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Regimes for granting rights to use hydropower in Europe

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Executive summary

The characteristics of hydropower make this energy source prominent in liberalized electricity systems integrating more and more renewable energy. Hydropower indeed provides widespread benefits to the whole power supply chain. First of all, it can substitute any other technology (either baseload, shoulder or peak power plants). Besides, pumping stations have a major place in balancing the system because of their significant flexibility, all the more useful to the system that intermittent generation is to be integrated. Hydropower has also the advantage to be emission-free technology. Moreover, considering its concentrated location in Europe, in the Alps, Pyrenees, in Scandinavia, etc., it also impacts significantly the network constraints at interconnections between the European countries.

Meanwhile, hydropower is also a peculiar generation technology as it significantly impacts its local environment. This may impact other water uses (tourism, agriculture, aquaculture, etc.) or even aquatic life for long distance. Its benefits for the whole power system should hence be weighed against its impact on watercourses quality. That is why the right to use hydropower as energy from watercourse is granted by the States or local authorities. This right can take different forms (authorisations, licences, concessions) with different durations (for a limited - e.g. several decades - or an unlimited period of time) and different obligations in terms of investment, environment protection (e.g. residual ecological flow) and tax payments.

The European States are in various situations with regard to their legislation for granting or renewing rights to use hydropower. Some countries implement a competitive process to grant rights to use hydropower to new installations (e.g. France, Italy, Great Britain or Spain) or to renew them (e.g. France or Italy) while others do not (e.g. Norway) and their duration greatly varies from some years (in Great-Britain, for new hydropower plants) to unlimited duration (Sweden).

In this context, over the last decade, the European Commission has launched several procedures concerning the compatibility of hydropower right granting with European laws and regulations in several countries (e.g. France, Spain, Italy, Portugal, etc.). Meanwhile, other hydropower regimes (e.g. in Austria or Sweden) are not subject of such investigations despite not being grounded on competitive process. This difference of treatment raises questions about the drivers of the European Commission actions.

Understanding and grabbing the main differences between the national hydropower regimes is then of particular interest. In 2010, the Florence School of Regulation had realised but unpublished such a benchmarking for European countries. The main objective of this study is hence to provide an updated benchmarking of hydropower concession regimes in Europe, describing hydropower regimes in 10 European countries (Austria, France, Germany, Great-Britain, Italy, Norway, Portugal, Spain, Sweden and Switzerland) and regions when appropriate (e.g. cantons in Switzerland or Lands/States in Germany).

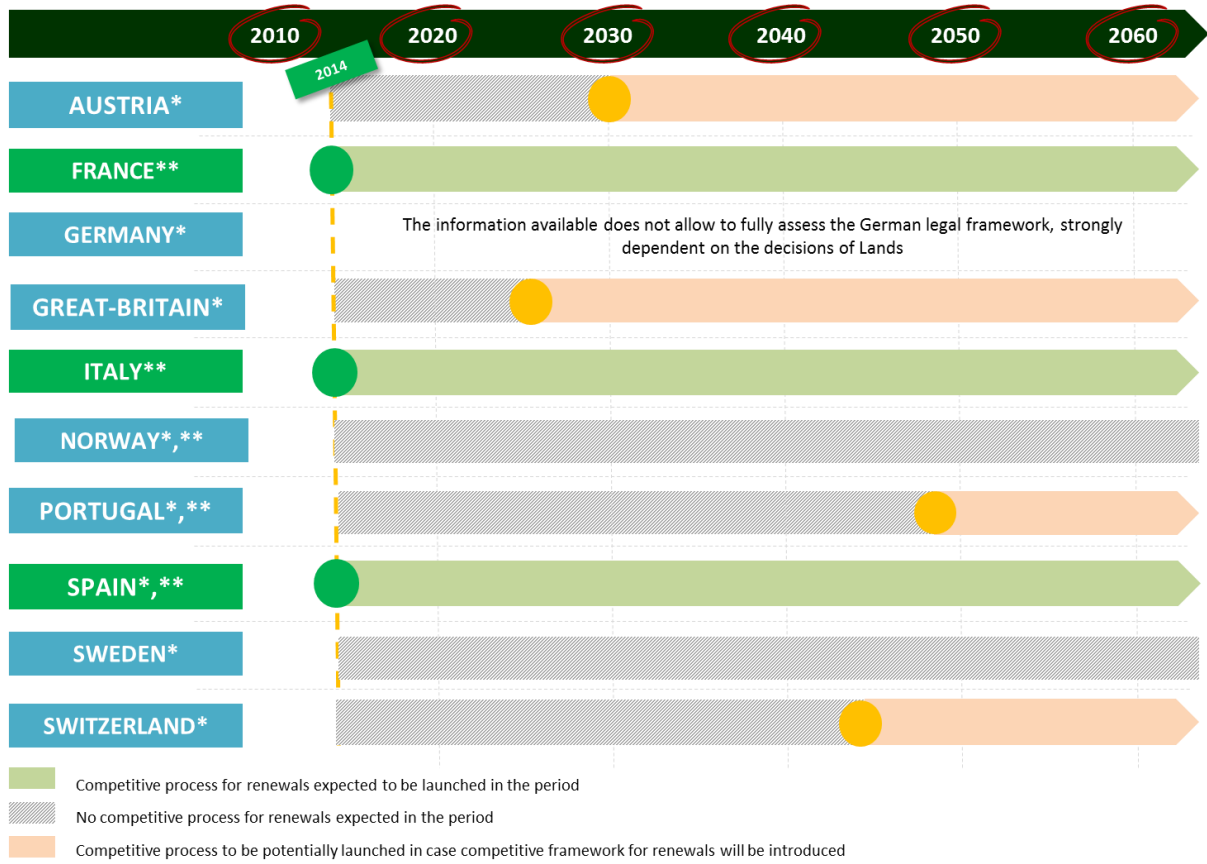
This report describes and scrutinizes hydropower regimes through a unified analysis framework to ensure their comparison on an equal basis. This framework is structured around 4 blocks: (1) the institutional framework of hydropower regimes (e.g. type of rights to use hydropower, authorities granting rights to use hydropower, etc.); (2) the framework for granting right to use hydropower (duration of rights and procedure, competitive process and existence of a possible EC infringement procedure); (3) the obligations of the hydropower operator (environmental and investment obligations and royalties); and (4) small hydro characterisation and support schemes.

The analysis of the selected countries is summed up in the four following figures concerning respectively the implications of local or regional authorities in the granting of right to use hydropower (figure 2), the different types of right to use hydropower and their duration (figure 3), countries that have been subject to infringement procedure (figure 4) and countries that implemented competitive process to grant those rights (figure 5). Table 1 also compares national situations and currently engaged procedure for competition infringement. To sum up country per country,

- in Austria, concessions to use hydropower and renewals are negotiated;
- in France, a competitive process exists for granting concession and renewal but its implementation is still waited while concessions have already expired;
- in Germany, national legislation does not seem to provide for competitive process to grant permit to use hydropower;
- in Great Britain, only the licences granted after 2003 have a limited duration and a competition process exists to grant and renew these licences but they can be indefinitely granted by a periodic application for a replacement licence;
- in Italy, a competitive process exists for granting concession and renewal;
- in Norway, hydro concessions are granted without time limit to public companies whereas private companies must revert their concession right at the expiry date. Only leasing of hydropower plants is now possible for private companies;
- in Portugal, a competitive process exists for granting new concessions, but such a process might not exist for renewals;
- in Spain, a competitive process exists for granting concession and renewal;
- in Sweden, hydro concessions are granted without time limit under the conditions that hydropower operators invest to respect more and more stringent environmental obligations;
- in Switzerland, concessions to use hydropower and renewals are negotiated and tenders are not mandatory for granting them.

Figure 1 also presents graphically the schedule. Each country is described by a timeline. A dot indicates an estimation of renewal potential start date for the national hydropower park, considering available information. Countries in green boxes have a legislation providing public and competitive procedures for renewals of all hydroelectric concessions while countries in blue boxes do not have such legislation for renewals of all the hydroelectric concessions.

Figure 1. Indicative schedule of hydropower renewals



* National legislations do not seem to provide public and competitive procedures for renewal of all the hydroelectric concessions

** Countries concerned in past decade by EU infringement procedures or similar procedures from the European Free Trade Association for Norway) that led to the revision of national framework

Figure 2. Local or regional authorities can play a large role in the decision making process

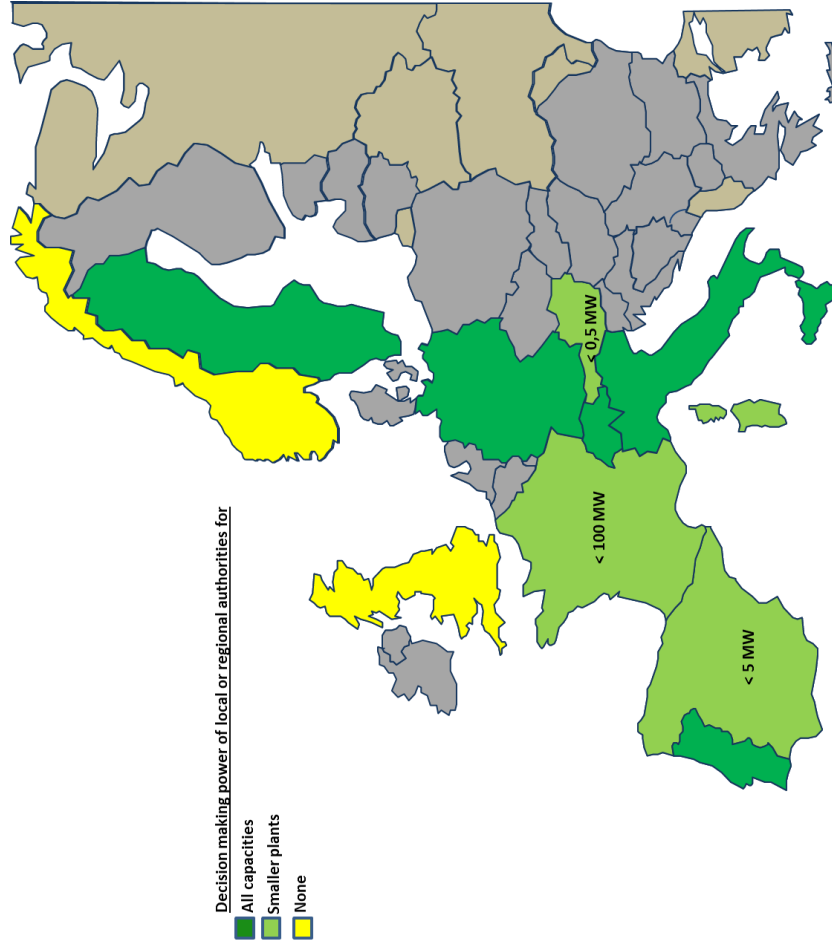


Figure 3. Different forms of right to use hydropower granted for different durations

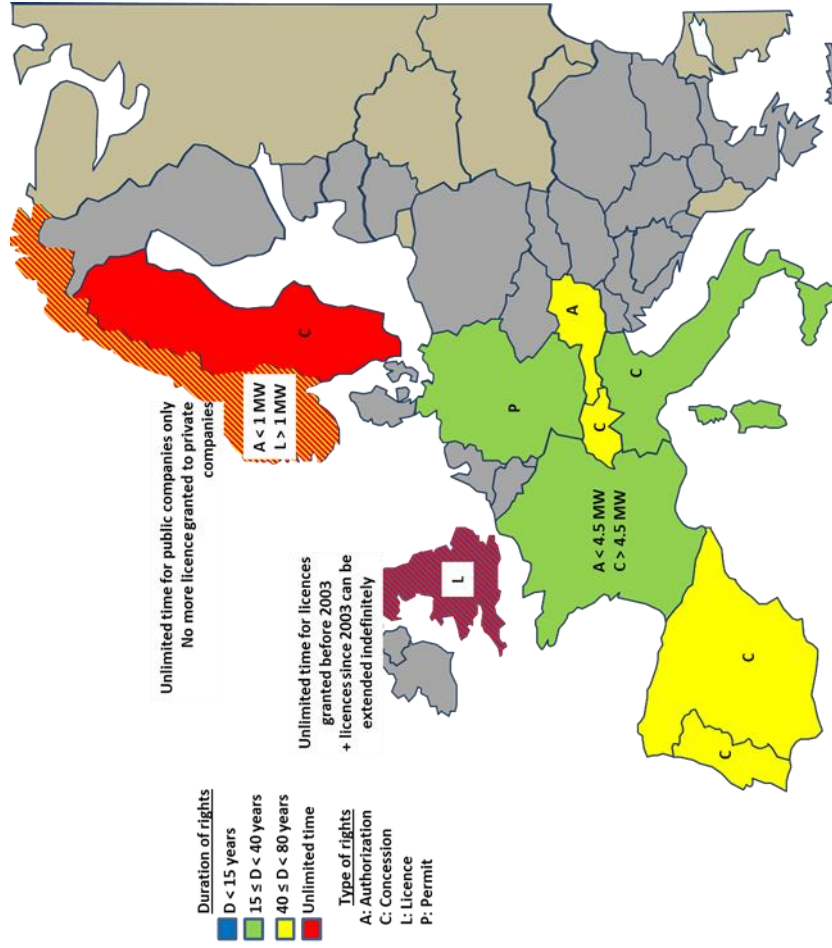


Figure 4. Several countries have been subject to infringement procedure

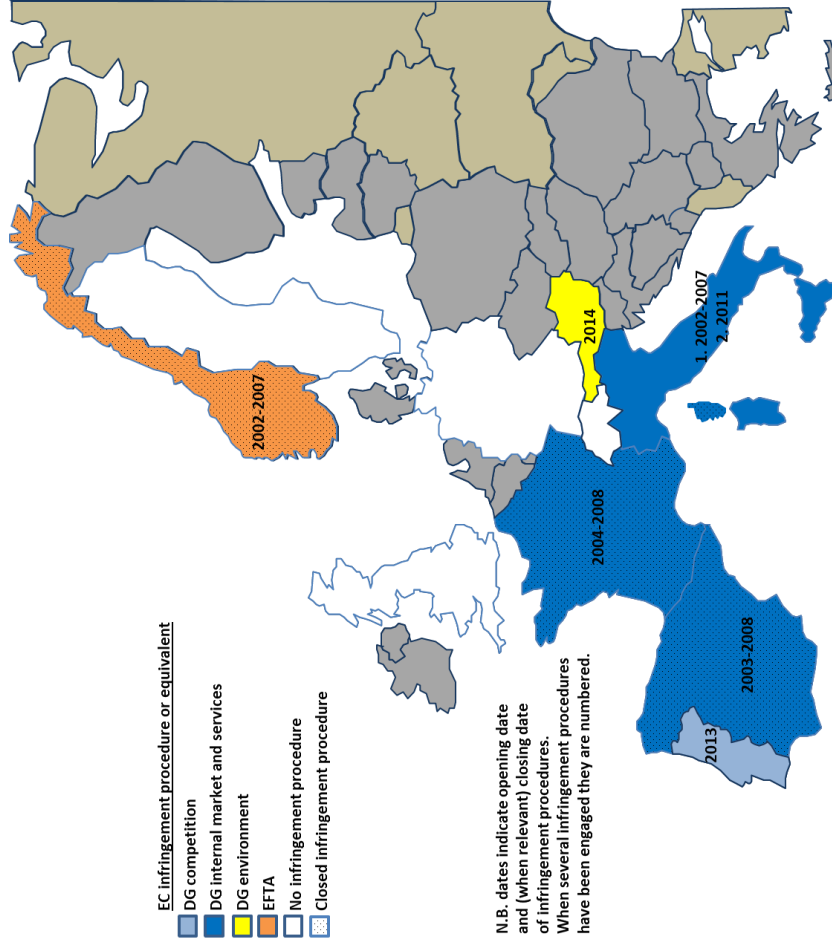


Figure 5. Competitive process to grant right to use hydropower

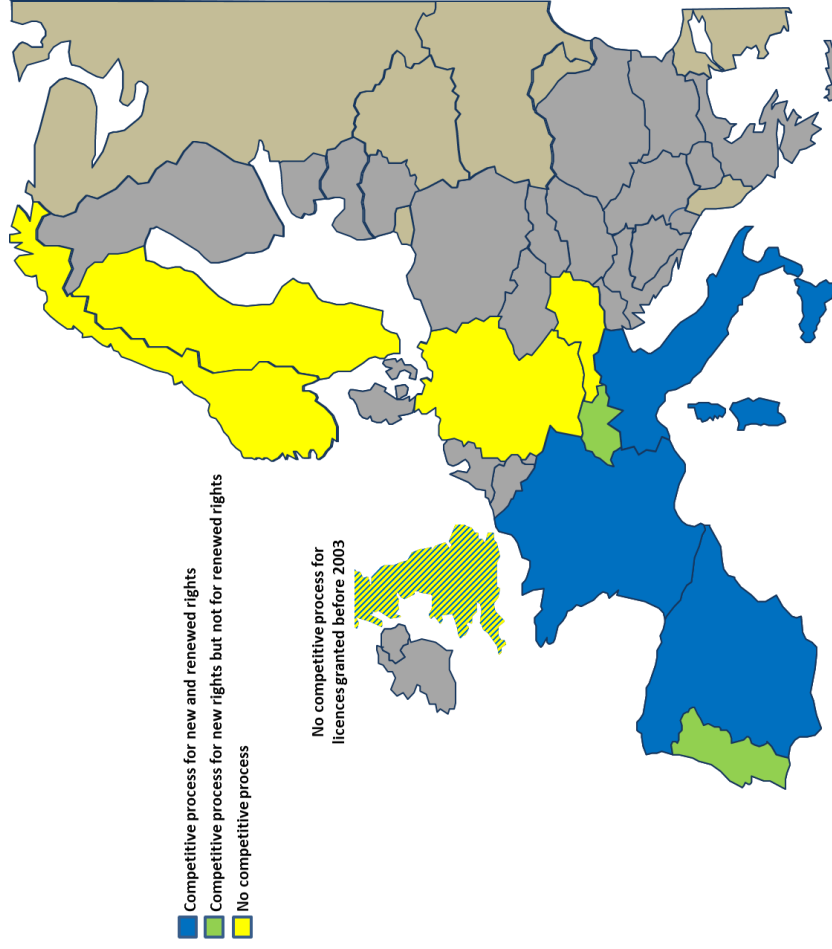


Table 1. Comparison of national situations and currently engaged procedures for competitive infringement

Countries	Type of right to use	Evaluation of granting procedure	Currently engaged procedure for
-----------	----------------------	----------------------------------	---------------------------------

	hydropower	Duration	Competitive process?	competition infringement?
Austria	Authorization	●	●	No
France	Concession > 4.5 MW	●	●	No
Germany	Permit	●	●	No
Great Britain	Licence	● (before 2003) ● (after 2003)	● (before 2003) ● (after 2003)	No
Italy	Concession	●	●	Yes
Norway	Licence > 1 MW	●	●	No
Portugal	Concession	●	●	Yes
Spain	Concession	●	●	No
Sweden	Concession	●	●	No
Switzerland	Concession	●	●	No

From the figures and table above, three main conclusions can be drawn:

1. The first one is that **the institutional framework relative to hydropower is generally complex with a stacking of interests and decision-making powers** from the European Commission (or EFTA, for non EU members) to local authorities (in several countries) through national authorities. Trade-offs between these interests are then needed to come up with decisions regarding hydropower right of use. With this regard, the national and local interests have a significant weight because of the environmental impact of hydropower on watercourses. This is also reinforced by the participation of hydropower to security of supply or climate change policy, even if this is also true to a variable extent for other types of generation technology;
2. For the same reasons, **liabilities of hydropower operators are consequential**. Their decisions have indeed an important impact on the environmental quality of the watercourses they exploit. These liabilities account for the in-depth controls for granting rights of hydropower use, as much for the operators' qualifications as for terms of rights and quality of assets during transfers of liabilities at renewals;
3. Analysing the framework of granting right to use hydropower, it is noteworthy that the implementation of competitive process remains secondary in this respect in the Member States as well in external countries. A number of countries implement authorisations (e.g. Austria), grant concessions for unlimited time (e.g. Sweden), or directly negotiate concession without a transparent competitive process for granting rights to use hydropower. Different levels of opening are observed for initial granting rights to use hydropower or for renewals. For example, the UK is in a hybrid situation: licences granted before 2003 were given for an unlimited period of time but new licences are granted for 12 or 24 years. Moreover, Spain and Portugal grant new concessions in a competitive process but such a process does not seem implemented for renewals. Several countries were hence under pressure (from the European Commission) to make their legislation evolve toward more competition and transparency (France, Spain, Italy – all granting concessions – from the European commission). Considering the situation of the different countries, these pressures nevertheless do not seem totally related to the openness or closure of the hydropower granting process alone. For instance, Sweden grant right to use hydropower for unlimited time, Austria grant right to use hydropower for a very long duration and Germany does not implement a competitive process to grant right to use hydropower. Nevertheless, they are not under any pressure to further open more and make more transparent their granting process.

Beside these main conclusions, it can be noted that **competition should not be the only concern with regard to hydropower since distortions from unharmonised obligations, taxation and support may be significant** if not consequential. Because of interdependencies among the national hydro sources through the European market, the question whether the non-harmonisation of obligations, taxation and support is prejudicial to the efficient use of hydropower in Europe or whether it reflects justified national specificities should also be addressed at the European level.

Introduction

The characteristics of hydropower make this energy source prominent in liberalized electricity systems integrating more and more renewable energy. First of all, hydropower has the particular feature that it can substitute any other technology. Indeed, run-of-the-river plants generate baseload energy while hydro storage plants (with or without pumping stations) provide capacity and act as shoulder and peak power plants in time of higher consumption. Besides, pumping stations have a major place in balancing the system because of their significant flexibility. For instance, in France, hydropower is used at least 30% of the time to compensate for downward and upward imbalances even if it only stands for less than 20% of installed capacity. It is also recognized that hydropower, as a major generation technology for balancing, shall be reinforced as more and more intermittent generation is to be integrated in the power system and more flexibility and balancing are going to be needed. This is all the more true as this is an emission-free technology. Therefore, hydropower provides widespread benefits to the whole power supply chain as it produces energy, provides capacity at peak time and offers flexible balancing. Moreover, considering its concentrated location in Europe, in the Alps, Pyrenees, in Scandinavia, etc., it also impacts significantly the network constraints at interconnections between the European countries.

Meanwhile, hydropower is also a peculiar generation technology as it significantly impacts its local environment. Watercourse residual flow can hence be close to 5% only. This may impact other water uses (tourism, agriculture, aquaculture, etc.) or even aquatic life for long distance. Its benefits for the whole power system should hence be weighed against its impact on watercourses quality. That is why the right to use hydropower as energy from watercourse is granted by the States or local authorities. This right can take different forms (authorisations, licences, concessions) with different durations (for a limited - e.g. several decades - or an unlimited period of time) and different obligations in terms of investment, environment protection (e.g. residual ecological flow) and tax payments.

Before liberalization of the European electricity sector, these rights to use hydropower were granted through a basic framework with neither criteria nor provision regarding competition. Now, the European States are in various situations with regard to their legislation for granting or renewing rights to use hydropower. Some countries implement a competitive process to grant rights to use hydropower to new installations (e.g. France, Italy, Great Britain or Spain) or to renew them (e.g. France or Italy) while others do not (e.g. Norway) and their duration greatly varies from some years (in Great-Britain, for new hydropower plants) to unlimited duration (Sweden).

In this context, over the last decade, the European Commission has launched several procedures concerning the compatibility of hydropower right granting with European laws and regulations in several countries (e.g. infringement procedures against France, Spain and Italy opened in 2005; a new infringement procedures against Italy opened in 2011 and extended in September 2013; an in-depth inquiry about State aid in Portugal and requests for preliminary information from other Member States; etc.). Meanwhile, other hydropower regimes (e.g. in Austria or Sweden) are not subject of such investigations despite not being grounded on competitive process. This difference of treatment raises questions about the drivers of the European Commission actions, all the more that there are interdependencies of national market through competition on more and more coupled energy markets, as well as interdependencies between the hydropower regimes in Europe due to the incentives they provide in investment and use of hydropower.

Understanding and grasping the main differences between the national hydropower regimes is then of particular interest. In 2010, the Florence School of Regulation had realised but unpublished such a benchmarking for European countries. The main objective of this study is hence to provide an updated benchmarking of hydropower concession regimes in Europe, describing hydropower regimes in 10 European countries (Austria, France, Germany, Great-Britain, Italy, Norway, Portugal,

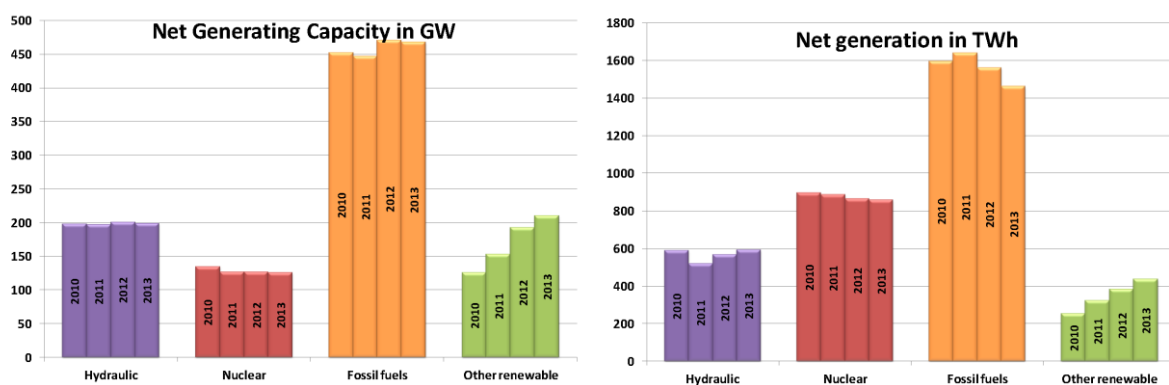
Spain, Sweden and Switzerland) and regions when appropriate (e.g. cantons in Switzerland or Lands/States in Germany).

To fulfil this objective, the report is organised as follow. Section 1 presents general information about hydropower and its use in Europe. The hydropower regime of the 10 studied countries will be described and scrutinised through a unified analysis framework to ensure their comparison on an equal basis in section 2. This framework is organized around 4 blocks: (1) the institutional framework of hydropower regimes (e.g. type of rights to use hydropower, authorities granting rights to use hydropower, etc.); (2) the framework for granting right to use hydropower (duration of rights and procedure, competitive process and existence of a possible EC infringement procedure); (3) the obligations of the hydropower operator (environmental and investment obligations and royalties); and (4) small hydro characterisation and support schemes. Section 3 concludes.

1 Main characteristics of hydropower in Europe

Hydropower has characteristics that make it very beneficial to the system in liberalized electricity market integrating more and more renewable energy¹. First of all, hydropower is an important technology since it substitutes to any other technology. Run-of-the-river plants indeed produce baseload energy while hydro storage plants provide capacity and act as shoulder or peak power plants in time of higher consumption depending on their storage capacity. Hydropower is also recognized as the cheapest technology all cost considered² (Eurelectric, 2011). Moreover, once built, these generators are then very competitive because their variable cost is very low. The energy they can produce nevertheless depends on the flow or reservoir level. That is why production from hydropower greatly varies from one year to another (see graphs below).

Figure 6. Overall ENTSO-E net generating capacity and net production



Source: ENTSO-E (2014)³

Hydropower is already developed in a number of European countries (see figures 3, 4 and 5) and it can still be developed in a number of European countries (see figure 6).

In the framework of climate change policy, hydropower is likewise an interesting technology for two reasons. First of all, it is an emission-free technology. Besides, hydro storage plants have also a major place in balancing the system because they are very flexible⁴. It is also recognized that hydropower, as a major balancing power production technology, shall be reinforced as more and more intermittent production will be integrated in the power system and more flexibility and balancing will be needed (Eurelectric, 2011). Consequently, hydropower has widespread benefits in the whole power supply chain, producing energy, providing capacity in time of peak load and offering flexible balancing.

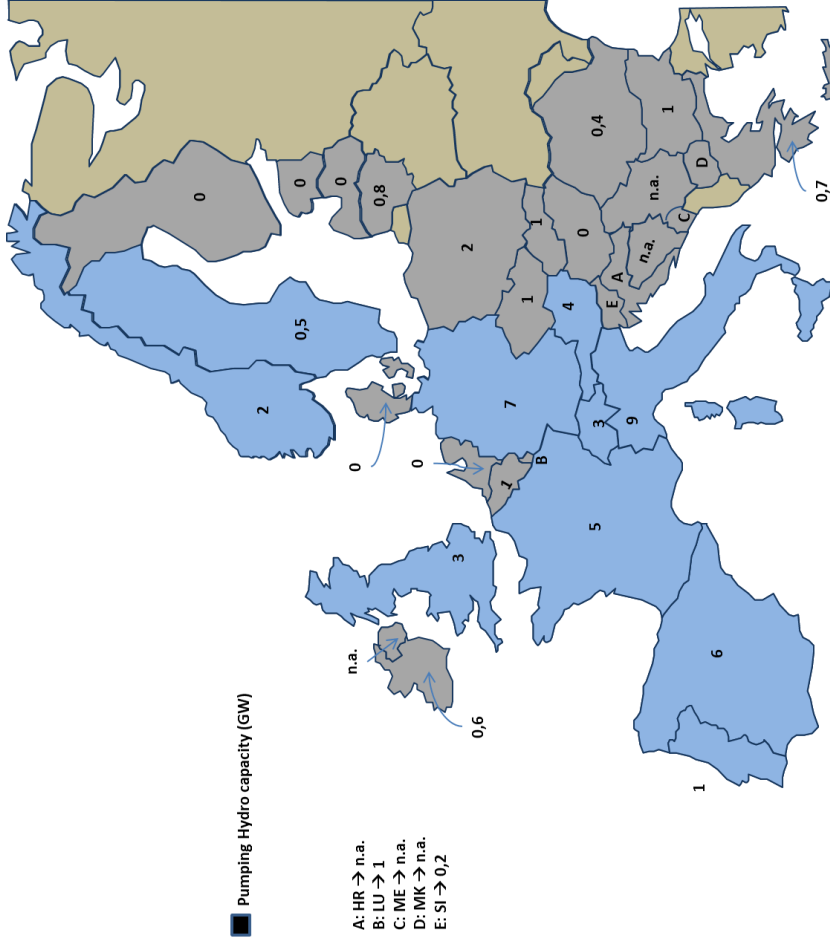
¹ Ruester, S., He, X., Vasconcelos J., Glachant J.-M., (2012). Electricity Storage: How to Facilitate its Deployment and Operation in the EU? THINK report to the European Commission.

² Eurelectric (2011), Hydro in Europe: Powering Renewables.

³ ENTSO-E (2014), Electricity in Europe 2013.

⁴ For instance, in France, hydropower is used at least 30 % of the time to compensate for downward imbalances and at least 50 % of the time to compensate for upward imbalances even if it only stands for less than 20% of installed capacity. Hydropower technology is also a significant contributor to blackstart (in order to restart the power system from a black-out).

Figure 11. Pumping station capacity



Source : DG ENER¹⁰

¹⁰ DG ENER Working Paper, The future role and challenges of Energy Storage. http://ec.europa.eu/energy/infrastructure/doc/energy-storage/2013/energy_storage.pdf

Considering its peculiar place in the energy mix and its inter annual variability, hydropower has correspondingly a major impact in the management of network constraints in the European power system. Hydropower is indeed concentrated mainly in the Alps, Pyrenees, Scandinavia, the Balkans, Romania and Bulgaria too, as show the above graphs. Power flows from and to countries with an important hydropower greatly varies from "dry" to "wet" years. The best example is to consider the extreme year of 2002 and 2003 when a severe drought happens in Europe. France, Norway, Sweden and Switzerland then experienced tight conditions of security of supply mainly because of very low inflows for hydropower¹¹. This is also true for the Iberian and Italian Peninsulas. As a consequence, hydropower and its inflow greatly impact results of national and more generally regional (coupled) markets.

Beside all these specificities, hydropower is a peculiar generation technology as it significantly impacts its local environment. Watercourse residual flow can hence be close to 5% only. This may impact other water uses (tourism, agriculture, aquaculture, etc.) or even aquatic life for long distance. Its benefits for the whole power system should hence be weighed against its impact on watercourses quality. That is why the right to use hydropower as energy from watercourse is granted by the national or local authorities.

The next section describes in a unified framework how the right to use hydropower are granted in 10 western European countries with high hydro potential.

¹¹ Lise W., Hobbs B., Hers S., (2008), Market power in the European electricity market. The impacts of dry weather and additional transmission capacity, *Energy Policy* 36(4), 1331-1343.

2 Benchmarking of hydropower frameworks

Hydropower regimes of 10 European countries (Austria, France, Germany, Great-Britain, Italy, Norway, Portugal, Spain, Sweden and Switzerland) and regions when appropriate (e.g. cantons in Switzerland or Landers in Germany) will be described and analysed through a unified analysis framework to ensure their comparison on an equal basis.

This framework will be structured around 7 axes:

- the institutional framework related to hydropower,
- the type of right to use hydropower and the framework for granting them,
- a description of the competitive process when it exists,
- the schedule of main renewals of rights to use hydropower,
- obligations to hydropower users, and
- support for small hydro power plants.

These 7 axes are summed up in 4 blocks:

- (1) the institutional framework of hydropower regimes (type of rights to use hydropower, authorities granting rights to use hydropower),
- (2) the framework for granting right to use hydropower (duration of rights and procedure, competitive process and existence of a possible EC infringement procedure),
- (3) the obligations of the hydropower operator (environmental and investment obligations and royalties), and
- (4) small hydro characterisation and support scheme

2.1 Austria

Table 2. Summary of Austrian hydropower framework

Characteristics		Description	
Institutional framework	Authorities for granting rights of use	<ul style="list-style-type: none"> • Authorization by regional district authority for facilities <500 kW • National authority for facilities on Danube as well as cross-border facilities • Otherwise by federal States 	
	Types of hydropower right and granting procedures	<ul style="list-style-type: none"> • Applications for authorizations validated in compliance with environmental criteria only 	
Framework for granting right to use hydropower	Duration	<ul style="list-style-type: none"> • Maximum authorization duration: 90 years • On average between 25 and 75 years 	
	Competitive process	For new concessions	National legislation does not appear to provide for competitive procedure
		For concession renewals	National legislation does not appear to provide for competitive procedure
	EC infringement proceedings or equivalent	DG environment takes Austria to Court in April 2014 over failure to protect water quality on Schwarze Sulm river after infringement proceedings in 2013 on the grounds that the permit for the power plant is not in line with the requirements of the Water Framework Directive	
Obligations of hydropower operators	Environmental obligations	<ul style="list-style-type: none"> • Mandatory EIA over 15 MW • Watercourse residual flow to be restore until 2027 in existing hydropower plants 	
	Investment obligations	National legislation does not appear to provide for investment obligations except environmental obligations	
	Royalties	<ul style="list-style-type: none"> • Energy taxes • Local taxes • Mandatory participation to special funds • Licence fees directly negotiated with competent authorities 	
Small-hydro	Small hydro definition	< 2MW	
	Support	<ul style="list-style-type: none"> • New or revitalised plants increasing efficiency by at least 15 % • 3.23 – 10.55 c€/ kWh for 13 years, depending on revitalisation and the amount of electricity fed into the grid. • Obligations to purchase at market prices for hydropower < 10 MW • Alternative possibility of investment aid 	

2.1.1 Context and economics of hydropower in Austria

Austria heavily relies on hydropower for its energy supply. In 2012, it represented 65% of the total electricity generation with 47.6 TWh produced¹². The role of hydropower is aimed to increase during the present decade in order to accommodate the renewable targets associated with the EU Renewable Energy Directive. Expansion targets have been implemented in the *Energy Strategy Austria*¹³ and the *Green Electricity Act 2012*¹⁴ with a 700 MW nominal capacity increase between 2010 and 2015 (equivalent to 3,500 GWh/y additional output in a normal year) and a 1000 MW

¹² Hollauf, 2014. *Anwendung von Kriterienkatalogen bei der strategischen Planung von Wasserkraftprojekten*

¹³ Federal Ministry of Economy, Family and Youth, 2010. *Energy Strategy Austria*

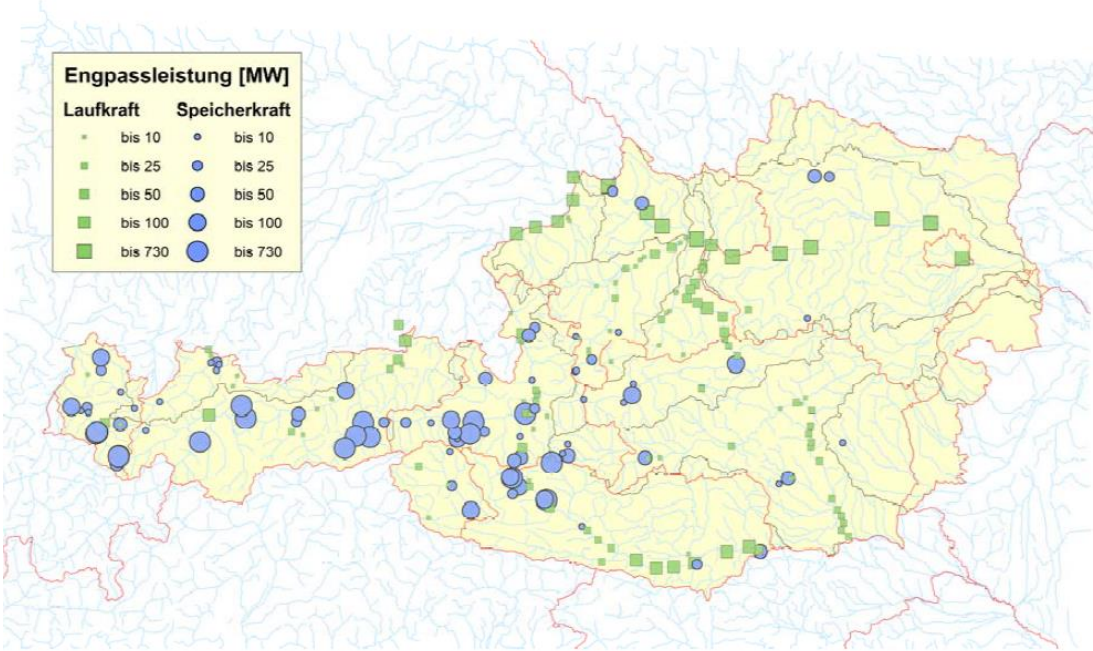
¹⁴ E-Control, 2014. *Green Electricity Act 2012*

capacity increase between 2010 and 2020 (equivalent to 4,000 GWh/y additional output in a normal year). The so-called expansion targets have to be reached by both new plants and rehabilitation and expansion of existing plants (with a 50/50 distribution). The effort is also evenly distributed between large hydropower plants and small and medium hydropower plants, with specific measures and incentives for the development of small and medium hydropower stations (Green Electricity Act 2013).

Austria presents the specificity of being a federal country separated into 9 States/Länder, each with its own government and legislation with regard to water use and management as well as environment protection. Likewise, expansion plans of hydropower differ from one State to the other, thus accommodating with both characteristics of local political situation and hydropower potential. According to a 2011 government decision, Tirol is to expand its hydropower capacity in order to produce an extra 2.8 TWh/y output over the next 25 years and 1.9 TWh/y over the 2010-2020 period, thus bearing about half of the national expansion effort.

Despite its significant reliance on hydropower, Austria does not provide an elaborate framework for hydropower access or use. There is no concession system but a licensing process that is mostly organized at a local level, following both State and federal legislations. These legislations have been evolving to converge with the stipulations of the Water Framework Directive as well as the increasing concern over the environmental impact of watercourse use.

Figure 12. Performance of Austrian reservoir ("Speicherkraft") and run-of-the-river ("Laufkraft") hydropower facilities



Source: Pöyry¹⁵

¹⁵ Pöyry, 2008. Wasserkraftpotentialstudie Österreich

2.1.2 The institutional framework for hydropower

Stakeholders and legislations

The legal structure for watercourse use as hydropower is mostly based on federal legislations and documents. It is organized through the following acts:

- The Austrian Water Act¹⁶ (1959, last updated in 2014) is the main piece of legislation regarding water management and provisions for projects having a potential impact on watercourse.
- The Green Electricity Act 2012¹⁷ (amended in 2013) provides for the expansion plans of renewable technologies as well as associated support schemes. It presents provisions regarding applicant and plant operators' obligations, guarantees of origin, and purchasing obligations. It provides the framework for investment support schemes for small (<10 MW) and medium sized (<20MW) hydropower plants.
- The EIA Act 2000¹⁸ (last updated in 2013) gives provisions for environmental planning instruments, development control plans, procedures and certification.
- The 2012 Water Catalogue¹⁹ (or Austrian Hydro Power Sustainability Criteria Catalogue) is a guidance for assisting bodies and authorities with regard to environmental impact assessment and the EIA Act 2000. It is a supporting tool which provides 16 environmental, energy, and economic criteria for application of the European Water Directive. Water management aspects and impact on the watercourse are in particular tested. The objective of the catalogue is to make the decision process for right granting and hydropower monitoring as transparent and reliable as possible and to help hydropower planners in project conception. Nevertheless, it does not prevent water authorities and bodies from taking the final decision.

The involved stakeholders for supervision, control, and authorization are:

- The Federal Minister of Agriculture, Forestry, Environment and Water management is responsible for setting environment protection provision and coordinating the local, State, and federal authorities. It is responsible for updating and applying the Austrian Water Act.²⁰
- The Austrian Reservoir Commission²¹ is appointed by the Federal Minister of Agriculture, Forestry, Environment and Water management to support water authorities on technical issues and safety monitoring in or outside water rights procedures. Since 1964, it has published guidance and opinions on monitoring and reservoir safety.
- The local authorities are responsible for water monitoring and water rights procedures. There are three levels. First, regional government and district authorities are responsible for water management and licensing for most hydropower facilities. Second, federal State authorities are responsible for authorization for small hydropower with capacity higher than 500 kW. Last, the

¹⁶ Wasserrechtsgesetz 1959, Nr. 98/2013, up-to-date January 2013.

¹⁷ Ökostromgesetz 2012, version of May 22, 2014.

¹⁸ Umweltverträglichkeitsprüfungsgesetz 2000, version of May 22, 2014.

¹⁹ Federal Ministry of Agriculture, Forestry, Environment and water management, 2014. *Wasserkatalog* - http://www.bmlfuw.gv.at/wasser/wasseroesterreich/wasserrecht_national/planung/erneuerbareenergie/Kriterienkatalog.html.

²⁰ Federal Ministry of Agriculture, Forestry, Environment and water management, 2014. *Reservoir*. <http://www.bmlfuw.gv.at/en/fields/water/Use-of-water/Reservoir.html>.

²¹ Federal Ministry of Agriculture, Forestry, Environment and water management, 2014. *Stauanlagen – Staubeckenkommission*. <http://www.bmlfuw.gv.at/wasser/nutzung-wasser/stauanlagen.html>.

national authority is responsible for hydropower facilities on the Danube as well as cross-border facilities. The authorities can be assisted in their tasks by the Austrian Reservoir Commission.

Types of right to use hydropower and granting procedures

The Austrian legislation does not issue clear water rights regarding diversion and use of public water besides authorization. There is no concession system but simple authorization and licence granting processes²².

Initial proposals for hydropower installations are made by the investors and project applicants to local and federal authorities. Any request / application must include the plant's technical characteristics as well as measures on residual flow.

According to the Austrian Water Act, a complete study of the environmental impact (EIA) must be realized for each project over 15 MW following the criteria issued in the act. It is our understanding that compliance with the environmental criteria is a necessary and sufficient condition for authorization granting. A special procedure provides the obligation for the administration to grant the authorization in the event they comply with environmental requirements. Article 104a stipulates that all projects having an impact on water status must be audited from the public interest point of view and can only be authorized if the audit of public interest finds that the impact has been minimized or is outweighed by the social benefits it provides, that there is no better alternative, and that it is compatible with water management plans and goals. An official licence is then granted to the applicant / hydropower planner.

2.1.3 Framework for granting right to use hydropower

There is no concrete definition of a validity time of water rights. The Austrian Water Act provides in article 21 that the authorization will be limited on the grounds of the assessment of the investments and costs needed for the construction of a plant or, in case of renewal, for the refurbishing and revamping of the existing plants. Licence duration cannot exceed 90 years. On average, authorizations are issued for a period from 25 to 75 years²³.

Authorization renewal can be realized until six months before the end of authorization. If it is realized at least 5 years before the end of authorization, the renewal decision must be made six months before expiry at the latest. Renewal requests are analysed on the ground of public interest and assessment of the water use during the authorization period. If satisfactory, it cannot be rejected. If renewal is not granted, the legislation provides for a free reversion to the State of all assets related to the usage and it does not contemplate any type of compensation for investments made.

²² Unternehmen Service Portal, 2014. *Wasserrechtliche Bewilligungspflichten*. https://www.usp.gv.at/Portal.Node/usp/public/content/umwelt_und_verkehr/wasserwirtschaft/bewilligungspflichten/51134.html.

²³ Interviews conducted by the 2010 FSR report authors (Florence School of Regulation, 2010. *Overview on hydropower regimes in Europe*).

2.1.4 Characteristics of the competitive process

Competitive authorisation procedure for new installations

The Austrian legislative framework does not seem to provide for public and competitive procedures for the authorisation of new hydropower installations.

Competitive procedure for authorisation renewals

The Austrian legislative framework does not appear to provide for public and competitive procedures for hydropower authorisation renewal.

2.1.5 Main schedule for renewal

The assessment of the temporal references of entry into operation of the majority of Austrian plants may offer an estimate of the remaining term of the authorization. Amongst more than 85 plants, about 65 came into operation after 1930. Assuming authorization duration of 70 years, it may estimate that these authorizations are set to expire beyond 2030.

2.1.6 Obligations of hydropower operators

Beside the right to use hydropower and the authorisation specificities, hydropower right holders must respect several major obligations which impact their strategic and operational decisions.

Environmental obligations

The EIA act 2000 provides that with regard to hydropower planning environmental impact assessment is mandatory for hydropower plants with a bottleneck output of 15 MW or more as well as several subcategories of hydropower facilities.

Provisions regarding watercourse residual flow protection were introduced in the 1990 Water Management Law and further defined in the 2010 ordinance on quality objectives for ecological quality elements in rivers and lakes. The ordinance is based on the EU Water framework directive. It complements the Austrian river basin management plan of 2009²⁴ which provides watercourse residual flow full stepwise restoration until 2027 in order to comply with the WFD. The impact of the WFD is then particularly significant for Austria as the compliance with the directive and the restoration of watercourse flow will result in major energy potential losses – up to 1.8 TWh/y²⁵ that must be compensated by the expansion plans. This also implies difficulties for Austria to respect good status at the specified dates. In April 2014, the European Commission took Austria to Court over failure to protect water quality in Schwarze Sulm river, after opening an infringement procedure in 2013 on the grounds that the hydropower license was not in line with the requirements of the WFD.

²⁴ NGP 2009. *Nationale Gewässerbewirtschaftungsplanverordnung* 2009, Federal Law Gazette II Nr. 103/2010.

²⁵ VEO, 2009. *Masterplan zum Ausbau des Wasserkraftpotenzials*.

Investment obligations

The Austrian legislative framework does not seem to provide for public and competitive procedures for hydropower investment obligations.

Taxes, levies and royalties

There are several levels of financial obligations for hydropower authorization holders, energy taxes, local taxes, mandatory participation to special funds and licences fees.

On account of the high tax load there is no further explicit hydro rent tax at the federal level. The current legislation does not provide for a cap/floor concerning the taxes/charges related to water exploitation. The licence fees, royalties and rents are directly negotiated between competent authorities and hydropower authorization applicants. Private provisions and obligations are then decided, such as payments and maintenance obligations, other investments, treatment procedures or flood protection.

2.1.7 Support to small hydropower

In Austria, a distinction is made between small and medium hydropower. Small hydropower only accounts for capacities up to 10 MW, while medium hydropower accounts for capacities from 10 to 20 MW. Both categories can benefit from financial support within the Austrian RES support scheme and the Energy Strategy 2050. The Green electricity act, last updated in 2013, is the reference document with regards to financial support to green electricity and both small and medium hydropower plants. Three different types of financial support can be identified:

- Obligation to purchase at fixed feed-in tariffs is provided for small hydro power plants with a nominal capacity up to 2 MW²⁶. The price is fixed between 4.97 and 10.55 c€/kWh for new and revitalized small hydro power plants with at least 50% efficiency increase, and between 3.23 and 8.26 c€/kWh for revitalized small hydropower plants with 15 to 50% efficiency increase. FiT are guaranteed for a 13-year duration;
- Obligation to purchase at market price is provided for small hydropower plants with a nominal capacity from 2 to 10 MW;
- Both small and medium hydropower planners can also apply to investment aid on a first come first served basis. Investment aid will be granted in the limits of the available funds and should correspond to a return on investment of 6% in case of operation in the market. It is not compatible with feed-in tariffs or purchase obligations. For small hydropower, new plants as well as rehabilitation with at least 15% capability increase. The support fund is €16 million annually and aid is capped according to the capacity (e.g., 30% of the total cost cap if the capacity is lower than 500 kW, 10% cap and 400 €/kW upper limit for a 10 MW capacity). For medium hydropower, the support fund is 50 M€, and the cap is at 10% of the total investment cost and 400€/kW.

²⁶ Ökostromverordnung. https://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2012_II_307/BGBLA_2012_II_307.pdf.

2.2 France

Table 3. Summary of French hydropower framework

Characteristics		Description	
Institutional framework	Authorities for granting rights of use	<ul style="list-style-type: none"> • Departmental prefecture for infrastructures <100MW • The Ministry of Energy > 100MW 	
	Types of hydropower right and granting procedures	<ul style="list-style-type: none"> • Authorisation < 4.5 MW • Concession > 4.5 MW 	
Framework for granting right to use hydropower	Duration	<ul style="list-style-type: none"> • Concession duration up to 75 years. More recent concessions are granted for 40 years • Authorisation procedures can last more than 5 years 	
	Competitive process	For new concessions	<ul style="list-style-type: none"> • A phase of dialogue may be launched if judged necessary by the authority to allow candidates to present its analysis of the project characteristics and variants • Authority selects the winning candidate based on project application granting better environmental protection
		For concession renewals	Ranking of tender <ul style="list-style-type: none"> • Maximizing energy • Limiting environment impact • Maximizing expected royalties
	EC infringement proceedings or equivalent	Closed (in 2008 by DG market – opened in 2004 with referral to the EC court in 2005) after elimination of preference to outgoing concession-holders at hydropower concession renewals	
Obligations of hydropower operators	Environmental obligations	<ul style="list-style-type: none"> • Watercourse minimum flow set at 10 % on average by the national regulation • Local authorities often requiring for watercourse minimum flow between 12% and 17% 	
	Investment obligations	To meet environmental requirements: <ul style="list-style-type: none"> • e.g. modernising installations to increase power production with the same flow • ensuring land drainage 	
	Royalties	1. Fee for the use of watercourses 2. + Fee for the occupation of hydroelectric public domain 3. + Charge proportional to the kWh produced, or dividends or distributed profits 4. + Charge proportional to the revenue from electricity sales	
Small-hydro	Small hydro definition	< 4.5MW	
	Support	6.07 c€/kWh (no time of use tariff) + a premium between 0.5 and 2.5 c€/kWh (inversely proportional to capacity) + a winter bonus of up to 1.68 c€/kWh depending on regularity of production	

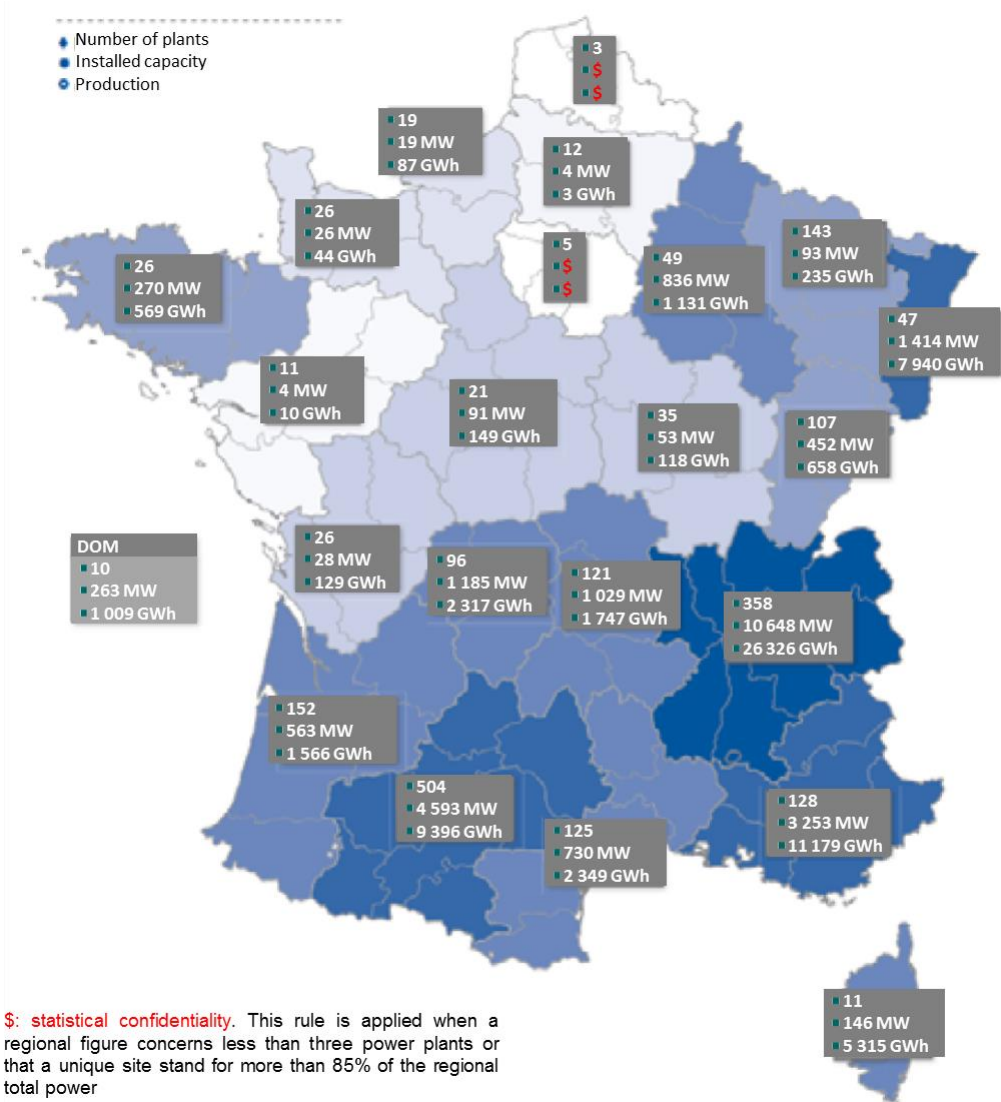
2.2.1 Context of hydropower in France

Although the French electricity mix is mostly dependent on nuclear (75.5%), hydropower (11.4%) is the second energy in the electricity mix (shortly ahead of conventional production – 9.7 %) ²⁷. It is an important source of electricity since the 1920s and a highly debated topic in the political arena

²⁷ World Energy Council (2014), Data, Sustainability Index, <http://www.worldenergy.org/data/sustainability-index/>.

nowadays. This can be explained by the fact that, in the near future, the country’s nuclear production is expected to decrease by 20% by 2020 to 2025. Hydropower and other renewable energy sources are thought to be major contributors to the new energy mix to maintain the low CO₂ emission level of the electricity sector but not to the country’s economic and competitive detriment.

Figure 13. Hydro power location in France in 2010



Source: Ministère du Développement Durable (2011)²⁸

In France, national legislation requires that hydropower generation facilities have valid concessions to operate. Nevertheless, the European Commission opened an infringement opinion in 2004 (with a referral to the EC court in 2005) against its legislation which grants preference to outgoing hydropower concessionaires for new or expiring concessions, contrary to the principle of non-discrimination. In 2006, France modified its legislation in accordance to the EC’s ruling²⁹. Since then,

²⁸ Ministère du Développement Durable (2011), Hydroélectricité, 2011-2012: Une période décisive pour répondre aux défis structurants de la filière, http://www.developpement-durable.gouv.fr/IMG/pdf/10_Hydroelectricite.pdf.
²⁹ EC (2005), Freedom of establishment: the Commission calls on France, Italy and Spain to amend their legislation on hydroelectric concessions, IP/05/920, 13/07/2005, http://europa.eu/rapid/press-release_IP-05-920_en.htm?locale=en.

the country has not experienced any major hydropower concessions' "reopening to competition" as it is still debated today. Several hydropower concessions in the Alps and Pyrenees (10 lots translating into 5,300 MW) are still pending, other concessions are approaching expiry, but the vast majority of them will regularly expire between 2020 and 2060.

2.2.2 The institutional framework for hydropower

Stakeholders and legislations

The main pieces of legislation pertaining to hydropower concessions are the following five:

- The Act of 16 October 1919 on the use of hydropower³⁰;
- The Energy Code³¹, which states the general organisation of the energy sector;
- The Decree No. 94-894 of 13 October 1994 on the concession and the declaration of public utility works using hydraulic power (January 2008 consolidation)³²;
- The Decree No. 2008-1009 dated 26 September 2008 amending Decree no. 94-894 of 13 October 1994 relating to the concession and declaration of public utility works using hydraulic power and Decree No. 99 - 872 of 11 October 1999 approving the standard specifications of hydraulic companies³³; and
- The Orders of 23 December 2008 relating to the letter of intent, the concession application file and concession end file³⁴.

The stakeholders involved with hydropower installations are the following:

- The DGEC (Directorate-General for Climate and Energy) at the Ministry of Ecology, Sustainable Development and Energy (hereinafter Ministry of Sustainable Development) prepares and implements government policy in the areas of sustainable development, environment and green technologies, energy transition, especially with regards to tariffs, climate, prevention of natural

EC (2008), Freedom of establishment and freedom to supply services: closure of a number of infringement proceedings, IP/08/1793, 27/11/2008, http://europa.eu/rapid/press-release_IP-08-1793_en.htm?locale=en.

EC (2008), COMMISSION STAFF WORKING DOCUMENT STATISTICAL ANNEX, Annexes I to III Accompanying document to the REPORT FROM THE COMMISSION 26th ANNUAL REPORT ON MONITORING THE APPLICATION OF COMMUNITY LAW (2008) {COM(2009) 675}

http://ec.europa.eu/eu_law/docs/docs_infringements/annual_report_26/en_sec_statannex_vol1clean.pdf.

³⁰ Legifrance (2014), Loi du 16 octobre 1919 relative à l'utilisation de l'énergie hydraulique,

<http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT00000498687&dateTexte=20100713>.

³¹ Legifrance (2014), Code de l'énergie,

<http://www.legifrance.gouv.fr/affichCode.do?cidTexte=LEGITEXT000023983208&dateTexte=20110816>.

³² Legifrance (2014), Décret n°94-894 du 13 octobre 1994 relatif à la concession et à la déclaration d'utilité publique des ouvrages utilisant l'énergie hydraulique, <http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000367955> (consolidé janvier 2008).

³³ Décret n° 2008-1009 du 26/09/08 modifiant le décret n° 94-894 du 13 octobre 1994 modifié relatif à la concession et à la déclaration d'utilité publique des ouvrages utilisant l'énergie hydraulique et le décret n° 99-872 du 11 octobre 1999 approuvant le cahier des charges type des entreprises hydrauliques concédées. Legifrance (2014), Décret n°99-872 du 11 octobre 1999 approuvant le cahier des charges type des entreprises hydrauliques concédées,

<http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000761418>.

³⁴ Legifrance (2008), Arrêté du 23 décembre 2008 définissant les éléments de la lettre d'intention prévue à l'article 2-2 du décret n° 94-894 du 13 octobre 1994 modifié relatif à la concession et à la déclaration d'utilité publique des ouvrages utilisant l'énergie hydraulique, <http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000020026033>.

and technological risks, industrial safety, transport and infrastructure, equipment, sea (except construction and ship repair, as well as in the fields of marine fisheries and aquaculture).³⁵

- The National Regulatory Commission³⁶ (CRE) is the national regulator for electricity and natural gas. It works mostly with themes related to access to the transmission and distribution network for electricity and gas as well as to the regulation of wholesale and retail electricity and gas markets.
- The Regional Directorate for Environment, Planning and Housing³⁷ (DREAL) is a State agency that carries out its duties under the prefectural authority and on behalf of the Ministries of Sustainable Development, Industry and Research, Transport and Labour. The Agency's main mission is the control of industrial activities that may have an impact on the environment.
- The Basin Authorities³⁸ (six in total) are part of the Ministry for Sustainable Development. They are responsible for reducing pollution from all sources and protecting water sources and aquatic environments. It is important to note that the French Basin Authorities neither have regulatory powers nor builds/owns hydropower installations.

Types of right to use hydropower and granting procedures

There are two types of licences for hydropower plants in France. Plants with installed capacity smaller than 4.5 MW require an authorisation to operate whereas plants with installed capacity greater than 4.5 MW need a concession.

Applications for concessions and authorisations are under the jurisdiction of the prefect of the department where the works are located. When these works are located in several departments, the prefect of the department in which the main power plant is installed is responsible for coordinating the process. In this case, the concession/authorisation application is addressed to the coordinator prefect. However, when the maximum gross power development is equal to or greater than 100 MW, the concession application falls within the jurisdiction of the Ministry of Sustainable Development.

Authorisation procedures are normally lengthy and can last for two years and up to more than five years³⁹.

2.2.3 Framework for granting right to use hydropower

The maximum validity of most concessions is 75 years⁴⁰. More recent concessions are granted for a period of 40 years. Concessions are subject to renewal. When a concession approaches the end of its validity period, a call for tender must be launched to determine the next concessionaire.

³⁵ Ministère de l'écologie, du développement durable et de l'énergie (2014), Décret d'attribution de la ministre de l'écologie, du développement durable et de l'énergie, <http://www.developpement-durable.gouv.fr/Decret-d-attribution-de-la.html>.

³⁶ Commission de régulation de l'énergie (n.d.), <http://www.cre.fr/en>.

³⁷ Direction régionale de l'environnement, de l'aménagement et du logement.

³⁸ Agences de l'Eau.

³⁹ Ministère de l'aménagement du territoire et de l'environnement (2002), Rapport du groupe de travail sur la rationalisation et la simplification des procédures applicables aux producteurs d'électricité à partir de sources d'énergie renouvelables, http://www.developpement-durable.gouv.fr/IMG/pdf/DGALN_rapport_GT.pdf.

Before 2008, a preference was given to outgoing concession-holders when concessions for works using hydraulic power are being renewed and awarded. But in 2005, the Commission had decided to take France to the European Court of Justice on account of Article 12 of French Decree No 94/894 of 13 October 1994 which grants this preference⁴¹. The French legislation was changed in 2006 no more granting preference to outgoing concession-holders, leading the Commission to drop its infringement procedure.

Therefore, France proceeded with designing a legal framework allowing for concessions to be tendered in compliance with EU legislation but tendering process has not still be launched. The current situation in France is well illustrated in the Battistel Parliamentary report that was published in October 2013.

The Battistel Parliamentary report is an informational report on the future of hydroelectric concessions in France. This report has the three objectives: 1) To stress the importance of hydroelectricity in the energy mix of France and how it can be beneficial in the process of the country's energy transition; 2) To establish the needs for the development of small hydroelectric schemes and outline the economic and ecological issues they encounter; and 3) To study the legal hydropower concession framework and suggest alternative scenarios for the reopening of competition for concessions.

The report puts forward several reasons that suggest the need of a thorough examination of hydropower market opening. The most important ones being:

- The lack of reciprocal "opening" to access other European countries' hydropower market mainly due to the countries' legislative framework for hydropower, which grants rights, authorisations or licences rather than concessions. The report puts forward that no other Member State is required to "reopen" competition to its hydroelectric installations under the same conditions as France.
- Jeopardising users' safety and security of supply as the hydropower framework would go from a centralised planning to a decentralised one.
- An inevitable increase in electricity prices for consumers as royalties would be passed on to consumers' bills and increase then.
- The fragmentation of hydro production in a same region would raise issues as the installations located in the same valley are in a situation of high hydraulic dependence.
- The insufficient guarantees for local actors with regards to low environmental impacts and the strong inequalities between local authorities in the collection of hydroelectric fees due to the coexistence of different legal situations (old proportional rent, i.e. low rent, vs. new proportional rent, i.e. higher rent).

Based on these arguments, the Report presents four solutions to the current situation. Several scenarios are outlined with regards to the increase of competition in the allocation of hydroelectric concessions.

⁴⁰ Ministère de l'écologie, du développement durable et de l'énergie (2012), Entreprises hydroélectriques : Recueil de textes, http://www.developpement-durable.gouv.fr/IMG/pdf/REC_hydroelectricite_mai_Octobre_2012.pdf.

⁴¹ Europa.eu (2005), Freedom of establishment: the Commission calls on France, Italy and Spain to amend their legislation on hydroelectric concessions. European Commission, http://europa.eu/rapid/press-release_IP-05-920_en.htm?locale=en.

1. The first scenario is the "Barycentre" method which was the Government's privileged scenario when the Battistel Report was published. This method consists of bundling concessions prior to reopening competition to create a coherent whole with a single maturity date for each valley. This date is obtained by weighting the maturity dates of the various contracts in proportion to the different revenue.
2. The second scenario consists of designating by law a single concession which would be attributed to the incumbent (i.e. the historical operator) as the manager of a service of general economic interest, i.e. the hydropower generation.
3. The third scenario consists of the operation of hydroelectric concessions by a public institution, meaning that EDF's hydropower activities would be spun off and bought by the State and converted into a public institution.
4. The fourth scenario consists of awarding authorisations to hydroelectric installations instead of concessions, as authorisations are not subject to the reopening to competition.

Since the Battistel report, a different scenario has been proposed and discussed. At the moment, the Government seems to privilege the choice of public-private joint ventures⁴², 51% owned by the State and 49% by private groups (French or foreign)^{43, 44}. The creation of public-private joint ventures would allow France to keep control of its hydropower concessions while allowing 49% to national or foreign players. This solution is already used by CNR (*Compagnie Nationale du Rhône*), where 50.1% is owned by CDC (*Caisse de dépôts et consignations*) and local communities and 49.9% by GDF Suez. This new scenario proposal should be included in the "Energy transition Bill", pushing the reopening of competition schedule. The Government will also have to ensure that the scenario of public-private joint ventures will be approved by the European Commission.

2.2.4 Characteristics of the competitive process

Competitive concession procedure for new installations

The procedure to obtain a concession can be summarised as follow⁴⁵. An applicant can file an application with the competent authority. The authority then examines the application and shall publish a notice of tendering. Candidates are then admitted to tender based on an assessment of their guarantees and abilities. The other candidates are informed of the reasons for the rejection of their application. The tender in itself can first begin with a phase of dialog with the competent authorities where the admitted candidates can present its analysis of the project characteristics and variants. In a second and last phase, the administrative authority shall inform the applicant of the closing phase of dialogue and, where appropriate, of the changes in quantitative and qualitative characteristics of the deliverables following the dialog with admitted candidates. They then submit their bids that are selected on previously specified criteria (granting better environmental protection) after opinions from services or Ministries (about Agriculture, Waterways, Finance,

⁴² *Sociétés d'économie mixte (SEM)*.

⁴³ Bezat, J-M. (2014), Barrages: l'Etat envisage de reprendre le contrôle, Le Monde.fr, http://www.lemonde.fr/economie/article/2014/02/04/barrages-l-etat-envisage-de-reprendre-le-contrôle_4359760_3234.html.

⁴⁴ Calls for tender would only relate to the minority share, i.e. 49% held by the private sector. EDF and GDF do not want to lose any business, but they will have to allow foreign companies such as the Italian Enel, the German E.ON the Norwegian Statkraft, and the Swiss Alpiq to enter the market.

⁴⁵ Ministère de l'écologie, du développement durable et de l'énergie (2012), *Entreprises hydroélectriques : Recueil de textes* (pp.70-72), http://www.developpement-durable.gouv.fr/IMG/pdf/REC_hydroelectricite_maj_Octobre_2012.pdf.

Marine & Fisheries, etc.) depending on the size of the plants (prefectural services below 100 MW and Ministries otherwise).

Competitive concession procedure for renewals

In the case of a concession renewal, the procedure is almost identical to the procedure for new installations. According to the article L.521-15 of the Energy Code (*Code de l'énergie, partie L, Livre 5*)⁴⁵, the following concession renewal procedure is still valid and can be summarised as follows:

- The "end of concession file" (*dossier de fin de concession*) is prepared at least five years before the end of the concession contract by the concessionaire. The file contains information on the installations' conditions that will be reverted to the State, along with the goods that belong to the concessionaire, such as the electric equipment, but that will be bought by the State. If the State chooses to acquire these assets with an indemnity, it lets the concessionaire know one year before the end of the concession. The asset valuation is made with the support of a specialist chosen by common agreement between the concessionaire and the State. Public consultations at the local level may also be carried out if necessary.
- The State launches a call for tender and then selects the candidates allowed to compete based on technical and financial grounds. The chosen candidates make their bids by sending a concession request.
- The processing of the selected concession request is a local procedure with public consultation. It leads to a decree "*en Conseil d'Etat*" (decision at National level by the Ministry of Sustainable Development) if the concession capacity is over 100 MW or to an *arrêté préfectoral* (decision at regional, i.e. at "département" level) otherwise.

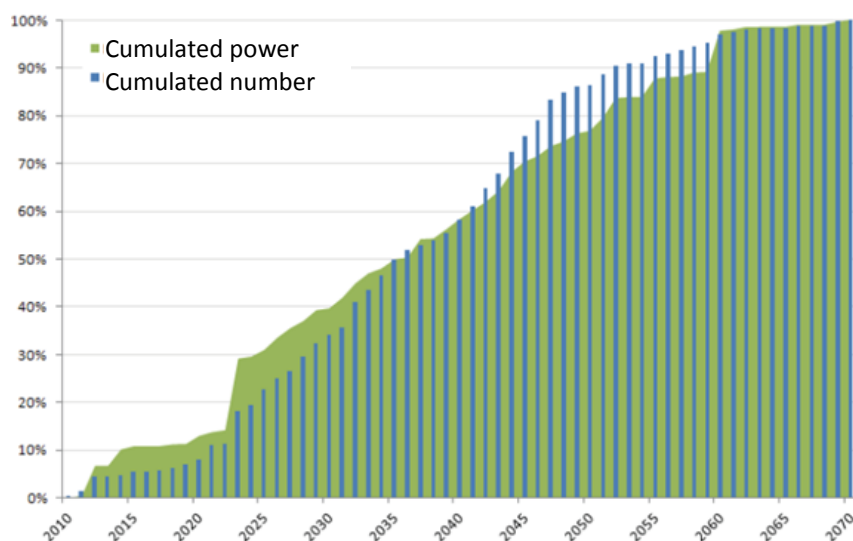
There are three key criteria to meet in order to be selected as the next (entering) concessionaire. The first one is on *Energy*, where the tender will encourage candidates to make investments to refurbish existing installations and in new equipment to increase production. The second one is on the *Environment*, where candidates make a proposal for a better protection of the ecosystems while respecting other uses of water besides electricity generation. The third and final criterion is based on *Royalties*, where candidates make a proposal for a royalty rate proportional to the revenues / turnover of the concession. Depending on the dimensions of the concessions (in term of installed capacity - MW), the prefect of the department or the Ministry of Sustainable Development chooses the next concessionaire which best meets these criteria.

2.2.5 Main schedule for renewal

The graph below illustrates the expiry of hydroelectric concessions. According to the Battistel report, only 16 contracts expire before 2015, while other contracts remain in place until after 2060⁴⁶.

⁴⁶ Battistel, M-N., and Staumann, E. (2013), Rapport d'information déposé par la Commission des affaires économiques en application de l'article 145 du Règlement sur l'hydroélectricité, Assemblée nationale, <http://www.assemblee-nationale.fr/14/pdf/rap-info/i1404.pdf>.

Figure 14. Expiry date of hydropower concessions in cumulated number and cumulated power



Source: Battistel, M-N., and Staumann, E. (2013)

2.2.6 Obligations of hydropower operators

Beside the right of use hydropower and the concession specificities, hydropower right holders must respect several major obligations which impact their strategic and operational decisions.

Environmental obligations

All hydropower plants must meet environmental requirements stated in applicable laws. Public or private hydropower projects, which by their nature, size or location are likely to have significant effects on the environment or human health, are preceded by EIAs. France has established values for the residual flow of watercourses, the minimum established by law being between 5 and 10%. Even so, the adapted residual flow is generally set during the environmental assessment. From 1984, the residual flow was set around 10% of the average annual flow. Since 2006, local administrations has started to ask for higher levels of residual flows (between 12 to 17%), without any justification on improvement or maintenance of good ecological status. Since then, it is estimated that 2,000 GWh/y were lost due to these higher levels for existing plants and from the decommissioning of some dams. It is expected that this loss will be compensated by the refurbishment and modernisation of some installations⁴⁷.

Investment obligations

Hydropower installations have investment obligations to comply with environmental requirements. For example, such obligations include modernising installations to increase power production with the same flow and ensuring land drainage.

⁴⁷ European Small Hydropower Association (2009-2012), Small hydropower roadmap: Condensed research data for EU-27 (Stream Map Project), http://streammap.esha.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf.

Taxes, levies and royalties

The legislative and regulatory framework currently provides the following four State fees (*redevances domaniales*):

- A fee for the use of watercourses;
- A fee for the occupation of the hydroelectric public domain;
- A charge proportional to the number of kWh produced or dividends or distributed profits ;
- A charge proportional to revenues from electricity sales, after deduction of the cost of the possible purchase of the electricity needed to pump water in the case of energy transfer pumping stations.

Royalties are computed according to various complex formulas established by the waterways of France (*Voies Navigables de France*)⁴⁸. Royalties are shared among the State, departments and municipalities. 2/3 of the royalties go to the State while 1/3 is split between the concerned departments and municipalities according to the energy potential along the water course and to the distribution of the works among municipalities⁴⁹.

2.2.7 Support to small hydropower

Small hydropower plants are subject to Feed-in-tariffs. The Arrêté 1 of March 2007 states that the FiTs are valid for a period of 20 years and consists of 6.07 c€/kWh in addition to premium between 0.5 c€/kWh to 2.5 c€/kWh, as well as a winter bonus of up to 1.68 c€/kWh depending on the regularity of the production⁵⁰.

⁴⁸ For more details, please refer to the following link: Voies navigable de France (2013), Bulletin Officiel des Actes de Voies navigable de France, http://www.vnf.fr/vnf/img/cms/Tourisme_et_domainehidden/BO63_complet_20131203134958.pdf.

⁴⁹ Ministère de l'écologie, du développement durable et de l'énergie (2012), Entreprises hydroélectriques : Recueil de textes, Article L.521-22 (Loi du 19 Octobre 1919, article 9 et loi n°53-79 du 7 février 1953, art 67), http://www.developpement-durable.gouv.fr/IMG/pdf/REC_hydroelectricite_maj_Octobre_2012.pdf.

⁵⁰ Lapierre, A. and Belisaire, A. (2013), European renewable energy incentive guide – France, Norton Rose Fulbright, http://www.nortonrosefulbright.com/knowledge/publications/66831/european-renewable-energy-incentive-guide-france#pg_hdr.

2.3 Germany

Table 4. Summary of German hydropower framework

Characteristics		Description	
Institutional framework	Authorities for granting rights of use	<ul style="list-style-type: none"> • District councils • Local authorities 	
	Types of hydropower right and granting procedures	<ul style="list-style-type: none"> • Request for permit is made by the hydropower planner / operator • Individual assessment is made by the competent authorities on the grounds of the Water Acts. Final decision is made at the reasonable discretion of the authority • Environmental requirements must be respected. EIA is compulsory except for small hydropower plants • Specific demands can be brought by the authority in each individual case 	
Framework for granting right to use hydropower	Duration	30 years maximum	
	Competitive process	For new concessions	National legislation does not appear to provide for competitive procedure
		For concession renewals	National legislation does not appear to provide for competitive procedure
	EC infringement proceedings or equivalent	No infringement procedure appears in the European archives	
Obligations of hydropower operators	Environmental obligations	<ul style="list-style-type: none"> • Minimum watercourse flow as a federal obligation for all hydropower stations, with regard to the Water Framework Directive • Compulsory EIA for medium and large hydropower 	
	Investment obligations	National legislation does not appear to provide for investment obligations	
	Royalties	There are no fees at the federal level, but specific taxes or rights can be negotiated by the authority and the stakeholders during project assessment	
Small-hydro	Small hydro definition	< 1MW	
	Support	FIT is available whatever the hydro power capacity. For small hydropower specifically, it is at 12.7 c€/kWh for capacity < 500 kW and at 8.3 c€/kWh otherwise for 2012 commissions. The tariffs are guaranteed for 20 years	

2.3.1 Context and economics of hydropower in Germany

Compared to its neighbours, Germany only presents limited hydropower resources. Hydropower accounted in 2011⁵¹ for around 2.9 % of total electricity generation in Germany. Within the 132.3 TWh of renewable electricity generated in 2011, hydropower represented only 13.1 %, providing around 17 TWh. About 7.400 hydropower stations are currently operated in Germany, the biggest 400 presenting a capacity bigger than 1MW and producing 87% of the total output⁵². In 2011, the total hydropower capacity was 11.5 GW, including 6.8 GW of pumped storage energy.

As a renewable energy source, hydropower has benefited from new support following the Energiewende of 2010 - with a target of 35% electricity generation from RES by 2020 against 22% in

⁵¹ IEA, 2013. Germany 2013 review.

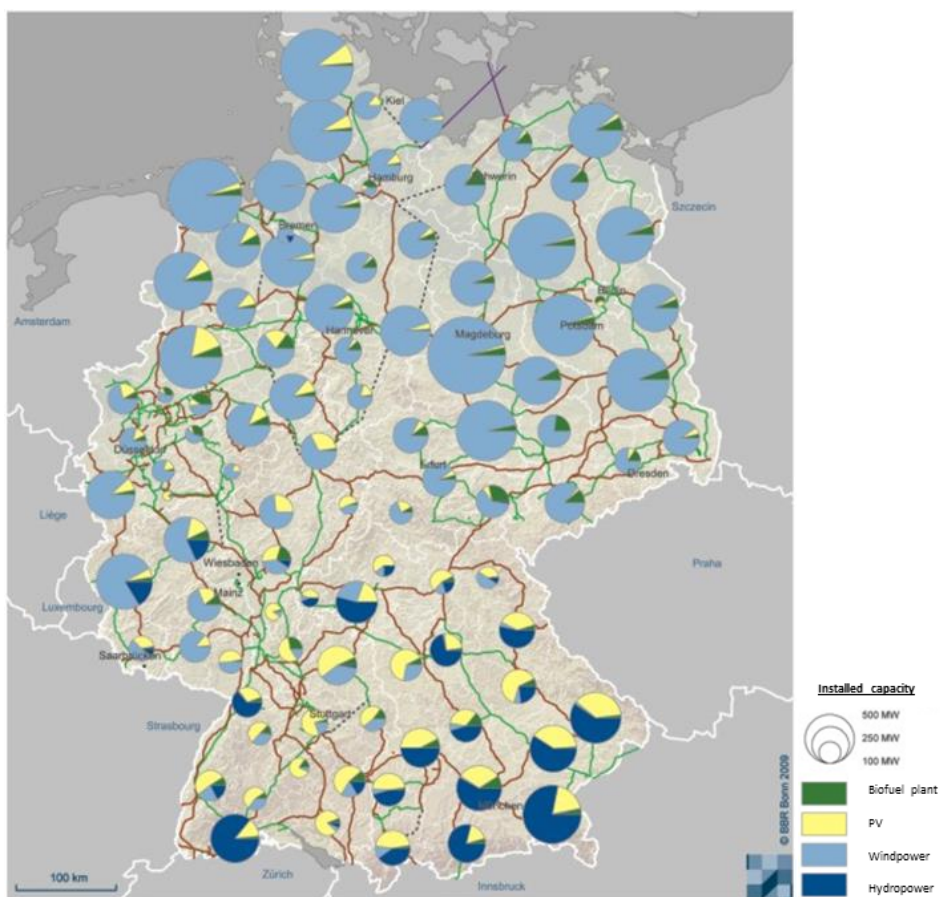
⁵² DWA, 2014. DWA-Politikmemorandum.

2011) as well as the shift in context following the Fukushima catastrophe and the quicker than expected nuclear phase-out that was consequently decided. The share of hydropower in the energy mix, which happened to decrease from 2000 to 2010, is now expected to stabilize and increase with extensive support. The increase in capacity will come from refurbishment rather than new projects, the potential of remaining non exploited basins being very low in Germany.

Germany is a federal country with very strong power delegated to each of its 16 Länder / States. The two States concentrating most hydropower capacity are the Southern Länder of Baden-Wurttemberg and Bavaria, which benefit from their position at the Alpine foothills. The potential and the share of hydropower in the energy mix are much higher in both States than in the rest of Germany.

In the rest of the focus on Germany, the two States which most contribute to hydropower resources, Bavaria and Baden-Wurttemberg (BW) will be described.

Figure 15. RES electric facilities in Germany



Source: BBSR⁵³

⁵³ Bundesinstitut für Bau-, Stadt- und Raumforschung. Energiedaten und -karten, http://www.bbsr.bund.de/cIn_032/nn_497574/BBSR/DE/Raumentwicklung/EnergieKlimaschutzpolitik/ErneuerbareEnergie/Projekte/EnergyMap/EnergyMap.html.

2.3.2 The institutional framework for hydropower

Stakeholders and legislations

The federal law has introduced major provisions regarding construction and operation of hydroelectric power plants, but the individual States also provide their own legislation. As in Switzerland, State legislation must consider and transpose federal legislation, hence only reinforcing federal provisions for construction and operation of hydropower plants.

At the federal level:

The legal structure for watercourse use as hydropower is mostly based on federal legislations and documents. It is organized through the following acts⁵⁴:

- Law on Environmental Impact Assessment Act (EIA Act) of February 24, 2010⁵⁵. It regulates environmental impact assessments for projects with potential impact on the environment.
- Federal Pollution Control Act of May 17, 2013⁵⁶.
- Water Resources Act (WHG) of July 31, 2009⁵⁷. It is the central law for assessing the lawfulness of the establishment and operation of hydropower facilities. It contains provisions for water management, use of hydropower, permit authorization and minimum water flow conditions with respect to the EU Water Framework Directive.
- Federal Nature Conservation Act
- Renewable Energy Sources Act (EEG) of 2012⁵⁸. The Act is complementary to the Energiewende and provides support schemes and conditions for renewable energy sources in Germany and to achieve the goal of an increase of the share of renewables to 35% by 2020. It provides economic incentives for use of watercourse as hydropower but also includes the ecological requirements to be met in order for hydropower installations to benefit from the scheme.

At the Bavarian level:

The main existing regulations are:

- State Water Act, which closely follows and transposes the federal WHG.

⁵⁴ Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. *Gesetzliche Regelungen für die Wasserkraft*. <http://www.erneuerbare-energien.de/die-themen/wasserkraft/gesetzliche-regelungen/>.

⁵⁵ Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. *Gesetz über die Umweltverträglichkeitsprüfung*. <http://www.bmub.bund.de/service/publikationen/downloads/details/artikel/gesetz-ueber-die-umweltvertraeglichkeitspruefung-neufassung-vom-24-februar-2010/>.

⁵⁶ Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. *Bundes-Immissionsschutzgesetz*. http://www.bmub.bund.de/service/publikationen/downloads/details/artikel/bundes-immissionsschutzgesetz-bimschg/?tx_ttnews%5bbackPid%5d=966.

⁵⁷ Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. *Wasserhaushaltsgesetz*. http://www.bmub.bund.de/service/publikationen/downloads/details/artikel/gesetz-zur-neuregelung-des-wasserrechts/?tx_ttnews%5bbackPid%5d=289.

⁵⁸ Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. *Renewable Energy Sources Act 2012*. <http://www.erneuerbare-energien.de/en/topics/acts-and-ordinances/renewable-energy-sources-act/eeg-2012/>.

- Other ordinance, policies, other regulations⁵⁹

At the Baden-Wurttemberg level:

The main existing regulations are:

- State Water Act, which closely follows and transposes the federal WHG.
- Land Conservation Act
- State Fisheries Act

The involved stakeholders for supervision, control, and authorization are the district councils that are the main authorities for request assessment and permit granting. The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety is responsible for the EEG and project funding for small and medium hydropower, as well as for controlling the respect of environmental obligations.

Types of right to use hydropower and granting procedures

There is no concession system in Germany but a permit-granting process which is provided by the Water Resources Act (WHG). Every hydropower station requires either a license or a permit. The authorization is issued through a process involving stakeholders and concerned authorities. During the process, objections can be raised and environmental impact assessment must be performed if the project is characterized as large hydropower (i.e., with a capacity higher than 1 MW) and is thus concerned by the EIA Act. The permit/license can be refused if the project is assessed as harmful or other requirements are not met. It is however worth noting that it is at the reasonable discretion of the competent authority to make the final decision. There are no clearly defined criteria. Furthermore, the competent authority may also carry secondary rules that go further than the provisions of the Water Resources Act or the State Water Acts. In particular, demands on quality, other measures, or further financial compensations can be demanded.

2.3.3 Framework for granting right to use hydropower

According to the Water Resources Act, the license / permit is granted for a reasonable time that cannot exceed 30 years. The actual duration is a provision of the negotiations between the hydropower planner/operator and the competent authorities.

The case-by-case approach also applies to renewal. This is the situation that concerns or will concern most hydropower stations, as the potential for new hydropower plants is almost none. At expiry date, the State can choose to grant again the licence to the same operator if the latter requests it, or it can choose for a competitive process for license granting. The legislation does not give any

⁵⁹ Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. *Gesetzliche Regelungen für die Wasserkraft*. <http://www.erneuerbare-energien.de/die-themen/wasserkraft/gesetzliche-regelungen/>.

provision for the renewal process and conditions, which are purely individual and regulated by the State. The district council however has a veto power on the new permit holder⁶⁰.

2.3.4 Characteristics of the competitive process

Competitive authorisation procedure for new installations

The German legislative framework does not seem to provide for public and competitive procedures for the authorisation of new hydropower installations.

Competitive procedure for authorisation renewals

The German legislative framework does not seem to provide for public and competitive procedures for hydropower authorisation renewal.

2.3.5 Main schedule for renewal

The information available, the reduced maximum limit for license period and the progressive construction of German hydropower plant (even with a peak during 1950-1960) does not allow to draw a coherent schedule for renewal.

2.3.6 Obligations of hydropower operators

Beside the right of use hydropower and the authorisation specificities, hydropower right holders must respect several major obligations which impact their strategic and operational decisions.

Environmental obligations

The environmental obligations are defined in the Water Resources Act. In particular, provisions to comply the Water Framework Directive are given, with a minimum water flow that must be guaranteed for hydropower facilities. Further ecological requirements are also provided.

Besides, the EEG provides complementary environmental requirements for supported hydropower. Financial incentives are given to improve the ecological of existing hydropower plants.

Investment obligations

There is no specific investment obligation provided in the Federal or State legislations. However, the individual negotiations between competent authorities and stakeholders can lead to specific obligations in that respect.

⁶⁰ Interviews conducted by the 2010 FSR report authors (Florence School of Regulation, 2010. *Overview on hydropower regimes in Europe*).

Taxes, levies and royalties

There are no water use fees at the federal level, but special taxes or license rights can be raised by competent authorities during permit negotiations.

In Baden Wurttemberg, the Water Act provides for a water use charge that is applied for the use of hydropower with more than 1 MW capacity. The amount of the fee is relative to the average available capacity of the plant. It is calculated from the usable quantity of water and the gross head. The fee is due to the owner of the river bed.

2.3.7 Support to small hydropower

The Renewable Energy Sources Act (EEG) also applies to hydropower and provides financial support to both small (lower than 1 MW) and medium hydropower facilities⁶¹. The support to hydropower should in particular give access to the expansion potential for small hydropower through modernization and reactivation of existing plants.

According to EEG 2012, financial support is given in the form of feed-in tariffs for all hydropower stations. The tariffs differ according to the rated average annual capacity as specified in table 5.

Table 5. Support to small hydropower in Germany

Year of commissioning	up to 500 kW in ct/kWh	up to 2 MW in ct/kWh	up to 5 MW in ct/kWh	up to 10 MW in ct/kWh	up to 20 MW in ct/kWh	up to 50 MW in ct/kWh	over 50 MW in ct/kWh
2012	12.70	8.30	6.30	5.50	5.30	4.20	3.40
2013	12.57	8.22	6.24	5.45	5.25	4.16	3.37
2014	12.45	8.13	6.17	5.39	5.19	4.12	3.33
2015	12.32	8.05	6.11	5.34	5.14	4.08	3.30
2016	12.20	7.97	6.05	5.28	5.09	4.03	3.27
2017	12.08	7.89	5.99	5.23	5.04	3.99	3.23
2018	11.96	7.81	5.93	5.18	4.99	3.95	3.20
2019	11.84	7.74	5.87	5.13	4.94	3.91	3.17
2020	11.72	7.66	5.81	5.08	4.89	3.88	3.14
2021	11.60	7.58	5.76	5.02	4.84	3.84	3.11

Source: EEG 2012

The support is available only if hydropower stations comply with the requirements of the Water Resources Act and especially the environment provisions. The first FiTs were introduced in 2009, but existing installations which were commissioned before are also eligible to new tariffs if their average or installed capacity increases after December 2011.

The financial support is guaranteed to all receivers for a 20-year duration.

⁶¹ <http://www.erneuerbare-energien.de/die-themen/wasserkraft/gesetzliche-regelungen/>.

2.4 Great Britain

Table 6. Summary of British hydropower framework

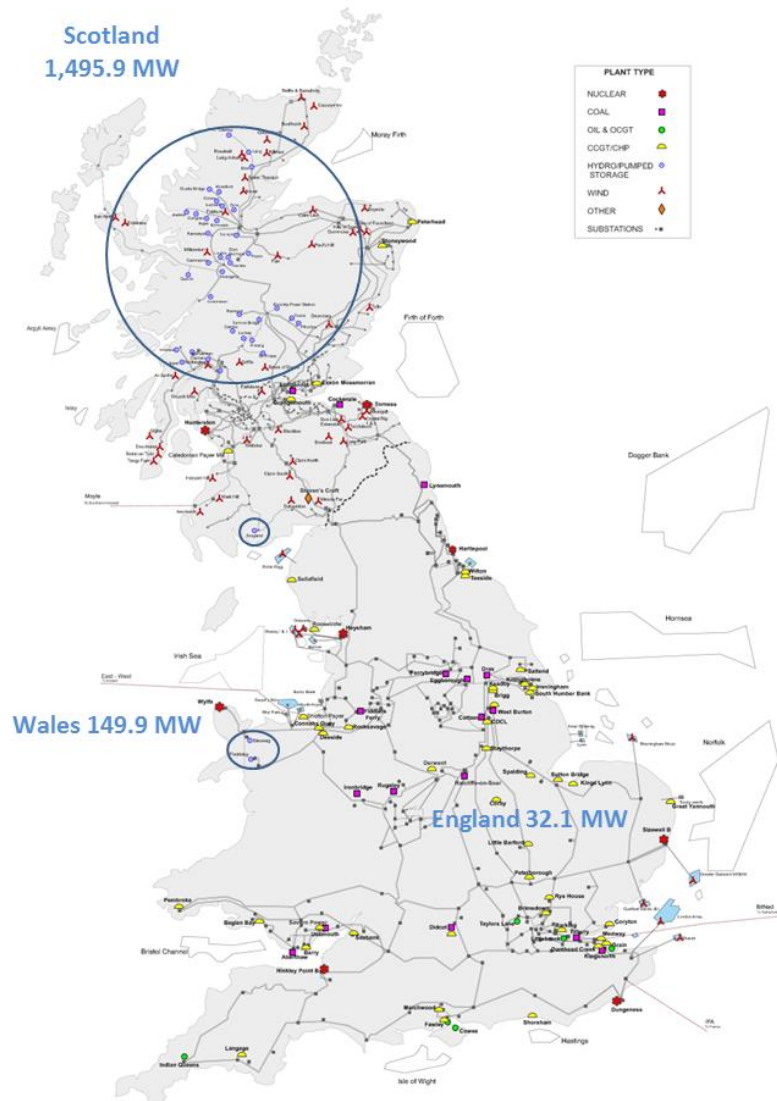
Characteristics		Description	
Institutional framework	Authorities for granting rights of use	Environment Agency	
	Types of hydropower right and granting procedures	3 permissions required prior to build and operate a hydropower scheme: <ul style="list-style-type: none"> • Environmental licence (Abstraction or transfer licence and impoundment licence) • Planning permission • Accreditation to generate and export electricity 	
Framework for granting right to use hydropower	Duration	<ul style="list-style-type: none"> • Before 2003, unlimited time • After 2003 (Water Act 2003): <ul style="list-style-type: none"> ○ Short-term licence: 12 years (most common to be more adaptable) ○ Long-term licence: 24 years (rather exceptional) ○ Can be indefinitely extended (by periodically applying for a replacement licence) Procedure duration between 1 and 3 years. Appeals against refusal of environmental and planning permissions from 6 to 12 months	
	Competitive process	For new concessions	Licences issued on a first come first served basis protecting the rights of existing users and the environment from derogation before considering the needs of new applicants Competing licence proposal, possibility for applicants <ul style="list-style-type: none"> • to propose a joint scheme • to share water • asked Environment Agency to choose one of them considering public interest based on <ul style="list-style-type: none"> ○ The most advantageous use of available water resources ○ Local and wider environmental effects ○ Assessment and mitigation of flood risk ○ Impact on other water users of the proposed scheme ○ The impact of the scheme in climate change terms Existence of a secondary market for transferring or leasing water rights
		For concession renewals	No expiry date for old abstraction licences <ul style="list-style-type: none"> • There is no competitive process For recent abstraction licences: <ul style="list-style-type: none"> • Holders of long duration licences can apply for a replacement licences midway through the duration of their licence No constraint on the number of times a long duration licence can be granted provided that all requirements are met
	EC infringement proceedings or equivalent	No infringement procedure appears in the European archives	
Obligations of hydropower operators	Environment	<ul style="list-style-type: none"> • Watercourse residual flow: 5% of natural flow (3% for a high base flow river) • EIA for plants in sensitive areas 	
	Investment	To meet environmental requirements (limiting adverse impacts in water resources creating fish pass, limiting flood risk and ensuring land drainage)	
	Royalties	1. Standard unit charges: between 14.14 and 34.48 ⁶² €/1,000m ³ /year, depending on the region (with a minimum of 30 €/year). 2. Application Charge = 164 € 3. Advertising Administration Charge = 122 €	
Small-hydro	Small hydro definition	<ul style="list-style-type: none"> • Small hydro < 5 MW • Micro-scale hydro <50 kW 	
	Support	<ul style="list-style-type: none"> • FIT< 5 MW: between 4.04 and 28.19 c€/kWh depending on the size of the plant and the tariff date • Renewables Obligation Certificates (> 5 MW but < 20 MW) 	

⁶² €11.63 and €28.36. £ is converted in € with the following rate 1 £ = 1.22 € (value of 6th May 2014 from oanda.com).

2.4.1 Context of hydropower in the Great Britain

Great Britain is made up of England, Scotland and Wales. The UK's (GB including Northern Ireland) energy mix consists of 76.5% of thermal conventional sources, 15.8% of nuclear, 6.7% of other renewables and only 1% of hydropower. The vast majority of the UK's hydropower facilities located in the Scottish Highlands (see figure below) were commissioned in the 1950s and 1960s and were publicly-owned. In the 1980s, following the privatisation of the energy sector, private companies were created and these facilities were transferred to the latter. National legislation seems to provide these hydropower facilities with unlimited licences to operate.

Figure 16. Hydro power (other generation technology) location in Great Britain in 2012



Sources: National Grid⁶³ and DECC⁶⁴

⁶³ National Grid (2013), Electricity Ten Year Statement 2012, Appendix A1, System Maps, http://www.nationalgrid.com/NR/rdonlyres/DCCBEA81-166A-48BF-928D-3B5807FF1F79/57729/ETYS_2012_Appendix_A1.pdf.

⁶⁴ DECC (2014), Regional-spreadsheets-2003-2012-installed-capacity-MW-REVISED-14 March2014.xls , National Statistics, https://restats.decc.gov.uk/cms/national-renewables-statistics/SearchForm?Search=hydro+capacity+map&action_results.x=0&action_results.y=0.

According to recent government studies, it is estimated that there is only 850 to 1,550 MW of remaining viable hydro potential in the UK, which represents approximately 1 to 2% of current UK generating capacity. This potential is rather modest, but can still contribute to the UK's overall renewable energy production and emission reduction targets⁶⁵.

Since large-scale hydropower projects are unlikely due to the fact that the most economically attractive sites have been used, only small-scale projects can still be exploited in a sustainable way. Bearing this in mind, the Government promotes the development of small-scale hydropower schemes by providing economic incentives and facilitating the application procedures by assigning an Account Manager to each project application. Hydropower schemes are subject to water abstraction, impoundment or transfer licences.

2.4.2 The institutional framework for hydropower

Since the United Kingdom encompasses four different countries, England and Wales have a common legislation and Scotland and Northern Ireland have their own legislation. Nonetheless, laws and regulations are generally quite similar.

Stakeholders and legislations

England and Wales

- The Water Industry Act 1991 sets out the powers and duties of the Water and Sewerage Companies, thus replacing those set out in the Water Act 1989, and defined the powers of the Director General of Water Services. The Water Resources Act 1991 set out the functions of the National Rivers Authority and introduced water quality classifications and objectives
- The Environment Act 1995. This led to restructuring of environmental regulation and placed a duty on the companies to promote the efficient use of water by customers
- Town and Country Planning (Assessment of Environmental Effects) Regulations 1988
- The Water Industry Act 1999, made several important amendments to the Water Industry Act 1991
- Water Framework Directive 2000/60/EC
- The Water Act 2003, which amended the framework for abstraction licensing, revisions to the corporate structure of economic regulation and extended the scope for competition in the industry to large users.
- Planning Act 2008
- The Town and Country Planning (Environmental Impact Assessment) Regulations 2011

Scotland

⁶⁵ Department of Energy & Climate Change and Environment Agency (2013), How hydroelectric power works, regional schemes and information on installing your own micro-hydro scheme, <https://www.gov.uk/harnessing-hydroelectric-power>.

- Water Environment and Water Services Act 2003
- Water Environment (Controlled Activities) Regulations 2005 (CAR) now superseded by The Water Environment (Controlled Activities) Regulations 2011
- Water Environment (Controlled Activities) (Amendment Regulations 2013)

Several stakeholders are involved in the hydropower sector. The most important one is the Environment Agencies that are responsible for granting environmental licences, i.e. water rights. The involved stakeholders are described below:

- The Department for Environment, Food and Rural Affairs (DEFRA) is responsible for setting the overall water resource management policies and developing the legislative and statutory framework for hydropower licences. It is also responsible for the Water Framework Directive at the UK level.
- The Department for Energy and Climate Change (DECC) is involved with the development of guidance on water abstraction.
- In England and Wales, the Environment Agency (EA) is an executive non-departmental public body of the DEFRA which also works with the DECC, amongst many others. The EA is responsible for licensing abstractions, regulating abstractions and protecting the water environment. It uses a number of planning instruments to deliver its duties including Catchment Abstraction Management Strategies, Water Resources Management Plans, Drought Plans and River Basin Management Plans⁶⁶. In Scotland, the Scottish Environment Protection Agency (SEPA) has this role.
- OFGEM is the Office of Gas and Electricity Markets and is responsible for the environmental programmes related to hydropower generation. Such programmes include Feed-in-Tariff (FIT) scheme and Renewable Obligations Certificates (ROC). It is also responsible for accrediting hydropower installations.
- The Planning Inspectorate is responsible for the national infrastructure planning under the Planning Act 2008 process as amended by the Localism Act 2011. It is also responsible for casework on rights of way cases and cases arising from the Environmental Protection and Water Acts and the Transport and Works Act⁶⁷.
- Local Planning Authorities are consulted when works are planned to be built on their territory.

Types of right to use hydropower and granting procedures

Hydroelectric power is categorised according to three main categories:

- a) Large-scale hydropower plant whose capacity is more than 5 MW
- b) Small-scale hydropower plant whose capacity is less than 5 MW but more than 50 kW
- c) Micro-scale hydropower plant whose capacity is less than 50 kW

⁶⁶ Frontier Economics (2011), A right to water? Meeting the challenge of sustainable water allocation, Anglian Water and Frontier Economics, <http://www.anglianwater.co.uk/assets/media/a-right-to-water-full-report.pdf>.

⁶⁷ Planning Portal (n.d.), The Planning Inspectorate, <http://www.planningportal.gov.uk/planning/planninginspectorate>.

Great Britain’s hydropower schemes are subject to water abstraction licences, not to any concession. Hydropower schemes must obtain three permissions prior to build and operate installations. The first one is an Environmental licence, the second one is a Planning Permission and the third one is an Accreditation to generate and export electricity.

1. Environmental licence:

These licences are for water abstraction, transfer and impoundment, whichever applies to the project and are granted by the relevant regional environmental agency (the EA in England and Wales or the SEPA in Scotland) and include input from other environmental groups, especially fishing interests.

Table 7. Hydropower licences⁶⁸

Environmental licences	Description
<p>Abstraction licences</p>	<p>According to the EA, a full licence is needed to abstract water from a watercourse unless that water is transferred to another watercourse. Furthermore, a full licence is also needed if water is abstracted from a river via a piped off-take or off-take structure to a turbine. The Government charges for hydropower abstractions if the proposed scheme has a peak output of more than 5 MW.</p> <p>Since 2003 (WRA 2003), new abstraction licences are normally time limited to a common end date for the catchment. The short duration licences are valid for 12 years while the long duration licences are valid for 24 years.</p>
<p>Transfer licences</p>	<p>A transfer licence is needed when water is transferred from, for example, one watercourse to another without using the water for another purpose. For example, a hydropower scheme may move water between channels. There is no annual abstraction charge for a transfer licence.</p>
<p>Impoundment licence</p>	<p>An impoundment licence is needed if changes are made to structures or works which obstruct, hold or store water, such as weirs and sluices, or if new structures are built in the watercourse. If existing unlicensed turbines are being refurbished, or reinstated derelict mill structures/equipment, an impoundment licence may be required. Impounding licences are not time limited.</p>

In Scotland, licence applications (called "CAR licences") are determined by the SEPA within four months, excluding the time for information requests and advertising⁶⁹. Procedures are similar to the ones described above.

To date, these licences have been issued on a first come first served basis. This means the EA has a legal duty to protect the rights of existing users and the environment from derogation before considering the needs of new applicants. Under the Water Resources Act 1991, a new applicant for a licence must demonstrate a reasonable need, that there will be no adverse impacts on the environment (i.e. status assessments must indicate that water resources remain available) and that the licence will not derogate other users’ rights. The 2003 Water Act made it a legal requirement for all new licences to be time-limited.

⁶⁸ DEFRA (2011), Water for life, HM Government, Gov.uk, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228861/8230.pdf.
⁶⁹ Scottish Environment Protection Agency (n.d.), Application process, http://www.sepa.org.uk/water/hydropower/applying_for_a_licence/application_process.aspx.

The licensee must have consulted other affected third-party and have obtained all other approvals (fish pass approval, flood defence consent, etc.).

According to a 2011 report published by Anglian Water and Frontier Economics⁷⁰, "*approximately 80 per cent of water rights have been granted in perpetuity*". Although the legislation was modified in 2003 where new licences (water rights) are time definite, this same report states that "*the EA has signalled that it has no plans to convert all existing licences. Most new time-limited licences in each CAMS area will be issued with a common end date to allow for a periodic review of abstractions. However, licences of shorter duration may be issued where the impact of abstraction remains unclear*".

The flow chart next page (figure 12) outlines the licence application procedure as stated by SEPA.

EA will grant a licence to a hydro scheme that meets all environmental requirements, including flood defence and fish pass approval. Where the impacts of a scheme are unacceptable, the application will be refused, and if they are deemed acceptable licences are issued⁷¹.

2. Planning permission

Hydropower schemes must have the Planning Inspectorate's approval along with the Local Authority approval prior to commence construction.

Planning permission establishes whether a hydropower scheme is an acceptable use of land (which includes the river), taking into account a wide range of environmental, social and economic considerations. These include potential cumulative effects and issues such as the physical appearance of any buildings, noise, ecology, geomorphology, landscape, amenity, flood risk, and archaeology⁷².

3. Accreditation to generate and export electricity

This permit is granted by Ofgem through its ROO-FIT⁷³ application procedure.

From 2009 to 2012, hydropower applications for small schemes led to about 500 hydropower installations consented in England and Wales. Nonetheless, not all of these have been developed.

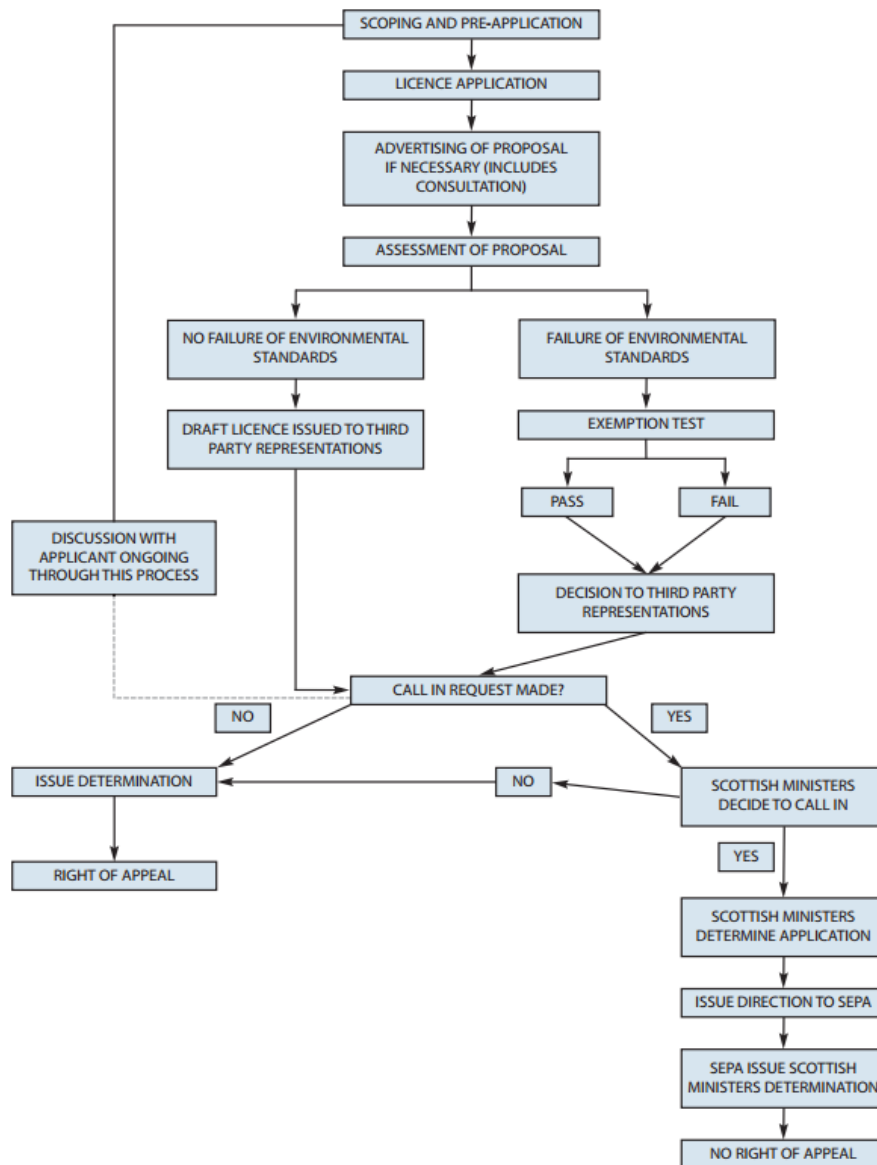
⁷⁰ Frontier Economics (2011), A right to water? Meeting the challenge of sustainable water allocation, Anglian Water and Frontier Economics, <http://www.anglianwater.co.uk/assets/media/a-right-to-water-full-report.pdf>.

⁷¹ Environment Agency (2013), Guidance for run-of-river hydropower development, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297147/LIT_4122_5f91bb.pdf.

⁷² Planning Portal (n.d.), The Planning Inspectorate, <http://www.planningportal.gov.uk/planning/planninginspectorate>.

⁷³ Renewable Obligation Order-Feed-in Tariff.

Figure 17. Licence application procedure in Great Britain



Source:SEPA (n.d.)⁷⁴

2.4.3 Framework for granting right to use hydropower⁷⁵

Before the Water Act entered into force in 2003, a licence holder was provided with a compensation (except in some specific circumstances) when his licence was modified or revoked. "Compensation was expected to reflect the costs to the right holder of obtaining alternative supply or putting in place measures to reduce water demand. The EA has tended to work collaboratively with abstractors to

⁷⁴ SEPA (n.d.), Guidance for applicants on supporting information requirements for hydropower applications, http://www.sepa.org.uk/water/hydropower/applying_for_a_licence/idoc.ashx?docid=67ef492a-5965-4295-b1c3-275475d7df95&version=-1.

⁷⁵ Frontier Economics (2011), A right to water? Meeting the challenge of sustainable water allocation, Anglian Water and Frontier Economics, <http://www.anglianwater.co.uk/assets/media/a-right-to-water-full-report.pdf>.

identify and agree appropriate changes to licences and the timescales over which these can be achieved. An Environmental Improvement Unit Charge (EIUC) was levied on abstractors to recover the costs of these compensation payments⁷⁵. Following the 2003 Water Act and since July 2012, the EA is no longer obliged to pay compensation for any changes to rights where it can be shown to be causing serious damage to the water environment.

The EA has the power to modify or revoke hydropower licences where they have not been used, or have been underused, for a four-year period and at the point of trade. The extent to which the EA has made use of the first option is unclear. However, the EA has reduced licences at the point of trade.

In England and Wales, it is possible to trade and transfer water rights and the Water Act 2003 included new provisions intended to reduce trading barriers. Under the Act it is possible to trade a water right (in part or whole) both permanently and temporarily (through a leasing arrangement). However, without interconnection assets only intra-basin trading is permitted by the EA.

The trade of water rights can be done in three ways:

- By transferring water rights within and between different users;
- By leasing water rights to other users on a temporary basis; and
- Through bulk water transfers between water companies (not detailed here).

To seek approval for and register a trade, applications are required from both the seller and buyer.

- For a permanent trade the transferred rights are set out in a new abstraction licence. The application process for this licence is the same as for any new licence application.
 - Pre-application discussions with the EA determine the assessments or evidence required in support of the proposed trade. Depending on the proposed arrangements and local circumstances an environmental statement (and report) or possibly an Environmental Impact Assessment may be required to support the application.

To date, the EA's approach to assessing trades has been on a case-by-case basis. While generic guidance at a national level has been provided, no explicit trading rules or guidelines have been identified at either the national or basin level.

- Temporary or short-term leases of water rights are also possible by entering into a 'linked trade'. The buyer and sellers' licences have specific linking conditions added, which set out how the shared licence volume may be used while retaining the validity of the seller's original licence. The trade approval process is the same as under a permanent water rights' trade.

2.4.4 Characteristics of the competitive process⁷⁶

Competitive abstraction licence procedure for new installations

The granting of licences is on a first-come first-serve basis. However, for competing hydropower applications, this principle is untrue. Since 2009, the EA has developed an approach to deal with competing licences proposals for the same site. The procedure is the following:

⁷⁶ Environment Agency (2013), Guidance for run-of-river hydropower development: Competing hydropower schemes, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297153/LIT_7517_8898b9.pdf.

- The applicants may be able to work together to bring forward a joint (shared) scheme, agreeing between themselves such issues as how investment in the scheme, and the electricity generated (or any profit from such generation), is to be split between them.
- It may be possible for the water at the site to be shared, with each of two applicants installing their own hydropower equipment.
- If neither a shared scheme nor a split scheme is possible, it will become necessary for the Environment Agency to decide which (if any) of the proposed schemes should be permitted to proceed

Finally, if the competing applicants cannot find a common ground, the EA will study both applications individually and will grant a licence to the most desirable in the public interest and/or of greater public benefit based on the following criteria:

- The most advantageous use of available water resources
- Local and wider environmental effects of the proposed scheme
- Assessment and mitigation of flood risk of the proposed scheme
- Impact on other water users of the proposed scheme
- The impact of the scheme in climate change terms⁷⁷

Competitive abstraction licence procedure for replacements

Old abstraction licences do not have expiry dates; therefore there is no competitive process for these facilities. Holders of a long duration licence can apply for a replacement licence midway through the duration of their licence. There is no constraint on the number of times that a long duration licence can be granted provided that all requirements are met⁷⁸.

2.4.5 Main schedule for renewal

Large-scale hydropower installations built between the 1940s and 1980s were granted unlimited licences to operate. To the best of our knowledge, more recent projects do have expiring licences, but since these are private projects their expiry dates are unknown.

2.4.6 Obligations of hydropower operators

Beside the right of use hydropower and the authorisation specificities, hydropower right holders must respect several major obligations which impact their strategic and operational decisions.

⁷⁷ Environment Agency (2012), Guidance for run-of-river hydropower development: Competing hydropower schemes, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/299376/Appendix_2_Avoncliff_Hydropower_Good_Practice_Guidelines_-_Competing_Hydropower_Schemes_Annex.pdf.

⁷⁸ Environment Agency (2013), Managing water abstraction, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297309/LIT_4892_20f775.pdf.

Environmental obligations

Abstraction licensing is based on the EA's Catchment Abstraction Management Strategies (CAMS) which use "the Environmental Flow Indicator (EFI) to indicate where and when water is available for new abstractions. It sets different percentages of flow that can be abstracted, depending on the sensitivity of an area to abstraction"⁷⁹. In England and Wales, a maximum flow (Qmax) and a minimum flow (Hand off flow, HOF) are set by the Environment Agency. In 2013, the volume of water that is allowed to be diverted to a turbine for a natural flow is 95% and for high baseflow rivers the value is set to 97%⁷⁹. A similar rule applies in Scotland⁸⁰

The process of Environmental Impact Assessment is governed by the Town and Country Planning (Environmental Impact Assessment) Regulations 2011. These regulations apply the EU directive "on the assessment of the effects of certain public and private projects on the environment" (usually referred to as the Environmental Impact Assessment Directive) to the planning system in England. The 2011 Regulations integrate Environmental Impact Assessment procedures into this framework and should only apply to those projects which are likely to have significant effects on the environment⁸¹.

Investment obligations

Hydropower schemes are subject to investment obligations with regards to meeting environmental requirements such as limiting adverse impacts in water resources, creating fish pass, limiting flood risk and ensuing land drainage.

Taxes, levies and royalties⁸²

Water abstraction charges include three main components:

1. Standard unit charge
2. Application charge
3. Advertising administration charge

The standard unit charges depend on the region in which the water is abstracted from a river. The following table illustrates the applicable charges:

⁷⁹ Environment Agency (2013), Guidance for run-of-river hydropower: Flow and abstraction management, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297149/LIT_8836_394228.pdf.

⁸⁰ Scottish Environment Protection Agency (2005), Guidance for applicants on supporting information requirements for hydropower applications, <http://www.sepa.org.uk/water/idoc.ashx?docid=358677fe-61f7-4fc9-baab-79cb93671387&version=-1>.

⁸¹ Planning Practice Guidance (2014), Guidance Environmental Impact Assessment, <http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/legislation-covering-environmental-impact-assessment/>.

⁸² See following link for more information. KPMG (2013), Research: Taxes and Incentives for renewable energy, <http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/taxes-and-incentives-for-renewable-energy/Pages/united-kingdom.aspx>.

Table 8. Standard unit charge value per region

Regions	2013/2014 Standard Unit Charge (€/1,000 m ³)
Anglian	33.45
Midlands	18.18
Northumbria	34.48
North West	15.28
Southern	23.38
South West (incl. Wessex)	23.96
Thames	16.83
Yorkshire	14.14
Environment Agency Wales	18.43

Source: Environment Agency (2013)⁸³

The application charge consists of €164 and the advertising charges total €122. If the standard unit charge is quite low, a minimum annual charge of €30⁸⁴ is applied.

2.4.7 Support to small hydropower

FIT are also available to accredited (according to Ofgem's ROO-FIT procedure⁸⁵) small and micro hydropower scheme owners (< 5 MW) located in Great Britain. The latter can get a generation tariff as well as an export tariff (selling surplus energy to the grid). In order to be eligible, the owner has to meet several requirements such as having a certified installation, meeting the Microgeneration Certification Scheme standard and being registered with an electricity supplier (micro scale) or with the Ofgem (small scale).

The latest generation tariff rates from 1 April 2014 to 31 March 2015 are shown in the table below:

Table 9. Feed-in tariff values

Description	Period in which Tariff Date falls	Tariff (c€/kWh) ⁸⁶
Hydro generating station with total installed capacity ≤ 15 kW	1 April 2010 to 30 November 2012	28.19
	1 December 2012 to 31 March 2014	27.03
	1 April 2014 to 31 March 2015	25.68
Hydro generating station with totalled installed capacity greater than 15 kW but not exceeding 100 kW	1 April 2010 to 31 March 2014	25.24
	1 April 2014 to 31 March 2015	23.98
Hydro generating station with totalled installed capacity 100 kW ≤ C ≤ 500 kW	1 April 2010 to 14 March 2013	15.59
	15 March 2013 to 31 March 2014	19.95
	1 April 2014 to 31 March 2015	18.95
Hydro generating station with totalled installed capacity 500 kW ≤ C ≤ 2 MW	1 April 2010 to 31 March 2014	15.59
	1 April 2014 to 31 March 2015	14.81

⁸³ Environment Agency (2013), Abstraction Charges Scheme 2013/14,

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/290020/LIT_7698_e25503.pdf.

⁸⁴ £135, £100 and £25 respectively. £ is converted in € with the following rate 1 £ = 1.22 € (value of 6th May 2014 from www.oanda.com).

⁸⁵ Ofgem (n.d.), ROO-FIT, <https://www.ofgem.gov.uk/environmental-programmes/feed-tariff-fit-scheme/applying-feed-tariff-roo-fit>.

⁸⁶ The table was modified to reflect tariff in Euros. £ is converted in € with the following rate 1 £ = 1.22 € (value of 6th May 2014 from www.oanda.com).

Hydro generating station with totalled installed capacity ≥ 2 MW	1 April 2010 to 30 November 2012	6.31
	1 December 2012 to 31 March 2013	5.76
	1 April 2013 to 31 March 2014	4.04
	1 April 2014 to 31 March 2015	4.04

Source: Ofgem (2014)⁸⁷

The export tariff rates⁸⁸ for the same period are:

- 5.88 €cents/kWh of electricity for infrastructures that were commissioned on or after 01/12/12; and
- 4.12 €cent/kWh⁸⁹ of electricity for infrastructures before 01/12/2012.

According to Smartest Energy Market Update of February 2014, "total FIT capacity is now over 2.1 GW. The Central FIT Register shows that there are 421 accredited hydro schemes, totalling 43 MW⁹⁰".

For large hydropower scheme owners (> 5 MW but < 20 MW), green certificates known as Renewables Obligation Certificates (ROCs) are available⁹¹. From 2027 the Department of Energy & Climate Change (DECC) will fix the price of the ROC for the remaining 10 years of the RO at its long-term value and buy the ROCs directly from the generators (as set out in the white paper on Electricity Market Reform and subject to parliamentary approval), which will reduce volatility in the final years of the scheme⁹².

⁸⁷ Ofgem (2014), Feed-in Tariff Payment Rate Table for Non-Photovoltaic Eligible Installations for FIT Year 5 (1 April 2014 to 31 March 2015), e-serve, <https://www.ofgem.gov.uk/ofgem-publications/87074/rpiadjustedtariffsnon-pvaprill2014.pdf>.

⁸⁸ Ofgem (2014), Feed-in Tariff Payment Rate Table for Non-Photovoltaic Eligible Installations for FIT Year 5 (1 April 2014 to 31 March 2015), e-serve, <https://www.ofgem.gov.uk/ofgem-publications/87074/rpiadjustedtariffsnon-pvaprill2014.pdf>.

⁸⁹ 4.77 p/kWh and 3.39 p/kWh respectively. £ is converted in € with the following rate 1 £ = 1.22 € (value of 6th May 2014 from www.oanda.com).

⁹⁰ Robertson, I. (2014), Market report, Smartest Energy. http://www.british-hydro.org/Market_Reports/2014/Market%20Report%202014%2002%2024.pdf.

⁹¹ Ofgem precises that "ROCs are green certificates issued to operators of accredited renewable generating stations for the eligible renewable electricity they generate. Operators can trade ROCs with other parties. ROCs are ultimately used by suppliers to demonstrate that they have met their obligation. Where suppliers do not present a sufficient number of ROCs to meet their obligation, they must pay an equivalent amount into a buy-out fund. The administration cost of the scheme is recovered from the fund and the rest is distributed back to suppliers in proportion to the number of ROCs they produced in respect of their individual obligation". Ofgem (n.d.), Renewables Obligation, <https://www.ofgem.gov.uk/environmental-programmes/renewables-obligation-ro>.

⁹² Gov.uk (2014), Policy: Increasing the use of low-carbon technologies, <https://www.gov.uk/government/policies/increasing-the-use-of-low-carbon-technologies/supporting-pages/the-renewables-obligation-ro>.

2.5 Italy

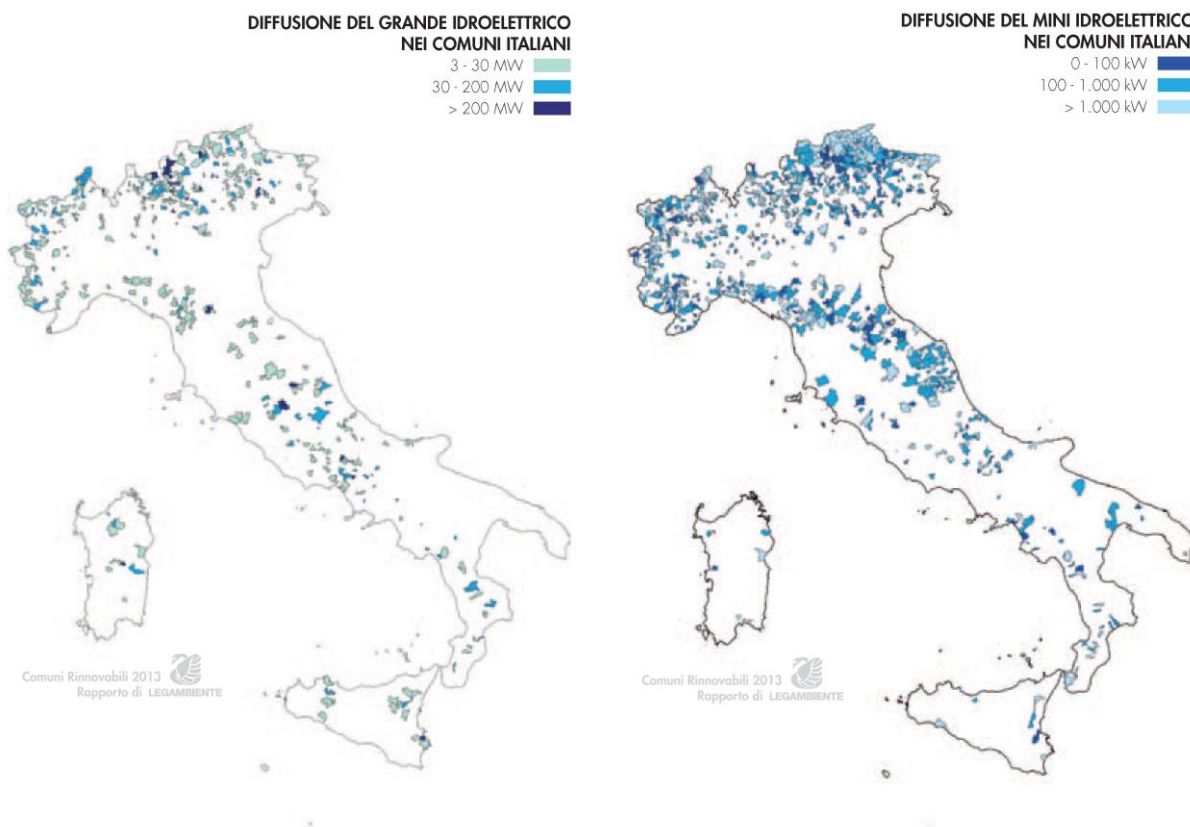
Table 10. Summary of Italian hydropower framework

Characteristics		Description	
Institutional framework	Authorities for granting rights of use	<ul style="list-style-type: none"> Regions, and provinces if delegated 	
	Types of hydropower right and granting procedures	<ul style="list-style-type: none"> Concessions 	
Framework for granting right to use hydropower	Duration	<ul style="list-style-type: none"> 20 to 30 years for large scale hydro; 30 years for small hydro Procedures from 3 to 7 years for small hydro 	
	Competitive process	For new concessions	Choice of competing applications <ul style="list-style-type: none"> Based on economic offer Increasing installed capacity Other qualitative elements, e.g. <ul style="list-style-type: none"> Equipped with an environmental management system, Higher technical, financial and economic guarantees
		For concession renewals	Tender (awarding criteria) based on: <ul style="list-style-type: none"> Economic offer Increasing energy generated or installed capacity and A plan for environmental improvement or restoration of the drainage basin concerned
	EC infringement proceedings or equivalent	<ul style="list-style-type: none"> Closed (in 2007 – opened in 2002 and taken to EC court in 2005 by DG Internal Market and Services) after elimination of preference given to an outgoing concession- Letter of formal notice sent in 2011 by DG Internal Market and Services because of the duration extensions possibly contrary to freedom of establishment. Procedure extended in 2013 as regards new 2012 provisions 	
Obligations of hydropower operators	Environmental obligations	<ul style="list-style-type: none"> Watercourse residual flow defined by regions EIA for hydropower plants > 40 MW and < 3 MW with a diversion capacity higher than 100 l/s in protected natural area (depending also on Regional obligations) 	
	Investment obligations	<ul style="list-style-type: none"> Investment to increase plant capacity and efficiency as qualitative elements of response to call for tenders 	
	Royalties	Public rent to regions and Local Authorities	
Small-hydro	Small hydro definition	< 3 MW	
	Support	FiT or premiums (for 20, 25 or 30 years depending on size and type) (between 96 and 257 €/MWh depending on size and type) or green certificate system (for 25 years) for plants commissioned before 1 January 2013 (between 70 and 80 €/MWh in 2010-2013)	

2.5.1 Context of hydropower in Italy

As of 2013, Italy's electricity generation mix strongly rely on conventional thermal sources (72.4%), followed by hydroelectricity with 17.8% and other renewables with 9.8%⁹³. Since 2011, Italy decreased its reliance on conventional thermal by 8% by increasing its hydroelectricity production and production from other renewables by 4% respectively. Hydropower capacity is mainly located in the North and centre of Italy (see figure below).

Figure 18. Hydro power location in Italy in 2013



Source: Legambiente (2013)⁹⁴

The hydropower sector and hydro-concessions have been opened to competition. Even so, the sector is under scrutiny mainly as a consequence of the country's institutional framework where national competencies are decentralised to local authorities (i.e. Regions).

In Italy, national legislation requires that hydropower generation facilities have valid concessions to operate. Concessions are granted at the local level and usually last between 20 to 30 years. Several new pieces of legislations and regulation entered into force in the past decade, following the Commission's (on the preferential right given to concession holders) and Italian Constitutional Court's interventions.

⁹³ World Energy Council (2014), Data, Sustainability Index, <http://www.worldenergy.org/data/sustainability-index/>.

⁹⁴ Legambiente (2013), Comuni Rinnovabili 2013, http://www.fonti-rinnovabili.it/do.download_elements.php?id=758.

2.5.2 The institutional framework for hydropower

Stakeholders and legislations

Italy's institutional framework is organised through different levels of control and authorisations. There is a common national framework for water policy, fees applied to hydropower (however defined at regional level) and environmental regulations. The hydropower sector is also subject to Regional legislations which implement and enforce the national legislative framework.

The relevant legislation regulating water concessions and the operations of hydropower plants is the following:

- Royal Decree No 1775 of 11 December 1933, Water Consolidation Act (framework in the field of water policy).
- Law No 959 of 27 December 1959 concerning regulations that modify the general law on water and electric plants (R. D. no. 1775/1933).
- Law No 925 of 22 December 1980 concerning new regulations on fees related to hydropower.
- Legislative Decree No 79 of 16 March 1999 about the implementation of Directive 96/92/EC concerning common rules for the internal market in electricity.
- Legislative Decree No 152 of 3 March 2006 on Environmental regulations
- Law no. 134/2013 - August 2012 on sustainable growth. (conversion of law decree no. 83/2012)

Relevant stakeholders involved in the process of awarding water concessions and granting authorisations for the operation of hydropower installations are the following:

- The Ministry of Economic Development: In the context of the energy industry, the Ministry of Economic Development is responsible for developing the national energy policy framework and coordinating activities related to the operations of national and regional planning in the energy and mining sectors.
- AEEGSI – National Energy Authority: The Regulatory Authority for Electricity and Gas is an independent body responsible for regulating, controlling and monitoring the electricity and gas markets. Its main purpose is protecting the interests of users and consumers, promoting competition and ensuring efficient, cost-effective and profitable nationwide services with satisfactory quality levels.⁹⁵
- Local authority (Regions and Provinces): in 1998⁹⁶, competences on water use and exploitation were transferred from the central State to Regions and Provinces. The Regional (and Provincial, if competent) Authorities are responsible for designing and implementing water management and water protection policies. Under the current framework, Regions grant concessions for projects with installed capacity greater than 3 MW while Provinces have the competence to grant authorisations for projects with installed capacity smaller than 3 MW. In regions such as Trentino Alto Adige, which have special statute as an Autonomous Region, or where water policy-making competences were transferred to provincial authorities, Provinces have the competence to grant concessions for large-scale hydropower projects.

⁹⁵ Autorità per l'energia elettrica il gas e il sistema idrico (n.d.), <http://www.autorita.energia.it/it/inglese/index.htm>.

⁹⁶ Legislative Decree No 112 of 31 March 1998 and Legislative Decree No 79 of 16 March 1999.

- Regions and Provinces have their own rules on water use administrative procedures.
- The River Basin Authorities are responsible for carrying out protection and planning activities with regards to water resources and river floods. The Authorities operate according to the State's and Regions' objectives. Their main mission is the environmental protection of Italian river basins through the following objectives: a) the protection of hydrogeological and hydrographic networks; b) the quality protection of watercourses; c) the rational use of water resources; and finally d) the regulation of land use.

Types of right to use hydropower and granting procedures

The average duration of the authorisation procedure for small-scale project is between 2 to 3 years⁹⁷, which is considered a shorter procedure than large-scale project. The procedure, which was introduced in the Legislative Decree no. 387/2003 is called "single permit" and no EIA is required⁹⁸. As expected, barriers that cause delays and increase development costs are related to the competitive procedures of authorisations, conflict of interests with local authorities, and rather long administrative processes.

The procedure for large-scale power plant can be summarised as follows:

- An application is filed with the relevant authority
- The application is then submitted to the Official Gazette of the Italian Republic and in the Journal of Legal Notices for publication. It is also posted in the municipal notice board.
- The relevant authority must then inspect the site and collect opinions from various bodies (such as the Hydrographic Office, the Military Authority, the Administration in charge of supervising the safety of reservoirs and weirs, the Basin Authority, etc.)
- Once all opinions are collected, an examination report is produced which sums up all the steps.
- Finally, the examination report justifying the competent administration's decision is published.
- Public tender to assign the new concession is required.

2.5.3 Framework for granting right to use hydropower

According to the Water Consolidation Act, the maximum validity time of a hydroelectric concession is 30 years. However, the Legislative Decree No 79/1999 sets down different expiry dates for the concessions in operation (these mechanisms have been conceived as a form of compensation for the former monopolist that had essentially perpetual concessions).

In 2004, the European Commission decided to send Italy a reasoned opinion concerning its legislation on granting concessions for works using hydroelectric power, on the grounds that it is incompatible with the freedom of establishment (infringement proceeding no. 2002/2282). In particular, the

⁹⁷ European Small Hydropower Association (2009-2012), Small hydropower roadmap: Condensed research data for EU-27 (Stream Map Project),

http://streammap.esha.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf.

⁹⁸ European Small Hydropower Association (2007), Administrative Barriers for Small Hydropower Developments in Europe, http://www.esha.be/fileadmin/esha_files/documents/publications/position_papers/ESHA_contribution_to_Administrative_barriers_workshop_IEEA_.pdf.

European Commission contested the right of preference given to outgoing concession holders, in accordance with Article 12 of Legislative Decree No 79/99, when concessions for works using hydroelectric power are being renewed. This kind of preference constituted a serious infringement of the principle of equal treatment for all applicants. It was likely to deter potential applicants from taking on the complex technical work of drawing up and submitting bids⁹⁹.

However, the decision concerning Italy was suspended for four months as a legislative amendment designed to abolish these preferences was being prepared at national level. The legislative amendment was enacted with the Budget Law 2006 (Law no. 266/2005) and set out a new mechanism for the renewal of a concession and the functioning of the public tender.

In 2008, the Italian Constitutional Court declared the law no. 266/2005 unconstitutional leaving a situation of uncertainty and lack of both economical and juridical guarantees for those concessionaires who made the investments requested by law no. 266.

The regulatory vacuum created by the ruling no. 1/2008 was then filled with Law no. 122/2010 which again amended article 12 of the Bersani Decree¹⁰⁰. Following the new rules, a new infringement procedure no. 2011/2026 was opened by the EU Commission that challenged the legitimacy of the extensions introduced by Law no. 122/10, considering again the Italian measures contrary to the freedom of establishment. With sentence no. 205/2011, the Constitutional Court repealed the 2010 provisions¹⁰¹.

In 2012, the Law no. 134/2013 (conversion of the decree no. 83/2013) was published where new provisions on hydropower concessions were introduced:

1. The competitive process is based on the "concession going concern", defined as the set of all assets and contracts related to the entire perimeter of the concession. A tendering process must also be carried out for new concessions;
2. The value of the going concern based on the market criteria (market value determined on the basis of the necessary costs to re-build the "dry assets" (e.g. civil engineering works such as buildings, machinery, processing and distribution systems, etc.), net of their current physical depreciation plus historic cost, revaluated and net of public grants for evaluating "wet assets" (e.g. hydraulic works)¹⁰²;
3. The concession is awarded through a competitive bidding mechanism that rest on: i) an economic offer (difference between the offer and the auction base, to be granted to Public Authority); ii) an increase of installed power and iii) other qualitative elements (e.g. environmental recovery, plant efficiency, technical, financial and economic guarantees of execution, etc.);

⁹⁹ EC (2005), Freedom of establishment: the Commission calls on France, Italy and Spain to amend their legislation on hydroelectric concessions, IP/05/920, 13/07/2005, http://europa.eu/rapid/press-release_IP-05-920_en.htm?locale=en.

EC (2007), Freedom of establishment: the Commission drops infringement proceedings against Italy concerning hydroelectric concessions IP/07/912, 27/06/2007, http://europa.eu/rapid/press-release_IP-07-912_en.htm?locale=en

EC (2008), COMMISSION STAFF WORKING DOCUMENT STATISTICAL ANNEX, Annexes I to III Accompanying document to the REPORT FROM THE COMMISSION 26th ANNUAL REPORT ON MONITORING THE APPLICATION OF COMMUNITY LAW (2008) {COM(2009) 675},

http://ec.europa.eu/eu_law/docs/docs_infringements/annual_report_26/en_sec_statannex_vol1clean.pdf.

¹⁰⁰ It has been included a 5-year extension for most the existing concessions and an extension of 7 years for some specific concessions located in the provinces of Belluno, Sondrio, Brescia, Como and Verbania, prior to the establishment of a joint venture controlled by provincial public share of 30-40 %.

¹⁰¹ http://ec.europa.eu/eu_law/eulaw/decisions/dec_20110314.htm#it and http://ec.europa.eu/eu_law/eulaw/decisions/dec_20130926.htm#it.

¹⁰² In case of disagreement with the value of going concern, the dispute shall be referred to an arbitration panel made up of three members appointed by the parties involved or, in case of failing agreement, by the President of the Water Court (i.e. Tribunale Superiore delle Acque Pubbliche).

4. Temporary regime for expired/expiring concessions, aiming at ensuring the 5-year procedure;
5. The maximum validity of a concession can vary from 20 to 30 years depending on the project's required investments (e.g. business plan and CAPEX)

Therefore, Italy has proceeded with designing a legal framework allowing for concessions to be tendered in compliance with EU legislation. The Government is now expected to implement the new provisions adopting a new ministerial decree on concessions' renewal. The Ministry for Economic Development is currently drafting its decree on tendering criteria and procedures for the renewal of concessions. The Decree will contain key provisions to determine modalities for asset transfer, qualification criteria of participants, award procedures and responsibilities.

From a European perspective, in September 2013, the European Commission (DG Internal Market) has relaunched and extended to new 2012 provisions an already existing infringement procedure (opened in 2011 against provision on the hydropower sector introduced with law no. 122/2010, afterwards repealed by the Italian Constitutional Court). Italian Republic has submitted its comment and provided any useful information for the evaluation of the case; the procedure is still on-going.

2.5.4 Characteristics of the competitive process

Competitive concession procedure for new installations

As already mentioned, there is a competitive bidding mechanism that rest on: i) an economic offer (difference between the offer and the auction base, to be granted to Public Authority); ii) an increase of installed capacity and iii) other qualitative elements (e.g. environmental recovery, efficiency, technical, financial and economic guarantees of execution, etc.);

Competitive procedure for concession renewals

According to article 12 of the Legislative Decree no. 79/1999 (as integrated in 2012), competent Authorities, at least, five years before the expiry of a large-scale hydropower concession, announces a competitive tender for the awarding of the same concession on condition that the bidder presents a plan for the increase of energy generated or installed capacity, as well as a plan for environmental improvement or restoration of the drainage basin concerned.

2.5.5 Main schedule for renewal

Expiry date of hydropower concessions in Italy are set down by article 12 of the Legislative Decree no. 79/1999. In particular, current concessions expire roughly between 2010 and 2029. Consequently, concession renewals will occur according to this schedule.

2.5.6 Obligations of hydropower operators

Beside the right of use hydropower and the concession specificities, hydropower right holders must respect several major obligations which impact their strategic and operational decisions.

Environmental obligations

The Legislative Decree No 152 of 3 March 2006 concerning Environmental regulations is a very important piece of legislation. It includes regulations in the fields of application of the watercourse residual flow (i.e. reserved flow) and the allocation of competences. *"The River Basin Authorities have to identify the general criteria for Reserved Flow definition (within the specific competence of water balance planning). The Regions have the regulatory competence; they introduce the Reserved Flow regulation in the Water Protection Plans. There is a wide range of methods of calculation suggested by the River Basin Authorities (e.g. based on hydrological and morphological parameters or environmental conditions, potable water and safety of drainage basins) and adopted by the Regions, so there are very different RF values. Also along the same water body, going from one Region to another, RF values can be very different."*¹⁰³

EIAs are required for hydropower installations with capacity greater than 40 MW as well as for small hydropower (<3 MW) with a diversion of water with capacity over 100 litres/second if it is in a protected natural area. In the first case, it is conducted by the Ministry of Environmental, while in the second case it is conducted by Regional Offices¹⁰⁴.

Investment obligations

In the competitive mechanism introduced in the Decree-Law no. 83/2013, in the context of calls for tender for concession renewals, interested parties must include in their proposals a plan that increases installed capacity and plant efficiency, amongst other qualitative elements.

Taxes, levies and royalties

Annual capacity-based rents on hydropower concessions are charged to large-scale hydropower concessionaires. The rent is calculated on a yearly basis, based on the average capacity in €/kW of each hydropower installations. Rents are under the Regions' jurisdiction leading to differing rates amongst regions. Even real estate taxes are to be considered.

Additionally, there are two more annual fees charge to concessionaires:

1. Fee to provinces and municipalities (Local Authorities) located on the river basin between the intake and the tail race (for the two-year period 2014-2015 it amounts to 7.60 €/kW)¹⁰⁵
2. Fee due to the Bacino Imbrifero Montano (BIM), a consortium of municipalities and provinces that are included in the catchment area (for the two-year period 2014-2015 it amounts to 30.40 €/kW)¹⁰⁶.

¹⁰³ European Small Hydropower Association (2009-2012), Small hydropower roadmap: Condensed research data for EU-27 (Stream Map Project),

http://streammap.esha.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf.

¹⁰⁴ Antoniazzi, M., I., et al. (2009), SMART – Strategies to Promote Small Scale Hydro Electricity Production in Europe, Small Hydro Power Plants In Europe: Handbook on Administrative Procedures Requested, Faculty of Mechanical Engineering and Naval Architecture (Zagreb), ISBN 978-953-6313-76-1,

http://www.provincia.cremona.it/ambiente/all/SMART_HANDBOOK_draftontheweb-v2.pdf.

¹⁰⁵ Public Land Agency, Decree 22 November 2013 concerning the review of hydropower rents.

¹⁰⁶ Ministry of Environment, Decree 22 November 2013.

2.5.7 Support to small hydropower

Up until 31 December 2012, all new, totally rebuilt, reactivated, repowered/upgraded or renovated renewable plants (including hydropower) which were commissioned before 1 January 2013 were subject to eligible for Green Certificates issued by the Italian Power Services Administrator (GSE). Plants then received certificates for a period of 15 years. Table 11 present average market values of green certificates for 2010, 2011 and 2012. Since then, renewable plants are only subject to FiT or premium incentive schemes.¹⁰⁷

Table 11. Green certificates values

Green certificates	Value (€/MWh)
2010	73.84
2011	80.38
2012	71.97
2013	80.34

There are two different types of FiTs and energy producers are only eligible to one. Type 1 FiT (*tariffa omnicomprensiva*) and Type 2 FiT (*ritiro dedicato*). Type 1 FiT are for all renewable installations except PV with an installed capacity between 1 kW and 1 MW and are valid for 15 to 20 years. Type 2 FiT is the regulation of the sale of electricity rather than a "classical" feed-in-tariff. The *Gestore Servizi Energetici* (GSE) manages the sale of renewable energy on behalf of the producers, enabling renewable energy to access the market indirectly and more easily. Producers of up to 1,500 MWh of electricity from renewable sources may choose between the minimum tariff (*prezzo minimo garantito*) determined by the energy authority and the market prices [...]. If production exceeds 1,500 MWh, the surplus is subject to the market price¹⁰⁸.

The Type 2 Premium Tariff is for all renewable energy installations except PV¹⁰⁹. For hydropower plants, the Type 2 Premium Tariff is available for capacities between 1 kW and 10 MW, meaning that plants with capacity between 1 kW and 1 MW can choose between the Type 1 FiT and the Type 2 Premium Tariff. Supports are granted for 20 years.

¹⁰⁷ Gestore Servizi Energetici (2012), Evoluzione normativa, <http://www.gse.it/it/Qualifiche%20e%20certificati/Qualificazione%20impianti/Evoluzione%20normativa/Pagine/default.aspx>. Note that a GC is valid during 3 years in the market.

¹⁰⁸ Zane, E., B. (2013), Electricity Promotion in Italy. Res Legal. European Commission, <http://www.res-legal.eu/en/search-by-country/italy/tools-list/c/italy/s/res-e/t/promotion/sum/152/lpid/151/page.pdf?out=pdf>.

¹⁰⁹ The Type 1 Premium Tariff is for PV installations only.

Table 12. Support for small-hydro in Italy

Hydropower plant type	Type 1 FiT	Type 2 FiT	Type 2 Premium Tariff
Conventional ¹¹⁰ (capacity C in kW)	$1 \leq C < 1,000 \rightarrow 101 \text{ €/MWh}$	N/A	$C < 10 \text{ MW} \rightarrow 96 \text{ €/MWh}$
Run-of-river (capacity C in kW)	<ul style="list-style-type: none"> $1 \leq C < 20 \rightarrow 257 \text{ €/MWh}$ $20 \leq C < 500 \rightarrow 219 \text{ €/MWh}$ $500 \leq C < 1 \text{ MW} \rightarrow 155 \text{ €/MWh}$ 	<ul style="list-style-type: none"> For the first 250 MWh $\rightarrow 153.2 \text{ €/MWh}$ Between the 251st and 500th MWh $\rightarrow 105.4 \text{ €/MWh}$ Between the 501st and 1,000th MWh $\rightarrow 66.5 \text{ €/MWh}$ Between 1,001st and 1,500th MWh $\rightarrow 57.6 \text{ €/MWh}$ For outputs above 1,500 MWh \rightarrow market price 	<ul style="list-style-type: none"> $1 \leq C < 20 \rightarrow 257 \text{ €/MWh}$ $20 \leq C < 500 \rightarrow 219 \text{ €/MWh}$ $500 \leq C < 1,000 \rightarrow 155 \text{ €/MWh}$ $1 \text{ MW} \leq C < 10 \text{ MW} \rightarrow 129 \text{ €/MWh}$ $C \geq 10 \text{ MW} \rightarrow 119 \text{ €/MWh}$

Source: EC (2013)¹¹¹

¹¹⁰ Conventional includes all hydropower plants with dams.

¹¹¹ European Commission (2013), RES LEGAL Electricity, Promotion in Italy. <http://www.res-legal.eu/en/search-by-country/italy/tools-list/c/italy/s/res-e/t/promotion/sum/152/lpid/151/page.pdf?out=pdf>.

2.6 Norway

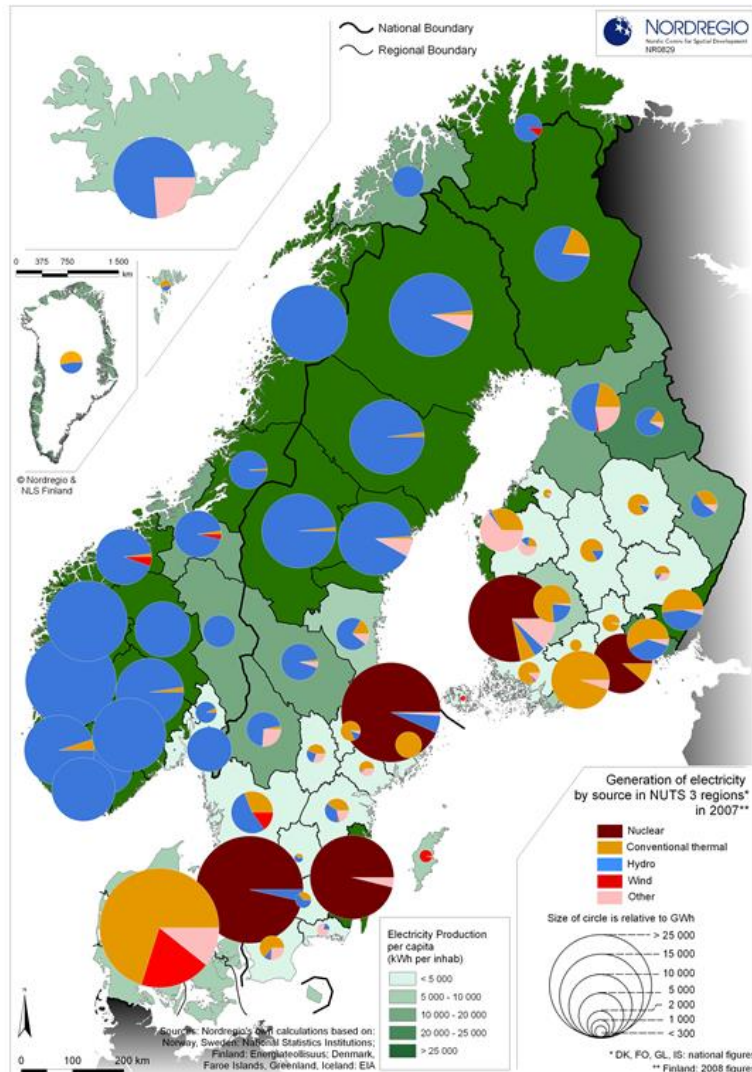
Table 13. Summary of Norwegian hydropower framework

Characteristics		Description	
Institutional framework	Authorities for granting rights of use	<ul style="list-style-type: none"> Ministry of Petroleum and Energy Ministry of Environment The Norwegian Water Resources and Energy Directorate (NVE) 	
	Types of hydropower right and granting procedures	<ul style="list-style-type: none"> Licences granted by King and government for waterfall purchase or long-term use (≥ 1 MW) after discussion by the Parliament (> 10 MW) or the Ministry (< 10 MW) and consideration by the energy regulator NVE No licensing needed for micro (< 100 kW) and mini (< 1 MW) power plants if the NVE agrees on limited environmental impact Leasing to private companies 	
Framework for granting right to use hydropower	Duration	<ul style="list-style-type: none"> Unlimited period of time for state-owned companies, municipalities and counties Previously, up to 60 years for private companies, reversion at expiry. No more concession granted to private companies Now possibility of leasing of public assets for 15 years only 	
	Competitive process	For new licences	National legislation does not appear to provide for competitive procedure
		For licence renewals	National legislation does not appear to provide for competitive procedure
	EC infringement proceedings or equivalent	International EFTA Court in Luxembourg ruling in 2007 that private or foreign companies granted a time-limited hydropower concession with obligation to revert installation to the State without compensation at concession expiry, whereas public companies benefited from time-unlimited concessions encroaching freedom of establishment and movement of capital guaranteed by the EEA Agreement. Nevertheless, this agreement lets the right to Norway legitimately pursue the objective of establishing a system of public ownership over these properties	
Obligations of hydropower operators	Environmental obligations	<ul style="list-style-type: none"> Mandatory EIA > 40 GWh Protection of some river systems forbidding hydropower development in some watercourse, including from micro and mini power plants since 2005 	
	Investment obligations	<ul style="list-style-type: none"> Make the necessary investments in order to ensure that these regulations are met 	
	Royalties	<ul style="list-style-type: none"> Annual fees to the State: Minimum: 0.16 €/kW Maximum: 1.62 €/kW Annual fees to counties and municipalities: Minimum: 0.16 €/kW Maximum: $\rightarrow 4.87$ €/kW + Resource rent tax: 31% (for excess returns only) 	
Small-hydro	Small hydro definition	< 10 MW	
	Support	Green certificates allocated for 15 years to RES in particular to measures to increase production at new and existing hydropower stations valued around 20 €/MWh in 2012-2013	

2.6.1 Context of hydropower in Norway

Norway has the world's largest per capita hydropower production, and is the sixth largest hydropower producer in the world¹¹². The country's main source of electricity generation is hydropower which consists of 95% of its entire production¹¹³. Norway's annual production is around 140 TWh (2012 statistics) of which 22 TWh are exported to neighbouring countries.¹¹⁴ Norway has more than 90 TWh of combined reservoir power plants and several run-of-river power stations which are mostly located in the lowland areas.

Figure 19. Hydro power (and other generation technology) location and production in Scandinavia in 2007



Source: NORDREGIO (2007)¹¹⁵

Although the country possesses a large amount of water resources, it is only from 1970 until 1985 that the largest hydropower projects were developed, when installed capacity increased by 10,730

¹¹² Ministry of Petroleum and Energy (2007), Electricity Generation,

<http://www.regjeringen.no/en/dep/oe/Subject/energy-in-norway/Electricity-generation.html?id=440487>.

¹¹³ World Energy Council (2014), Data, Sustainability Index, <http://www.worldenergy.org/data/sustainability-index/>.

¹¹⁴ Statistics Norway (2014), Electricity Annual Figures 2012, <http://www.ssb.no/en/elektrisitetaar>.

¹¹⁵ <http://www.nordregio.se/en/Maps--Graphs/05-Environment-and-energy/Generation-of-electricity-in-the-Nordic-Countries/>.

MW, or an average of 4.1 per cent per year¹¹⁶. Since then, new production capacity is much lower, consisting of small hydropower projects and power station refurbishments.

The institutional framework for hydropower is based on the Norwegian Water Resources Act (2000). In Norway, national legislation requires that hydropower generation facilities have valid licences to operate. Hydropower generators are largely publicly-owned companies and licences are granted for an unlimited time to State-owned companies and for they were granted for a maximum validity of 60 years for private companies until 2008. Hydropower plants reverted to the public sector can now be leased to private companies for a maximum of 15 years.

2.6.2 The institutional framework for hydropower

Stakeholders and legislations

The development of hydropower in Norway is organised according to the nature and size of each project. Several institutions are involved in the process, but the Norwegian energy regulator has a central role in the procedure in all cases¹¹⁷.

The main legislation related to hydropower regulation¹¹⁸ is the following:

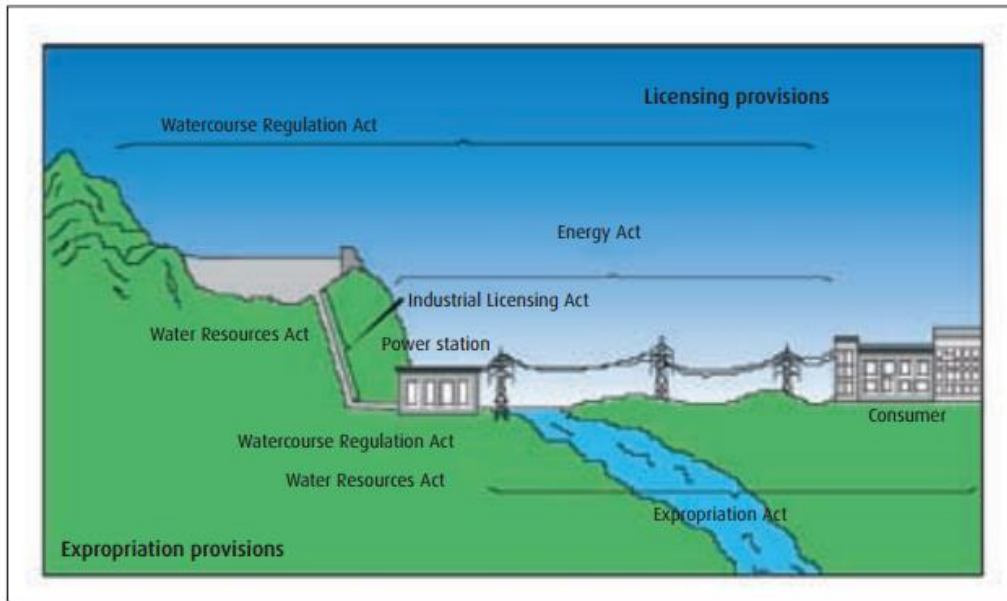
- Act No. 16 of 14 December 1917 on the acquisition of waterfalls, mines and other real properties (Industrial Licensing Act).
- Act No. 17 of 14 December 1917 on the regulation of watercourses (Watercourse Regulation Act).
- Act No. 50 of 29 June 1990 on the generation, conversion, transmission, trading, distribution and use of energy, etc. (The Energy Act).
- Reg. No. 945 of 4 December 1990 pertaining to the adjustment of licence fees, annual compensation and funds, etc., pursuant to water resources legislations.
- Act No. 82 of 24 November 2000 on river systems and groundwater (Water Resources Act) The Water Resources Act is the general statute governing fresh water resources including ground water.

¹¹⁶ Ministry of Petroleum and Energy (2007), Electricity Generation, <http://www.regjeringen.no/en/dep/oed/Subject/energy-in-norway/Electricity-generation.html?id=440487>.

¹¹⁷ Ministry of Petroleum and Energy (2013), Licensing procedures, <http://www.regjeringen.no/en/dep/oed/Subject/energy-in-norway/licensing-procedures.html?id=440496>.

¹¹⁸ Ministry of Petroleum and Energy (2007), Rules, <http://www.regjeringen.no/en/dep/oed/documents-and-publications/Laws-and-rules-2/Rules/2000/Acts-and-Regulations-.html?id=106724>.

Figure 20. Legislation governing licensing in the hydropower sector



Source: Ministry of Petroleum and Energy (2009)

The institutions empowered to regulate hydropower are also the ones granting licences for water use. The institutions are the following ones.

- The Ministry of Petroleum and Energy (MPE) holds the overall administrative responsibility to ensure that the resource management is carried out in accordance with guidelines given by the Parliament.
- The Ministry of Environment formulates the water plan in close cooperation with the MPE. It does not play an active role in the hydropower sector or grants water licences, however.
- The Norwegian Water Resources and Energy Directorate (NVE) is the regulator, subordinate agency of the MPE, responsible for administrating Norway's water and energy resources and regulating the energy sectors. With regard to hydropower, NVE's objectives are to ensure consistent and environmentally sound management of the country's water resources. It plays a central role in contingency planning for floods and other emergencies related to watercourses, and takes part in research and development and international collaboration in the water field, as well as being the national competent authority on hydrology¹¹⁹. It is also in charge of regulating the electricity and green certificates markets.

Types of right to use hydropower and granting procedures

Hydro power development in Norway is subject to a number of different licences, each regulated by a different Act. According to the MPE, in order to carry out regulatory measures or divert water in a watercourse, a developer or licensee must have a licence pursuant to the Watercourse Regulation Act. Furthermore, any interested party who acquires ownership, user rights or long time user rights to a waterfall, or shares in companies with such rights, must obtain a licence pursuant to the

¹¹⁹ Ministry of Petroleum and Energy (2014), Norwegian resource management, <http://www.regjeringen.no/en/dep/oed/Subject/energy-in-norway/Norwegian-resource-management.html?id=440678>.

Industrial Licensing Act. Furthermore, development of a waterfall and construction of a power plant usually require an additional licence pursuant to the Water Resources Act and under the Energy Act. This licence is required for the construction and operation of all installations for generation, conversion, transmission and distribution of electricity, all the way from power plant to consumer, as well as district heating plants over 10 MW. Nonetheless, Norwegian legislation does not require licences for micro (< 0.1 MW) and mini (< 1 MW) power stations as it is considered that their impact is negligible¹²⁰.

Although Norway has a well-defined framework, procedures may be rather complex depending on the nature of each project. Even so, projects that are expected to produce less than 40 GWh/year may be subject to simpler procedures without notification. This distinction is made on the basis that larger projects have different technical solutions and environmental impacts.

According to the Industrial Licensing Act, when a waterfall is subject to acquisition by an interested party, the State has the right of pre-emption and can exercise its right within one year. The State's power to exercise its right of pre-emption to a waterfall arises as soon as an application for a licence is received by the Ministry. The State must inform the county in which the waterfall is located whether or not this right will be exercised. If the State does not exercise its right of pre-emption, the counties can then exercise their pre-emption rights within three months.

At different stages, the relevant authorities and public must be involved in the process. The licensing process may take from one year to five years (with two to three years on average) for small projects without notification time. For larger projects with notification, the process is longer and can take anywhere between two to six years or more. Nonetheless, on average, Norway's processing time is rather short compared to other EU countries (such as Portugal and Spain). The time needed for approval depends on the following:

- How controversial the project is;
- The time required to perform an Environmental Impact Assessment (EIA);
- The working capacity of the competent authorities; and
- Whether the fixed time limits for comments on the notification and the EIA can be met¹²¹.

The advantage of Norway's procedure is that it is based on a "one window" approach. This approach involves *"all parts of the total hydropower plant (dam, power station, electric installations, power lines, access roads, quarries and tips) and the corresponding acts and authorities [to be] included in a coordinated process. NVE has the responsibility to co-ordinate this process"*¹²¹.

The licence procedure is summarised as follows:

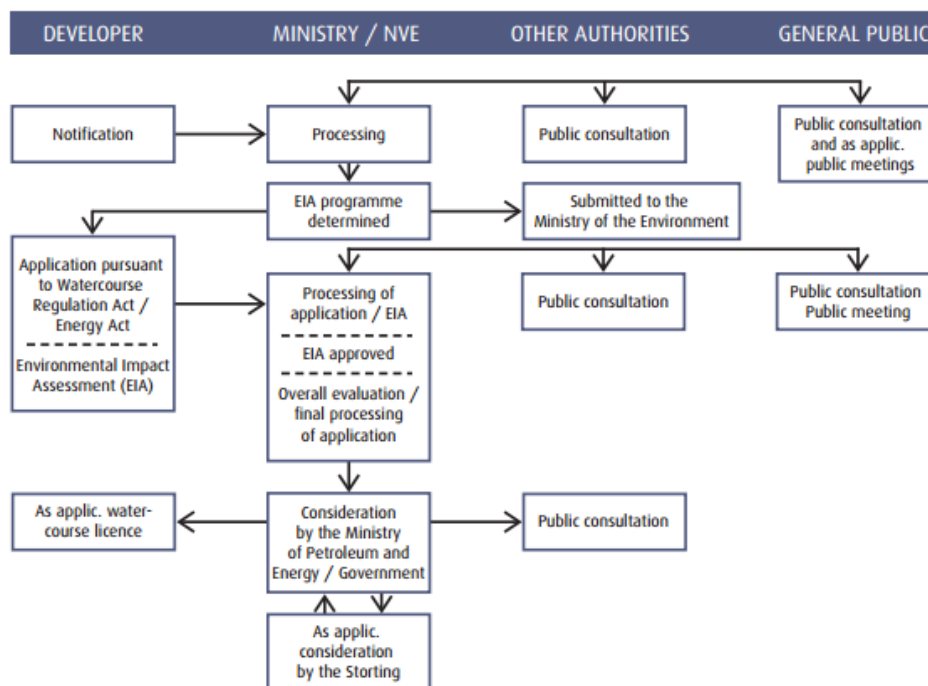
- A project application is filed
- For larger projects, the Parliament prepares the file for discussion while smaller projects (< 10 MW) are handled by the Ministry alone
- An EIA is conducted and submitted to the Ministry of Environment which carries out a public consultation for installations that are expected to produce more than 40 GWh
- Following the approval of the EIA, the project goes through the final processing via an overall evaluation

¹²⁰ Ministry of Petroleum and Energy (2009), Facts 2008: Energy and Water Resources in Norway, The Legal Framework, http://www.regjeringen.no/upload/OED/pdf%20filer/Faktaheftet/EVfakta08/EVfacts08_kap04_eng.pdf.

¹²¹ Norwegian Water Resources and Energy Directorate (2009), Handling procedures, <http://www.nve.no/en/Licensing/Handling-prosedures/>.

- The application is then considered by the NVE and the government, i.e. the MPE. If required, a public consultation is held and depending on the project's nature, the Parliament may consider the application as well.
- Finally, licenses are granted by the King and the Government.

Figure 21. Administrative procedures involved in licensing hydropower developments (> 40 GWh/year) which require an EIA pursuant the Planning and Building Act¹²²



Source: Ministry of Petroleum and Energy (2009)¹²³

2.6.3 Framework for granting right to use hydropower

Prior to 2008, licenses for State Companies and companies owned by municipalities and counties were granted for an unlimited period of time. Private companies were granted a 60-year license however, and had to revert its installations to the State at concession expiry.

But in 2007, the international EFTA¹²⁴ Court has ruled that Norway's regulations on ownership of hydropower concessions are contrary to regulations of the European Economic Area (EEA). The matter was that, at that time, private or foreign companies were granted a time-limited concession for the acquisition of hydro power plants, with an obligation to surrender all installations to the Norwegian State without compensation at the expiry of the concession period, whereas Norwegian public companies benefited from concessions for an unlimited period of time. It was representing an encroachment of freedom of establishment and freedom of movement of capital guaranteed by the

¹²² The *Storting* (in the lower box) is the Parliament.

¹²³ Ministry of Petroleum and Energy (2009), Facts 2008: Energy and Water Resources in Norway, The Legal Framework, http://www.regjeringen.no/upload/OED/pdf%20filer/Faktaheftet/EVfakta08/EVfacts08_kap04_eng.pdf.

¹²⁴ The European Free Trade Association is a free trade organization between Iceland, Liechtenstein, Norway and Switzerland that operates in parallel with and is linked to the European Union. EFTA Court (2007), Case E-2/06, EFTA Surveillance Authority v. The Kingdom of Norway, Judgment of the Court: Conditions for concession acquisition of hydropower resources, etc., http://www.eftacourt.int/uploads/tx_nvcases/2_06_Judgment_EN.pdf.

EEA Agreement. Nevertheless, this agreement lets the right to State to decide whether hydropower resources and related installations should be exclusively in public ownership meaning that Norway may legitimately pursue the objective of establishing a system of public ownership over these properties.

Consequently, the new terms, as endorsed by the Government's proposition no. 61 (2007–2008) in recommendation no. 78 (2007-2008) to the Parliament (lower house), that amended the Industrial Licensing Act which entered into force on 25 September 2008, are the following ones:

- New licences for acquiring titles to waterfalls may be granted only to public-sector owners;
- Acquisition of reverted waterfalls and power plants is restricted to public-sector operators;
- The sale of more than one third of publicly owned waterfalls and power plants is prohibited; and
- The current licences of limited duration that revert to the State on expiry will run normally until the reversion date. The last major reversion will occur in 2057¹²⁵.

In addition, under the Regulations on the Lease of Hydropower Plants (text implementing the Industrial Licensing Act), which came into force on 1 July 2010, allows domestic and international, and public and private, companies the opportunity to lease already built hydropower plants for a period of up to 15 years, but no subleasing is permitted.

The regulations apply to agreements concerning hydropower plants and projects which are subject to licensing under the Industrial Licensing Act. The regulations comprise three types of agreement:

- leasing agreements with transfer of operational liability;
- leasing agreements without transfer of operational liability; and
- agreements on operational liability and running of the plant.

The first two types of agreement are traditional leasing agreements which transfer the commercial rights to the lessee. The third option transfers the responsibility for running the plant to another operator. However, these agreements do not include the transfer of the commercial rights (i.e., the right to make commercial decisions regarding the running of the plant).

Two important clauses are included in the agreements; 1) A clause that provides for invalidity if the lease system is found to violate obligations under the European Economic Area Agreement and 2) Agreements must be approved by the ministry¹²⁶.

2.6.4 Characteristics of the competitive process

Competitive licence procedure for new installations

The Norwegian legislative framework does not provide for public and competitive procedures for licensing new installations.

¹²⁵ Ministry of Petroleum and Energy (2009), Facts 2008: Energy and Water Resources in Norway, The Legal Framework, http://www.regjeringen.no/upload/OED/pdf%20filer/Faktaheftet/EVfakta08/EVfacts08_kap04_eng.pdf.

¹²⁶ Bjerke, M., R., and Tannum, A., S. (2010), Energy & Natural Resources – Norway: New provisions on lease of developed hydropower plants. International Law Office. <http://www.internationallawoffice.com/newsletters/detail.aspx?g=63856802-a3ec-4abd-b8b3-78c736b44ddc>.

Competitive licence procedure for renewals

The Norwegian legislative framework does not provide for public and competitive procedures for licence renewals or leases.

2.6.5 Main schedule for renewal

Private companies must revert their installations at the expiry of their concessions. There is therefore no renewal schedule. The last major reversion will occur in 2057.

2.6.6 Obligations of hydropower operators

Beside the right of use hydropower and the concession specificities, hydropower right holders must respect several major obligations which impact their strategic and operational decisions.

Environmental obligations

Several watercourses are permanently protected. In this case, hydropower developments are forbidden. As early as 1973, the Parliament implemented a protection plan for the Norwegian river systems. Since then, three more plans were implemented; in 1993, 2005 and 2009 and form the Protection Plan for Watercourses. Along with the Water Resources Act of 2000, watercourses have regulations on water levels and quality, on the value of the river system to flora and fauna, on groundwater body and on the watercourse residual flow, to name but a few. Authorities control water levels in reservoirs, variations on the quantity of by-pass water, residual flow in watercourses and flood operation. The Protection Plan for Watercourses protects a "*total of 388 objects with a power potential of 49.5 TWh/year [which] are protected against development for power production*"¹²⁷. Nonetheless, in the 2005 supplement Plan, the Parliament allowed the processing of licence applications for hydropower installations with installed capacity < 1 MW in protected river systems.

Investment obligations

Installation owners must meet all regulations, meaning that they must make the necessary investments in order to ensure that these regulations are met. For example, investments may be required for the closing down of a power installation, the restoration of the course of a river or for safeguarding against harm through design and functional requirements and requirements for the necessary maintenance of watercourse installations.

¹²⁷ Norwegian Ministry of Petroleum and Energy (2013), Facts 2013L Energy and Water Resources in Norway, ISSN: 0809-9464, http://www.regjeringen.no/upload/OED/Faktaheftet/FACTS_energy_water.pdf.

Taxes, levies and royalties

According to the Industrial Licensing Act and the Watercourse Regulation Act, the licensee must pay annual fees to the State, counties and municipalities. These fees are determined by assessment but the Ministry fixes a minimum and maximum value¹²⁸ for them, namely:

Table 14. Minimum and maximum values of annual fees to the State, counties and municipalities

Annual fees to the State ¹²⁹	Annual fees to counties and municipalities ¹³⁰
Minimum: 0.16 €/kW Maximum: 1.62 €/kW	Minimum: 0.16 €/kW Maximum: 4.87 €/kW

Those limits apply to three types of licence:

- Acquisition of ownership rights of waterfalls (Industrial Licensing Act);
- Acquisition of right of use or long-term deployment of waterfalls belonging to the State (Industrial Licensing Act);
- Installations that regulate the watercourse flow rate (Watercourse Regulation Act)

Municipalities that have hydropower installations on their territory benefit from more affordable electricity rates as the owners of these plants, who have a license according to the Acquisition Act, are obliged to deliver power (10 %) at non- or low-profit cost to the local municipalities.

The Resource rent tax was introduced in 1996 and consists of a levy of 31% on hydropower producers' excess returns¹³¹. The income base for calculation of the resource rent tax is the spot price for electricity. All costs related to hydropower production may be deducted from the basis for the resource rent tax. Hence, the marginal tax rate on the excess return within the power sector is 58% (=27% for corporation rate as any other company¹³² and 31% for return in excess). "In addition, a profitability-independent natural resources tax of [0.00157 €/kWh]¹³³ paid to the municipal authority and the county authority is levied on hydropower producers. Of this, [0.00133 €/kWh]¹³⁴ is allocated to the municipal authority and ¹³⁵[0.00024 €/kWh] to the county authority¹³⁶."

¹²⁸ Norwegian Water Resources and Energy Directorate (2009), Acts and regulations, <http://www.nve.no/en/About-NVE/Acts-and-regulations/>.

¹²⁹ Minimum and maximum annual fees to the State are respectively 1NOK/hp and 10NOK/hp. hp means horsepower and is worth 0.75 kW. NOK is converted in € with the following rate 1 NOK = 0.12 € (value of 6th May 2014 from oanda.com).

¹³⁰ Minimum and maximum annual fees to counties and municipalities are respectively 1NOK/hp and 30NOK/hp.

¹³¹ KPMG (2014), Tax Facts Norway 2014, <https://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/taxnewsflash/Documents/norway-april10-2014.pdf>. Norwegian Ministry of Finance (2012), Taxing Natural Resources: Basic Principles and Norwegian Experience, <http://www.oecd.org/greengrowth/12%20Semmingen%20231112%20OECD.pdf>. Excess return are computed as follow: Sales income (market prices) - Operating costs - Concession fees - Property tax - Depreciation (linear: installations 1,5% equipment 2,5%) - Uplift (tax values * risk free rate = 2.7%) = Tax base liable to 31% tax.

¹³² KPMG (2014), Tax Facts Norway 2014, <https://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/taxnewsflash/Documents/norway-april10-2014.pdf>.

¹³³ NOK 0.013/kWh.

¹³⁴ NOK 0.011/kWh.

¹³⁵ NOK 0.002/kWh

¹³⁶ KPMG (2014), Tax Facts Norway 2014, <https://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/taxnewsflash/Documents/norway-april10-2014.pdf>.

2.6.7 Support to small hydropower

In January 2012, a common Norwegian-Swedish market for green certificate was created. This partnership has a goal of establishing new renewable installations with a total combined capacity of 26.4 TWh by 2020. Each country is responsible for financing half (13.2 TWh) of the capacity, regardless of the installations' location. This market-based support scheme aims at promoting new electricity production based on renewable energy sources. For a period of 15 years, eligible producers will receive one certificate per MWh of renewable energy generated¹³⁷.

Eligible production is new power plants where construction of the plant started after 7 September 2009 or 1st January 2004 for hydropower plants with installed capacity of less than or equal to 1 MW or existing power plants which increase their production on a permanent basis. Certificates are provided for a share corresponding to the expected increase in annual production. From 1 April 2012 to 31 March 2013, the average price per certificate (per MWh) was 20.26 €/MWh¹³⁸.

The Norwegian Water Resources and Energy Directorate (NVE) is the supervisory authority for the electricity certificate market in Norway.

¹³⁷ Ministry of Petroleum and Energy, 2012, Electricity certificates, <http://www.regjeringen.no/en/dep/oed/Subject/energy-in-norway/electricity-certificates.html?id=517462>.

¹³⁸ Res Legal ,(2013), Quota System –Sweden, <http://www.res-legal.eu/search-by-country/sweden/single/s/res-e/t/promotion/aid/quota-system-1/lastp/199/>.

2.7 Portugal

Table 15. Summary of Portuguese hydropower framework

Characteristics		Description	
Institutional framework	Authorities for granting rights of use	<ul style="list-style-type: none"> • Directorate General for Energy and Geology (DGEG) • Regulatory Authority of Energy Services (ERSE) • Basin authorities (Administração da Região Hidrográfica -ARH) 	
	Types of hydropower right and granting procedures	Concessions for hydropower scheme via <ul style="list-style-type: none"> • Project application, or • Calls for bidding (auctions) conducted by the Government 	
Framework for granting right to use hydropower	Duration	Concession: up to 75 years Procedures from 3 to 11 years	
	Competitive process	For new concessions	Case of application by a private investor <ul style="list-style-type: none"> • Request concession licence with ARH • ARH call for tender if project in the interest of the river • Opening to competing projects • Applicant selection based on highest bid for up-front payment with a possibility to outbid for the first applicant Case of ARH identifying need for hydropower installations: applicant selection based on highest bid for up-front payment with no priority to any applicant
		For concession renewals	National legislation does not appear to provide for competitive procedure
	EC infringement proceedings or equivalent	In-depth inquiry opened in 2013 (by DG Competition) into hydropower concessions to EDP to verify whether the price paid by the Portuguese electricity incumbent EDP in 2007 for the extension of its right to use public water resources for electricity generation was in line with EU state aid rules	
Obligations of hydropower operators	Environmental obligations	<ul style="list-style-type: none"> • EIA • No regulation on watercourse residual flow but 5 to 10% of modular flow in average 	
	Investment obligations	For the protection of the environment (e.g. acceptable level of ecological and residual flows of watercourses)	
	Royalties	Rate on water resources (The Taxa de recursos Hidricos -TRH)	
Small-hydro	Small hydro definition	< 10 MW	
	Support	9.5 c€/kWh for a maximum of 25 years	

2.7.1 Context of hydropower in Portugal

Since the mid-20th century, Portugal has enjoyed electricity production from hydropower plants. According to the World Energy Council, in 2013, Portugal's energy mix consists of conventional thermal (45.2%), hydroelectricity (30.7%) and other renewables (24.1%)¹³⁹. The hydropower capacity is mainly located in the North and centre of Portugal (see figure next page).

Figure 22. Hydro power location in Portugal in 2010



Source: Global Energy Observatory¹⁴⁰

Over the next decades, the country will increase its hydropower capacity thanks to the National Programme for Dams with High Hydroelectric Potential (PNBEPH)¹⁴¹ launched by the Federal Government in 2007. Initially there were 10 projects, but the call for tender received proposals for 8 out of the 10 dams. The eight projects under PNBEPH will only come into full operation at the end of

¹³⁹ World Energy Council (2014), Data, Sustainability Index, <http://www.worldenergy.org/data/sustainability-index/>.

¹⁴⁰ <http://globalenergyobservatory.org/countryid/172#>.

¹⁴¹ Programa Nacional de Barragens de Elevado Potencial Hidroelétrico.

the next decade. EDP will build two of these projects (Foz Tua, Fridão). The Group expects to add 2,400 MW to its current water park, consisting of 36 dams. The Iberdrola and Endesa Spanish groups will build and operate the remaining six dams. At that time, the country's hydropower capacity should be around 9,000 MW, producing 17.9 TWh/year of gross production or 13.3 TWh/year of net production pumping. It will be enough to power 2.2 million people with electricity produced from renewable energy sources¹⁴².

In Portugal, national legislation requires that hydropower generation facilities have valid hydroelectric concessions to operate. These concessions are granted by the federal government and basin authorities. Expiring concessions must go through a call for tender for renewal.

2.7.2 The institutional framework for hydropower

Stakeholders and legislations

The main pieces of legislation regulating hydropower concessions are the following:

- Decree-Law no. 46/1994 of 22 February defining the water concession regime.
- Water Act no. 58 of 29 December 2005 determining the institutional framework for sustainable water management and assigning responsibilities to govern water.
- Decree-Law no. 97/2008 of 11 June defining the calculation method for water royalty.
- Decree-Law no.29/2006 of 15 February transposing Directive 2003/54/EC establishing the general structure of the Portuguese National Electricity system, including the rules for the activity of production.

In the past few years, the Portuguese legislation was modified leading to existing plants being regulated under several different laws. The Authorities responsible for regulating and granting hydropower concessions are the following:

- The Directorate General for Energy and Geology (DGEG) within the Ministry of Economy and Innovation, is responsible for the development and implementation of energy policies.
- The Energy Services Regulatory Authority (ERSE) is the regulator for natural gas and electricity. The Authority is mainly responsible for monitoring energy prices for end-users as well as monitoring quality of service and security of supply.
- The Regional Basin Authorities¹⁴³ (ARH) (five in total) were created in 2008. The ARHs are public institutions responsible for licensing hydropower concessions, which was before under the Government's jurisdiction.

In the past, Energias de Portugal (EDP), which was public monopoly that was privatised in 1997, was responsible for developing the country's hydropower installations. Since 1994 the Decree-Law 46/1994 stipulates that hydropower concessions must be granted through public tender by the federal government which is represented by the Water Institute¹⁴⁴ (Inag), situation that changed in 2008 with the creation of the basin authorities (ARHs). Since 2008, Inag's main mission is ensuring

¹⁴² EDP (n.d.), Programa Nacional de Barragens, http://www.a-nossa-energia.edp.pt/mais_melhor_energia/programa_nacional_barragens.php.

¹⁴³ Administração da Região Hidrográfica.

¹⁴⁴ Instituto das Águas

that basin authorities comply with the Law with regards to concession granting. Nevertheless, Inag is still responsible for regulating several hydropower plants that were licensed between 1994 (Decree-Law regulating concessions) and 2008 (i.e. before the creation of the ARHs). The federal government is responsible for regulating and granting hydropower concessions for the PNBEPH.

Types of right to use hydropower and granting procedures

Hydropower concessions are granted in two different ways. The first one is when a private investor files a project application with an ARH and the second one is when the ARH itself identifies the need for the development of hydropower installations and organises a call for tender.

When a private investor is interested in developing a hydropower installation, it first has to request for a concession licence with the ARH. After careful analysis, the ARH decides whether the project application is suitable for the river basin or not. If the project is considered in the interest of the river basin, the ARH will make a call for tender. The information is published in the Portuguese Gazette (Diário da República) and allows other companies to file competing projects with the ARH. The ARH base its selection criteria on the applicant's highest bid for "up front" payment (which is a minimum value stipulated by the Basin Authority). However, the company who initiated the process (initial project application) has priority on the concession. Given the biddings, the company with the priority right can choose to equalise the highest bid in order to gain the concession.

When the ARH identifies the need for the development of hydropower installations, it organises a call for tender for the construction and/or operation of a hydropower installation. The same competitive process is valid, but the preference right is not applicable in the case of call for tenders initiated by the ARHs.

In the case of hydropower installations under the PNBEPH, concessions are granted for a maximum of 65 years. If concessionaires are able to commission their installations before 2016, the Government grants the concessions an extra 10 years of operation under the same licence¹⁴⁵.

2.7.3 Framework for granting right to use hydropower

According to law, the maximum validity of a concession licence is 75 years. As stated by the European Small Hydropower Association, the average duration of the authorisation procedure is between 3 to 11 years for small hydropower schemes¹⁴⁶.

In September 2012, private citizens filed a complaint with the European Commission against alleged illegal state aid granted by Portugal to EDP. It targets the conditions under which Portugal extended the duration of 27 hydropower concessions for the right of use of public water resources for hydropower generation in 2007 for an amount of 759 M€, apparently foregoing State income to the economic advantage of EDP, thus potentially distorting competition and affecting trade between Member States.

The Commission doubts that this measure is compatible with the EU electricity market as it may have had an anticompetitive effect of preventing entry of interested competitors in the Portuguese

¹⁴⁵ Atkins (2009), Estudo de impacte ambiental do aproveitamento hidroelectrico do alvito, Resumo nao técnico, EDP http://pnbeph.inag.pt/np4/np4/?newsId=25&fileName=AH_Alvito_RNT.pdf.

¹⁴⁶ European Small Hydropower Association (2009-2012), Small hydropower roadmap: Condensed research data for EU-27 (Stream Map Project), http://streammap.esh.a.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf.

market. Furthermore, the amount paid for the concession extensions seems to be low in regard to the economic value of the extension of the concession. Therefore, this could be considered State aid, which would come on top of the stranded cost compensation approved for the same 27 power plants. In the European Commission's latest procedure relating to the implementation of the competition policy for State aid in Portugal¹⁴⁷, the Commission concludes that "*[it] further doubts on the compatibility of a possible state aid to EDP if the extension of the concessions breached other provisions of EU law. If that were the case, any possible state aid involved in the consideration paid by EDP for the extension of hydropower generation concessions in 2007 would also and a fortiori be incompatible with the internal market*"¹⁴⁷.

In the next months, the Portuguese Republic will submit its comments and provide any useful information for the evaluation of the case. Any aid recipient will also be informed of the case.

2.7.4 Characteristics of the competitive process

Competitive concession procedure for new installations

As already mentioned calls for tender are carried out for new hydropower installations.

Competitive procedure for concession renewals

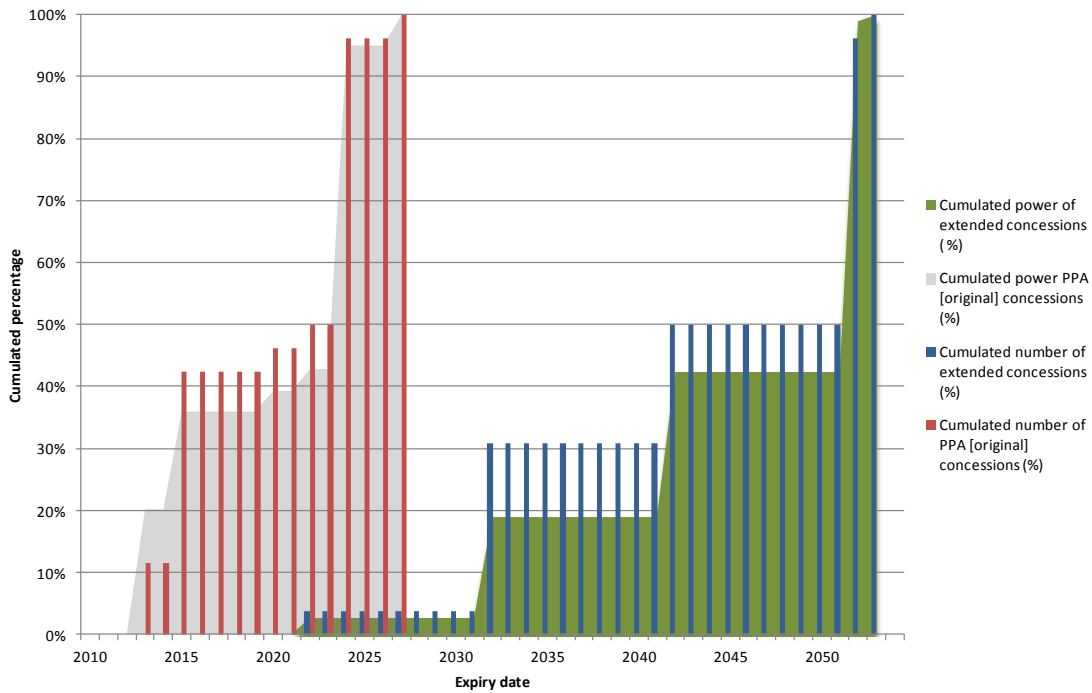
Portuguese legislation does not seem to provide for public and competitive procedures for hydroelectric concessions' renewals.

2.7.5 Main schedule for renewal

With the extended expiry dates of hydropower concessions, the first concession to expire occurs in 2022, with 108 MW, followed by a more significant number of expiries in 2032 (647 MW) followed by 2042, 2052 and 2053.

¹⁴⁷ European Commission (2013), State Aid SA.35429 (2013/C, ex 2012/CP) —Portugal: Extension of use of public water resources for hydro electricity generation.

Figure 23. Expiry date of hydropower concessions in cumulated number and cumulated power



Source: Hydro power plants covered by PPAs and Decree Law 226-A/2007

2.7.6 Obligations of hydropower operators

Beside the right of use hydropower and the concession specificities, hydropower right holders must respect several major obligations which impact their strategic and operational decisions.

Environmental obligations

The objective of the environmental evaluation is to ensure that environmental legislation is respected. Hydropower concessions must obtain a favourable Evaluation of Environmental Impact (AIA regulated by the Decree-Law no. 69/2000 from 3rd May 2000) issued by the federal government or a favourable Evaluation of Environmental Incidences (AlnCa regulated by the Decree-Law no. 225/2007 of 31st May 2001) issued by the Basin Authority, according to the each project's characteristics.

In Portugal, there is still no regulation on watercourse residual flow. Nevertheless, *"there are indications stating that the ecological flow in Portugal should be, in average, 5 to 10% of the modular flow. Also, this flow should be variable during the year, to enable a better adjustment to the differences on the natural hydrological regime and to the spawning seasons. The residual flow would be the sum of the ecological flow with flow necessary for the existing uses as irrigation and water supply"*¹⁴⁸ⁿ.

¹⁴⁸ European Small Hydropower Association (2009-2012), Small hydropower roadmap: Condensed research data for EU-27 (Stream Map Project), http://streammap.esh.a.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf.

Investment obligations

Investment obligations have increased over the years due to more stringent environmental requirements, particularly resulting from the implementation of the WFD. For example, works have to be completed to respect ecological and residual flows.

Taxes, levies and royalties

Portugal implemented a water tax for the first time in 2008. The Taxa de Recursos Hídricos (TRH) is the Portuguese water royalty which is regulated by the Decree-Law no. 97/2008. It applies to the hydroelectric sector, amongst many other sectors (urban water cycle, thermoelectric, industries, etc.). The TRH's basic concept follows the "polluter pays and user pays principles" and collects funds for public environmental purposes. The TRH is not only a simple tax, but rather encourages users towards a more efficient water usage and favours activities with higher economic worth¹⁴⁹.

The TRH is composed of the following five elements¹⁵⁰:

TRH = A + E + I + O + U	
$A = V_{\text{base}} \cdot \text{m}^3 \cdot \text{SC}$	The abstraction of public water for private uses, and it is calculated by multiplying the base value of the respective use by the volume of water drawn, diverted or used expressed in cubic meters, and by the applicable shortage coefficient
$E = V_{\text{base}} \cdot \text{kg}$	The direct or indirect discharge of effluents on water resources which may cause significant impact, and it is calculated by multiplying the base value of the effluent to the quantity of toxicity or pollution loads contained in the discharge, expressed in kilograms
$I = V_{\text{base}} \cdot \text{m}^3$	The aggregate extraction of public water resources, calculated by multiplying the base value to the volume of aggregate extracted, expressed in cubic meters
$O = V_{\text{base}} \cdot \text{m}^2$	The land occupation of the public water resources and/or the occupation and creation of water plans, and it is calculated by multiplying the base value of the respective use by the occupied area, expressed in squared meters
$U = V_{\text{base}} \cdot \text{m}^3$	The private use of water; whatever its nature or statutory regime, subject to planning and public management, which may cause significant impact; it is calculated by multiplying the base value of the respective use to the volume of water drawn, diverted or used, expressed in cubic meters

Source: Souza d'Alte (2010)¹⁵¹

Values are updated yearly according to the CPI. In 2013, the base value (V_{base}) for hydroelectricity was fixed at 0.00002 €/m³. The value of the shortage coefficient (SC) varies between 1, 1.1 and 1.2 depending on the water basin¹⁵².

¹⁴⁹ Agencia Portuguesa Do Ambiente (2010), Report on Portuguese Environmental Economic Instruments, http://www.apambiente.pt/_zdata/Divulgacao/Publicacoes/Guias%20e%20Manuais/report_peeki_2010.pdf.

¹⁵⁰ For computational details, please refer to pp. 15 to 24 of this document

http://www.apambiente.pt/_zdata/Divulgacao/Publicacoes/Guias%20e%20Manuais/report_peeki_2010.pdf.

¹⁵¹ Souza d'Alte T. (2010), Report on Portuguese Environmental Economic Instruments 2010, http://www.apambiente.pt/_zdata/Divulgacao/Publicacoes/Guias%20e%20Manuais/report_peeki_2010.pdf.

¹⁵² Gabinete de Planeamento e Politicas (GPP) (2009), Regime economico e financeiro dos recursos hidricos, Ministerio da agricultura, do desenvolvimento rural e das pescas, http://www.gpp.pt/ambiente/agua/REF_RH.pdf.

2.7.7 Support to small hydropower

Feed-in-Tariffs are available for Small hydropower installations. According to the Decree-Law no. 225/2007, of May 31, an average FiT of 7.5-7.7 c€/kWh is provided with a limit to the first 52 GWh/MW or up to 20 years whichever is reached first. In special cases, the FiT may be granted for an extra 5 years. In 2010, the Decree-Law no. 126/2010 defined a new FiT tariff for the public tender launched in that year which corresponded to 9.5 c€/kWh for a maximum of 25 years¹⁵³.

¹⁵³ European Small Hydropower Association (2009-2012), Small hydropower roadmap: Condensed research data for EU-27 (Stream Map Project), http://streammap.asha.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf.

2.8 Spain

Table 16. Summary of Spanish hydropower framework

Characteristics		Description	
Institutional framework	Authorities for granting rights of use	<ul style="list-style-type: none"> Ministry of Energy for capacities > 5 MW Local Authorities (<i>Comunidades Autonomas</i>), capacities < 5 MW Basin Authorities 	
	Types of hydropower right and granting procedures	<ul style="list-style-type: none"> Water concessions 	
Framework for granting right to use hydropower	Duration	<ul style="list-style-type: none"> Up to 75 years + potential 10 years extension, if considerable investments have been made close to the expiry date of the concession Procedure duration between 6 to 10 years 	
	Competitive process	For new concessions	<ul style="list-style-type: none"> Competing projects on a vacant section of a river chosen from more rational use of water and a better environmental protection will be preferred Partially or publicly-owned dams, the operation of the dam built to regulate the river flow, secure water supply during the dry summer months and avoid floods possibly used for hydropower generation whose operation may be offered to public tender through the Basin Authority
		For concession renewals	Expiring hydropower concessions that are reverted to the State may be subject to a call for tender procedure
	EC infringement proceedings or equivalent	Closed (in 2008 by DG Internal market and services – opened in 2003 with reasoned opinion sent in 2005) asking for a competitive procedure for the award of hydropower concessions in the Spanish legislation	
Obligations of hydropower operators	Environmental obligations	<ul style="list-style-type: none"> Mandatory EIA for plants located in environmentally sensitive areas Preventing deterioration, protecting and enhancing the status of aquatic and terrestrial ecosystems and wetlands that are directly dependent on aquatic life regarding their water needs 	
	Investment obligations	<ul style="list-style-type: none"> For the protection of the environment and watercourses For functional state of installations at concession expiry (reversion to the State) 	
	Royalties	<ul style="list-style-type: none"> Production tax (<i>Canon de producción</i>) Regulation tax (<i>Canon de regulación</i>) Taxes on water use (<i>Tarifa de Utilización del Agua</i>) 	
Small-hydro	Small hydro definition	< 5 MW	
	Support	<ul style="list-style-type: none"> Up to 2012: FIT for capacities < 50 MW After 2012: no incentive mechanisms due to stringent tariff deficit measures 	

2.8.1 Context of hydropower in Spain

Although Spain's has greatly irregular precipitation patterns, the country's electricity generation mix includes hydropower. As early as the 1900's, Spain experienced substantial hydropower

development, especially during the 40's, when a number of public companies were created¹⁵⁴. Since then, the legal framework was modified to increase competition and encourage the liberalisation of the sector on the one hand, and to promote renewable energy production as well as small hydropower installations on the other hand. According to the World Energy Council's latest data (2013), Spain's electricity generation is largely based on conventional thermal (45.6%), nuclear (20.5%), renewables such as wind (19.4%) and finally hydroelectricity with 14.5%¹⁵⁵. Hydropower capacity is spread in the different Spanish regions (see figure below).

Figure 24. Hydro power location in Spain in 2010



Source: IDEA (2011)¹⁵⁶

In Spain, national legislation requires that hydropower generation facilities have valid concessions or authorisations to operate. There is a common hydropower framework at the national level, but Autonomous Communities have jurisdiction on the matter when river basins are located within their territory.

¹⁵⁴ Antoniazzi, M., I., et al. (2009), SMART – Strategies to Promote Small Scale Hydro Electricity Production in Europe, Small Hydro Power Plants In Europe: Handbook on Administrative Procedures Requested. Faculty of Mechanical Engineering and Naval Architecture (Zagreb), ISBN 978-953-6313-76-1, http://www.provincia.cremona.it/ambiente/all/SMART_HANDBOOK_draftontheweb-v2.pdf.

¹⁵⁵ World Energy Council (2014), Data, Sustainability Index, <http://www.worldenergy.org/data/sustainability-index/>.

¹⁵⁶ IDEA (2011), Boletín de energías renovables: datos 2010, Secretaria general: Departamento de planificación y estudios, http://www.idae.es/uploads/documentos/documentos_Boletin_de_Energias_Renovables_1_Datos_2010_2011_12FINAL_a242d62f.pdf.

2.8.2 The institutional framework for hydropower

Stakeholders and legislations

Spain's hydropower framework is detailed in various national Royal Decrees and Laws. The following legislation is valid at the national level and regulates the intercommunity (located in more than one Autonomous Community) and intracommunity (river basin located within an Autonomous Community) water sector, river basins and concessions as well as the economic incentives given to renewable sources of electricity generation:

- Royal Decree 894/1986 of 11 April approving the Public Water Regulation, as amended by the Royal Decree 606/2003 of 23 May¹⁵⁷
- Law 6/2001, of May 8, amending the Royal Legislative Decree 1302/1986 of 28 June, on environmental impact assessment¹⁵⁸.
- Law 10/2001 of 5 July, establishing the National Hydrological Plan¹⁵⁹.
- Royal Legislative Decree 1/2001 of 20 July, approving the amended text of the Water¹⁶⁰.
- Royal Decree 661/2007 of 25 May, on the regulation of electricity production activities under the special regime¹⁶¹.
- Royal Decree 907/2007 of 6 July, approving the Regulation of the Hydrological Planning approved¹⁶².
- Royal Decree-Law 1/2012 of 27 January, which suspends the pre-allocation procedures and the suppression of economic incentives for new installations generating electricity from cogeneration sources, renewables and waste¹⁶³.
- Royal Decree 1290/2012 of 7 September, amending the Public Water Regulation¹⁶⁴.
- Royal Decree 129/2014 of 28 February, approving the Spanish Hydrological Plan of the Ebro River Basin¹⁶⁵.

In Spain, water resources are managed in a rather complex way. There are different governing bodies at various administrative levels (national, regional and local) that are assigned different competencies.

- The Ministry of Energy that is responsible for planning the electricity sector, establishing capacity payments and feed-in tariffs.

¹⁵⁷ Real Decreto 894/1986, de 11 de abril por el que se aprueba el Reglamento del Dominio Público Hidráulico, modificado por el R.D. 606/2003, de 23 de mayo.

¹⁵⁸ Ley 6/2001, de 8 de mayo, de modificación del Real Decreto legislativo 1302/1986, de 28 de junio, de evaluación de impacto ambiental.

¹⁵⁹ Ley 10/2001, de 5 de julio, del Plan Hidrológico Nacional.

¹⁶⁰ Real Decreto Legislativo 1/2001, de 20 de julio, por el que se aprueba el texto refundido de la Ley de Aguas.

¹⁶¹ Real Decreto 661/2007, de 25 de mayo, por el que se regula la actividad de producción de energía eléctrica en régimen especial.

¹⁶² Real Decreto 907/2007, de 6 de julio, por el que se aprueba el Reglamento de la Planificación Hidrológica.

¹⁶³ Real Decreto-ley 1/2012, de 27 de enero, por el que se procede a la suspensión de los procedimientos de preasignación de retribución y a la supresión de los incentivos económicos para nuevas instalaciones de producción de energía eléctrica a partir de cogeneración, fuentes de energía renovables y residuos.

¹⁶⁴ Real Decreto 1290/2012, de 7 de septiembre, por el que se modifica el Reglamento del Dominio Público Hidráulico.

¹⁶⁵ Real Decreto 129/2014 de 28 de febrero, por el que se aprueba el Plan Hidrológico de la parte española de la Demarcación Hidrográfica del Ebro.

- The Directorate-General of Water under the Ministry of Agriculture, Food and the Environment is responsible for authorising hydropower installations when its use affects more than one region and for granting hydropower concessions with installed capacity greater than 5 MW, amongst other things.
- The National Commission on Markets and Competition¹⁶⁶ (CNMC) is the national regulatory body that ensures fair competition and regulates all productive sectors of the Spanish economy to protect consumers. More specifically, for the energy sector, it aims at ensuring effective competition in energy systems and the objectivity and transparency of its operation for the benefit of all agents operating in these systems and consumers. Furthermore, it is responsible for supervising issues related to network management, accounting separation as well as transparency and competition.
- The Local Authorities/Autonomous Communities¹⁶⁷ are responsible for further developing the regulation and legislation at the local level and for authorizing hydropower plants with installed capacity lower than 5 MW.
- The River Basin Institutions¹⁶⁸ (CH) are part of the Ministry of Agriculture, Food and the Environment but work independently and are responsible for the intercommunity basins.
- Finally, the Basin Authorities¹⁶⁹ are responsible for water basins within their Autonomous Communities (i.e. intracommunity). The administrative body responsible for Basin Authorities is the Water Administrations (see chart below). Both administrations (CH and Basin Authorities) follow the same national legislation on water concessions.

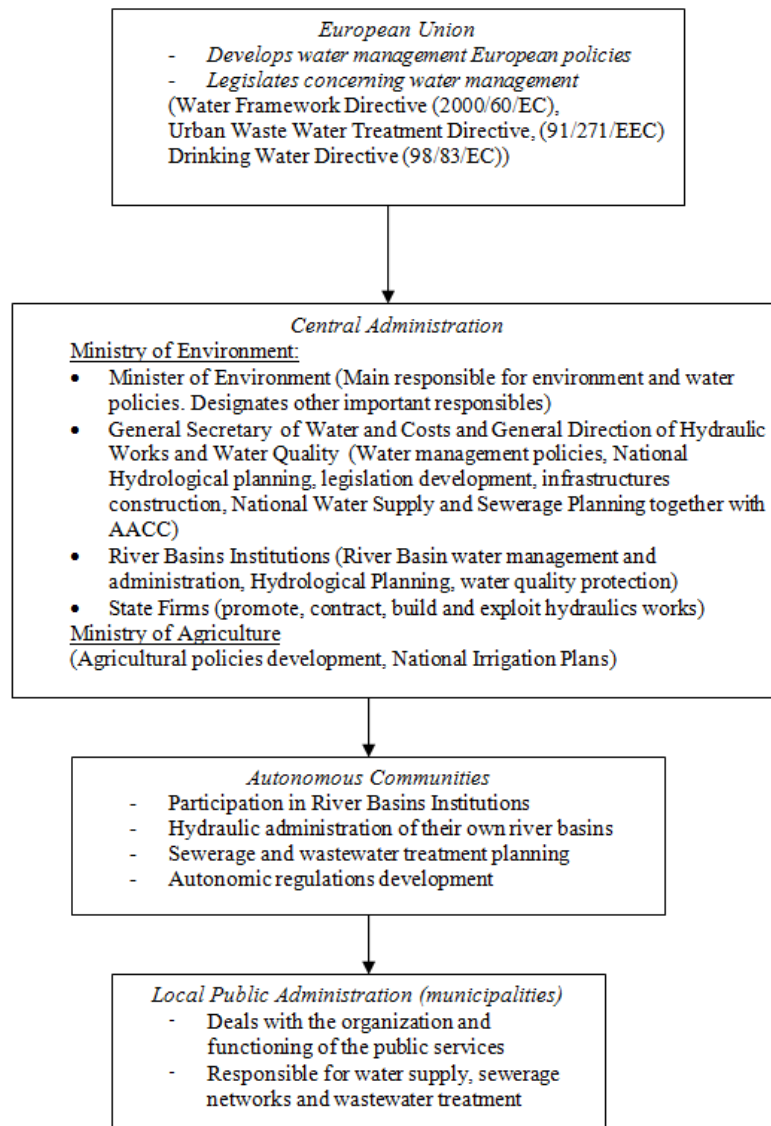
¹⁶⁶ Comisión Nacional de Mercados y Competencia.

¹⁶⁷ Comunidades Autonomas.

¹⁶⁸ Confederaciones Hidrográficas.

¹⁶⁹ Organismos de Cuenca.

Figure 25. Regulatory management of water resources in Spain



Source: Water time (2004)¹⁷⁰

River Basin Institutions (CH) are set when river basins cover territory belonging to more than one Autonomous Community. These Institutions are public and have their own legal status, but depend on the Central State through the Ministry of Agriculture, Food and the Environment. Water concessions for hydraulic exploitation are granted by the latter through the River Basin Institutions.

The River Basin Institutions have the following competences:

- Devising, monitoring and reviewing the River Basin Plan;
- Administrating and controlling the public hydraulic authority as well as the general interest exploitations;

¹⁷⁰ Water time (2004), D10K: Water time national context report – Spain , http://www.watertime.net/docs/WP1/NCR/D10k_Spain.doc.

- Administrating project construction and exploitation of own works or entrusted by State agreement, or by the Autonomous Communities, or the Town Halls; and
- Granting authorizations and concessions relating to the public hydraulic authority, as well as inspecting and monitoring conditions performance.

When a river basin is located on one Autonomous Community's territory, it is administered by a hydraulic administration (i.e. Basin Authority) that depends on the Autonomous Community itself. Autonomous Communities have competence to legislate and implement their own regulations. Water concessions are granted through the community's River Basin Authority when the watercourse is located within its territory.

With regards to projects and construction of hydraulic and hydroelectric exploitations, canals and irrigations, the same framework applies.

Hydrological planning is carried out at two levels; the River Basin Hydrological Plan and the National Hydrological Plan. The River Basin Hydrological Plan¹⁷¹ is the responsibility of the River Basin Institutions (CH) or the corresponding River Basin Authority and must be approved by the Government. The National Hydrological Plan¹⁷² is suggested by the Ministry of Environment and is approved by the Parliament.

Types of right to use hydropower and granting procedures

A concession must be granted in order to use water for hydropower. The administrative procedure for processing water concessions and administrative authorizations is described in the Royal Legislative Decree 1/2001 of 20 July. The River Basin Authorities are competent for granting concessions for hydroelectric projects of less than 5 MW, and the General Directorate of Water through the Ministry of Agriculture, Food and the Environment, for hydroelectric power plants greater than 5 MW or affecting several autonomous communities¹⁷³.

The procedure for concession granting is summarised below¹⁷⁴:

1. An initial proposal is submitted by the applicant and submitted to the CH.
2. The CH analyses the request which includes the project's technical feasibility, its compatibility with the River Basin Hydrological Plan, and its possible competition or conflict with existing or new projects.

¹⁷¹ It covers such important issues as the inventory updated of hydraulic resources; the uses and existing and forecasting demands; the criteria of priority of uses; the assignment and reserve of resources for uses and current and future demands; the conservation and recovery of the environment; the basic characteristics of the water quality and regulation of wastewater emissions; the protective areas and the resource recovery measures; directives for recharge and protection of aquifers; basic infrastructures needed by the Plan; and the measures to anticipate damages due to floods or other hydraulic phenomena.

¹⁷² It includes the following aspects: necessary measures for the coordination of the different River Basin Plans; forecast and transfer conditions of hydraulic resources between different river basins; foreseen modifications of the resource use planning; and the necessary infrastructures for the development of the National Hydrological Plan.

¹⁷³ Ministerio de Industria, turismo, y comercio (2010), Plan de acción nacional de energías renovables de España (PANER) 2011-2020,

http://www.minetur.gob.es/energia/desarrollo/energiarenovable/documents/20100630_paner_espanaversión_final.pdf.

¹⁷⁴ Blomquist, W., et al. (2005), Institutional and Policy Analysis of River Basin Management: The Guadalquivir River Basin, Spain. World Bank Policy Research Working Paper 3525, <http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-3526>.

3. The proposal is then made public in order to allow for public review and comments from interested stakeholders and communities. At this stage, competitors, if any, may present concurrent projects for the same site.
4. Following the public review, the CH prepares a technical report with its recommendation.
5. Finally, based on the report, the CH's Board approves or rejects the applicant's request for a water concession.

When the CH rejects the applicant's concession request, a document explaining its decision is provided to the applicant. In some cases, the applicant is allowed to modify and resubmit its application. The CH is required to maintain a publicly available and accessible registry of authorized water users according to law.

2.8.3 Framework for granting right to use hydropower

According to the European Small Hydropower Association, the average duration of the authorisation procedure is between 6 to 10 years¹⁷⁵.

There are two types of concessions:

- The "Central pie de presa" is a fully or partially state-funded dam, built to regulate the river flow, secure water supply during the dry summer months and avoid floods, has the possibility of being used for hydropower generation.
- A company interested in building a new hydropower plant in a vacant section of a river.

The maximum duration of a concession is 75 years, regardless of its installed capacity. The concession may exceptionally be extended for another 10 years if significant investments were made near the concession's expiry date¹⁷⁶. This 10-year extension can only be granted once. The concessionaire is the owner of the installations and pays an annual fee for the use of public land.

In February 2014, the Royal Decree no. 129/2014 was published. Article 54¹⁷⁷ states that for the Ebro river, the maximum validity of a concession is 40 years, although a longer concession, up to 75 years, may be granted if the hydropower project need a longer period to amortised its facilities in order to make it viable. Furthermore, when water flows cannot accurately be predicted for a section of a river, concessions may be granted for 25 years only and are subject to residual flows, as soon as those are known.

In 2005, the Commission has decided to send Spain a reasoned opinion concerning that country's legislation on the award of hydraulic concessions stating that there is no provision in Spanish Laws No 29/1985 (water) and No 54/1997 (electricity) for a competitive procedure for the award of such concessions, with the result that they may be awarded arbitrarily. This may cause the lack of open competition among potential candidates which is an infringement of the Treaty (failure to comply

¹⁷⁵ European Small Hydropower Association (2009-2012), Small hydropower roadmap: Condensed research data for EU-27 (Stream Map Project), http://streammap.esha.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf.

¹⁷⁶ Boletín Oficial del Estado (2001), Real Decreto Legislativo 1/2001, de 20 julio, por el que se aprueba el texto refundido de la Ley de Aguas. Ministerio de Medio Ambiente, <http://www.boe.es/boe/dias/2001/07/24/pdfs/A26791-26817.pdf>.

¹⁷⁷ Boletín Oficial del Estado (2014), Real Decreto 129/2014, de 28 de febrero, por el que se aprueba el Plan Hidrológico de la parte española de la Demarcación Hidrográfica del Ebro, Ministerio de agricultura, alimentación y medio ambiente, <https://www.boe.es/boe/dias/2014/03/01/pdfs/BOE-A-2014-2223.pdf>.

with the principles of non-discrimination, transparency and equal treatment). Moreover, the period of 75 years indicated in the Spanish law for the right of concession considerably strengthens the privileged position of current holders of water concessions¹⁷⁸. The infringement proceeding was closed in 2008 by DG Internal market and services¹⁷⁹.

2.8.4 Characteristics of the competitive process

Competitive concession procedure for new installations

According to the Royal Decree 849/1986, a public and competitive procedure for the allocation of new hydropower concessions for the operations of the installations may take place when the hydropower scheme is fully or partially built with State or River Basins funds¹⁸⁰.

When there are competing projects for the construction of new hydropower plants for the same site, the authority responsible for granting the concession will evaluate all projects and grant rights to the one that better fits the public interest, i.e. a project with more rational use of water and a better environmental protection will be preferred.

Competitive procedure for concession renewals

Since 7th of September 2012, the Royal Decree 1290/2012 modified the Regulation for Public Water (Royal Decree 849/1986).

Whereas Article 132 of the Royal Decree 849/1986 only stipulated that a call for tender may take place for the operation of new hydropower concessions fully or partially built with State or River Basins funds, the Royal Decree 1290/2012 adds a section to Article 132 stipulating that expiring hydropower concessions that are reverted to the State may also be subject to a call for tender procedure¹⁸¹.

2.8.5 Main schedule for renewal

Several hydropower concessions will expire in the next decades. These installations are then reverted to the State. For instance, concessions in the Ebro basin will expire soon. More generally, it can be estimated that the majority of Spanish concessions will expire between 2040 and 2060, which represent more than 65% of total concessions.

¹⁷⁸ Europa.eu. (2005), Freedom of establishment: the Commission calls on France, Italy and Spain to amend their legislation on hydroelectric concessions, European Commission, http://europa.eu/rapid/press-release_IP-05-920_en.htm?locale=en.

¹⁷⁹ EC (2008), COMMISSION STAFF WORKING DOCUMENT STATISTICAL ANNEX, Annexes I to III Accompanying document to the REPORT FROM THE COMMISSION 26th ANNUAL REPORT ON MONITORING THE APPLICATION OF COMMUNITY LAW (2008) {COM(2009) 675}, http://ec.europa.eu/eu_law/docs/docs_infringements/annual_report_26/en_sec_statannex_vol1clean.pdf.

¹⁸⁰ Boletín Oficial del Estado (1986), Real Decreto 849/1986, de 11 de abril, por el que se aprueba el Reglamento del Dominio Público Hidráulico, que desarrolla los títulos preliminar I, IV, V, VI y VII de la Ley 29/1985, de 2 de agosto, de Aguas. Ministerio de Obras Públicas y Urbanismo, http://www.boe.es/diario_boe/txt.php?id=BOE-A-1986-10638.

¹⁸¹ Boletín Oficial del Estado (2012), Real Decreto 1290/2012, de 7 de septiembre, por el que se modifica el Reglamento del Dominio Público Hidráulico, aprobado por el Real Decreto 849/1986, de 11 de abril, y el Real Decreto 509/1996, de 15 de marzo, de desarrollo del Real Decreto-ley 11/1995, de 28 de diciembre, por el que se establecen las normas aplicables al tratamiento de las aguas residuales urbanas. <http://www.boe.es/boe/dias/2012/09/20/pdfs/BOE-A-2012-11779.pdf>.

2.8.6 Obligations of hydropower operators

Beside the right of use hydropower and the concession specificities, hydropower right holders must respect several major obligations which impact their strategic and operational decisions.

Environmental obligations

According to Law 6/2001, an environment impact assessment is mandatory for hydropower plants located in environmentally sensitive areas.

In order to regulate the flow, the State has built many reservoirs along watercourses, though there is no regulation published concerning the residual flow.

According to the Royal Legislative Decree 1/2001, there are general rules to follow with regards to the protection of the environment and watercourses such as preventing deterioration, protecting and enhancing the status of aquatic and terrestrial ecosystems and wetlands that are directly dependent on aquatic life regarding their water needs. Furthermore, each river basin district must have at least one record of areas that have been designated as requiring special protection under specific rules on protection of surface water or groundwater, or conservation of habitats and species that directly depend on water.

Investment obligations

Some basic investments must be done to ensure the protection of the environment and watercourses. Furthermore, when concessions are reverted to the State, installations must be in functional state implying that they must be well-maintained and potentially refurbished.

Taxes, levies and royalties

Hydropower installations are subject to the following taxes¹⁸²:

- Production tax (*Canon de producción*) – When a multi-purpose state funded reservoir can be used for hydropower production, the company exploiting the hydroelectricity pays an annual production tax that includes a fixed value and a variable rate based on kWh produced.
- Regulation tax (*Canon de regulación*) is a tax levied on beneficiaries of dams that are fully or partially owned by the State. It is paid to the river basin authorities (Organismos de Cuenca OC). It is meant to offset the construction and maintenance costs. It is charged proportionally to the benefit it causes to the one paying. In the case of hydropower it is charged by kWh produced.
- Water use tax (*Tarifa de Utilización del Agua*) is a tax levied on beneficiaries for installations that are fully or partially owned by the State. The tax is meant to compensate the State for the investments, conservation as well as the O&M costs.

A new tax on energy was introduced in January 2013 with the Law 15/2012, of 27 December on tax measures for sustainability¹⁸³. It is not an environmental tax per se as it will rather be used to finance the tariff deficit¹⁸⁴. Hydroelectricity is subject to that tax.

Before 2012, Spain had Feed-in-Tariffs in place for hydropower installations with installed capacity no greater than 50 MW which were part of the Special Regime. The FiTs had two different options: 1) to receive a full FiT or 2) to receive a premium on top of the market price, with a cap and floor for total revenues¹⁸⁵.

¹⁸² For the computational details, refer to Ministerio de Medio Ambiente (2007), Precios y costes de los servicios de agua en España, http://www.chi.es/es-es/ciudadano/participacion_publica/Documents/Plan%20Hidrol%C3%B3gico%20de%20cuenca/Precios_y_costes_de_los_servicios_del_agua_en_Espa%C3%B1a.pdf.

¹⁸³ Ley 15/2012, de 27 de diciembre, de medidas fiscales para la sostenibilidad.

¹⁸⁴ KPMG (2013), Research: Taxes and Incentives for renewable energy, <http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/taxes-and-incentives-for-renewable-energy/Pages/spain.aspx>.

¹⁸⁵ Boletín Oficial del Estado (2007), Real Decreto 661/2007, de 25 de mayo, por el que se regula la actividad de producción de energía eléctrica en régimen especial, Ministerio de Industria, Turismo y Comercio, <https://www.boe.es/boe/dias/2007/05/26/pdfs/A22846-22886.pdf>.

2.8.7 Support to small hydropower

Before 2012, Spain had Feed-in-Tariffs in place for hydropower installations with installed capacity below 50 MW which were part of the Special Regime. The FiTs had two different options: 1) to receive a full FiT or 2) to receive a premium on top of the market price, with a cap and floor for total revenues¹⁸⁶.

Table 17. Support for small-hydro in Spain until 2012

	Support for installed capacity < 10 MW (2012 values)	Support for installed capacity between 10 MW and 50 MW (2012 values)
FiT	First 25 years :FiT → 2.7795 c€/kWh After 25 years: FiT → 1.4920 c€/kWh	First 25 years :FiT → 2.3355 c€/kWh After 25 years: FiT → 1.4920 c€/kWh
Cap and floor revenues with a market premium	Cap → 9.4557 c€/kWh Floor → 7.2360 c€/kWh	Cap → 8.8785 c€/kWh Floor → 6.7921 c€/kWh

Since 2012 however, due to the increasing tariff deficit which threatens the sustainability of the Spanish electricity sector, the government decided to suppress the economic incentive schemes for some Special regime and Ordinary regime renewable generators for an undefined period of time, at least until the system reaches a viable point¹⁸⁷.

¹⁸⁶ Boletín Oficial del Estado (2011), Orden IET/3586/2011, de 30 de diciembre, por la que se establecen los peajes de acceso a partir de 1 de enero de 2012 y las tarifas y primas de las instalaciones del régimen especial. Ministerio de Industria, Energía y Turismo, <http://www.boe.es/boe/dias/2011/12/31/pdfs/BOE-A-2011-20646.pdf>.

¹⁸⁷ Boletín Oficial del Estado (2012), Real Decreto-ley 1/2012, de 27 de enero, por el que se procede a la suspensión de los procedimientos de preasignación de retribución y a la supresión de los incentivos económicos para nuevas instalaciones de producción de energía eléctrica a partir de cogeneración, fuentes de energía renovables y residuos, Jefatura del Estado, <http://www.boe.es/boe/dias/2012/01/28/pdfs/BOE-A-2012-1310.pdf>.

2.9 Sweden

Table 18. Summary of Spanish hydropower framework

Characteristics		Description	
Institutional framework	Authorities for granting rights of use	Five regional Land and Environment Courts	
	Types of hydropower right and granting procedures	Concessions: water operation permits for hydropower operators Legal force of concession meaning that operating conditions specified in them are not directly altered by new substantive law or policy changes before a completed judicial concession	
Framework for granting right to use hydropower	Duration	<ul style="list-style-type: none"> No time limit Some examples of procedure during 5 years and leading to no approval 	
	Competitive process	For new concessions	National legislation does not appear to provide for competitive procedure
		For concession renewals	National legislation does not appear to provide for competitive procedure
	EC infringement proceedings or equivalent	No infringement procedure appears in the European archives	
Obligations of hydropower operators	Environmental obligations	Compliance with <ul style="list-style-type: none"> The objectives of the Environmental Code, the general rules of consideration, the adopted environmental quality standards and the rules on special protection areas 	
	Investment obligations	To comply with more and more stringent environmental obligations	
	Royalties	Industrial property tax = 2.8% of the property's value	
Small-hydro	Small hydro definition	< 1.5 MW	
	Support	Green certificates allocated for 15 years to renewable sources in particular to measures to increase production at new and existing hydropower stations value around 20 €/MWh in 2012-2013	

2.9.1 Context of hydropower in Sweden

Due to Sweden's geographical location and large water supplies, hydroelectricity consists of a large part of the country's total electricity mix. In 2013, 45.5% of Sweden's electricity demand was generated by hydropower installations. Nuclear power consisted of 38%, other renewables totalled 11.7% and conventional thermal only accounted for 4.8%¹⁸⁸. Hydropower capacity is mainly located in the North of Sweden (see figure 12 page 64).

Swedish hydropower operators are either private, owned by individuals and corporations, or public, owned by municipalities. Most hydropower plants are owned by joint stock organizations however. Statistics from 2013 indicate that there are 2,101 hydropower plants in Sweden, 206 of which

¹⁸⁸ World Energy Council (2014), Data, Sustainability Index, <http://www.worldenergy.org/data/sustainability-index/>.

account for 93 percent of the country's hydropower production, according to the Swedish Agency for Marine and Water Management¹⁸⁹.

In Sweden, national legislation requires that hydropower generation facilities have concessions to operate. Most water concessions were granted in the mid-1900s and have no time limit. A large amount of hydropower installations were also built around that time resulting in high refurbishment needs in the next decade.

2.9.2 The institutional framework for hydropower

Stakeholders and legislations

Sweden has three main pieces of legislation of major importance for hydropower concessions and regulations. The legislation is described below:

- 1999 Swedish Environmental Code (SFS 1998:808): The SEC is the country's environmental code that combines 15 earlier environmental acts. It aims at providing a better coordinated environmental legislation in order to promote sustainable development. Since it is a framework law, it does not generally specify limit values for various operations, and it does not go into detail when it comes to striking a balance between various interests¹⁹⁰.
- 1918 Water Law: The Water Law remained in force until 1983 (SOU 2009:42). Nevertheless, it is still an important legislation as 88% of hydropower concessions were granted according to the 1918 Water Law or older¹⁹¹.
- The Water Framework Directive (WFD) (EC 2000/60): The Water Framework Directive is a European-wide directive that "*establishes a framework for the protection of inland surface water, transitional waters, coastal waters and groundwater*"¹⁹². It aims at enhancing the protection of and improving the aquatic environment as well as promoting sustainable water use.

Additionally, there are two Acts that are of secondary importance, an important document setting environmental quality objectives as well as a European Directive for renewable energy:

- Municipality Act (*Kommunallagen, SFS 1998:1*) states that the municipalities have the overall responsibility for waste water disposal and water supply.
- Public Water and Wastewater Plant Act (*Lag (1970:244) om allmänna vatten- och avloppsanläggningar*) is a more general legislation that states that the municipalities have the responsibility to either themselves arrange or to make sure that someone else arranges

¹⁸⁹ Swedish Agency for Marine and Water Management (n.d.), SwAM Suggests Key Areas for National Water Strategy, <https://www.havochvatten.se/en/swam/our-organization/press-and-media/press-releases/press-releases/2013-12-03-swam-suggests-key-areas-for-national-water-strategy.html>.

¹⁹⁰ Rudberg, P., M. (2013), Sweden's Evolving Hydropower Sector: Renovation, Restoration and Concession Change, Stockholm Environment Institute, <http://sei-international.org/mediamanager/documents/Publications/SEI-ProjectReport-Rudberg-SwedensEvolvingHydropowerSector-2013.pdf>.

¹⁹¹ Rudberg, P., M and Nilsson, M. (2011), Reducing our emissions while achieving good status of our water bodies – is it possible? Swedish hydropower in the limelight, World Renewable Energy Congress 2011, http://www.ep.liu.se/ecp/057/vol10/053/ecp57vol10_053.pdf.

¹⁹² Rudberg, P., M. (2013), Sweden's Evolving Hydropower Sector: Renovation, Restoration and Concession Change, Stockholm Environment Institute, <http://sei-international.org/mediamanager/documents/Publications/SEI-ProjectReport-Rudberg-SwedensEvolvingHydropowerSector-2013.pdf>.

adequate "public" water supply and waste water treatment to secure the health of their urban population.

- The Swedish Environmental Quality Objectives: Sweden's environmental policy is based on these 16 objectives which are intended to be reached by 2020¹⁹³.
- The Renewable Energy Directive (RES) (EC 2009/28): Is a common EU framework which aims at promoting energy generation from various renewable sources¹⁹³.

Sweden, like Norway, Finland and Denmark, are renowned for their strong tradition of local self-government. The Swedish Government has three different levels of control. The central level includes the Parliament and the Government with its Ministries. The regional level has County Administration Boards that have as a main function to examine, supervise and coordinate. Finally, at the local level there are Municipal Committees for Environment and Health (MCEH) (around 300) which are responsible for planning, constructing and operating the water and wastewater facilities. The municipalities also own these facilities¹⁹⁴.

More specifically, the administrative bodies involved in the hydropower sector are the following:

- The Ministry of Environmental is responsible for protection of water sources.
- The Swedish Energy Agency is a supervisory body that works for the use of renewable energy, improved technologies, a smarter end-use of energy, and mitigation of climate change.
- The Land and Environment Courts replace the former Environmental courts (for water operation permits) since May 2011. These five regional courts grant "*permits for water undertakings, including buildings in water such as hydro-electricity operations and reservoir construction*"¹⁹⁵. The Courts are also involved in reviewing local land use plans and building permits as they arose by the Act of Planning and Building. The Environmental Court of Appeal hears appeals from the Land and Environment Courts and is the final instance in cases where a local or a regional board made the first decision, while the Supreme Court of Sweden is the final instance if the environmental court was the first instance.
- The Swedish Agency for Marine and Water Management is responsible for managing the use and preventing the overuse of Sweden's marine and freshwater environments.

Types of right to use hydropower and granting procedures

Hydropower installations owners must have a valid water operation permits in order to operate. A case is initiated through an application for a permit by a hydropower operator. Licences/concessions are granted by the Swedish Land and Environmental Courts according to the Environmental Code, which contains the regulation for building and operating plants. When a case pertains to a concession change, it can either be initiated by the operator itself or by public authorities who work in the public interest. This type of hearing is called a Concession modification hearing. Concessions

¹⁹³ Rudberg, P., M. (2013), Sweden's Evolving Hydropower Sector: Renovation, Restoration and Concession Change, Stockholm Environment Institute, <http://sei-international.org/mediamanager/documents/Publications/SEI-ProjectReport-Rudberg-SwedensEvolvingHydropowerSector-2013.pdf>.

¹⁹⁴ Katko, T. (2004), D10I: WaterTime National Context Report – Sweden, http://www.watertime.net/wt_cs_cit_ncr.html

¹⁹⁵ Bjallas, U. (n.d.), Experiences of Sweden's Environmental Courts. Journal of Court Innovation, http://law.pace.edu/sites/default/files/IJIEA/jciBjallas_Final%203-17_cropped.pdf.

can be reviewed or revoked if water operations lead to significant damage and if water operations do not comply with Sweden's obligations as a result of its membership of the EU.

There are common rules to follow with respect to hydropower application procedures. The next points figure in Chapter 16 of the SEC¹⁹⁶:

- Applicants must show that they have complied with the general rules of consideration by reporting the measures they have taken to the reviewing authority.
- The authorities apply the same criteria to all cases and matters considered by them, i.e. the objectives of the Environmental Code, the general rules of consideration, the adopted environmental quality standards and the rules on special protection areas.
- Associated projects are also considered in connection with such procedures, for example new roads that need to be built in connection with the establishment of an operation.
- Applications may be denied in cases where the applicant has not complied with previous decisions.
- Decisions may be made subject to certain conditions.
- Decisions may be of limited duration.
- Financial securities may be required for remedial measures. The state, municipalities, county councils and associations of municipalities shall not be required to furnish a security.
- Permits must not conflict with the planning provisions currently in force.
- Environmental quality standards must not be infringed.
- Conditions may apply to more than one operation where several operators have agreed to take joint measures.
- Permits may be made subject to the following conditions:
 - an examination of the area concerned must be carried out
 - specific measures must be taken with a view to conservation of the area
 - specific measures must be taken to compensate for any encroachment.

Concessions have legal force, which "*means that operating conditions specified in them are not directly altered by new substantive law or policy changes unless a judicial concession review is completed*"¹⁹⁷. Whether a hearing is for a new water operation permit, for a concession review or a concession modification, the Court examines the case in a similar way, with the exception that the concession review does not need an EIA, as long as a technical study has been performed. In any case, the party initiating a concession review must demonstrate that its modification proposal aligns with the SEC's framework and rules. Concessions granted under the 1918 Water Law or older regulations are still subject to reviews. Even so, these installations are somewhat shielded from more recent laws and regulations as the polluter pays principle is limited to 5% of the value of the

¹⁹⁶ Ministry of the Environment (n.d.), The Swedish Environmental Code, <http://www.government.se/content/1/c6/02/05/49/6736cf92.pdf>.

¹⁹⁷ Rudberg, P., M. (2013), Sweden's Evolving Hydropower Sector: Renovation, Restoration and Concession Change, Stockholm Environment Institute, <http://sei-international.org/mediamanager/documents/Publications/SEI-ProjectReport-Rudberg-SwedensEvolvingHydropowerSector-2013.pdf>.

hydropower station's production. It is the initiator's responsibility to provide monetary compensation to the operator of these installations for losses above this level.

Finally, a case is settled by the ruling of legally trained judges helped by technical advisors and particular members of court¹⁹⁸.

Concession modification can be rather long. For example, Rudberg (2013) mentions how the legal process for Edensforsen hydropower station concession modification took over two years and it was not approved. Another example was given for the Furudal dam concession modification, where the legal procedure took five years and where, again, the modifications were not approved. For Hedefors hydropower station concession review, the legal process took over two years, but the Land and Environment Court of Appeal ruled in favour¹⁹⁹.

2.9.3 Framework for granting right to use hydropower

Concessions are granted for an unlimited time and have legal force against all parties. In other words, *"no Swedish or EU legislation or policy that is enacted after a concession has been granted has any direct effect on the operating conditions stipulated in the original hydropower concession"*¹⁹⁹.

As of 2013, there were more than 3,700 concessions in force which translates into approximately 2,000 hydropower plants¹⁹⁹. Most water concessions were granted between the 1950s and the 1980s under the 1918 Water Act. Today, these plants are approaching the end of their life and considerable investments will be needed to refurbish existing hydropower installations. It is estimated that investment of €276 million per year²⁰⁰ will be needed until 2020, to refurbish existing large-scale hydropower plants²⁰¹.

From 1990 until 2010, 90 concessions were reviewed to improve biodiversity and fish habitat. In 2012, a special investigator was assigned by the government to scrutinise legislation on water operations, including hydropower. The investigator's main goal was to ensure that all water operations that require concessions have concessions that abided by the environmental requirements of the SEC and EU legislation. With regards to hydropower concessions, the government sought to ensure appropriate ground drainage and uphold production and balancing capacity (Dir 2012:29)²⁰².

The main issue with applications is that they are time-consuming and costly and this translates into fewer or more limited installation refurbishments to avoid lengthy hearings that could lead to reviews of original concessions²⁰³.

¹⁹⁸ Sveriges Domstolar (2012), Land and Environment Courts, <http://www.domstol.se/Funktioner/English/The-Swedish-courts/District-court/Land-and-Environment-Courts/>.

¹⁹⁹ Rudberg, P., M. (2013), Sweden's Evolving Hydropower Sector: Renovation, Restoration and Concession Change, Stockholm Environment Institute, <http://sei-international.org/mediamanager/documents/Publications/SEI-ProjectReport-Rudberg-SwedensEvolvingHydropowerSector-2013.pdf>.

²⁰⁰ MSEK 2,500 per year. SEK is converted to € with the following rate 1 SEK = 0.11 € (value of 6th May 2014 from www.oanda.com).

²⁰¹ Mill, O., et al. (2010), Analysis and Development of Hydro Power Research, Elforsk report 10:66, http://www.elforsk.se/Rapporter/?download=report&rid=10_66.

²⁰² Rudberg, P., M. (2013), Sweden's Evolving Hydropower Sector: Renovation, Restoration and Concession Change, Stockholm Environment Institute, <http://sei-international.org/mediamanager/documents/Publications/SEI-ProjectReport-Rudberg-SwedensEvolvingHydropowerSector-2013.pdf>.

²⁰³ Rudberg, P., M and Nilsson, M. (2011), Reducing our emissions while achieving good status of our water bodies – is it possible? Swedish hydropower in the limelight, World Renewable Energy Congress 2011, http://www.ep.liu.se/ecp/057/vol10/053/ecp57vol10_053.pdf.

2.9.4 Characteristics of the competitive process

Competitive concession procedure for new installations

National legislation does not appear to provide for competitive procedure for the award of hydropower concessions.

Competitive procedure for concession renewals

Since concessions have been allocated for an unlimited period of time, there is no process for concession renewals.

2.9.5 Main schedule for renewal

As concessions have no expiry date, there is no renewal schedule. Some concessions may be revoked under special circumstances, but it is only done at irregular intervals.

2.9.6 Obligations of hydropower operators

Beside the right of use hydropower and the concession specificities, hydropower right holders must respect several major obligations which impact their strategic and operational decisions.

Environmental obligations

Hydropower installations are also subject to environmental obligations, in particular to the ones that figure in their concession licence and the SEC. The most important ones are the amount of water that can be diverted from a river into turbines to produce electricity and the allowed maximum and minimum levels of the impoundment or lake (in cases of storage of hydropower) which are both specified in the concession licence. In addition, hydropower operators must ensure that their installations do not have adverse effect on plant and wildlife and that their activities are not prejudicial to other activities which are likely to involve the same water source in the future and which serve important public or private purposes²⁰⁴.

Other obligations include EIAs for new concessions and for concession modification hearings.

Investment obligations

Since concessions have no expiry date, hydropower operators must refurbish ageing installations as to keep up or even increase current production and meet more and more stringent environmental obligations.

²⁰⁴ Ministry of the Environment (n.d.), The Swedish Environmental Code, <http://www.government.se/content/1/c6/02/05/49/6736cf92.pdf>.

Taxes, levies and royalties

Electricity producers are subject to an industrial property tax. For hydropower plants, this tax represented 2.2% of the property's taxation value from 2007 to 2011. Since 2011, the tax was raised to 2.8%²⁰⁵.

2.9.7 Support to small hydropower

Sweden has its own renewable electricity certificates system since 2003 managed by the Swedish Energy Agency. These green certificates are intended to increase energy generation from energy resources, in particular from hydropower installations (whether existing or new ones). Operators receive certificates for the amount of green electricity generated and, if necessary, are traded amongst operators to provide additional revenue. The certificates also include measures such as to increase the average use of the water flow through the installation, to reduce losses in the waterways and losses in the energy conversion system²⁰⁶.

It is only recently, in 2012, that Sweden and Norway created a joint market for renewable electricity certificates where certificates can be traded. From 1 April 2012 to 31 March 2013, the average price per certificate (per MWh) was €20.26²⁰⁷. Only hydro power plants whose capacity is smaller than 1.5 MW are eligible to this support.

²⁰⁵ Energimyndigheten (2012), Energy in Sweden 2012,

http://www.energimyndigheten.se/Global/Engelska/Facts%20and%20figures/Energy_in_sweden_2012.pdf.

²⁰⁶ Rudberg, P., M. (2013), Sweden's Evolving Hydropower Sector: Renovation, Restoration and Concession Change, Stockholm Environment Institute, <http://sei-international.org/mediamanager/documents/Publications/SEI-ProjectReport-Rudberg-SwedensEvolvingHydropowerSector-2013.pdf>.

²⁰⁷ Res Legal (2013), Quota System – Sweden, <http://www.res-legal.eu/search-by-country/sweden/single/s/res-e/t/promotion/aid/quota-system-1/lastp/199/>.

2.10 Switzerland

Table 19. Summary of Swiss hydropower framework

Characteristics		Description	
Institutional framework	Authorities for granting rights of use	Cantonal authorities can delegate, in particular to communal authorities	
	Types of hydropower right and granting procedures	Water concession	
Framework for granting right to use hydropower	Duration	Set by negotiation, with a maximum of 80 years	
	Competitive process	For new concessions	Preference given to the company serving most the public interest. If the competing companies serve it likewise, preference given to the company allowing the best use of the watercourse Not open to foreign entities
		For concession renewals	<ul style="list-style-type: none"> Right holder can ask for renewal of the concession in case major of works and refurbishments or by request at minimum 15 years prior to the end of the concession Concession can expire and be reverted with a negotiated compensation for the "dry" part (electric installations). Reopening to confirm
	EC infringement proceedings or equivalent	It appears there was no infringement procedure from EFTA	
Obligations of hydropower operators	Environmental obligations	<ul style="list-style-type: none"> Watercourse residual flow above a minimum level 	
	Investment obligations	<ul style="list-style-type: none"> Ask for renewal minimum 15 years before expiry date Necessary work to prevent danger in case of end of operation 	
	Royalties	<ul style="list-style-type: none"> Maximum charge per gross capacity at 90 €/kW²⁰⁸ set at federal level Authorities flexible as to which charge collected on which producer (e.g. linear tariff in Vaud canton for capacity below 2 MW) Pumping tax and storage tax in Valais canton set at 1.64 €/kW and 0.12 €/kW²⁰⁹ 	
Small-hydro	Small hydro definition	< 10 MW	
	Support	<ul style="list-style-type: none"> Maximum amount of 29c€/kWh²¹⁰ for 25 years Specific to each project depending on installed capacity, yearly production, hydraulic head, etc. 	

2.10.1 Context of hydropower in Switzerland

Due to its geographical characteristics at the heart of the Alpine sector, Switzerland has strongly benefited from hydropower resources which constitute one of the country's main sources of energy

²⁰⁸ That is 110 CHF/kW. CHF is converted in € with the following rate 1 CHF = 0.82 € (value of 6th May 2014 from oanda.com).

²⁰⁹ 2 CHF/kW and 0.15 CHF/kW respectively.

²¹⁰ CHF 35 cts/kWh.

supply²¹¹. Following the literal "boom" in hydropower plant and storage investment in the 1945-1970 period, hydropower accounted for a strong 90% of domestic electricity production. Since then, the commissioning of the Swiss nuclear plants has reduced the dependence of the country on its water resources. In 2013, hydropower only represented about 56% of its domestic production, while nuclear power accounted for 39% of the generation. The events of these last few years and in particular the Fukushima catastrophe, are however likely to result in a new trend towards higher use of hydropower in Switzerland. In 2011, the national parliament decided on not replacing any of the current reactors, which would lead to a progressive nuclear phase-out until 2034 on and the need for progressive restructuring in order to maintain security of supply²¹². As a result, the Federal Council has been implanting a new long-term energy policy²¹³ based on hydropower and new renewable energy sources. The federal government is planning on the promotion of hydropower through the renovation and the expansion of hydropower capacities. An objective of production increase of 4 TWh/year by 2050 is deemed as accessible by the Federal Council.

The 2013 hydropower mix of Switzerland is made of 556 hydro power plants of more than 300 kW capacity, producing an average of 35,830 GWh/year and offering a maximal output of 13,681 MW²¹⁴. The Swiss hydro power plants are sorted into four categories: run-of-river (3,768 MW), storage power plants (8,073 MW), pumped storage power plants (1,383 MW) and basic water flow plants (plants with no natural water supply – 456 MW).

Like Germany and Austria, Switzerland is a federal country. Hydropower frameworks and legislations are different for each Federal state (canton)²¹⁵. The two highest producing cantons are Valais (installed capacity of 4,600 MW) in the South West of Switzerland and Graubündel (or Grisons in French, with an installed capacity of 2,600 MW) in the South East of Switzerland counting for half of its annual average production.

²¹¹ Swiss Federal Office of Energy (SFOE) (2014), Hydropower, <http://www.bfe.admin.ch/themen/00490/00491/?lang=en>.

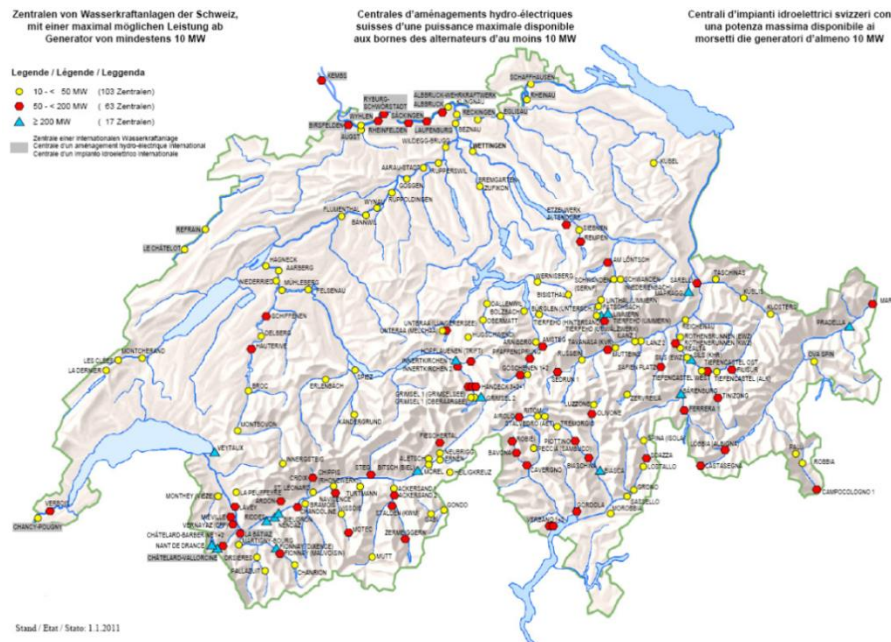
²¹² It should however be noted that public opinion on nuclear phase-out has been shifting since 2011 in favour of the continued use of nuclear power and the stability of the Swiss energy mix.

²¹³ "Energy Strategy 2050": Swiss Federal Office of Energy (SFOE) (n.d.), Federal Council decides to gradually phase out nuclear energy as part of its new energy strategy, <http://www.admin.ch/aktuell/00089/index.html?lang=en&msg-id=39337>.

²¹⁴ Swiss Federal Office of Energy (SFOE) (2011), Large-scale hydropower, <http://www.bfe.admin.ch/themen/00490/00491/00492/index.html?lang=en>.

²¹⁵ Hydropower has become a significant stake for cantons as well as communes, as it can provide a significant income for the local economy. As a result, new debates are surging about hydropower rent sharing between cantons and communes (see Valais State council).

Figure 26. Hydro power location in Switzerland (for plants with capacity higher than 10 MW)



Source: BFE

2.10.2 The institutional framework for hydropower

Stakeholders and legislations

The development of hydropower in Switzerland is organized through different legislations and levels of control and authorizations than duplicate the federal structure of the country. Several institutions are responsible for ensuring the development of the sector and the respect of other objectives, such as environment and water protection.

At the first level, legislators ensure the legal structure of hydropower development and operation through several pieces of federal or local legislation.

- The federal legislator is responsible for the federal structure than all cantons must comply with. The main piece of legislation is the Water Right Law (LFH, 1916), lately updated in 2012. The law provides the global framework for use of hydropower resources, water sovereignty, and environmental obligations and water royalties. Other pieces of federal legislation include the 2000 ordinance over utilization of hydraulic power at the federal level, the 1995 ordinance on the compensation for foregone hydropower utilization revenue, or the 1988 Energy act (Lene). Federal legislation provides in particular the disposal of waters to the cantons.
- The cantonal legislator is responsible for the specific cantonal legal structure for water rights, use and royalties.

At the second level, authorities ensure the supervision, control, and allocation of water authorization and concessions.

- The federal authority for hydropower use is the Swiss Federal Office of Energy (SFOE, integrated in the federal Department of the Environment, Transport, Energy and Communications). It is responsible for the formulation, implementation, and supervision of energy policy. The planned development and support of hydropower at the Federal level is then done by SFOE, which is for example responsible for the Energy Strategy 2050 development plan. The SFOE is also responsible for setting guidelines for right granting. Finally, it is responsible for the allocation and supervision of water concessions entering in the Federal jurisdiction, i.e., concessions in international waters and concessions involving at least two Swiss cantons.
- The cantonal authorities are responsible for the allocation and regulation of hydropower concessions in their respective jurisdiction. They can pass the responsibility onto other bodies, such as communal authorities, districts, communes, corporations or private entities (e.g., the river bank owners in the Glarus canton).
- Communal authorities benefit from water sovereignty as well as concession issuance most of the time, in particular in Valais and Graubündel. When the responsibility is conferred to them, they are also responsible for concession allocation and regulation.

As a result of this multi-stakeholder structure, there is only little uniformity in the frameworks, legislations and procedures from one case to the next. This constitutes a potential barrier to entry for potential investors and planners, which must reset their strategies and knowledge for projects in different cantons.

Types of right to use hydropower and granting procedures

Operators and investors of hydropower plants of more than 300-kW capacity are required to present an authorization for the use of hydropower resources. This authorization takes the form of a water concession granting for a limited amount of time.

The procedure for concession granting is the following. An initial proposal is first emitted by the investor or the company willing to operate the hydropower plant. The proposal includes technical plans and reports as well as environmental impact assessment (EIA). Local negotiations and consultations are then carried out with communes and cantons, before a final request be submitted to vote for populations. If the local population (through the municipalities) take the decision to grant the usage right and if this decision is approved by the cantonal (or federal) government, then the concession is granted. It provides to the operator, according to the Water Right Law, a water utilization right for the whole concession time. This right can only be diminished in case of higher public interests and against full compensation. During the period of concession, the operator is free to operate the plant within the limits of its legal obligations.

2.10.3 Framework for granting right to use hydropower

In each case, concessions are delivered by competent authorities, i.e., the Federal authority, cantons, districts or communes. The concession is granted to the right holder for a limited amount of time, with the maximal duration fixed by the Water right act at 80 years. The real duration is then fixed according to the individual negotiations between the right holder and the authorities.

Water concession corresponds to a fixed river section, a fixed flow and a fixed head. During the concession period, the right holder benefits from the right of water use and operation of the power plant. The acquired right cannot be annulled and changes in the conditions of the act of concession

must lead to concession renewal. Early return and restriction of the licence right are restricted to public interest situations and are subject to compensation.

There are two cases than can follow the concession period.

- First, the right holder can ask for early renewal of the concession in case major works and refurbishments are needed. In that case, the concession is terminated and a new concession begins. It can also ask for renewal at the end of the concession period. According to the Federal law, the renewal should be requested at minimum 15 years prior to the end of the concession, and the granting authority has five years to analyse it. In most cases, concession renewal is granted to the same operator, ensuring maintenance.
- Second, the renewal can be refused and the concession can expire. This is concession reversion. The Federal law then provides that all the "wet" parts of the plant (i.e., dams, pipes, turbines) return for free to the granting authorities while the "dry" part (electric installations) remains property of the operator, which can then sell them at a negotiated price²¹⁶.

2.10.4 Characteristics of the competitive process

Article 41 of the Water right law states that *"in case of competition, the preference is given to the company serving most the public interest. If the competing companies serve it likewise, the preference is given to the company allowing the best use of the watercourse"*.

There is no competitive process organized besides that provision. A law in 2011²¹⁷ has restated that a tender is not mandatory to grant a hydropower concession. Moreover, the concession rights are not open to foreign entities.

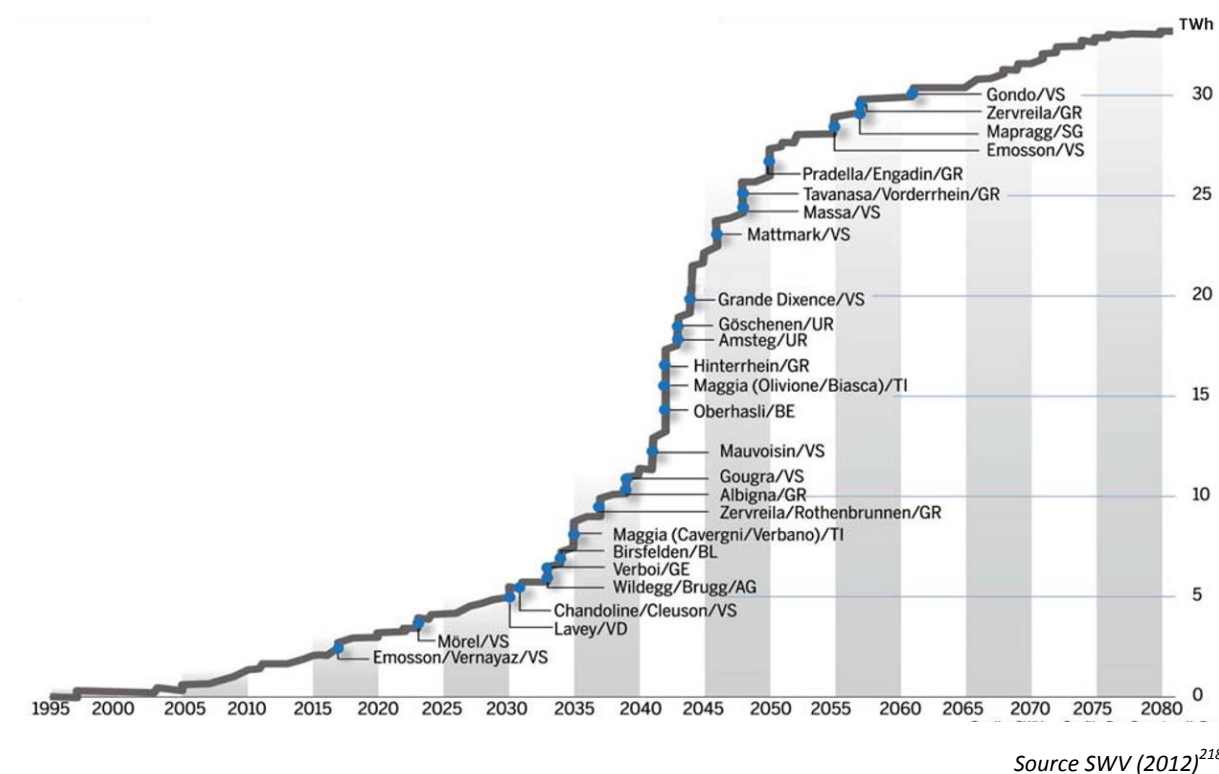
2.10.5 Main schedule for renewal

In terms of capacity, most concession reversions or renewals will occur between 2035 and 2045²¹⁶. This broadly corresponds to the boom in hydropower investment which happened between 1945 and 1970.

²¹⁶ Association suisse pour l'aménagement de l'eau (SWV), , 2012, Droit de retour e renouvellement de concession des centrales hydroélectrique, <http://www.swv.ch/?uuid=023c5b55-98f1-4257-893f-8f477dcdbab3&mode=live&open=true>.

²¹⁷ Federal law modifying the law on use of hydropower and law on electricity supply of 23rd December 2011. <http://www.admin.ch/opc/fr/official-compilation/2012/3229.pdf>.

Figure 27. Expiry date of Swiss hydropower concessions in cumulated number and cumulated power



2.10.6 Obligations of hydropower operators

Beside the right of use hydropower and the concession specificities, hydropower right holders must respect several major obligations which impact their strategic and operational decisions.

Environmental obligations

All hydropower plant must respect environment provisions in the applicable laws, and in particular in the water rights act. Requirement concern especially the residual flow of watercourses which must be over a minimum level to preserve current navigation and future enhancements, as well as to allow sluices to function. This obligation limits the maximal output of the power plant, hence reducing the expected profitability. Other requirements include maintenance of the natural line, removal of debris, fish migration measures or submissions for EIAs. The impact of these measures on the hydropower sustainability is significant. It is estimated that annual production will be reduced of 1.4 TWh/y by 2050²¹⁹ due to the inability to respect the environmental requirements while ensuring profitability (in comparison to a production of 36 TWh in 2012).

²¹⁸ Association suisse pour l'aménagement de l'eau (SWV), 2012, Droit de retour e renouvellement de concession des centrales hydroélectrique, <http://www.swv.ch/?uuid=023c5b55-98f1-4257-893f-8f477dcdbab3&mode=live&open=true>.

²¹⁹ OFEN (2012), Le potentiel hydroélectrique de la Suisse, http://www.bfe.admin.ch/php/modules/publikationen/stream.php?extlang=fr&name=fr_437904302.pdf&endung=Le%20potentiel%20hydro%E9lectrique%20de%20la%20Suisse.

Investment obligations

Other investment obligations regard in particular the engineering process for building certification. According to the Water right law, the rights holder must also provide the necessary work to prevent any future danger in case of end of operation (e.g., if the concession is not renewed and the plant is closed).

Taxes, levies and royalties

In return for the concession and the water use, rights holders must pay to the competent authority a water royalty as provided in the Water right act. Water royalty is defined by Federal law based on the gross capacity of the plant. Federal legislation does not fix the royalty level, but provides for a maximal charge per gross capacity. The cap is fixed by the government at 82€/kW from 2011 to 2014, and at 90 €/kW²²⁰ from 2015 to 2019.

The competent authorities benefit from high flexibility under that cap, as they can implement both a water royalty and an imposed power plant tax, providing that the sum of the taxes is not be higher than the Federal cap. For example, the charges in the Graubünden canton are collected at 50% through a power plant tax by the canton and at 50% through the water royalty by municipalities. In the Valais canton, the royalty is equal to 40% of the Federal cap but the special imposition for use of hydraulic forces is at 60% of the cap.

The authorities are also flexible as to which charge is collected on which type of hydropower. In the Valais canton, all power plants pay the same water royalty, while in the Vaud canton the royalty is linear between 0% and 100% for capacities lower than 2 MW.

Other fees can also be implemented by the cantons. For instance, in the Valais canton, the pumping/storage tax amounts at 0.12 c€/kWh and 1.64 €/kW²²¹ for hydropower installations with pumping power higher than 50 MW. An initial tax for concession granting or renewal is also fixed by the act of concession, with the canton fixing the maximal amount at 4 times the annual water royalty.

2.10.7 Support to small hydropower

As a renewable energy source, small hydro power (i.e., with a capacity lower than 10 MW) is supported by the SFOE through the Swiss feed-in tariffs which were implemented in 2009. Subsequent tariff subventions are specific to each project and specific evaluations are carried through by relevant authorities. The subvention amount is not uniform and will depend in particular on the installed capacity and the yearly production, as well as an engineering bonus depending on the equivalent capacity of the installation and a hydraulic head bonus. The maximum amount for small hydropower is 29 c€/kWh²²², and tariffs are guaranteed for a 25-year period.

Given the high potential for small hydropower in Switzerland and the diversification objective of the Energy Office, the supporting cost of small hydropower is capped to 50% of the total supporting cost (for all the renewable energy sources).

²²⁰ 100 CHF/kw and 110 CHF/kw respectively. CHF is converted in € with the following rate 1 £ = 0.82 € (value of 6th May 2014 from oanda.com).

²²¹ CHF 0.15 cts/kWh and CHF 2 CHF/kW respectively.

²²² CHF 35cts/kWh.

In the discussions on the Energy Strategy 2050 and the necessity to promote large-scale hydraulic projects, the application of feed-in tariffs to large hydropower is contemplated.

3 Conclusion

The main objective of this study is to provide a benchmarking of hydropower concession regimes in Europe, describing them in 10 European countries (Austria, France, Germany, Great-Britain Italy, Norway, Portugal, Spain, Sweden and Switzerland) and regions when appropriate (e.g. cantons in Switzerland or Landers in Germany).

Hydropower regimes was described and scrutinised through a unified analysis framework to ensure their comparison on an equal basis. This framework is structured around 4 blocks: (1) the institutional framework of hydropower regimes (e.g. type of rights to use hydropower, authorities granting rights to use hydropower), (2) the framework for granting right to use hydropower in itself (duration of rights and procedure, competitive process and existence of a possible EC infringement procedure), (3) the obligations of the hydropower operator (environmental and investment obligations and royalties) and (4) small hydro characterisation and support as RES.

The analysis of the selected countries is summed up in the following tables and figures concerning respectively the institutional framework (table 20), the framework for granting the right to use hydropower (tables 21 and 22 and figures 28 to 31), a comparison of national situations and currently engaged procedures for competitive infringement (table 23), the obligations applying to the hydro power operators (tables 24 and 25 and figure 32) and the small hydro definition and support as RES (table 26 and figures 33 and 34). To sum up,

- in Austria, concessions to use hydropower and renewals are negotiated;
- in France, a competitive process exists for granting concession and renewal but its implementation is still waited while concessions have already expired;
- in Germany, national legislation does not seem to provide for competitive process to grant permit to use hydropower;
- in Great Britain, only the licences granted after 2003 have a limited duration and a competition process exists to grant and renew these licences but they can be indefinitely granted by a periodic application for a replacement licence
- in Italy, a competitive process exists for granting concession and renewal;
- in Norway, hydro concessions are granted without time limit to public companies whereas private companies must revert their concession right at the expiry date. Only leasing of hydropower plants is now possible for private companies;
- in Portugal, a competitive process exists for granting new concessions, but such a process might not exist for renewals;
- in Spain, a competitive process exists for granting concession and renewal;
- in Sweden, hydro concessions are granted without time limit under the conditions that hydropower operators invest to respect more and more stringent environmental obligations;
- in Switzerland, concessions to use hydropower and renewals are negotiated and tenders are not mandatory for granting them.

Table 20. Summary of institutional framework for Austria, France, Germany, Great Britain, Italy, Norway, Portugal, Spain, Sweden and Switzerland

	Austria	France	Germany	Great Britain	Italy
Characteristics for granting rights of use	<ul style="list-style-type: none"> Facilities with <500 kW, authorization granted by regional district authority, Otherwise by federal States 	<ul style="list-style-type: none"> Departmental prefecture <100MW The Ministry of Energy > 100MW 	<ul style="list-style-type: none"> District councils Local authorities 	<ul style="list-style-type: none"> Environment Agency 	<ul style="list-style-type: none"> Regions and Provinces, if delegated
Types of hydropower right and granting procedures	<p>Applications for authorizations validated in compliance with environmental criteria only</p>	<ul style="list-style-type: none"> Authorisation < 4.5 MW Concession > 4.5 MW 	<ul style="list-style-type: none"> Assessment of applications for permit made by competent authorities on grounds of Water Acts and discretionary final decision Specific demands from the authority possible in each case 	<ul style="list-style-type: none"> Environmental licence (Abstraction or transfer licence and impoundment licence) Planning permission Accreditation to generate and export electricity 	<p>Water Concessions</p>
	Norway	Portugal	Spain	Sweden	Switzerland
Characteristics for granting rights of use	<ul style="list-style-type: none"> Ministry of Petroleum and Energy Ministry of Environment The Norwegian Water Resources and Energy Directorate (NVE) 	<ul style="list-style-type: none"> Directorate General for Energy and Geology (DGEG) Regulatory Authority of Energy Services (ERSE) Basin authorities (Administração da Região Hidrográfica - ARH) 	<ul style="list-style-type: none"> Ministry of Energy (capacities > 5 MW) Local Authorities - Comunidades Autonomas (for capacities < 5 MW) Basin Authorities 	<ul style="list-style-type: none"> Five regional Land Environment Courts 	<p>Cantonal authorities can delegate, in particular to communal authorities</p>
Types of hydropower right and granting procedures	<p>Licences granted by King and Government for waterfall purchase or long-term use (≥ 1 MW) after discussion by the Parliament (> 10 MW) or the Ministry (< 10 MW) and consideration by the energy regulator NVE.</p>	<p>Concessions for hydropower scheme via:</p> <ul style="list-style-type: none"> Project application, or Calls for bidding (auctions) conducted by the Government 	<p>Water concessions</p>	<p>Concessions: water operation permits for hydropower operators. Legal force of concession meaning that operating conditions are not directly altered by new substantive law or policy changes before a completed judicial concession</p>	<p>Water concessions</p>

Table 21. Summary of framework for granting right to use hydropower in Austria, France, Germany, Great Britain, Italy

Characteristics	Austria	France	Germany	Great Britain	Italy
Duration	<ul style="list-style-type: none"> Maximum authorization duration: 90 years On average between 25 and 75 years 	<ul style="list-style-type: none"> Concession duration up to 75 years. More recent concessions are granted for 40 years Procedures can last more than 5 years 	<ul style="list-style-type: none"> 30 years maximum 	<p>Before 2003, unlimited time</p> <p>After 2003 (Water Act 2003):</p> <ul style="list-style-type: none"> Licence: 12 or exceptionally 24 years but with possibility for indefinite extension (replacement licence) Procedure duration 1-3 years. 	<ul style="list-style-type: none"> 20 to 30 years for large scale hydro 30 years for small hydro
Competitive process	For new concession	<ul style="list-style-type: none"> A phase of dialogue launched if judged necessary by the authority to allow candidates to present analysis of project characteristics and variants Authority selects the winning candidate based on project application granting better environmental protection 	National legislation does not appear to provide for competitive procedure	<p>Competing licence proposal</p> <ul style="list-style-type: none"> to propose a joint scheme to share water asked Environment Agency to choose one of them considering public interest Existence of a secondary market for transferring or leasing water rights 	<p>Choice of competing applications</p> <ul style="list-style-type: none"> Based on economic offer Increasing installed capacity Other qualitative elements (quality, environment, etc.)
	For concession renewals	<p>Ranking of tender (awarding criteria):</p> <ul style="list-style-type: none"> Maximizing energy Limiting environment impact Maximizing expected royalties 	National legislation does not appear to provide for competitive procedure	<ul style="list-style-type: none"> None for authorization granted before 2003. Otherwise like for new concession. Holders of long duration licences can apply for a replacement licence midway through the duration of their licence. No constraint on the number of times it can be replaced. 	<p>Tender based on:</p> <ul style="list-style-type: none"> Economic offer Increasing energy generated or installed capacity A plan for environmental improvements or restoration of the drainage basin concerned
EC infringing proceedings or equivalent	DG environment takes Austria to Court in April 2014 over failure to protect water quality on a river contrary to the requirements of the Water Framework Directive	Closed (in 2008 by DG Internal Market and Services – opened in 2004 with referral to the EC court in 2005) after elimination of preference to outgoing concession-holders at hydropower concession renewals	No infringement procedure appears in the European archives	No infringement procedure appears in the European archives	<ul style="list-style-type: none"> Closed in 2007 after elimination of preference for outgoing concession-holder Letter of formal notice sent in 2011 by DG Internal Market and Services because of extensions duration possibly contrary to freedom of establishment. Procedure extended in 2013 as regards new 2012 provisions

Table 22. Summary of framework for granting right to use hydropower in Norway, Portugal, Spain, Sweden and Switzerland

Characteristics	Norway	Portugal	Spain	Sweden	Switzerland
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<p>Duration</p> <ul style="list-style-type: none"> • Unlimited period of time for public companies • No more concession granted to private companies • Leasing to private firms for 15 years 	<ul style="list-style-type: none"> • Concession: up to 75 years • Procedures from 3 to 11 years 	<ul style="list-style-type: none"> • Up to 75 years + 10 year extension, if considerable investments are made • Procedure duration from 6 to 10 years 	<ul style="list-style-type: none"> • No time limit • Some examples of procedure lasting 5 years and leading to no approval 	<ul style="list-style-type: none"> • Set by negotiation, with a maximum of 80 years
<p>Competitive process</p> <p>For new concession</p>	<p>Application by a private investor:</p> <ul style="list-style-type: none"> • Request concession licence with ARH that call for tender if project in the interest of the river • Opening to competing projects • Applicant selection based on highest bid <p>ARH identifying need for hydropower installations: applicant selection based on highest bid for up-front payment with no priority to any applicant</p>	<ul style="list-style-type: none"> • The project that will be chosen amongst competing projects on a vacant section of a river will have a more rational use of water and provide for better environmental protection. • For partially or publicly-owned dams, the operation may be offered to public tender through the Basin Authority 	<p>National legislation does not appear to provide for competitive procedure</p>	<p>Preference given to the company serving most the public interest. If the competing companies serve it likewise, preference given to the company allowing the best use of the watercourse</p>
<p>For renewals</p>	<p>National legislation does not appear to provide for competitive procedure</p>	<p>Expiring hydropower concessions that are reverted to the State may be subject to a call for tender procedure</p>	<p>National legislation does not appear to provide for competitive procedure</p>	<p>National legislation specifies that tenders are not mandatory</p>
<p>EC infringement proceedings or equivalent</p>	<p>International EFTA Court ruling in 2007 that private or foreign companies granted a time-limited concession with obligation to revert installation to the State without compensation at concession expiry whereas time-unlimited concessions for public companies encroaching freedom of establishment and movement of capital guaranteed by the EEA Agreement. Possibility for Norway to pursue legitimately the objective of establishing a system of public ownership over these properties</p>	<p>Closed (in 2008 by DG Internal Market and Services – opened in 2003 with reasoned opinion sent in 2005) asking for a competitive procedure for the award of hydropower concessions in the Spanish legislation</p>	<p>No infringement procedure appears in the European archives</p>	<p>It appears there was no infringement procedure from EFTA</p>

Figure 28. Local or regional authorities can play a large role in the decision making process

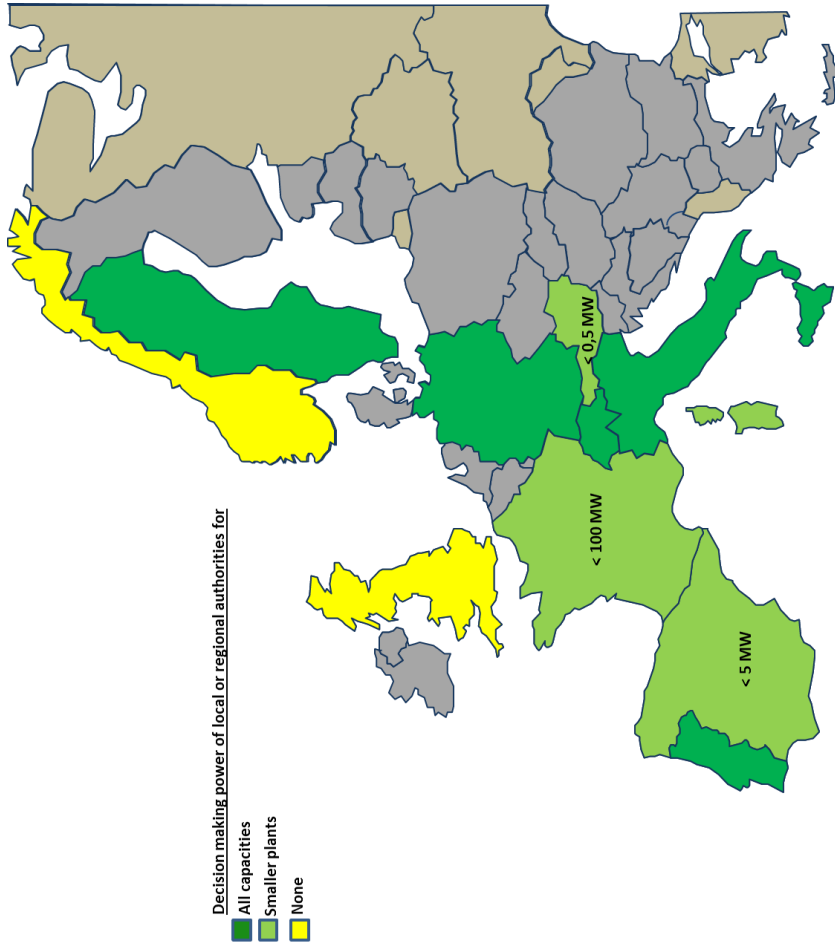


Figure 29. Different forms of right to use hydropower granted for different durations

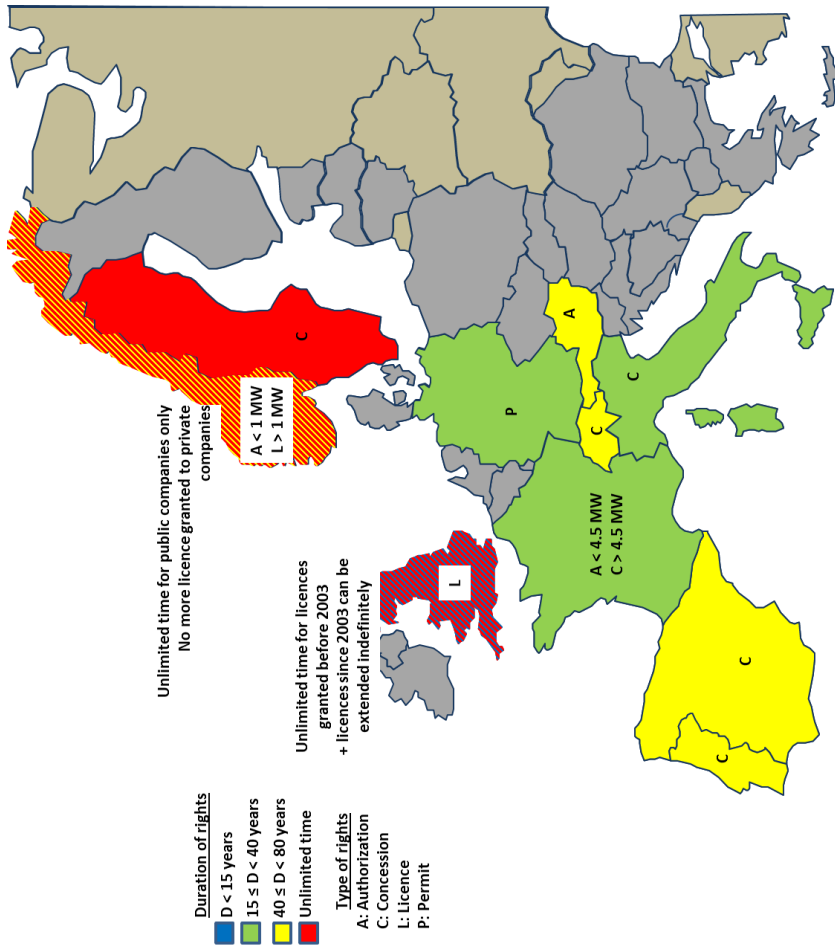


Figure 30. Several countries have been subject to infringement procedure

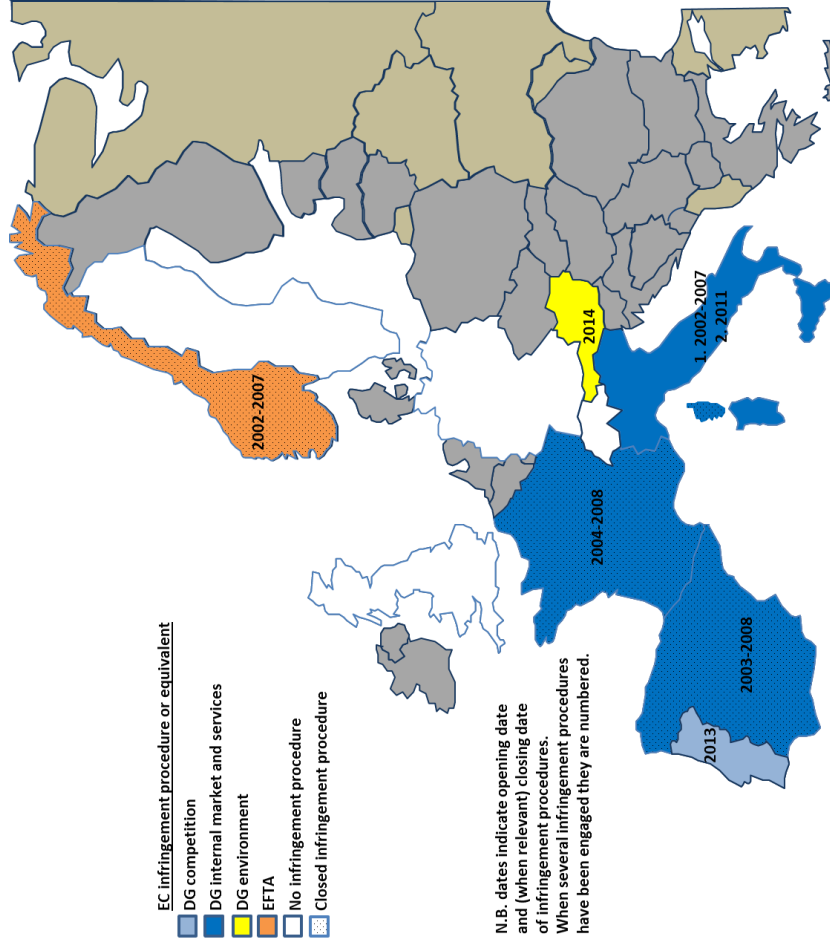


Figure 31. Competitive process to grant right to use hydropower

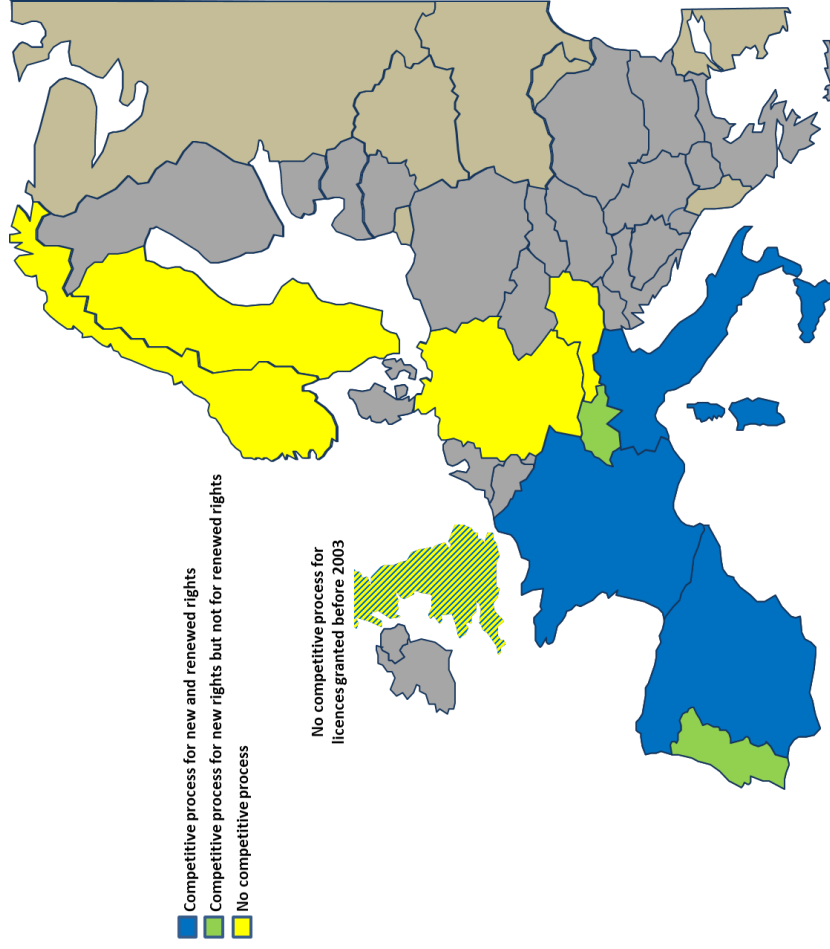


Table 23. Comparison of national situations and currently engaged procedures for competitive infringement

Countries	Type of right to use	Evaluation of granting procedure	Currently engaged procedure for
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	hydropower	Duration	Competitive process?	competition infringement?
Austria	Authorization	●	●	No
France	Concession > 4.5 MW	●	●	No
Germany	Permit	●	●	No
Great Britain	Licence	● (before 2003) ● (after 2003)	● (before 2003) ● (after 2003)	No
Italy	Concession	●	●	Yes
Norway	Licence > 1 MW	●	●	No
Portugal	Concession	●	●	Yes
Spain	Concession	●	●	No
Sweden	Concession	●	●	No
Switzerland	Concession	●	●	No

Table 24. Obligations on hydropower operators in Austria, France, Germany, Great Britain, Italy

Country	Environmental obligations ²²³	Investment obligations	Royalties
Austria	<ul style="list-style-type: none"> EIA mandatory over 15 MW Ecological minimum flow to be restored until 2027 in existing hydropower plants 	National legislation does not appear to provide for investment obligations	<ul style="list-style-type: none"> Energy taxes Local taxes Mandatory participation to special funds Licence fees directly negotiated between competent authorities and applicants
France	<ul style="list-style-type: none"> Watercourse residual flow often set between 12% and 17% 	To meet environmental requirements: <ul style="list-style-type: none"> e.g. modernising installations to increase power production with the same flow and ensuring land drainage. 	<ul style="list-style-type: none"> For the use of watercourses For the occupation of hydroelectric public domain Charge proportional to the kWh produced, or dividends or distributed profits + charge proportional to the revenue from electricity sales
Germany	<ul style="list-style-type: none"> Environmental requirements to respect EIA compulsory except for small hydro Minimum watercourse flow as an federal obligation for all hydropower stations, with regard to the Water Framework Directive 	National legislation does not appear to provide for investment obligations	No fees at the federal level, but specific taxes or rights can be negotiated by the authority and the stakeholders during project assessment.
Great Britain	<ul style="list-style-type: none"> Watercourse residual flow: 5% of natural flow (3% for high baseflow river) EIA for plants in sensitive areas 	To meet environmental requirements (limiting adverse impacts in water resources creating fish pass, limiting flood risk and ensuring land drainage)	<ul style="list-style-type: none"> Standard unit charges: between 14.14 and 34.48 €/100m³/year, depending on the region. Application Charge = 164 € Advertising Administration Charge = 122 €
Italy	<ul style="list-style-type: none"> Reserve flow defined by regions EIA for hydropower plants > 40 MW and < 3 MW with a diversion capacity higher than 100 l/s in protected natural area 	Investment to increase plant capacity and efficiency as qualitative elements of response to call for tenders	<ul style="list-style-type: none"> Public rents to regions and Local Authorities (Municipalities, Provinces) Real estate tax

²²³ The review of EU legislation is ongoing e.g. the 2000 water framework directive.

Table 25. Obligations on hydropower operators in Norway, Portugal, Spain, Sweden and Switzerland

Country	Environmental obligations ²²⁴	Investment obligations	Royalties
Norway	<ul style="list-style-type: none"> • Mandatory EIA > 40 GWh • Protection of some river systems forbidding hydropower development in some watercourse, including from micro and mini power plants since 2005 	Make the necessary investments to ensure that environmental regulations are met	<ul style="list-style-type: none"> • Annual fees to the State: between 0.16 and 1.62 €/kW • Annual fees to counties and municipalities: between 0.16 €/kW and 4.87 €/kW • + Resource rent tax: 31% (for excess returns only)
Portugal	<ul style="list-style-type: none"> • EIA • No regulation on watercourse residual flow but 5 to 10% of modular flow in average 	For the protection of the environment (e.g. acceptable levels of residual and ecological flows of watercourses)	<ul style="list-style-type: none"> • Rate on water resources (Taxa de recursos Hidricos - TRH)
Spain	<ul style="list-style-type: none"> • Mandatory EIA for plants located in environmentally sensitive areas • Preventing deterioration, protecting and enhancing the status of aquatic and terrestrial ecosystems and wetlands that are directly dependent on aquatic life regarding their water needs 	For the protection of the environment and watercourses as well as for the functional state of installations at concession expiry (reversion to the State)	<ul style="list-style-type: none"> • Production tax (Canon de producción) • Regulation tax (Canon de regulación) • Taxes on water use (Tarifa de Utilización del Agua)
Sweden	<p>Compliance with</p> <ul style="list-style-type: none"> • The objectives of the Environmental Code • the general rules of consideration • the adopted environmental quality standards • and the rules on special protection areas 	To comply with more and more stringent environmental obligations	<p>Industrial property tax = 2.8% of the property's value</p>
Switzerland	Watercourse residual flow above a minimum level	<ul style="list-style-type: none"> • Ask for renewal minimum 15 years before expiry date • Necessary work to prevent danger in case of end of operation 	<ul style="list-style-type: none"> • Maximum charge per gross capacity at 90€/kW set at federal level • Authorities flexible as to which charge collected on which producer (e.g. linear tariff in Vaud canton for capacity below 2 MW) • Pumping tax and storage tax in Valais canton set at 1.64 €/kW and 0.12 €/kWh

²²⁴ The review of EU legislation is ongoing e.g. the 2000 water framework directive.

Table 26. Small hydro definition and support schemes

Country	Small hydro definition	Support schemes
Austria	< 2MW	<ul style="list-style-type: none"> New or revitalised plants increasing efficiency by at least 15 % 3.23 – 10.55 c€/kWh for 13 years, depending on revitalisation and the amount of electricity fed into the grid. Obligations to purchase at market prices for hydropower < 10 MW Alternative possibility of investment aid
France	< 4.5MW	6.07 c€/kWh (no time of use tariff) + a premium between 0.5 and 2.5 c€/kWh (all the more high that the capacity is small) + a winter bonus of up to 1.68 c€/kWh depending on regularity of production
Germany	< 1 MW	FIT is available whatever the hydro power capacity. For small hydropower specifically, the FIT is for 2012 commissions at 12.7 c€/kWh for capacity below 500 kW and at 8.3 c€/kWh otherwise. The tariffs are guaranteed for 20 years
Great Britain	Small hydro < 5 MW Micro-scale hydro < 50 kW	<ul style="list-style-type: none"> FIT < 5 MW: between 4.04 and 28.19 c€/kWh depending on the size of the plant and the tariff date Renewables Obligation Certificates for capacity > 5 MW but < 20 MW
Italy	< 3 MW	FIT or premiums (for 20, 25 or 30 years depending on size and type) (between 96 and 257 €/MWh depending on size and type) or green certificate system (for 25 years) for plants commissioned before 1 January 2013 (between 70 and 80 €/MWh in 2010-2013)
Norway	< 10 MW	Green certificates allocated for 15 years to renewable sources in particular to measures to increase production at new and existing hydropower stations valued around 20 €/MWh in 2012-2013
Portugal	< 10 MW	9.5 c€/kWh for a maximum of 25 years
Spain	< 5 MW	After 2012: no more incentive mechanisms due to stringent tariff deficit measures
Sweden	< 1.5 MW	Green certificates allocated for 15 years to renewable sources in particular to measures to increase production at new and existing hydropower stations valued around 20 €/MWh in 2012-2013
Switzerland	< 10 MW	Maximum amount = 29c€/kWh for 25 years Specific to each project depending on installed capacity, yearly production, hydraulic head, etc.

Figure 33. Small hydro definition

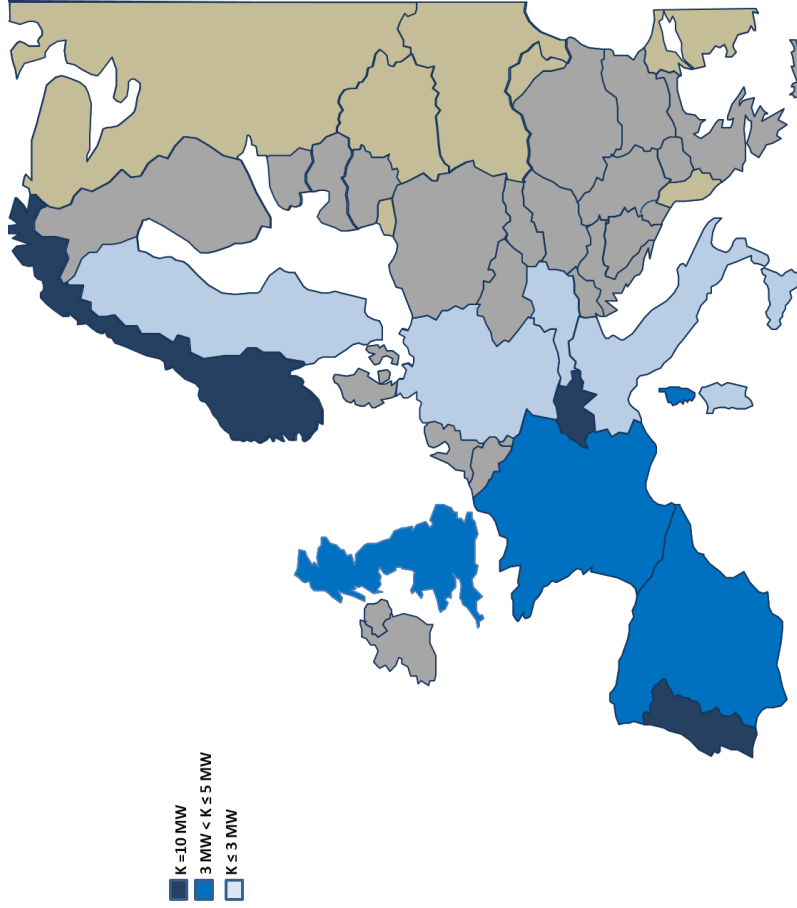


Figure 34. Small hydro support

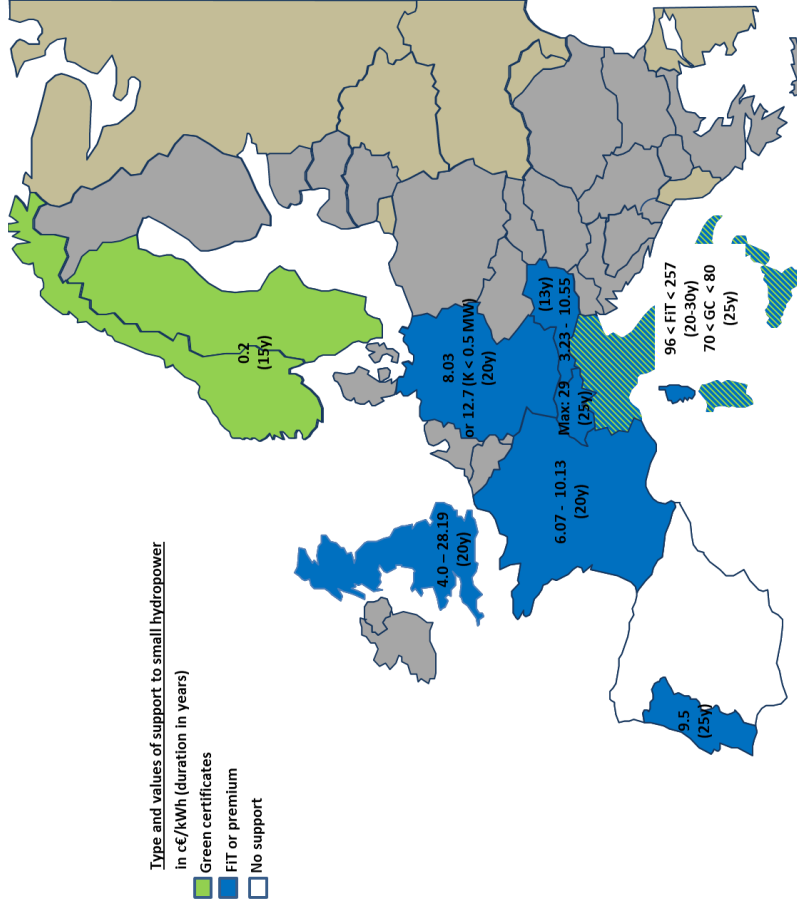
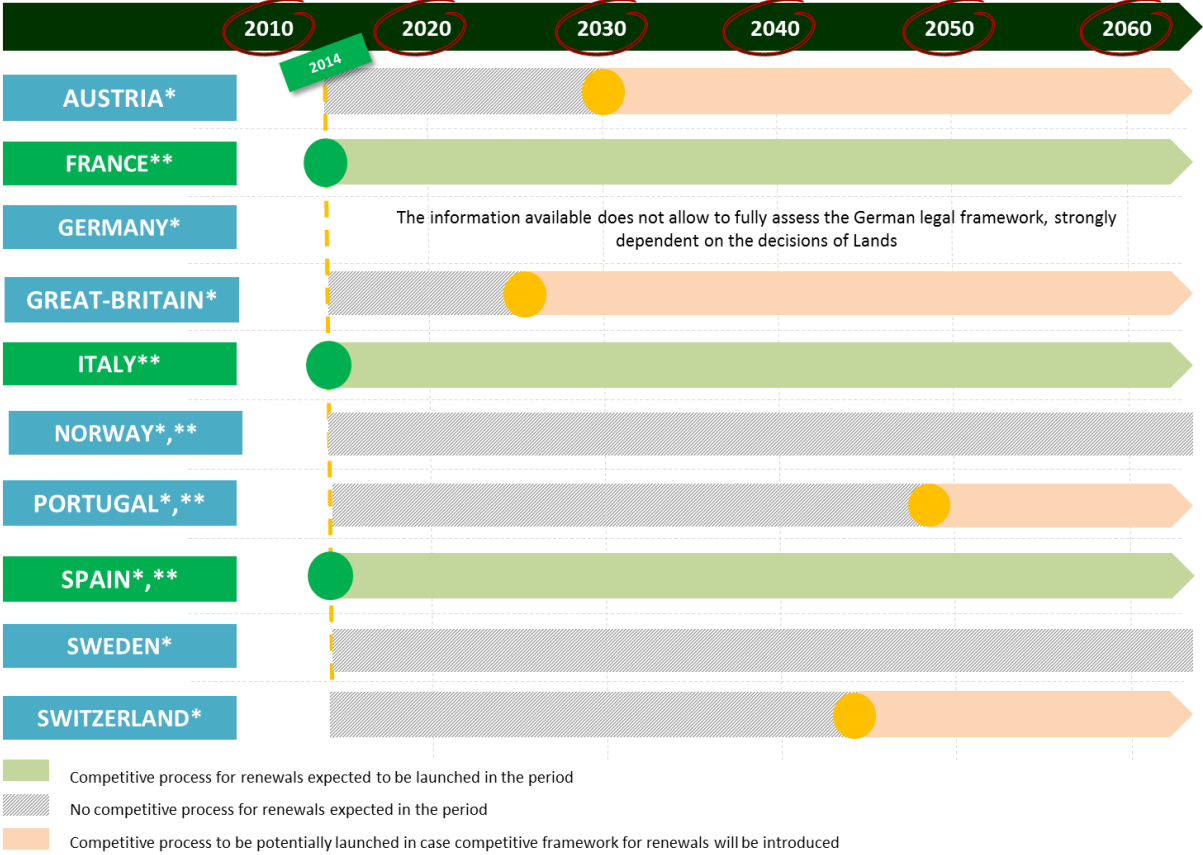


Figure 35 also presents graphically the schedule. Each country is described by a timeline. A dot indicates an estimation of renewal potential start date for the national hydropower park, considering available information. Countries in green boxes have a legislation providing public and competitive procedures for renewals of all hydroelectric concessions while countries in blue boxes do not have such legislation for renewals of all the hydroelectric concessions.

Figure 35. Indicative schedule of hydropower renewals



* National legislations do not seem to provide public and competitive procedures for renewal of all the hydroelectric concessions
 ** Countries concerned in past decade by EU infringement procedures or similar procedures from the European Free Trade Association for Norway) that led to the revision of national framework

From the tables and figures above, three main conclusions can be drawn:

1. The first one is that **the institutional framework relative to hydropower is generally complex with a stacking of interests and decision-making powers** from the European Commission (or EFTA, for non EU members) to local authorities (in several countries) through national authorities. Trade-offs between these interests are then needed to come up with decisions regarding hydropower right of use. With this regard, the national and local interests have a significant weight because of the environmental impact of hydropower on watercourses. This is also reinforced by the participation of hydropower to security of supply or climate change policy, even if this is also true to a variable extent for other types of generation technology;
2. For the same reasons, **liabilities of hydropower operators are consequential**. Their decisions have indeed an important impact on the environmental quality of the watercourses they exploit. These liabilities account for the in-depth controls for granting rights of hydropower use, as much for the operators’ qualifications as for terms of rights and quality of assets during transfers of liabilities at renewals;
3. Analysing the framework of granting right to use hydropower, it is noteworthy that the implementation of competitive process remains secondary in this respect in the Member States

as well in external countries. A number of countries implement authorisations (e.g. Austria), grant concessions for unlimited time (e.g. Sweden), or directly negotiate concession without a transparent competitive process for granting rights to use hydropower. Different levels of opening are observed for initial granting rights to use hydropower or for renewals. For example, the UK is in a hybrid situation: licences granted before 2003 were given for an unlimited period of time but new licences are granted for 12 or 24 years. Moreover, Spain and Portugal grant new concessions in a competitive process but such a process does not seem implemented for renewals. Several countries were hence under pressure (from the European Commission or the European Free Trade Association) to make their legislation evolve toward more competition and transparency (France, Spain, Italy from the European commission and Norway from the EFTA, etc.). Considering the situation of the different countries, these pressures nevertheless do not seem totally related to the openness or closure of the hydropower granting process alone. For instance, Austria and Sweden grant right to use hydropower for unlimited time but are not under any pressure to further open more and make more transparent their granting process.

Beside these main conclusions, it can be noted that **competition should not be the only concern with regard to hydropower since distortions from unharmonised obligations, taxation and support may be significant** if not consequential. Because of interdependencies among the national hydro sources through the European market, the question whether the non-harmonisation of obligations, taxation and support is prejudicial to the efficient use of hydropower in Europe or whether it reflects justified national specificities should also be addressed at the European level.

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