongs to the Ministry of Development, whereas the residual flows are defined by the Ministry of Environment, Planning & Public Works.

4.3.2 Strong points of different regulations

The financial incentives are more than satisfactory. As stated above the quaranteed tarrif is at least 73 euro per MW and there is a good possibility that the capital investment will be subsidized.

4.3.3 Most important conflicts related to the use of water

- Cultural heritage: water resources might be part of the cultural heriage of a region. Thus, there might be a conflict between the use of water resources and cultural heritage;
- Local authorities: local authorities might ignore the overall benefit of the region focusing on local issues;
- Legislation: legislation can be unecessarlly compicated;
- Beauraacy: imlementation of existing laws can be extremely time cofusing;
- Farming: in Greece the lack of a pricing water implies possible wasteful activities.

4.4 NORWAY

4.4.1 Weak points of different regulations

As mentioned in the above chapters there are two possible procedures to obtain a permission to develop hydro power:

a) simplified application to omit a concession license;

b) application for a concession license.

Obviously it is a strong point for smaller hydro power that it is possible to omit the long, tedious and not to mention the more expensive application for concession. However, the weak point about this system is that only the negative effects of the SHP are considered when deciding whether a concession license is necessary or not.

The laws and regulation for the preservation of a river system are often more strictly interoperated when it comes to building a SHP. In Norway, there are many examples on roads that are build along a river has larger environmental impact on the river system than any SHP. This is giving the developer a feeling that his application in the preserved area is unjustly treated.

In areas that have already been developed with roads, houses, farms, etc, the persons that shall enforce the laws for preservation should focus on whether the development of SHP has any negative effect on the main river system compared to other developments in the area. This is often the original intention of the preservation.

In general, if the development of SHP has no or insignificant effect on the preservation, a development of SHP should not be denied due to preservation.

Moreover, it is a serious weak point that the apparent authority is not obligated to make their final decision within a certain time frame.

Also, the laws pays little respect to the technical equipment installed in the power station as the main focus is primarily related to the environment and any possible damage to the surrounding area.

Today's regulation does not take into account the evaluation of the maximum energy output from a river. In Norway, there are examples where has been built several SHPs along a river course using the same amount of water. Building one large power plant would have given less environmental impact and higher energy output. However, it may give better economy for each SHP.

4.4.2 Strong points of different regulations

One strong point in particular is that the applicant only has to relate to one authority, namely NVE, regarding any possible permission related to development of SHP.

In addition, the applicant does not have to apply for one concession to use the water, one concession to develop hydro power and finally one concession to connect to the grid. The applicant only composes one application to develop hydro power, and if the permission is granted, automatically the applicant has the permission to use the water, build the power station (including the intake and the piping) and connect to the grid. This is an effective way of evaluating an application and development of SHP as a whole. This is a very strong point relative to other countries where several applications for concession need to be worked out.

4.4.3 Most important conflicts related to the use of water

The conflicts linked to the use of water in Norway are linked to the following:

- preserved area;
- fish, especially salmon;
- flora and fauna;
- water framework directive;
- water supply;
- public interests (tourism, recreation, etc.);
- lapp interests;
- culture heritage.

The fish in the rivers are very much taken care off in the laws and regulation. The regulations will always make sure that there is water enough in the river so that the fish can survive. This is very important in the winter time and dry season of the year. However, in the periods with much water in the river such as in the spring time when the snow melts in the mountains, there is a possibility to run more water through the turbines without posing any threat to the fish. This seems unreasonable to the SHP owner and it has resulted in some conflicts.

In Norway, the flora and fauna has a vast diversity and the. This is mainly due to endangered flora that lives along the river. The fact that we do not know the impact on the fauna or flora from reduced flow rate in the river has resulted in a reduction of the allowed flow rate to the SHP. The SHP developer does of course oppose to this kind of preservation and this has given some conflicts. However, the SHP developer does not have much chance to fight this kind of law enforcement.

The EU Water Framework Directive whish is an integrated river basin management for whole Europe has been implemented in the European Economic Area, EEA in 2008. This has given the Norwegian government another regulation to enforce. The Water Framework Directive has much of the same as other Norwegian regulations and this gives some double work for the SHP developer.

Water supply to people and hydro power plants some times use the same water source. The SHPs that are built together with water supply system are often more profitable than others because intake system and pipes are available. However, if a developer of a SHP wants to use water from the same water source as the local water supply is using, extra regulation applies. This is due to the quality of the water that will be used for water supply.

The term "public interests" is some times used as an argument for not giving a developer of SHP a permit to build. The question that is raised in the public media is who decide what the "public interests" are. It seams unfair that persons from the capital city shall decide the "public interests" of the few living in the countryside.

The Lapps in Norway has been using the nature for reindeer management for centuries. Therefore has the Norwegian government given the Lapps extra attentions when they oppose to SHP development. The SHP developers some times experience this as offending and unjust.

Culture heritage can be defined for many different things and it may also be an old hydro power plant. In Norway, we have many small and old hydro power plants which are defined as cultural heritage. Some of these old SHP can be economical viable to restore but this may not be the case if the buildings and

equipment of the power plant has to be taken care of as a cultural heritage. The result from this kind of dispute may end with no action which means that the old power plant is not maintained and the new power plant was never built.

4.5 AUSTRIA

4.5.1 General remarks to the weaknesses and strengths of the existing legislation and legal procedures

- It is seen as a strength that the starting conditions for all consensus applicants are equal.
- In particular planning engineers and plant operators consider the hitherto long duration of permit issuing procedures including all preparatory steps a weakness. In addition, several stakeholders state critically that not only at operator side but also at public authority side the required professional expertise is not always in place.
- It is not easy to point out single strong and weak sides in questions of conflicts in water utilization issues. A critical remark expressed particularly by planning engineers is that among public servants there are very different individual opinions in terms of ecological assessment of SHP plants, which leads to uncertainty and makes it hard to avoid or solve conflicts. Differing opinions expressed by public authority representatives in public are being recognized; in case of conflicts appearing during the permission procedure, conflict parties make use of such discrepancies in order to strengthen their own positions.

4.5.2 Groups of questions

- Subdivision of watercourse-related **property rights** into private and public ones
  The differentiation into public and private water-bodies according to § 2 and 3 of the Austrian Riparian Rights Act WRG is of little importance, as in Austria only a small number of private water-bodies exist. It is important to state whether in a certain case there is a “public riparian good” according to § 4 of the WRG (this means a water-body owned by the State). Water would always cover land, and all land in Austria is being owned by owners. The administrators of public riparian goods would almost always permit the use of the utilization of the land – however in some cases, not free of charge. On the other hand, private owners use to sometimes show certain reservation against permitting the use of the land below the water by other persons.
  In most cases it will be easier to build a hydro-power station which uses public riparian good than to use private watercourses.

- **Indemnification** of owners ore holders of utilization rights in cases of interference into their existing rights by the public Riparian Authority as a sovereign
  Basically it is welcomed that in cases of such interference a possibility for compensation is foreseen. Yet this possibility is being hardly ever applied. When acting as a sovereign, the Riparian Authority (the state) may interfere into existing rights only in order to safeguard public interests. For the time being, the Austrian Riparian Act does not consider small hydro-power to be a case of eminent domain.

- Exclusive **sovereignty** of the Riparian Rights Authority in terms of all waterbodies and all kinds of water utilization and hydraulic engineering activities
  It is favorable to have a jurisdiction in which only the Riparian authority alone is exclusively in charge of all kinds of water utilization related to all waterbodies. This brings about that there is only one contact partner responsible and no competence conflicts can arise.

- Division of **competences** in Austria between the state and the Länder
  It may look as an anachronism that a country as small as Austria is made up of as much as nine federal states. Anyway, important laws such as the Riparian Act are Federal laws which have to be executed by the Länder. According to the specific situation within the various Länder different interpretation priorities might arise, but still the essential content of all federal laws must be accepted and executed in all Länder in a very similar - almost in an identical - way. Planners and plant

operators who are active in more than just one Austrian Land have to meet the challenge of coping with differences in federal law interpretations. They are not that grave that they would refrain from working in more than one Land, but they can cause surprises, complications and delays.
The competences which stay with the Länder bring about a closer interconnection between citizen and Land administration than would be possible in a centrally administrated country. In the end of the day the federal structure of Austria brings about more advantages than drawbacks.

- **Federal and regional responsibility for legal matters** to be taken into consideration in permitting procedures
  In permitting procedures, the Länder hold the competence for only one relevant law – the Construction Act (Bauordnung). Efforts have been undertaken – and meanwhile have developed into a rather advanced state – to unify the various Construction Acts and there is some hope that the Federal Framework Construction Act for the whole of Austria might be enacted in the near future.

- **Clarity** of framework conditions and regulations (e.g. a definite catalogue of ordinations) versus leeway for personal law interpretation of public servants in charge of juridical, technological or environmental issues
  In Lower Austria, the public authority's experts for technological and ecological issues attempt to achieve standardized procedures and to coordinate their approach with their colleagues of the neighbouring Länder. Due to considerable climatic, orographical and hydrological differences, there can be no absolutely standardized way of acting all across the whole of Austria, and not even all across Lower Austria.

- **„ban on reformation in peius" and „good ecological state"** – as an underlying ecological principle
  The ban on reformatio in peius (on deterioration) is laid down in §30a of the Riparian Act in a binding way and cannot be discussed. This does not mean, however, that no new hydrological engineering activities would be possible. This ban means only that a measure will not receive a permit in case it is going to deteriorate the overall water quality of a water body (the length of which can be mostly measured in several kilometres) with quality being measured as a bundle of four quality criteria. For the implementation of this ecological approach in project assessment procedures in Austria the funding has already been laid.
  The same paragraph even states a demand to even improve the situation by each new measure. For the time being the implementation phase of these new regulations of the Riparian Act is continuing and it might still take years to establish harmonized procedures. This means that for quite a long while work will keep on following the principle „try and error" in spite of all high-end scientific research being done.

- **Assessment criteria in riparian and nature preservation-related decision making** – without taking into account the positive effects of reduced fossil energy consumption, of carbon emission reduction of CO_2 and of reduction of other adverse environmental impacts
  Among public servants acting as experts for nature preservation and riparian right, but also among environmental politicians the opinion that water would be more important for people's lives than energy, can still be heard frequently. Such an opinion gives proof of a restricted understanding of energy, which is just as little helpful for the creation of sustainable life conditions as a restricted understanding of the meaning of water for the life of the population. Without energy, there is no life, just as there is no life without water. Discussing the question whether energy or water would be of greater importance for hunan life resembles a discussion about whether the hen or the egg came first – it does not make sense.
  When one puts the importance of water above everything else, one ends up with the logical consequence that one will judge on the usefulness of a new hydro-power plant just by assessing ist impact on the quality of a certain part of a watercourse without taking into account the impact of the new plant on the substitution of fossil energy, nor ist contribution to the reduction of negative impacts of energy production on climate and environment.
  In an analogy, in Austrian permit edition procedures for new photovoltaic plants one may face the situation that the impact of the new plant on cultural heritage protection and townscape is being taken most seriously and might lead to the rejection of the project. When deciding on projects for

new wind-turbines, Austrian authorities sometimes appraise the protection of presumably endangered birds and landscape more highly than the positive effect of cleaner energy production, and when permits for biomass-operated heat-lines are at stake, the protection of forests is weighted more important, and in negotiations on new biogas plants the protection of neighbors from noise and smell possibly emitted by the plant and by transport vehicles is esteemed a higher good than the near-to-zero-carbon energy produced.
Of course, it is justified and important to take all effects of each measure into account and to duly weigh all positive and negative impacts. But the fact that the ecological impact on energy production very often remains outside of the scope of such deliberations, bears in itself some implicit favoring of fossil energy production. Fossil energy economy in total causes much graver adverse environmental impacts on soil, water, air and finally on animals and humans which are not being looked at during the permitting procedures.
Issues such as changes of regional precipitation regimes as a part of ongoing climate change, the erosion of soil and the sinking of groundwater horizons influence the environment and our watercourses more harmfully than the construction of small hydropower plants ever could; still when it comes to permission procedures for new hydropower stations (or for new wind turbines of solar power stations), they are treated as issues of no relevance.

- **Ranking of priorities within the scope of water-related issues** – flooding prevention, ecologization (including, in particular, the Water Framework Directive), green energy production – in Austria and especially in Lower Austria
  Flood protection and ecologization are laid down precisely in the Riparian Act (no permits can get issued for projects which might lead to increased danger of flooding, there is the clear aim to achieve a “good ecological state” respectively a “good ecological potential” in all watercourses. The production of green electricity is to be welcomed and is a necessity for the future, yet it just ranks third in this list of priorities.

- **One-stop-shop permit edition** – attempt of the responsible authorities to cluster the procedures which lead to the issuing of the permits necessary for hydropower plant construction to one concentrated procedure – in this case the procedure related to nature protection is being clustered with the one concerning riparian rights.
  Is already being practiced in Lower Austria; experience been made in this respect is good.

- **Water information system** of the Federal Länder – easy access to riparian data-bases for everybody who is interested:
  It is a reliable source of information and valuable for all stakeholders.

- **Water registry** – an official documentation about all water-related rights – easily accessible by everybody, complete evidence of all riparian rights
  Similar to the water information system, it is an excellent and reliable source of information.

- Denomination as a **Green Energy production plant** – by the Land governor
  Such a denomination is based on an individual decision in the respective Land. It would be better to have a pan-Austrian standardized procedure for this case. As to decision duration, this procedures is not time-consuming and in most cases would just take a week or two.

- **Access to the grid by electricity feed-in** – the grid operator defines a point in his mains and hands the rights to feed electricity into it to the plant operator.
  It is a frequent case that the persons in charge of the SHP plant permit edition show little familiarity with the topic. An inter-disciplinary manual for this staff should be designed and applied.
  If at the side of the planners sufficiently qualified and experienced experts will be acting, it will be possible to obtain feed-in regulations for electricity from SHP plants in close cooperation with grid operators.

- **Public funding from Land and Federal level, feed-in tariffs**
  Also in respect to questions of available national and regional funding and of applying feed-in tariffs

among officials responsible for SHP plant permit procedures, one can frequently find only rather limited information this relates to the nature preservation department just as it applies to the riparian department.

- **Helpful guidelines** as good practice manuals for existing and future plant operators from all Austrian regions - specific situation in Lower Austria
  The guidelines are considered very helpful not only by the representatives of the relevant public authorities, but also by power-plant operators and by those intending to become plant operators. In regions in which such guidebooks are not yet available, one can often hear the wish to have them in place as soon as possible.
  Most of the experienced planners would have a different view on these guidelines. Quite many of them claim to treat each plant as a special case and thus put forward the opinion that such guidelines are not reasonable. This can be understood from their individual point of view. Being experts, they know what it is all about when it comes to SHP plant planning.

- **Public contact points** for operators of projects and plants at various levels – municipalities, county administration, various relevant departments (e.g. construction department) of Land administration
  A main source of discomfort at the side of both planners and plant operators during the past years has been the multi-stage decision making structure, giving a role to various public bodies at various levels from local to federal. One thing that was criticized was the often poor quality of their communi-cation flows. The other negative point often mentioned is that especially at the municipal level there is a shortage of persons who are sufficiently familiar with questions related to small hydro-power.

- **Private contact points** – SHP Operators' Association („Verein Kleinwasserkraft") as a professional association, lobby and advisor; NGOs such as regional Energy Agencies should serve as regional turning points for information and networking
  In this respect it is interesting that quite many public servants dealing with SHP had no notion of the existence of such private institutions, respectively they know that they exist but hardly ever perceive or monitor their activities.
  Both plant operators and planning engineers are familiar with the activities of the Austrian SHP Association "Verein Kleinwasserkraft Österreich" and appreciate them and the work of its elected national and regional representatives.
  Existing and prospective operators of small hydro-power plants also know about the existence of other NGOs such as energy agencies; they contact these NGOs asking for advice, depositing ideas and problems. These private bodies are often found suitable to act as intermediates, and they procure contact addresses and start-up information for beginners. On the other hand, planning engineers and authorities hardly recognize their presence, and some of them who are less familiar with the issue tend to estimate their role as not helpful. In connection with rather technocratic approaches of some planners and officials, the potential positive role of regional contact points as unbiased advisory support and as conflict mediators of this kind is often strongly underestimated.

- **Master-plan SHP for Lower Austria (Niederösterreich) 2009**
  This strategy paper issued by the Lower Austrian Land administration is seen positively and as a step in the right direction. The master-plan is a tangible political good will statement declaring commitment in respect to an increased SHP utilization. Thus it show the direction to take to representatives of public authorities and to politicians who release jurisdiction and by-laws just as well as to operators of small power-plant s and those willing to operate plants.

- **Procedure duration**
  The whole duration of all procedures for the issuing of plant construction and operation permits in the above mentioned one-stop-shop procedures is between two and three months, provided that the project has been duly prepared in advance and that the draft versions of this project have been regularly discussed with the authorities' experts during their regular consultation days. The administrative costs attached to this procedure in this case are comparably low.
  As it will often be true, the devil sleeps in the details also in this case. It is not always easy to "duly prepare" a project. I happens frequently that this preparatory stage takes a very long time.

- **Public relation**
  In respect to small power plants show considerable room for improvement. Especially, the side of the „Greens“ needs to be convinced. Still now, from their side very often just cold wind is blowing. And quite often one can experience that they lack basic information on technological and ecological facts and circumstances. In many well-known cases of small hydro-power projects one ends up with the impression that their basic interest is just the spoiling of the project without regard to the question which alternative will be the most favourable for the environment.

CHAPTER 5

STRATEGIES TO IMPROVE THE EXISTING REGULATIONS

This chapter gives recommendations, methodologies and tools to improve the existing regulations to apply to new applicants for authorization of SHPs in different partner countries.

5.1 Recommendations, methodologies and tools to apply to new applicants to authorize in Italy

Following what has been stated in the previous chapters, as regards the procedure and the tools that can be applied only at national level, the Province of Cremona suggests the following different actions according to the relevant body in order to streamline the procedures and stimulate the investments on small hydropower plants:

At local level	a) Rationalization of the administrative steps within the laws in force; b) Spreading of information on the website;
At regional level	c) Arrangement of "guiding" regulations; d) Definition of the technical content necessary to assess the aspects connected to the construction of hydropower plants; e) List of relevant bodies as regards Legislative Decree no. 387/2003; f) Diversification of the documents to submit according to energy use; g) Official monitoring of flow rates;
At ministerial level	h) Joint use and definition of the authorizing procedures; i) Definition of compensation costs;
A.E.E.G.	j) Maximum price fixing as regards quotations under resolution no. 99/08.

a) Rationalization of the administrative steps within the laws in force

It is of fundamental importance to unequivocally define the roles that each public party shall play in the examining procedures described in chapter 3 both as regards the water diversion concession for hydroelectric purposes and the implementation of the single procedure deriving from Legislative Decree no. 387/2003 as regards the authorization to build the power plant. From now on, the provinces can rationalize the administrative steps within their competence. Such rationalization would become stronger if it were supported by provincial regulations. While waiting for the regulations on the procedures to be examined by the relevant regional authority, the Province of Cremona, within this work, would like to suggest a first draft of the unified procedure that, through only one application submitted by the private party, may lead to the issue of all the documents necessary to build and commission a hydropower plant, thus saving administrative costs and construction time.

Days.	Administrative steps	Publication	Competitors
0 days.	The proponent may require the convocation of a preliminary Conference of the Concerned Bodies (hereinafter CDS) through an application and a preliminary project containing the basic information required by art. 11 of the R.R. no. 2/2006, the receipts of payment of examination and publication costs (art. 14_b - 241/1990), the basic information for art. 12 of 387/2003 (road practicability for works, electrical works and power line, environmental mitigation works, sanitation and occupied working premises (ASL), town planning compliance (zoning), noise pollution, aspects linked to the property (cadastral parcel map, beneficial uses, etc.).		
60 days.	Within 60 days, the examining office shall start the procedure that will be sent to all the concerned parties along with a copy of the preliminary project, and calls the preliminary CDS within the following 10 days (art. 9 of the R.R: no. 2/2006). If the application does not include the fundamental contents, it is turned down under art. 9 of the R.R. no. 2/2006. In case of EIA, also the relevant EIA Bodies and authority will be summoned.	At the same time, the provincial office arranges the publication of the project in the Regione Lombardia Gazette (hereinafter BURL) for 30 consecutive days for the Competitors and in the Municipal Notice Board for 60 consecutive and natural days from the publication in the BURL. If the application is subject to EIA procedure, the publication is also valid for the EIA	
70 days.	CDS: during the conference, the Bodies make sure of the feasibility and of the conditions according to which it is possible to obtain the approval and lay down the contents for the final projects regarding the concession, the authorization to build the power plant and the power line, and, if necessary, they require the submission of the EIA screening decree along with the project.		Actual publication of the application in the BURL. At the end of the 60 days, in case of competitors, the applications submitted during the competition validity period are published, the proponents are required to submit the same documents of the preliminary CDS and the EIA screening decree
100 days.			Competition is closed. Arrival of possible further applications
115 days.	If no elements blocking the carrying out of the project emerge, the bodies in charge of environmental protection, …, shall establish, within 45 days, the conditions and elements necessary to obtain the approval documents regarding the final project.		
125 days.	Within 10 days from the delivery of the over-mentioned opinions, the last meeting of the preliminary CDS is called. The final CDS decree shall define the term by which the final project shall be submitted (max 300 days from the application reception) + delivery of the EIA screening decree		Within such term possible competing applications shall be assessed and chosen thus starting the procedure, publishing them in the BURL and requiring document integrations necessary for the final decision of the preliminary CDS. Time to submit the documents within the 300th day shall be granted.
130 days.		Time is over as regards the submission of remarks in the first instance	
135 days.			Publication of possible further competing applications

160 days.		Time is definitely over as regards competing applications started at the 100th days.	
195 days.			Time is definitely over as regards the submission of competing remarks
300 days.	Submission of the final project to the Province + EIA screening decree	From now on the time of the possible further competing applications follows the same path	Submission of the final competing project to the Province + EIA screening decree
330 days.	Transmission of the final project and calling of the final CDS within 60 days in case of no competing applications. Otherwise, calling of a CDS in order to collect opinions propaedeutic to choosing the best project within 30 days.		Transmission of the final competing project and calling of the CDs within 30 days in order to collect the opinions propaedeutic to choosing the best project
360 days.	ONLY IN CASE OF COMPETING APPLICATIONS: convocation of a CDS in order to collect the opinions under art. 12 of the R.R. no. 2/2006 relating to water diversion concession propaedeutic to choosing the best project and under art. 24 of the R.R. no. 2/2006 as regards the EIA. The time regarding various possible integrations that may postpone the CDS term under Legislative Decree no. 387/2003 shall be assessed.		
380 days.	ONLY IN CASE OF COMPETING APPLICATIONS: technical and examining report regarding the choice of the project with the involvement of a advisory body		
380 days.	ONLY IN CASE OF COMPETING APPLICATIONS: convocation of a final CDS on the previously chosen project under 387/2003 and power line		
390 days.	In case of no competing applications, first meeting of the UNIFIED CDS under art. 14 b par. 5 law 241/90 and under art. 12 of the Legislative Decree 387/2003 (within 180 days from the submission of the final project) and in case called for the EIA procedure under art. 24 of the R.R. no. 2/2006. The CDS will have several items on the agenda, for every item/topic an opinion shall be released only by the relevant bodies having competence on that topic. For example: as regards the hydraulic compatibility examination of the competing projects with indication of only one winner, only those concerned by the R.R. no. 2/2006 give their opinion. Final decision with indication of the winning competitor and the instructions to include in the concession rules and regulations and instructions to build the power plant and the connected works. IN CASE OF COMPETITION the CDS shall be called only as regards 387/2003 as the winner has already been chosen in advance.		
	The issue of the possible EIA decree follows, then the diversion concession grant and the rejection of competitors		
480 days.	Issue of the Decree to private parties under art. 12 of the Legislative Decree 387/2003 only against submission of the registration of the rules and regulations		

b) Spreading of information on the website

The following proposal is emerging as the natural development of the over-mentioned regulatory strategy. Once the body in charge of the whole examining procedure necessary to build and commission the hydropower plant has been defined through the relevant regulations, it is advisable that such body takes upon itself the creation and the updating of an interactive website, first of all addressed to the public Bodies involved in the procedure, but also to private interested entities.

The website should comprise the following information:

- current regulations: European, national, regional or local (rules);
- procedures established for the different types of plants (in case different types are planned);
- list of the Bodies involved in the administrative procedure according to the type of application and location of the plant. It would also be useful to make reference to the technical aspects on which they have competence, with a link to the specific rules to consider when examining hydropower plants;
- list of the documents accompanying the diversified application for each type of plant along with the main criteria implemented for their assessment and weighing;
- general reference to costs and time owed to the public administrations in order to attain the authorization to build and operate the plant;
- reference/link to certified sites holding databases useful to examine plant feasibility (e.g. Water Use Register, environmental monitoring networks - ARPA, hydrographic flood warning services A.I.PO, etc.).

The creation of such a website would have the advantage to overcome those administrative and technical

difficulties that are not a real, concrete obstacle to plant construction, but that in fact are the main cause of the non-development of the mini hydropower sector.

c) Arrangement of "guiding" regulations

The over-mentioned roles may be defined through the approval of "guiding" regulations by the regional authority that reduce the number of redundant steps between the procedure of water diversion concession and of authorization of mini hydropower plants (pursuing the indications of Regione Lombardia in order to harmonize concession and screening procedures).

In the immediate future a possible solution is to identify a single party in charge of the over-mentioned examining procedures and having the task to coordinate the activities of the conference of the concerned bodies and the issuing of the opinions of the relevant bodies.

In order to avoid slowdowns and inconsistencies of decisions due to the separation of the different procedures it would also be useful to require the applicant to submit the final-working project when applying for water diversion concession so that such technical documents also allow the parallel start of the procedure to authorize the construction of the power plant and of the connected works.

These proposals result from the observation of the recent regulatory trends, first of all European and then national, which are more and more disconnected from the assessment of the single aspects taken into consideration for the construction of whichever project, but that pay more and more attention to the construction of a plant in its entirety, and deal with all the aspects linked to environmental protection, resource exploitation, public health and safety in only one procedure; an example refers to the AIA rules that Italy has adopted too late.

d) Definition of the technical content necessary to assess the aspects connected to the construction of hydropower plants

The definition of rules that precisely list the documents to attach to the applications regarding water diversion concession and regarding the authorization to build the power plant is held necessary; in particular, such rules should define:

1. The technical documents necessary for both the diversion concession application and for the authorization to build and operate the plant;
2. The technical documents necessary to authorize the power line;
3. The documents to attach to the applications so that, as contents are concerned, they can be extended to all those aspects that, during examination, will be dealt with also by the other Bodies required to issue their opinions and, until today, to issue documents propaedeutic to the granting of concessions and authorizations connected to the construction and commissioning of the plant;
4. The technical contents necessary to assess technically incompatible applications (competing applications), and for each of them arranging a weighing method that allows to make a choice as free as possible from the discretionary power of each examiner. In particular, the most consistent parameters to establish the technical-economic skills of the applicant should be precisely defined; the rules require that such skills are assessed when choosing competing applications.

While waiting for the over-mentioned regulations to be drawn by the relevant regional authority, this Province intends to require the following documents:

a) as regards the granting procedure of water use concession for hydroelectric purposes:

Maps drawings and reports:

- site plan;
- topographic map of the existing site conditions;
- proposed site plan;
- engineering and detailed drawings;

Reports:

- general report;
- hydrological and hydraulic study;
- geotechnical report;
- environmental stydy;
- economic and financial analysis;

In the documents of the project and in the report, every applicant has to describe the following topics:

General description of the site

- cartography;
- geological study;
- gross and net head evaluation;
- gross head (HG);
- net head (HN);
- stream flow evaluation;
- stream flow records;
- regionalized stream flow;
- fhe flow duration curve (FDC) ;
- residual or compensation flow [DMV];
- design flood [QF];
- plant capacity and energy output;

Technical description of the project

- diversion structure;
- weir;
- residual flow device;
- fish passageway;
- spillway and energy and dissipation structures;
- conveyance structure;
- intake;
- channels, canals or tunnels;
- penstock;
- tailrace;
- power house;
- inlet gate or valve;
- turbine and control system;
- generator and speed increaser (if needed);
- protection systems and dc emergency supply;
- substation;

Economic and financial analysis

- investment and costs for installed capacity;
- initial investment cost;
- operation and maintenance cost;
- benefits due to generation;
- tariffs;
- incentives;
- cash flow forecast analysis;
- methods of economic evaluation;
- time value of money;
- payback method;
- return on investment method;
- net present value (NPV) method;
- benefit-cost ratio [BCR];
- internal rate of return method [IRR];

Environmental impact study

- environmental general description of the site;
- impacts identification;
- impacts during construction;
- impacts during operation;
- impacts from the electric line;
- environnemental impacts mitigation;

Grid connection characteristics

Land properties information

Supporting documents (Construction schedule, Developer information)

b) as regards the procedure for the authorization to build the power plant and the power line:

- **the Legal person applying and its details;**
- **the final project of the small hydropower plant** that encloses the working plan of the works, all the requirements arisen during the prior concession examination to water diversion and the technical characteristics of the infrastructures necessary to operate the power plant, the type of the turbines and the electrical parameters about power and energy production;
- **a chorography that shall be adequately extensive to allow a reliable positioning of the diversion** with reference to the well-known neighbouring places; it shall include the waterway intended for diversion, its surroundings, the drainage basin or basins to use for water collection, the pieces of land to cross with the designed works and their location (scale 1:10.000 and 1:2000);
- **the power lines and the substations layout** (scale 1:10.000 and 1:2000) with electrical parameters about power and energy production, with the solution proposed by the Distribution Network Operator;
- **the final project of the long-distance power line** that encloses the working plan of the works, the technical characteristics of the infrastructures necessary to connect the power plant to the grid, the type of wires, all electrical parameters about power and energy transport, environmental impacts on the area, the chorography that shall be adequately extensive to contain the layout of the long-distance power line with reference to the well-known neighbouring places; also, it shall include railways, waterways, pipelines, roads, natural areas, parks, etc., all things that physically interfere with the power line, as well as the holders of public properties crossed by the line (scale 1:10.000 and 1:2000);
- even if the line voltage is below 15.000 volt or when the line is very near to some buildings, we require a report that shall demonstrate the proposed works are innocuous for the human health as regards electromagnetic fields.

c) List of relevant bodies as regards Legislative Decree no. 387/2003: as already described in chapter 4, it is of fundamental importance to issue a list that defines the bodies in charge to express their opinion within the single procedure authorizing the construction of the mini hydropower plant, as well as it happens, at regional level in Lombardia, in the examination for water use concessions, where the bodies and their competences are listed.

d) diversification of authorizing procedures and of the documents to submit according to energy use: in order to stimulate the exploitation of low heads, a diversification of the documents accompanying the concession application has been carried out, as well as a reduction of design and examination costs according to the type of plant. The proposed classification considers the type of energy use:

d.1) generation for sale to third parties: it concerns all the plants for power generation through public water diversions that will pour energy into the grid and thus sell it to third parties. It is deemed necessary to submit complete documents, because the parties that enter the market with a project of hydropower generation must necessarily guarantee territory protection, third parties' rights and public security. The guarantee by the examining Body that the assessment of incompatible applications will take place through transparent and objective criteria becomes a fundamental value, without forgetting that the Province of Cremona plans to bring together the authorization for the power line and the power plant in only one examining procedure

d.2) self-generation for production activities: it refers to self-generation plants linked to economic and productive activities. Energy generation shall be used for at least 70% in the economic activity of the applicant and, in this case, the applicant shall benefit from a partial streamlining both of the documents to submit and accompanying the application and of the procedure for plant concession and authorization. The proposal follows the streamlining trend started with the financial act dated 24/12/2007 no. 244, which states that as regards plants below 100 kW the construction authorization under legislative decree no. 387/2003 shall be replaced with the DIA procedure (Declaration of Work Onset). Similarly to what is provided for procedure ex 387/2003, as regards water use concession procedures, a limit equal to 100 kW shall be introduced; below such limit more streamlined documents shall be submitted as the plant is expected to have a limited impact both from the environmental point of view and from the point of view of grid connection. As regards these plants, **the diversion thresholds, currently too low, for the regional screening of VIA (200 l/s)** may also be increased.

d.3) self-generation for the benefit of families: it comprises all self-generation plants for the benefit of families and, generally speaking, for non-profit making activities, for which the production limit of 100 kW may still apply; below such limit a streamlined project shall be submitted to the public administration, without the need for the issue of a final opinion but the application of the implied assent and an extremely concessional examining fee. Also as regards these plants, **the diversion thresholds, currently too low, for the regional screening of VIA (200 l/s)** may be increased**.**

e) official monitoring of flow rates*:* as already described in chapter 4, one of the aspects that limit the development of mini hydropower is due to the uncertainties on water resources; Italy lacks a technical data bank capable of supplying data regarding the flow rates of exploited water resources, which are fundamental in order to take a technically and economically sustainable decision. It is necessary to develop a regional hydrographic service more thoroughly; such service, however, exists and receives funds from the grantees through the hydrographic contribution and is in charge of assessing the projects concerning the flow meters. The real added value that such service may give to the citizens is to act on the territory through the creation of a data bank that records the data relating to the flows monitored by the grantees, validating the supplied data and making them homogeneous and usable. The preliminary condition to the proper carrying out of the tasks of the hydrographic service is the regulatory definition of specific techniques relating to installation, maintenance and transmission of flow meters data, compulsory for water diversion grantees.

f) Joint use and definition of the authorizing procedures*:* art. 166 of the environmental code (Legislative Decree 152/2006) fosters the joint use of water in that it allows waterworks operators (irrigation and land reclamation consortia) to use the flowing water of canals and mains for uses in which water is returned and which are compatible with subsequent uses, including hydropower generation and water supply to businesses. Such article also makes the procedure simpler (even though it has neither defined nor included it in the Consolidation Act no. 1775/1933) establishing that the Basin Authority shall express its decision within 120 days; after such period the application is deemed accepted. However, today, this article is only a principle and has not been implemented; on the contrary, a procedure may be developed in order to regulate the practical aspects connected to concession granting for joint use.

g) Definition of compensation costs: such costs, connected to the examinations, consist of a payment of a fee related to the granting of water use concessions (extra-fees), and of a compensation for the environmental “damage”, less explicitly provided for within the regulations concerning the competence of the managing bodies of Parks and Municipalities. A real definition of the compensation costs that can be required is necessary, in terms of soil occupation and impact caused by the construction of the plant, in order to reduce the subjectivity of the Bodies’ requirements and to define the price to pay for the impacts at national level.

h) Maximum price fixing as regards quotations under resolution no. 99/08*:* such resolution may be improved by introducing, for the private entities who apply to the grid operator, the possibility to ask for a quotation for the construction of public grid connection works at prices that are lower than the maximum values calculated with the A.E.E.G. formula, so that the latter represent the maximum expense limit that the grid operator can ask for to the concession applicant.

5.2 Recommendations, methodologies and tools to apply to new applicants to authorize in CROATIA

In the process of preparing and constructing of SHPs it is important to find an effective way for solving all the cited weak points so that it is not time-consuming and the outcome is not uncertain:

- Make the process of preparing and constructing SHPs simpler;
- Make necessary distinctions between different renewable energy sources and for different powers of plants;
- Define the estimation grade about the need for carrying out the study about environmental impact and the study about nature impact: to clearly to define what these grades need to contain and who is responsible for them. To precisely define the criteria which determine whether these studies are necessary or not;
- Define the content and volume of the conceptual project;

- Stipulate the solution of proprietary-legally relations on land to stipulate before requesting a building permit;
- For SHP to reduce a tax of 7.5% on the net profit;
- Equalize the duration of concession for SHP of up to 5 MW with SHP exceeding 5 to 20 MW up to 60 years;
- Completion of SHPs cadastre with reliable data.

5.3 Recommendations, methodologies and tools to apply to new applicants to authorize in GREECE

On the basis of the European Water Framework Directive, every water sector in Greece - water resources, hydraulic works, water uses - requires certain measures in the direction of equitable estimation, reliable planning, rational management, etc. These measures have been partially collected from the responsible institutions - e.g. the Public Power Corporation for the hydropower production, EYDAP for the urban use of Athens, the Ministry of Agriculture for the rural use etc - but the results are still meagre, compared to their implementation cost. Law (3199/2003) defines the establishment of a Special Secretariat within the Ministry of Environment, Planning and Public Works, that is, the Central Water Service, which has to map out and implement a national water policy, with water uses balancing and sharing available resources. This highly important planning tool still is not available to the licencees or private consultants.

5.4 Recommendations, methodologies and tools to apply to new applicants to authorize in NORWAY

The Norwegian Water Resources and Energy Directorate (NVE) has developed an Application template which describes the content of the application and every required attachment. Our recommendation is to make a similar template that can be downloaded from the Internet and has descriptions and examples available for the user. The application template should include the following:

- average production and installed capacity;
- budget cost related to development of SHP;
- the minimum flow release;
- flow duration curve;
- the flow situation before and after development of SHP, typical in a dry year, average year and wet year.

5.5 Recommendations, methodologies and tools to apply to new applicants to authorize in AUSTRIA

- **Distribution of responsibilities between the federal government and the nine Land administrations**
  Albeit the differing of legal regulations in Austria's nine Land administrations does not cause a big problem, there is still room for improvement of many procedures by interregional unification of regulations; and also synergetic potentials could be identified in order to smoothen the cooperation between public authorities, planners and SHP plant operators.

- **Jurisdiction matters at federal and regional level to be taken into account in permit issuing procedures**
  It would be desirable to have a Federal Construction Framework Act as a common referential base for the regional Construction Acts issued by the Länder. With such a Federal Framework law in place, there would no more be any (major) differences among the (future) Construction acts of the nine Länder; wherever differences will be maintained, they would have to be justified. This would be a first step in the right direction and would be very helpful in decision making and preparation procedures – most of all planners would benefit from it.

- **Clarity** of framework conditions and standards in general (for instance: a definite catalogue of ordinances) – to be seen in contrast to the individual decision leeway for personal decision making which all representatives of public authorities possess, be they environmental, legislation or technology experts.
  The most suitable means in order to achieve permanent co-ordination and regular exchange are harmonized administrative decision making procedures leading to comparable decisions in comparable project environments.

- **„ban on** *reformatio in peius*“ **and „good ecological state“** - as an underlying ecological principle
  In order to pass on as quickly as possible from an experimental stage to clear evaluable standards, a comprehensive and critical reflection and validation of the experimental stage and its outcomes has to be undertaken.

- **Assessment criteria and priority ranking**
  Energy issues should be given the same importance in legal matters as the issues of flooding prevention and the conservation of potable water.
  Methods and tools should be designed which allow to validate positive effects of green energy production in relation to the substitution of fossil fuels.

- Denomination as a **Green Energy production plant** - by the Land governor Procedures and criteria should be harmonized all across Austria.

- **Access to the grid by electricity feed-in, public funding from Land and Federal level, feed-in tariffs**
  In the matters listed above some more information should be passed to the public servants in charge of riparian rights and nature preservation.

- **Guidelines** as good practice manuals for existing and future plant operators from all Austrian regions
  Guidelines for planning, construction and implementations will be support instruments of vital importance for inexperienced prospective operators of SHP plants, but will also be helpful for experienced plant operators planning to build re-vitalize small hydropower stations.

- **Public contact points** for operators of projects and plants at various levels - municipalities, county administration, various relevant departments (e.g. construction department) of Land administration
  Local administration bodies do possess legal competence in permit issuing procedures, but very often they lack the necessary expertise. In this situation, the unification of the majority of construction-related legal regulations will be valuable. In the end of the day it will be necessary not only to simplify and unify procedures, but also to train the public servants in charge of decision preparation and/or to delegate expert work to external experts in order to close the remaining knowledge gap.
  Horizontal and vertical information flows between various public institutions are not always well developed. In order to improve this inter-administrative co-operation, efforts leading to improved frictionless and harmonized procedures will have to be undertaken.

- **Private contact points** - SHP Operators' Association („Verein Kleinwasserkraft“) as a professional association, lobby and advisor; NGOs such as regional Energy Agencies should serve as regional turning points for information and networking
  Among public servants, a better level of information about existence, competence and range of activities of relevant NGOs should be in place.

- **Master-plan SHP for Lower Austria 2009**
  Should be extended and prolonged.

- **Public relations**
  Should be improved and intensified.

REFERENCES

Used in the Italian chapters:

[1] Royal Decree no 1775/1933.
[2] Environmental Consolidation Act no 152 of 2006.
[3] Legislative Decree no. 387/2003.
[4] Regional Law no. 1 of 5th January 2000.
[5] Regional Regulations no. 2/2006.

Used in the Croatian chapters:

[6] Physical Planning Act.
[7] Building Act.
[8] Environment Protection Act
[9] Nature Protection Act.
[10] Concessions Act.
[11] Water Act.
[12] Energy Act.
[13] Regulation of Energy Activities Act.
[14] Electricity Market Act.
[15] Ordinance on environmental impact assessment (OG 59/00, 136/04, 85/06).
[16] Ordinance of derive water on nature.
[17] Ordinance on the usage of renewable energy sources and cogeneration (OG 67/07).
[18] Ordinance on the obtaining of the eligible electricity producer status (OG 67/07).
[19] Tariff system for the production of electricity from renewable energy sources and cogeneration (OG 33/07).
[20] Rules on Charges for Connection to the Network and for Increase in Connected Power (OG 28/06).
[21] Rules on Conditions for the Carrying Out of an Energy Activity.

Used in the Greek chapters:

[22] Law 1559/1985 “On the resolution of issues pertinent to the reniewable energy sources and to special issues regarding electricity production”.
[23] Law 1650/1986 “For the protection of the Environment” (OGJ A' 160).
[24] Law. 2244/1994 “Adjustment of issues of electricity production from renewable energy resources and conventional fuel and other” (OGJ A' 168).
[25] Law 2508/1997, Art. 3 on “Sustainable land development of cities and other urban areas of the countries and other provisions” (OGJ A' 124).
[26] Law, Art. 15, 2742/1999 “Zoning development and sustainable development and other provisions” (OGJ A' 207).
[27] Law. 2773/1999 “Liberalizing the market of electricity, adjusting issues of energy policy, adjusting issues and other provisions” (OGJ A' 286).
[28] Law 2941/2001 “Simplification of establishment and permit granting procedures for the establishment RES companies” (OGJ A' 201).
[29] Law 3017/2002 “Ratification of the Kyoto Protocol in the Charter of the United Nations on climate change” (OGJ A' 117).
[30] Law 3028/2002 “For the protection of antiquities and cultural heritage in general” (OGJ A' 153).
[31] Law 63/2005 “Codification of legislation for the Government and Governing Tools” (OGJ A' 98).
[31] Common Ministerial Decision 33318/3028/1998 on “Defining measures and procedures for the preservation of natural eco areas, etc” (OGJ B' 1289).
[32] Common Ministerial Decision 15393/2332/2002 on “Enlistment of public and private works and activities in categories according to article 3 of law. (OGJ B' 1002).
[33] Common Ministerial Decision 25535/3281/2002 on the “Approval of Environmental Terms from the General Secretary of Regional works and activities that are enlisted in subcategory 2 of Category A’ etc.” (OGJ B' 1463).
[34] Common Ministerial Decision 11014/703/ (OGJ104/2003) on the “Procedure for the Preliminary Environmental Assessment and Evaluation and Approval of Environmental. (OGJ B' 332).

[35] Common Ministerial Decision 37111/2021/2003 on “Defining the way and participation of the public during the procedure of Environmental Terms Approval of works and activities according to 36. Law 1650/1986, Art. 5, para. 2 and Law 3010/2002, Art. 3, pa. 2” (OGJ B' 1391).
[36] Common Ministerial Decision 145799/2005 on “Supplementing 15393/2332/2002” (OGJ 1022/B/5.8.2002).

Used in the Norwegian chapters:

[37] The Acquisition Act: Licenses to acquire waterfalls and shares in power utilities.
[38] The Water Resources Act: Licenses regarding all kind of measures in the river system.
[39] The Watercourse Regulation Act: Licenses to establish reservoirs and to transfer water.
[40] The Energy Act: Licenses for transmission lines and electric equipment.
[41] The Planning and Building Act: A general law, maintained by the municipality, governing all kind of construction activities and land use. Handling procedures, notifications and provisions concerning EIA.

Used in the Austrian chapters:

[42] Water Act (“Wasserrechtsgesetz 1959”) from 1959.
[43] Hydrography Act (Hydrographiegesetz) from 1979.
[44] Water Works Promotion Act (“Wasserbautenförderungsgesetz”) from 1985.
[45] Torrent and Avalanche Act (“Wildbach- und Lawinenverbauungsgesetz”).
[46] Landfill Remediation Act (Altlastensanierungsgesetz).