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# RESEARCH REPORT

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## *Regimes for granting the right to use hydropower in Europe*

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### *Abstract*

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.

This report aims at providing a benchmarking of hydropower concession regimes in Europe, describing hydropower regimes in 14 European countries (Austria, Bulgaria, Finland, France, Germany, Great-Britain, Greece, Italy, Norway, Poland, 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).
4. Small hydro characterisation and support schemes.

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# Regimes for granting the right to use hydropower in Europe<sup>1</sup>

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## Executive summary

The characteristics of hydropower make it a prominent energy source in liberalised electricity systems integrating increasing amounts of renewable energy. Hydropower provides widespread benefits to the entire power supply chain. First, it can substitute for any other technology (either baseload, shoulder or peak power plants). Furthermore, pumping stations play a major role in balancing the system because of their significant flexibility, which would be all the more useful to a system in which intermittent generation is to be integrated. Hydropower also has the advantage of being an emission-free technology. Moreover, considering its concentrated location in Europe, in the Alps, Pyrenees, in Scandinavia, etc., it also significantly impacts the network constraints at interconnections between the European countries.

Meanwhile, hydropower is also a peculiar generation technology as it seriously affects its local environment. This may impact other water uses (tourism, agriculture, aquaculture, etc.) or even aquatic life over long distance. The broader benefits for the power system, as a whole, should hence be weighed against its impact on the quality of the watercourses. This is why the right to use the watercourse as for hydropower is granted by the States or local authorities. The right to use hydropower can take different forms (authorisations, licences, concessions) with different duration periods (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 the rights to use hydropower. Some countries implement a competitive process to grant the 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. Finland, Norway, Poland) and their duration greatly varies from a few years (in Great Britain, for new hydropower plants) to unlimited duration (Sweden).

In this context, over the past decade, the European Commission has launched several procedures concerning the compatibility of national hydropower rights granting European laws and regulations in numerous countries (e.g. France, Spain, Italy, Portugal, etc.). And yet other hydropower regimes (e.g. Finland or Sweden) are not subject to such investigations, despite not being founded through a competitive process. This difference of treatment raises questions about the motivation behind the actions of the European Commission.

To grasp an understanding of the main differences between the national hydropower regimes is of particular interest. In 2014, the Florence School of Regulation published the first benchmarking study targeting 10 European countries. Hence, the main objective of this document is to provide an updated benchmark of the hydropower concession regimes in Europe, extending beyond the 2014 analysis to describe the hydropower regimes in 14 European countries (Austria, Bulgaria, Finland, France, Germany, Great Britain, Greece, Italy, Norway, Poland, Portugal, Spain, Sweden and Switzerland) and relevant regions (e.g. cantons in Switzerland or Lands/federal states in Germany).

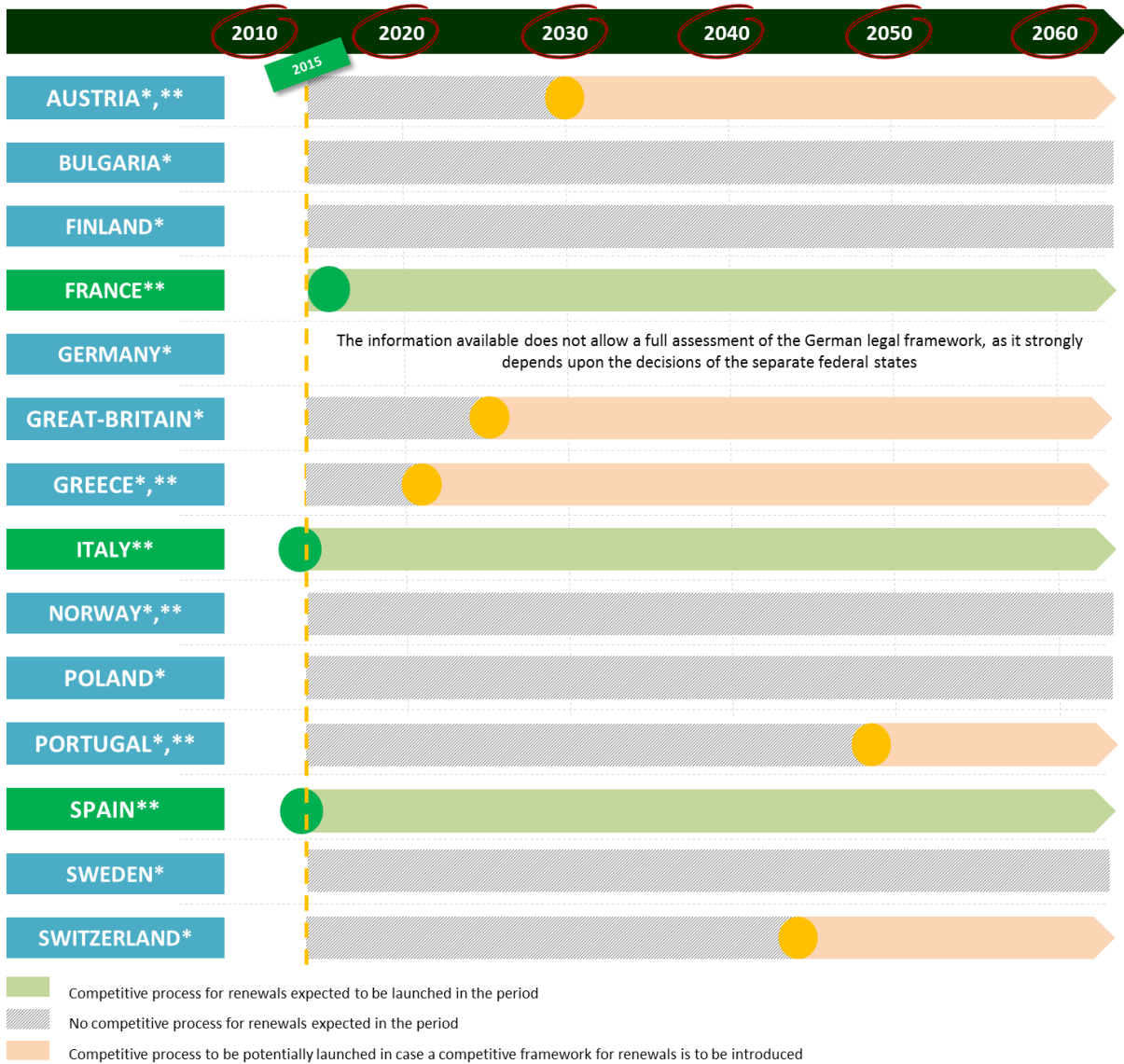
This report describes and examines the hydropower regimes through a unified analysis framework to ensure their equal comparison. The framework is structured around 4 blocks: (1) the institutional framework of hydropower regimes (e.g. the types of rights for hydropower usage, the authorities granting the rights to use hydropower, etc.); (2) the framework for granting the right to use hydropower (duration of the rights and procedure, competitive process and the existence of a possible EC infringement procedure); (3) the obligations of the hydropower operator (environmental and investment obligations and royalties); and (4) the 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 granting the right to use hydropower (figure 2), the different types of rights to use hydropower and their duration (figure 3), countries that have been subject to an infringement procedure (figure 4) and countries that implemented a competitive process to grant those rights (figure 5). Table 1 also compares national situations and the currently engaged procedure for competition infringement. To sum up country by country,

- in Austria, concessions to use hydropower and renewals are negotiated;
- in Bulgaria, permits for water use and renewals are attributed on a first-come first-served basis, but new permit issuance seems unlikely due to severe restrictions on hydropower development;
- in Finland, permits for water use are normally attributed for an undefined duration period, unless the previous (or new) provisions of the permits are not respected;
- in France, a competitive process exists for granting concession and renewal but its implementation still awaits while concessions have already expired;
- in Germany, national legislation does not seem to provide for competitive process in the granting of hydropower permits;
- 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 Greece, water use licences are granted on a non-competitive basis, with expiration scheduled for all licences in 2022, when a new scheme is to be implemented;
- in Italy, a competitive process exists for granting concession and renewal;
- in Norway, hydro concessions are granted without a time limit to public companies whereas private companies must revert their concession right at the expiry date. Only the leasing of hydropower plants is currently possible for private companies;
- in Poland, time-limited water permits for the special use of water are attributed on a first-come first-served basis following a strict approval process.
- 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, permits for water utilisation are granted without a time limit under the condition that hydropower operators respect the environmental conditions stated in the original permit;
- in Switzerland, concessions to use hydropower and grant renewals are negotiated and tenders are not mandatory for granting them.

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

Figure 1. Indicative schedule of hydropower renewals



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

\*\* Countries that were subject to EU infringement procedures (or similar procedures from the European Free Trade Association for Norway) over the past decade, which led to a revision of the national framework



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

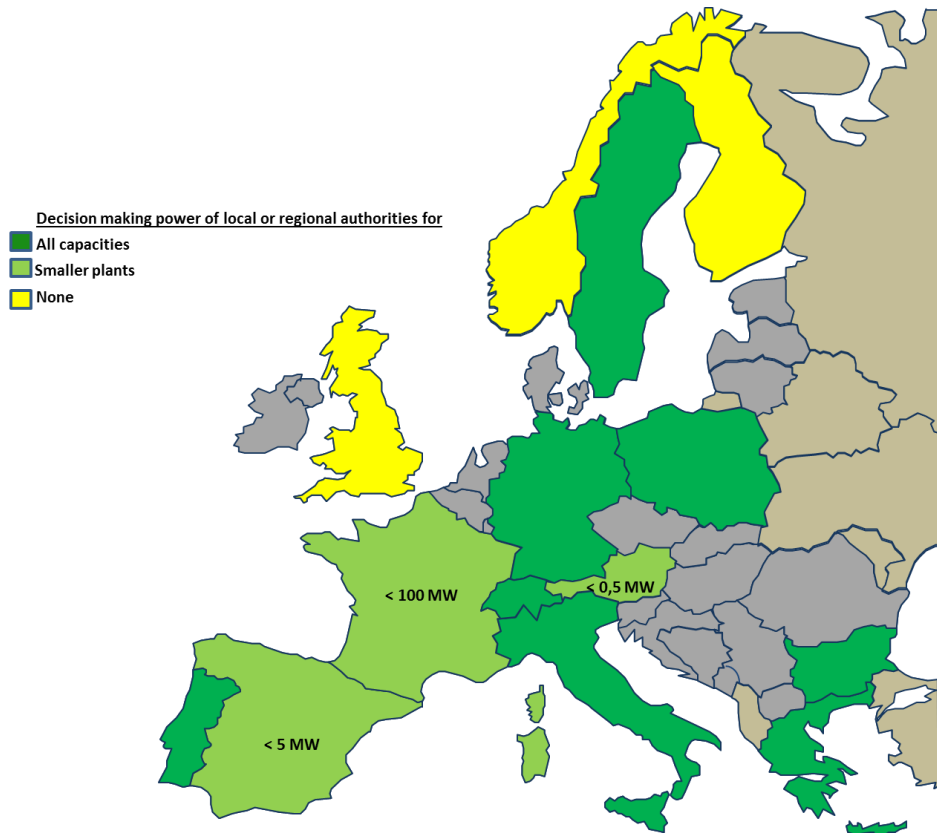


Figure 3. Different forms of hydropower usage rights granted for different durations

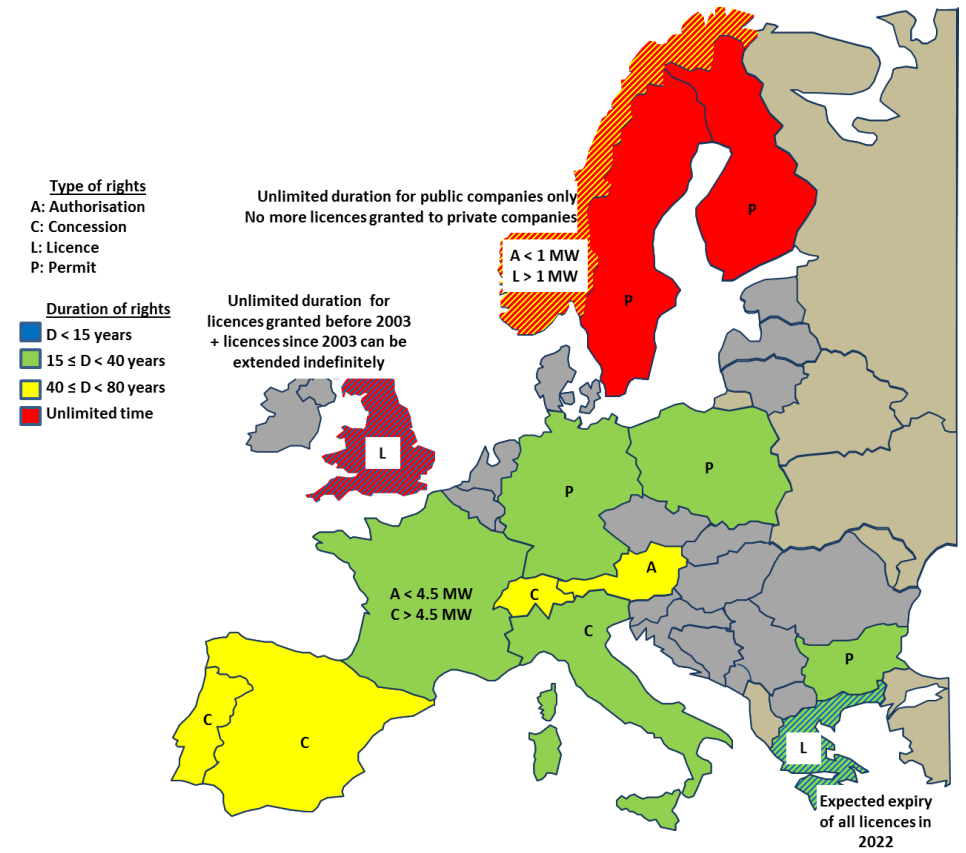


Figure 4. Several countries have been subject to infringement procedures

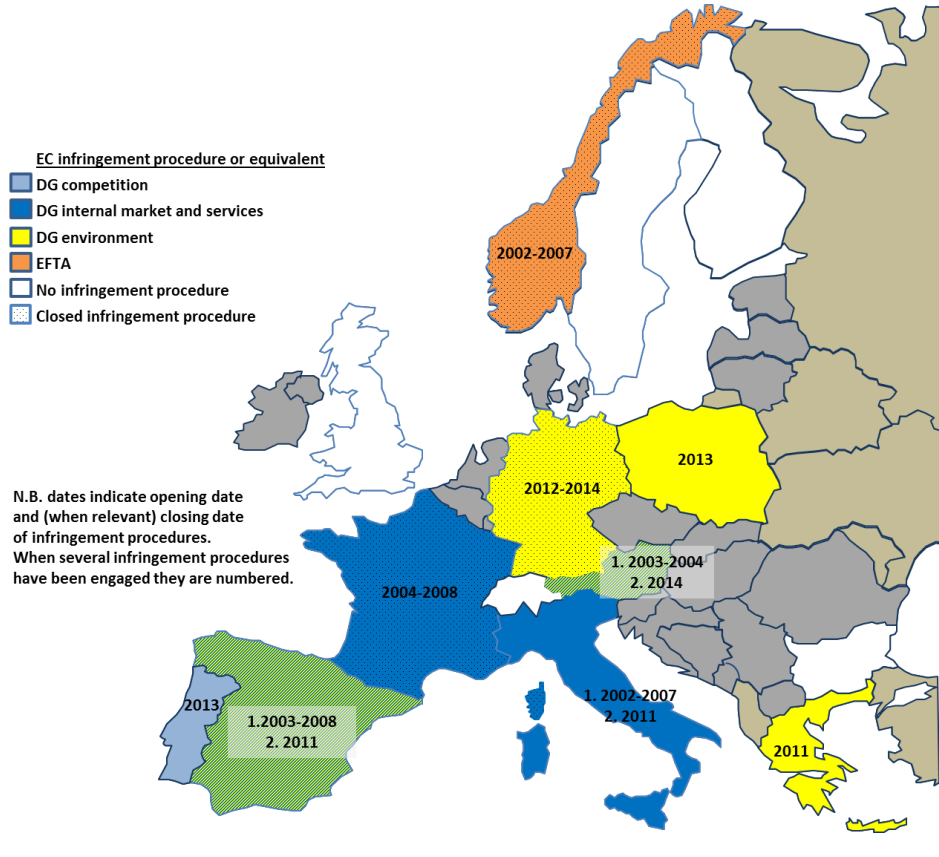


Figure 5. Competitive process to grant the right to use hydropower

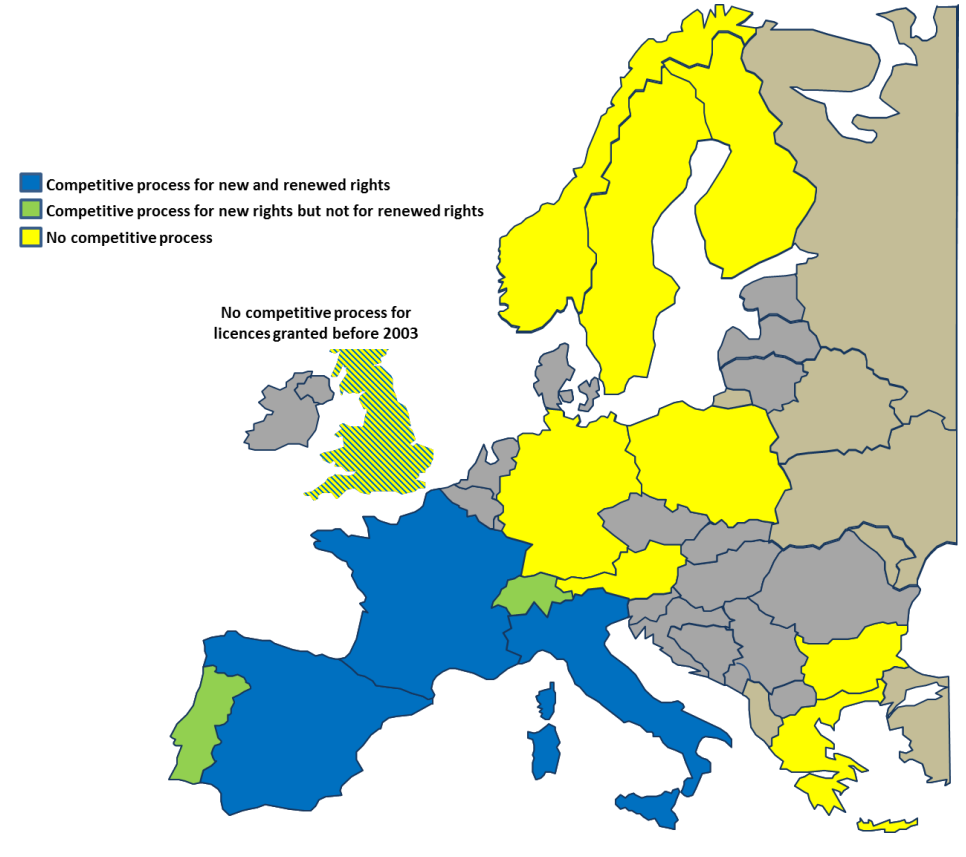


Table 1. Comparison of national situations and currently engaged procedures for competitive infringement

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

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

1. Firstly, **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 to national authorities. Trade-offs between these interests are then needed to reach decisions regarding the right of hydropower usage. In this regard, the national and local interests carry a significant weight because of the environmental impact of hydropower on watercourses. This is also reinforced by the role of hydropower in the 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, the precise definition of the **liabilities of hydropower operators is actually very consequential**. The operators' 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 the rights to use hydropower, as much for the operators' qualifications regarding the terms of rights and the quality of assets during the transfer of liabilities at renewals;
3. Analysing the framework for granting the right to use hydropower, it is noteworthy that the implementation of competitive process remains secondary, in this respect, in the EU Member States as well in other external countries. A number of countries implement authorisations (e.g. Austria), grant concessions for unlimited time (e.g. Finland and Sweden), or directly negotiate concession without a transparent competitive process. Different levels of opening are observed for the initial granting process 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 to be 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). 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 the right to use hydropower for an unlimited time, Austria grant the right to use hydropower for a very long duration period and Germany does not implement any competitive process to grant the right to use hydropower. Nevertheless, they are not under any pressure to open their granting process or make it more transparent. From this perspective, it is worth noting that the lack of uniformity in the methodology employed by the hydropower regimes will impact investment and decision making regarding this resource among Member States. Competition in the progressively integrated energy market would imply homogeneous rules for this strategic sector across Europe. It is worth emphasising that hydropower generation has lately become paramount in achieving a balanced portfolio; consequently, uneven treatment of access to this crucial resource may prove a severe and distortive hindrance to the completion of the Internal Energy Market.

Beside these main conclusions, it can be noted that **competition framing should not be the only concern with regard to hydropower since distortions can also come from unharmonised obligations, taxation and support**. Due to interdependencies among the national hydro sources through the European power market, the question of 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 it a prominent energy source in liberalised electricity systems integrating increasing amounts of renewable energy. First and foremost, hydropower has the distinct feature that it can substitute for 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 mid-merit and peak power plants in periods of higher consumption. Besides, pumping stations have a major place in balancing the system because of their considerable 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 recognised 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 is going to be needed. This is all the more valid as hydropower is an emission-free technology. Therefore, hydropower provides widespread benefits to the entire power supply chain as it produces energy, provides capacity at peak times and offers flexible balancing. Moreover, considering its concentrated location in Europe, in the Alps, Pyrenees, in Scandinavia, etc., it also significantly impacts the network constraints at the interconnections between the European countries.

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

Before liberalisation 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 the 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, Poland, Bulgaria, etc.) and their duration varies greatly, from a few years (in Great Britain, for new hydropower plants) to an unlimited duration period (Finland, Sweden).

In this context, over the past decade, the European Commission has launched several procedures concerning the compatibility of national hydropower rights granting with the European laws and regulations in numerous countries (e.g. infringement procedures against France, Spain and Italy opened in 2005; a new infringement procedure 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. Sweden or Poland) are not subject to such investigations, despite not having been founded through a competitive process. The difference of treatment raises questions about the motivation behind the actions of the European Commission, which are all the more pertinent given the interdependencies of national markets through competition on more and more coupled energy markets, as well as the interdependencies between the hydropower regimes in Europe due to the incentives they provide in investment and the use of hydropower.

To grasp an understanding of the main differences between the national hydropower regimes is then of particular interest. In 2014, the Florence School of Regulation published the first benchmarking

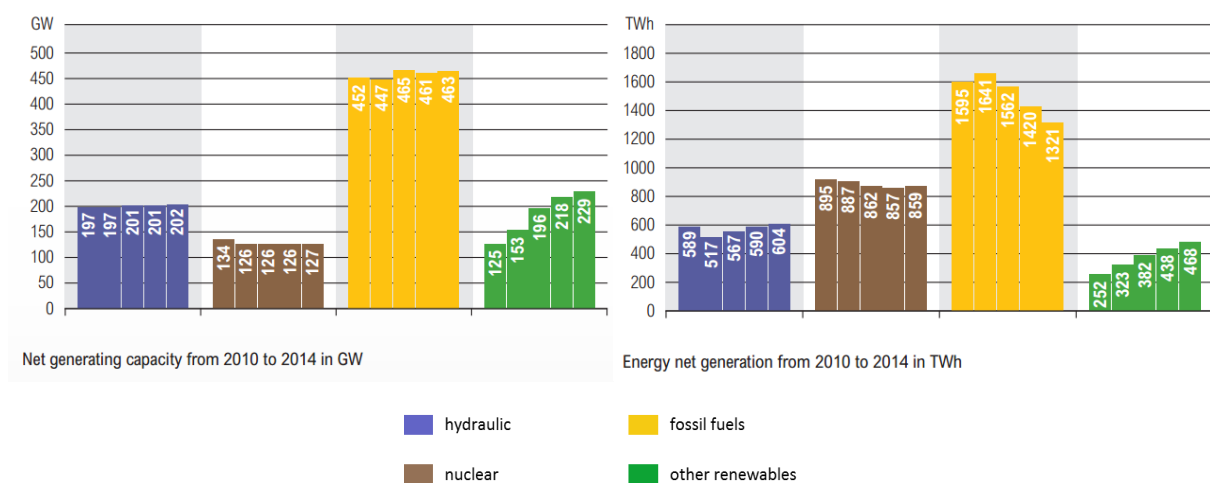
study targeting 10 European countries. Hence, the main objective of this document is to provide an updated benchmark of hydropower concession regimes in Europe, and extend the study beyond the 2014 analysis, to describe the hydropower regimes in 14 European countries (Austria, Bulgaria, Finland, France, Germany, Great Britain, Greece, Italy, Norway, Poland, Portugal, Spain, Sweden and Switzerland) and the relevant regions (e.g. cantons in Switzerland or Lands/federal states in Germany).

To fulfil this objective, the report is organised as follows. Section 1 presents general information about hydropower and its use in Europe. The hydropower regime of the 10 studied countries will be described and examined through a unified analysis framework to ensure their equal comparison in section 2. This framework is organised around 4 blocks: (1) the institutional framework of hydropower regimes (e.g. the type of rights to use hydropower, the authorities granting the rights to use hydropower, etc.); (2) the framework for granting the 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 The main characteristics of hydropower in Europe

Hydropower has characteristics that make it very beneficial to the system in liberalised electricity markets which are increasingly integrating renewable energy<sup>5</sup>. First of all, hydropower is an important technology since it can substitute for any other technology. Run-of-the-river plants produce baseload energy while hydro storage plants provide capacity and act as mid-merit or peak power plants in times of higher consumption depending on their storage capacity. Hydropower is also recognised as the cheapest technology, all costs considered<sup>6</sup> (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 (2015)<sup>7</sup>

Hydropower is already developed in a number of European countries (see figures 7, 8 and 9) and it can still be developed in a number of other European countries (see figure 10).

In the context of climate change policy, hydropower is likewise an interesting technology for two reasons. First of all, it is an emission-free technology. Furthermore, hydro storage plants also play a major role in balancing the system because they are very flexible<sup>8</sup>. It is also recognised that, as a major balancing power production technology, hydropower 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 for the whole power supply chain, producing energy, providing capacity in times of peak load and offering flexible balancing.

<sup>5</sup> 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 and Eurelectric (2015), Hydropower – supporting a power system in transition.

<sup>6</sup> Eurelectric (2011), Hydro in Europe: Powering Renewables.

<sup>7</sup> ENTSO-E (2015), Electricity in Europe 2014.

<sup>8</sup> 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 black-start (in order to restart the power system from a black-out).

Figure 7. Renewable<sup>9</sup> hydro power installed capacity and production

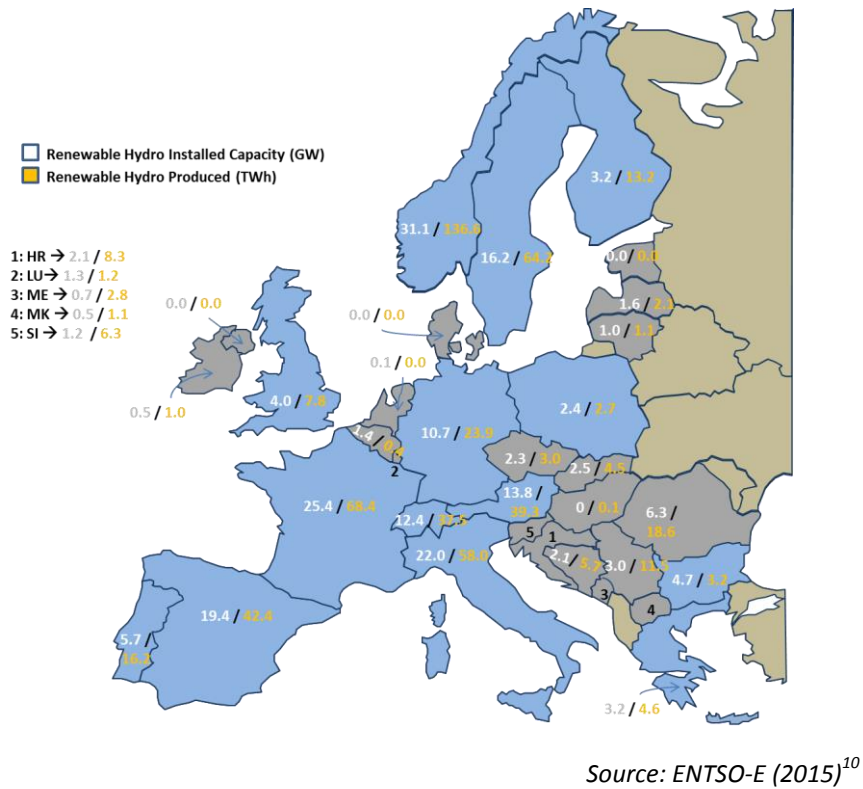
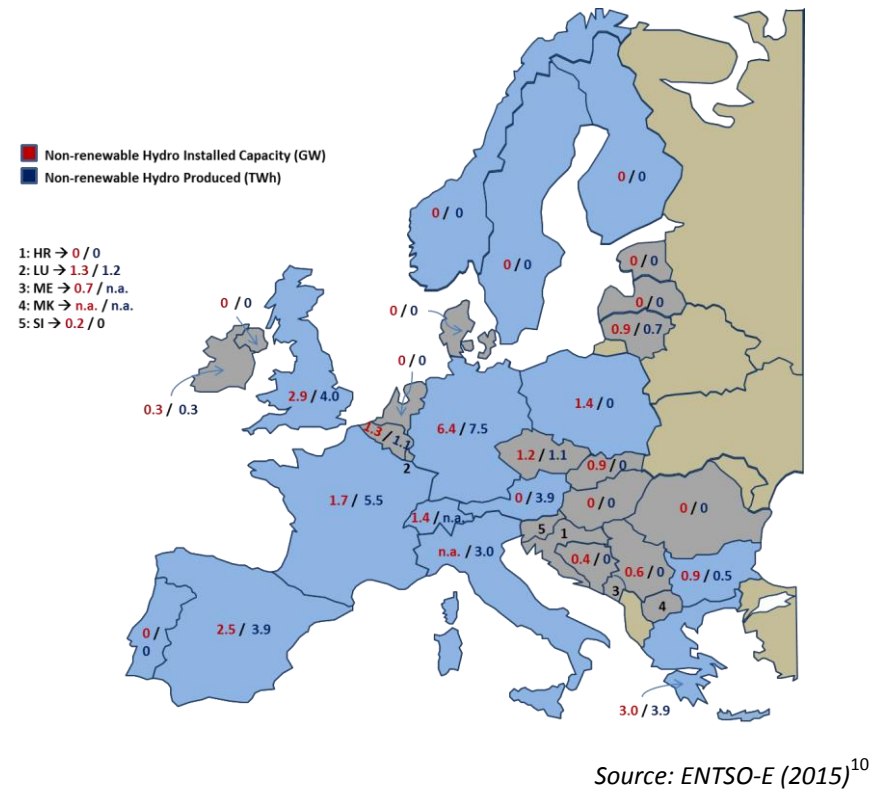


Figure 8. Non-renewable<sup>11</sup> hydro power installed capacity and production



<sup>9</sup> Renewable hydropower plants allow a non-zero watercourse residual flow, whether or not there are dams.

<sup>10</sup> ENTSO-E, 2015. Statistical Factsheet 2014.

<sup>11</sup> Non-renewable hydropower plants are supposed to be pure pumped hydro storage plants, not connected to any watercourse. Nevertheless, there are discrepancies between national and ENTSO-E data. For instance, the value of renewable hydro provided by ENTSO-E corresponds to the production of run-of-the-river power plants in Italy, but production of power plants with pondage (storing energy between 2 and 400 hours) is not integrated (14 TWh).



Figure 9. Hydropower contribution to renewable and total electricity consumption

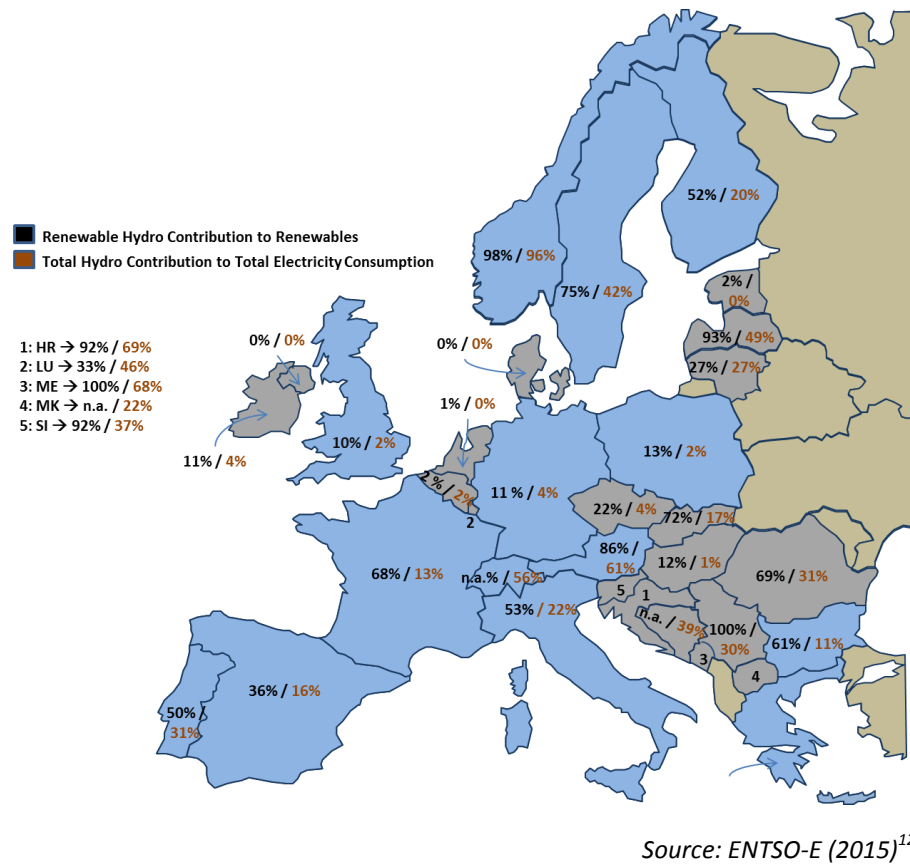


Figure 10. Hydropower potential in European countries

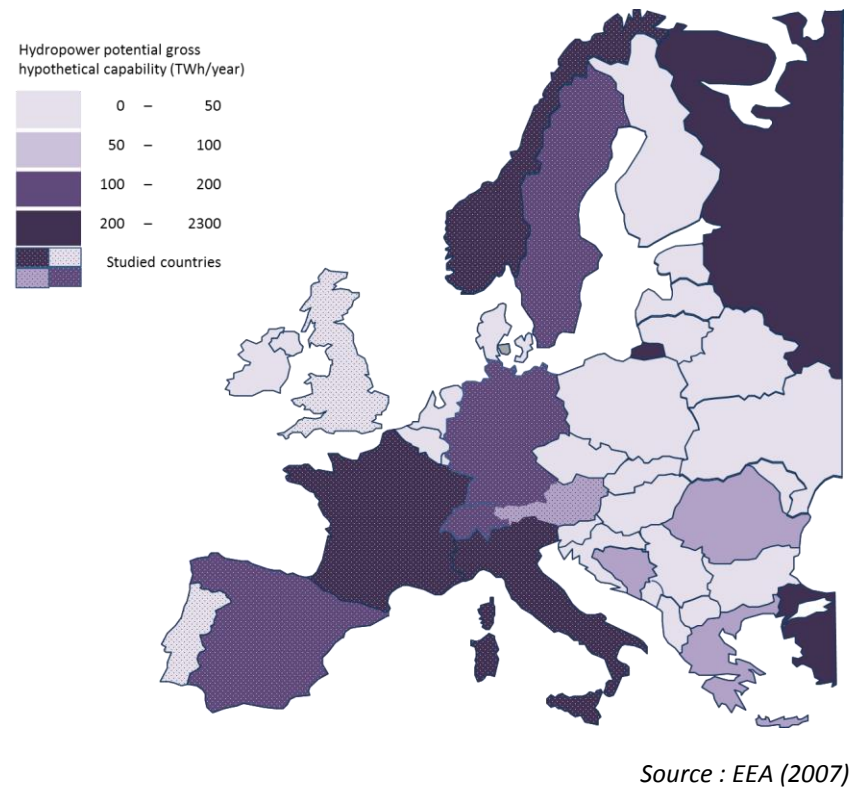
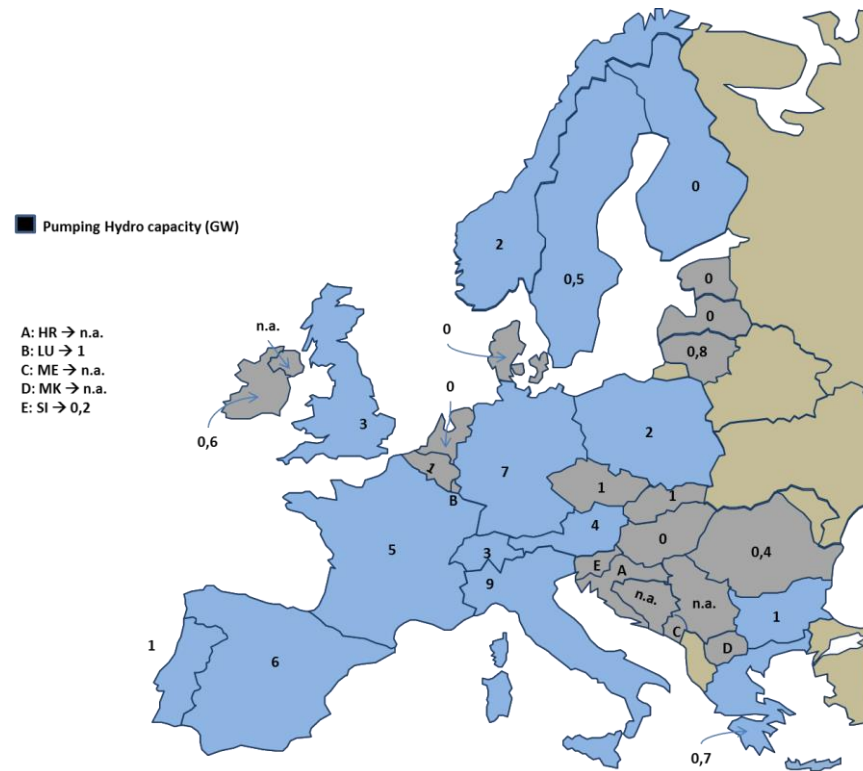


Figure 11. Pumping station capacity

<sup>12</sup> ENTSO-E, 2015. Statistical factsheet 2015

<sup>13</sup> EEA (2007), Hydropower potential (theoretical possibility for electricity generation), [http://www.grida.no/graphicslib/detail/hydropower-potential-theoretical-possibility-for-electricity-generation\\_1094](http://www.grida.no/graphicslib/detail/hydropower-potential-theoretical-possibility-for-electricity-generation_1094).



Source : DG ENER<sup>14</sup>

<sup>14</sup> 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](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 a major impact, correspondingly, 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 shown in the above graphs. Power flows to and from countries with substantial 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 happened in Europe. France, Norway, Sweden and Switzerland experienced tight supply conditions, mainly because of very low inflows for hydropower<sup>15</sup>. This is also true for the Iberian and Italian Peninsulas. As a consequence, hydropower and its inflow greatly impact the results of national and, more generally, regional (coupled) markets.

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

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

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<sup>15</sup> 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 The benchmarking of hydropower frameworks

The hydropower regimes of 14 European countries (Austria, Bulgaria, Finland, France, Germany, Great Britain, Greece, Italy, Norway, Poland, Portugal, Spain, Sweden and Switzerland) and relevant regions (e.g. cantons in Switzerland or federal States in Germany) will be described and examined through a unified analysis framework to ensure an equal comparison.

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 main schedule of renewals of the 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 (the type of rights to use hydropower, authorities granting rights to use hydropower),
- (2) the framework for granting the right to use hydropower (duration of rights and procedure, competitive process and the 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 the Austrian hydropower framework

Characteristics		Description	
Institutional framework	Authorities for granting usage rights	<ul style="list-style-type: none"> <li>• Authorisation by regional district authority for facilities &lt;500 kW</li> <li>• National authority for facilities on Danube as well as cross-border facilities</li> <li>• Otherwise by federal States</li> </ul>	
	Types of hydropower rights and granting procedures	<ul style="list-style-type: none"> <li>• Applications for authorisations validated in compliance with environmental criteria only</li> </ul>	
Framework for granting the right to use hydropower	Duration	<ul style="list-style-type: none"> <li>• Maximum authorisation duration: 90 years</li> <li>• On average between 25 and 75 years</li> </ul>	
	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	<ul style="list-style-type: none"> <li>• DG environment took Austria to Court in April 2014 over failure to protect water quality on the 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</li> <li>• In 2003, the European Commission sent a formal notice concerning the lack of competitive tenders and the maximal duration of authorisation. The case was, however, closed in 2006</li> </ul>	
Obligations of hydropower operators	Environmental obligations	<ul style="list-style-type: none"> <li>• Mandatory EIA over 15 MW</li> <li>• Watercourse residual flow to be restored until 2027 in existing hydropower plants</li> </ul>	
	Investment obligations	National legislation does not appear to provide for investment obligations except for environmental obligations	
	Royalties	<ul style="list-style-type: none"> <li>• Energy taxes</li> <li>• Local taxes</li> <li>• Mandatory participation in special funds</li> <li>• Licence fees directly negotiated with competent authorities</li> </ul>	
Small-hydro	Small hydro definition	< 2MW	
	Support	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Obligations to purchase at market prices for hydropower &lt; 10 MW</li> <li>• Alternative possibility of investment aid</li> </ul>	

### 2.1.1 Context and economics of hydropower in Austria

Austria heavily relies on hydropower for its energy supply. In 2014, it represented 61% of the total electricity generation with 40.2 TWh produced<sup>16</sup>. 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*

<sup>16</sup> ENTSO-E, 2015. *Statistical factsheet 2014*.

Austria<sup>17</sup> and the *Green Electricity Act 2012*<sup>18</sup> 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 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 the 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 environmental protection. Likewise, the expansion plans of hydropower differ from one State to the other, thus accommodating both characteristics of the 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 organised 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 the use of the watercourse.

## 2.1.2 The institutional framework for hydropower

### **Stakeholders and legislations**

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

- The Austrian Water Act<sup>19</sup> (1959, last updated in 2014) is the main piece of legislation regarding water management and the provisions for projects having a potential impact on the watercourse.
- The Green Electricity Act 2012<sup>20</sup> (amended in 2013) provides for the expansion plans of renewable technologies as well as associated support schemes. It presents provisions regarding the 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 2000<sup>21</sup> (last updated in 2013) gives provisions for environmental planning instruments, development control plans, procedures and certification.
- The 2012 Water Catalogue<sup>22</sup> (or Austrian Hydro Power Sustainability Criteria Catalogue) is a guidance for assisting bodies and authorities with regard to the environmental impact

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<sup>17</sup> Federal Ministry of Economy, Family and Youth, 2010. *Energy Strategy Austria*

<sup>18</sup> E-Control, 2014. *Green Electricity Act 2012*

<sup>19</sup> Wasserrechtsgesetz 1959, Nr. 98/2013, up-to-date as of January 2013.

<sup>20</sup> Ökostromgesetz 2012, version of May 22, 2014.

<sup>21</sup> Umweltverträglichkeitsprüfungsgesetz 2000, version of May 22, 2014.

assessment and the EIA Act 2000. It is a supporting tool which provides 16 environmental, energy, and economic criteria for the application of the European Water Directive. Water management aspects and the impact on the watercourse are especially tested. The objective of the catalogue is to make the decision process for the granting of rights and hydropower monitoring as transparent and reliable as possible and to help hydropower planners in the conception of their project. Nevertheless, it does not prevent water authorities and relevant bodies from making the final decision.

The stakeholders involved for the supervision, control, and authorisation are:

- The Federal Minister of Agriculture, Forestry, Environment and Water management is responsible for setting an environmental protection provision and coordinating the local, State, and federal authorities. It is responsible for updating and applying the Austrian Water Act.<sup>23</sup>
- The Austrian Reservoir Commission<sup>24</sup> 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 of 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, the regional government and district authorities are responsible for water management and the licensing for most hydropower facilities. Second, federal State authorities are responsible for the authorisation of small hydropower with a capacity higher than 500 kW. Last, the 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.

### ***The type of rights to use hydropower and the granting procedures***

The Austrian legislation does not issue clear water rights regarding diversion and the use of public water besides authorisation. There is no concession system but simple authorisation and licence granting processes<sup>25</sup>.

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

According to the Austrian Water Act, a complete study of the environmental impact (EIA) must be realised 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 authorisation granting. A special procedure provides for the obligation of the administration to grant the authorisation in the event that they comply with environmental requirements. Article 104a

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<sup>22</sup> Federal Ministry of Agriculture, Forestry, Environment and water management, 2014. *Wasserkatalog* - [http://www.bmlfuw.gv.at/wasser/wasseroesterreich/wasserrecht\\_national/planung/erneuerbareenergie/Kriterienkatalog.html](http://www.bmlfuw.gv.at/wasser/wasseroesterreich/wasserrecht_national/planung/erneuerbareenergie/Kriterienkatalog.html).

<sup>23</sup> Federal Ministry of Agriculture, Forestry, Environment and water management, 2014. *Reservoir*. <http://www.bmlfuw.gv.at/en/fields/water/Use-of-water/Reservoir.html>.

<sup>24</sup> Federal Ministry of Agriculture, Forestry, Environment and water management, 2014. *Stauanlagen – Staubeckenkommission*. <http://www.bmlfuw.gv.at/wasser/nutzung-wasser/stauanlagen.html>.

<sup>25</sup> Unternehmen Service Portal, 2014. *Wasserrechtliche Bewilligungspflichten*. [https://www.usp.gv.at/Portal.Node/usp/public/content/umwelt\\_und\\_verkehr/wasserwirtschaft/bewilligungspflichten/51134.html](https://www.usp.gv.at/Portal.Node/usp/public/content/umwelt_und_verkehr/wasserwirtschaft/bewilligungspflichten/51134.html).

stipulates that all projects having an impact on the water status must be audited from the public interest point of view and can only be authorised if the audit of public interest finds that the impact has been minimised or is outweighed by the social benefits it provides, that there is no better alternative, and that it is compatible with the water management plans and goals. An official licence is then granted to the applicant / hydropower planner.

### 2.1.3 Framework for granting the right to use hydropower

There is no concrete definition of the validity time for water rights. The Austrian Water Act provides, in article 21, that the authorisation 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. The licence duration cannot exceed 90 years. On average, authorisations are issued for a period from 25 to 75 years<sup>26</sup>.

Authorisation renewal can be realised until six months before the end of the authorisation period. If it is realised at least 5 years before the end of the authorisation period, the renewal decision must be made six months before the expiry, at the latest. Renewal requests are analysed on the basis of public interest and an assessment of the water use during the authorisation 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.

The framework has remained relatively stable over the past 15 years, despite an official contest from the European Commission<sup>27</sup>, which sent a formal notice in 2003 on the lack of competitive tenders and the maximal duration of the authorisations. However, the case was closed in 2006 without any amendment brought to the relevant legislation.

### 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.

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<sup>26</sup> Interviews conducted by the 2010 FSR report authors (Florence School of Regulation, 2010. *Overview on hydropower regimes in Europe*).

<sup>27</sup> Case n. 2003/2236, *Discriminations dans les procédures d'attribution de concessions hydroélectriques*. Formal notice 258(ex226), April 1, 2004; additional formal notice 258(ex226), December 14, 2004; closing of the case December 12, 2006.



### 2.1.5 Main schedule for renewal

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

### 2.1.6 Obligations of hydropower operators

Aside from 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, an 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 the 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 2009<sup>28</sup>, which provides for a full watercourse residual flow 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 potentially major energy losses – up to 1.8 TWh/y<sup>29</sup> which must be compensated by the expansion plans. This also implies difficulties for Austria to be compliant at the specified dates. In April 2014, the European Commission took Austria to Court over failure to protect the water quality of the Schwarze Sulm river, after opening an infringement procedure in 2013 on the grounds that the hydropower licence was not in line with the requirements of the WFD.

#### ***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 authorisation holders, energy taxes, local taxes, mandatory participation to special funds and licence 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 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 authorisation applicants. Private provisions and obligations are then

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<sup>28</sup> NGP 2009. *Nationale Gewässerbewirtschaftungsplanverordnung* 2009, Federal Law Gazette II Nr. 103/2010.

<sup>29</sup> VEO, 2009. *Masterplan zum Ausbau des Wasserkraftpotenzials*.

decided, such as payments and maintenance obligations, other investments, treatment procedures or flood protection.

### 2.1.7 Support for 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 of up to 2 MW<sup>30</sup>. The price is fixed between 49.7 and 105.5 €/MWh for new and revitalised small hydro power plants with at least a 50% efficiency increase, and between 32.3 and 82.6 €/MWh for revitalised small hydropower plants with a 15 to 50% efficiency increase. FiT are guaranteed for a 13-year duration period;
- The 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 for investment aid on a first-come first-served basis. Investment aid will be granted according to 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. It will be granted for small hydropower, new plants as well as rehabilitation with at least a 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.

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<sup>30</sup> Ökostromverordnung. [https://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA\\_2012\\_II\\_307/BGBLA\\_2012\\_II\\_307.pdf](https://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2012_II_307/BGBLA_2012_II_307.pdf).

## 2.2 Bulgaria

Table 3. Summary of the Bulgarian hydropower framework

Characteristics		Description	
Institutional framework	<b>Authorities for granting the rights of use</b>	<ul style="list-style-type: none"> <li>The Minister of Environment and Water</li> <li>The Executive Environment Agency</li> <li>The State Commission for Energy and Water Regulation</li> <li>The directors of Basin Directorates</li> <li>The directors of the Regional Inspectorates for Environment and Water</li> </ul>	
	<b>Types of hydropower rights and granting procedures</b>	<ul style="list-style-type: none"> <li>Request for water use permit is made by the hydropower planner</li> <li>Environmental requirements must be respected, and EIA is generally requested</li> <li>After approval by the Environment Authority, the application is transferred at the local level. The municipality then has a short delay for a review and possible objection to the project</li> </ul>	
Framework for granting the right to use hydropower	<b>Duration</b>	35 years	
	<b>Competitive process</b>	<b>For new concessions</b>	National legislation does not appear to provide competitive procedure
		<b>For concession renewals</b>	National legislation does not appear to provide competitive procedure
	<b>EC infringement proceedings or equivalent</b>	No infringement procedure appears in the European archives	
Obligations of hydropower operators	<b>Environmental obligations</b>	<ul style="list-style-type: none"> <li>Environmental Impact Assessment appears as quasi-compulsory during the permission process</li> <li>High level of constraints linked with environmental protection.</li> </ul>	
	<b>Investment obligations</b>	<ul style="list-style-type: none"> <li>National legislation does not appear to provide investment obligations.</li> <li>A “compensation flow” must, however, be provided by the hydropower plant for irrigation and water supply in the area.</li> </ul>	
	<b>Royalties</b>	There does not seem to be specific fees or royalties for hydropower plants, except for regular administrative costs linked to the permission procedure	
Small-hydro	<b>Small hydro definition</b>	Small hydropower < 10MW Support differs according to technical specificities	
	<b>Support</b>	Feed-in tariffs are available for small hydropower, with a preferential price of between 47.9 and 121.1 €/MWh (before VAT). The current price reform in Bulgaria may drive to end the hydropower feed-in tariff after July 2015, as is already the case for PV and wind power.	

## 2.2.1 Context and economics of hydropower in Bulgaria

There are 87 hydropower plants in operation in Bulgaria, with a cumulated capacity of around 3 GW, i.e. 24% of net generating capacity in the country<sup>31</sup>. Most of the existing plants are owned by the state-owned electricity utility NEK EHD (through Bulgarian Energy Holdings), with its 14 largest plants generating 97% of Bulgarian hydropower<sup>32</sup>.

Opportunities for new hydropower installations seem to be limited to small hydropower (< 10 MW), with a potential of 200 MW<sup>33</sup>. Prospects are even less favourable for large hydropower, as the new environmental dispositions (in particular, by the Water Act) prevent all new strategic projects and drive investors to bring environmental protection measures before the court. Meanwhile, small hydropower has benefited from financial support through preferential prices fixed by the regulator; however, the support may soon come to an end as Bulgarian energy prices are soaring.

## 2.2.2 The institutional framework for hydropower

### **Stakeholders and legislations**

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

- The Energy Act of 2003
- The Energy from Renewable Sources Act of 2011, last amended in December 2014, describes in particular the dispositions for the promotion of generation and consumption of energy from renewable sources. It provides details on the support schemes for small hydropower generation.
- The Act on Waters proclaimed in 1999, and last updated in November 2014, delivers legal dispositions for water use permit granting. The objective of the act is to provide water management dispositions for community interest, and health and environmental protection.

The authorities involved in the control and regulation of hydropower activities are organised at different levels<sup>34</sup>.

- At the national level, first:
  - The Minister of Environment and Water is the competent environmental authority for projects of national scope. It then requires the realisation of the Environment Impact Analysis prior to permit attribution.
  - The Executive Environment Agency is an administration with the Minister of Environment and Water to carry out management, coordination and information functions as regards the control and environmental protection in Bulgaria.
  - The State Commission for Energy and Water Regulation is the national regulatory authority for the energy, water, and sewerage sectors.
  
- At the regional and local levels:
  - The directors of the 4 Basin Directorates
  - The directors of national parks

<sup>31</sup> ENTSO-E, 2015. *Statistical Factsheet 2014*

<sup>32</sup> KPMG, 2010. *Central and Eastern European Hydro Power Outlook*

<sup>33</sup> REEP policy database 2012. <http://www.reegle.info/policy-and-regulatory-overviews/BG>

<sup>34</sup> Rivers project report, 2013. *Hydropower renewable energy study of the Bulgarian-Serbian cross-border region*

- The directors of the RIEW (Regional Inspectorates Environment and Water) are the competent environmental authorities for projects of national scope. They require the realisation of the Environment Impact Analysis prior to permit attribution.

### ***Types of rights to use hydropower and granting procedures***

There is no concession or licence system in Bulgaria. Instead, the permits for water use are granted to hydropower plants based on the provisions of the Water act. The competent environmental authority (either the Minister of Environment and Water or the RIEW) is first notified with an official demand from the project developer, after which they can require an environmental impact assessment (EIA) depending the nature and the location of the project. All relevant data and information is then transmitted to the decision maker which, depending on the situation, is the Minister of Environment and Water, the municipality, or the director of the basin directorate.

#### 2.2.3 Framework for granting the right to use hydropower

After application to the relevant Environment authority, the applicant can be required to complete an Environmental Impact Assessment. All results and documents are then assessed by the authority, and sent to the local authorities for publication and potential challenging, during a fixed period of 14 days. If no objection to the project is raised, the competent authority must deliver the permit within one month.

The Water Act fixes the maximum permit duration at 35 years. Change in the permit dispositions and obligations is possible if conditions were not respected by the applicant, or major changes occurred concerning the status of the water environment. The plant owner can submit an application for extension of the permit validity. In that case, the authority must verify that all provisions and permit conditions are verified.

The current provisions of the Water Act (e.g., article 118 section 8) impose strong restrictions that make the issue of new permissions for large hydropower unlikely<sup>35</sup>. Under these provisions, new hydropower cascade installations are forbidden, and environmental thresholds for authorisation are such that new installations are all but guaranteed not to be authorised. This strengthening of environmental criteria and objectives stems from the historic development of the hydropower stations and seriously inadequate legislation which enabled exploitation of natural resources, even in protected areas. In this context, development of new hydropower projects has been interrupted, and investors are launching procedures before the court to reassess environmental restrictions.

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<sup>35</sup> Rivers project report, 2013. *Hydropower renewable energy study of the Bulgarian-Serbian cross-border region*

## 2.2.4 Characteristics of the competitive process

### ***Competitive authorisation procedure for new installations***

The Bulgarian legislative framework does not seem to provide public and competitive procedures for the authorisation of new hydropower installations. Hydropower permissions seem to be attributed on a first-come first-served basis. In theory, foreign applications are possible, but the main hydropower plants, as all energy assets assessed of strategic importance, are owned by the State through the Bulgarian Energy Holding EAD<sup>36</sup>. Besides, current restrictions on hydropower plant development are such that new installations are unlikely in the near future.

### ***Competitive procedure for authorisation renewals***

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

## 2.2.5 Main schedule for renewal

Due to unavailable information and the seemingly progressive attribution and renewal of licences over the years<sup>37</sup>, it is not possible to draw a coherent schedule for renewal.

## 2.2.6 Obligations of hydropower operators

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

### ***Environmental obligations***

Environmental obligations are considered to be constraining for hydropower operators. According to the Water Act and the Environmental Impact Assessment framework, continuity of the water flow and residual discharge of the diversion reach must be ensured.

The Water Act also imposes severe environmental obligations, which all but forbid new large hydropower projects. In particular, cascade hydropower installations are not allowed, and new constructions are prohibited in areas where the river falls into protection zones. Environmental criteria (place of taking out of alluvial deposits, residual flows) are also placed at prohibitive thresholds.

### ***Investment obligations***

The Bulgarian legislative framework does not seem to provide investment obligations for hydropower facilities. However, facilities have to provide a "Compensation Flow"<sup>38</sup>, which must serve for irrigation as well as the industrial and potable water supply. The flow is set as a fraction of the

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<sup>36</sup> Practical Law. *Electricity regulation in Bulgaria: Overview*. [http://uk.practicallaw.com/2-523-7911?q=\\*&qp=&qo=&qe=#a699235](http://uk.practicallaw.com/2-523-7911?q=*&qp=&qo=&qe=#a699235)

<sup>37</sup> NEK. *Hydro Power Cascades and Dams* - <http://www.nek.bg/images/content/pdf/2-hpcd.pdf>

<sup>38</sup> SmallHydroWorld.org, 2013. *World Small Hydropower Development Report 2013 - Bulgaria*

long-term average flow. A minimum mean flow is also planned, which particularly affects small hydropower, where losses due to Compensation Flow can be higher than 10%.

### ***Taxes, levies and royalties***

The Bulgarian legislative and regulatory frameworks do not seem to provide specific taxes or levies aimed at hydropower plants. No special water fee seems to be in place, even though the Compensation Flow provision can be perceived as an additional cost for hydropower plants.

#### 2.2.7 Support for small hydropower

The Energy from Renewable Sources Act provides financial support for small hydropower with installed capacity lower than 10 MW. According to the legislation, the facilities are able to sell their electricity to the public provider or end suppliers at a preferential price which is set by the National Regulatory Authority for energy and water. The long-term contracts are provided for a maximum 15 year period. However, new projects commissioned from 2016 on benefit from a lower purchase period, with the end of all contracts fixed at 2030.

The preferential prices are set on an annual basis. They depend on the type of renewable source and technology, as well as the capacity of the project and the development procedure characteristics. The prices are determined for the whole period of the purchase contracts. The current prices for hydropower facilities are the ones presented in the following table.

As is the case in several European countries, the future trend of preferential prices in Bulgaria is toward a reduction of financial support, as the country faces soaring energy prices<sup>39</sup>. In February 2015, the end of preferential prices for PV and wind facilities was eventually decided, and the future of hydropower support, to be cleared up in the next few months, seems just as grim.

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<sup>39</sup> IEA - <http://www.iea.org/policiesandmeasures/pams/bulgaria/name-25061-en.php>

Table 4. Hydropower preferential prices from 1<sup>st</sup> July 2014 to 1<sup>st</sup> July 2015

Technical characteristics	Preferential price (€/MWh <sup>40</sup> ) excl. VAT
Micro hydropower plants with installed capacity < 200 kW	100.3
Low-head hydropower plants, storage hydropower stations and hydropower plants with annual equaliser with a net drop to 30 meters, and installed capacity btw. 200 kW and 10 MW	96.8
Low-head hydropower plants with drop to 15 meters without diversion channel and installed capacity btw. 200 kW and 10 MW	121.1
Medium hydropower plants, operating storage and hydropower plants with a net drop 30-100 meters and installed capacity 200 kW – 10 MW	81.4
High-pressure hydropower plants, operating storage and hydropower plants with a net drop over 100 meters, installed capacity 200 kW – 10 MW	77.9
Tunnel derivations with upper reservoir with an annual installed capacity of 10 MW	114.7
Small hydropower plants pumps	47.9

Source: Regulation № 4 -13 om 01. 07. 2014 z of the SCEWR

<sup>40</sup> 1 € = 1.9558 BGN



## 2.3 Finland

Table 5. Summary of the Finnish hydropower framework

Characteristics		Description	
Institutional framework	<b>Authorities for granting the rights of use</b>	<ul style="list-style-type: none"> <li>Regional State Administrative Agency</li> <li>Ministry of Employment and the Economy</li> <li>Centre for Economic Development, Transport and the Environment</li> <li>Municipal Environment Protection Authorities</li> </ul>	
	<b>Types of hydropower rights and granting procedures</b>	<ul style="list-style-type: none"> <li>Request for water use permit is made by the hydropower planner</li> <li>The coordinating authorisation shall be submitted with the application report, containing if required the Environmental Impact Assessment</li> <li>Statement is then issued and the application is published to give local stakeholders the opportunity to object or express opinions</li> </ul>	
Framework for granting the right to use hydropower	<b>Duration</b>	Unlimited time	
	<b>Competitive process</b>	<b>For new concessions</b>	National legislation does not appear to provide competitive procedure
		<b>For concession renewals</b>	No (competitive or negotiated) procedure regarding permit renewals
	<b>EC infringement proceedings or equivalent</b>	No infringement procedure appears in the European archives	
Obligations of hydropower operators	<b>Environmental obligations</b>	<ul style="list-style-type: none"> <li>Environmental Impact Assessment can be required</li> <li>Environmental obligations are otherwise limited and are inexistent for old permits</li> </ul>	
	<b>Investment obligations</b>	National legislation does not appear to provide investment obligations	
	<b>Royalties</b>	<ul style="list-style-type: none"> <li>Real estate tax levy based on the value of the property: max 2.85% for large hydropower plants (&gt; 10MW), max 1.3% for small hydropower plants</li> <li>Environmental compensation to fish population: 0.3-0.5 €/MWh; discussions to make it 5 to 7 times higher</li> </ul>	
Small-hydro	<b>Small hydro definition</b>	< 10 MW	
	<b>Support</b>	<ul style="list-style-type: none"> <li>Same mechanism for all hydropower</li> <li>“Energy aid” grant attributed to RES plants for up to 30% of their eligible investment cost</li> <li>End of the programme in 2017</li> </ul>	

### 2.3.1 Context and economics of hydropower in Finland

With 13.2 TWh generated in 2014, a dry year<sup>41</sup>, hydropower represents about 20% of Finnish power generation (65.4 TWh) and half of the electricity generated by renewable energy sources<sup>42</sup>. There are currently more than 200 hydropower plants in Finland with a combined capacity of around 3000 MW. According to a 2005 study by the Ministry of Trade, more than 600-MW capacity could still be exploited within the authorised areas, mostly as an upgrade of existing sites<sup>43</sup>. Between 2014 and 2017, 72-MW combined capacity should be commissioned in the country.

### 2.3.2 The institutional framework for hydropower

#### **Stakeholders and legislations**

The legal structure for the use of the watercourse for hydropower is mostly based on the following documents:

- The Act on Water Resources Management (1299/2004) organises the structure for monitoring and control of water resources
- The Water Act (587/2011) ensures the social, economic, and ecological sustainability of water resources through the control and coordination of its uses
- The Environmental Impact Assessment Procedure (468/1994) provides the criteria for the requirement of an EIA as well as the completed assessment
- Energy Aid decree (1063/2012) provides disposition of the Energy aid which benefits hydropower

The relevant stakeholders involved in the control and authorisation of the development and operation of hydropower installations are the following:

- The Regional State Administrative Agency is the Authority responsible for permit issuance.
- The Ministry of Employment and the Economy is responsible for the organisation of the “Energy aid” where investment costs exceed €5 million
- The Centre for Economic Development, Transport and the Environment is the State supervisory authority for the use of water resources. It is also responsible for the organisation of the “Energy aid” where investment costs are lower than €5 million
- Municipal Environment Protection Authorities are the local supervisory authorities for the use of water resources

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<sup>41</sup> Comparatively, the electricity production from hydropower reached 16 TWh in “wet” years 2008 and 2012, according to the official Finnish Statistics.

<sup>42</sup> National report 2014 of the Finnish NRA - <https://www.energiavirasto.fi/documents/10179/0/National+Report+2014+Finland+1602-601-2014+-+20140710.pdf/61dd1249-c1d7-4b15-8af6-e2ce41f8dcd9>

<sup>43</sup> <http://www.small-hydro.com/Past-Contributors-Pages/Finland.aspx>

### ***The types of rights to use hydropower and granting procedures***

The Finnish regulatory system does not provide a concession or licence scheme for the use of water by hydropower facilities. A simple permit process is instead organised at the national level, with legal disposition laid down in the Water Act.

The permit process is initiated by the initial application of the investor, which must provide to the coordination authority (Centre for Economic Development, Transport and the Environment) an assessment programme<sup>44</sup>, *i.e.* relevant information regarding the project. This includes information on the benefits and the costs of the project, with a preliminary assessment of the impact at the social, economic and environmental level. Information must also be obtained concerning the plans for operation monitoring and implementation. In case an Environmental Impact Assessment is required under the provision of law 468/1994, a specific assessment report must also be joined to the submission by the applicant. The coordination authority then issues a statement on the report, and the application is officially announced by public notice to the municipalities impacted by the project. The local stakeholders are able to address objections and express opinions on the projects, before eventual permit issuance.

#### 2.3.3 Framework for granting the right to use hydropower

The permit issued under the Water Act is normally valid for an undefined period, *i.e.*, “until further notice”. However, details are specified regarding delays for the construction and project implementation: the time limit for implementation is thus limited to 10 years, and undertaking implementation may take a maximum of four years.

There is no expiry for a permit valid “until further notice”, unless the provisions of the permit were not respected, *e.g.* regarding the delays to undertake actions imposed by the permit. The permit holders, however, have the possibility to transfer their rights to use hydropower to another party, either temporarily or permanently. Competent authorities may also review permit conditions, imposing new constraints on permit holders, to be respected to preserve the permit. In case the new obligations are due to extraordinary changes in the water body, the hydropower facility can be financially compensated<sup>45</sup>.

#### 2.3.4 Characteristics of the competitive process

##### ***Competitive authorisation procedure for new installations***

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

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<sup>44</sup> Practical Law, 2012. *Environmental law and practice in Finland: overview*.

<sup>45</sup> Source Issue Paper 2011

### **Competitive procedure for authorisation renewals**

Given the unlimited nature of regular permits for water use, there are no (competitive or negotiated) procedures regarding permit renewals.

#### 2.3.5 Main schedule for renewal

Given the unlimited nature of regular permits for water use, there is no pertinent schedule for their renewal.

#### 2.3.6 Obligations of hydropower operators

Hydropower permit holders must respect several major obligations which impact their strategic and operational decisions.

##### **Environmental obligations**

When applicable, hydropower operators must also comply with an Environmental Impact Analysis prior to the emission permit. Their obligations at the environmental level are otherwise limited: a minimum residual flow may be stated in new hydropower permits, but it is usually not the case for old permits, the main issues of which are usually not covered by any law or regulatory constraint.

##### **Investment obligations**

There is no specific investment obligation provided in the Finnish legislation.

##### **Taxes, levies and royalties**

Hydropower plants are subject to regular taxes such as ordinary income tax (reduced to 20% in 2014) and property taxes levied by local municipalities<sup>46</sup> on the value of the property. Concerning property taxes, larger hydropower (capacity higher than 10 MW) is subject to a specific real estate tax for power plants, of which the maximum rate is 2.85%. Meanwhile, small hydropower is subject to regular real estate, of which the maximum rate is 1.3%. Overall, the differences observed in real estate tax levels can lead to major distortions from one plant to another<sup>47</sup>: the rate for the River Vuoksi dam is 0.9 €/MWh for a generation capacity of 1.1 TWh, while the rate for the River Kemijoki dam is 3.9 €/MWh, for a generation capacity of 4.4 TWh.

Specific fees for hydropower plants mostly concern the environmental compensation to fish population. The current level is at 0.3 to 0.5 €/MWh, but discussions are currently underway which could lead to a five-time multiplication of the tax. There is otherwise no fee for water use by hydropower plants. Indeed, Finnish hydropower is part of real estate; hence the project owner must own or lease the water section in order to operate.

In 2013, a new windfall tax to the State was also considered for non-emission power generation assets such as hydropower or nuclear power. The Parliament approved a first version of the document which provided for a tax, which could have been up to 3.8 €/MWh; however the

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<sup>46</sup> Nordenergi, 2015. *Nordic tax report 2014*.

<sup>47</sup> Fortum, 2014. Report on the hydro meeting presentation of 2014

government eventually renounced it in 2014, and the Parliament officially revoked the tax in January 2015<sup>48</sup>.

### 2.3.7 Support for small hydropower

Small hydropower initially benefited from support in the form of feed-in tariffs; however, the support ended in January 2012. Since then, new measures for tax relief and investment grants have been launched by the government.

The Energy Aid decree (1063/2012) was voted for in 2012, and concerns specific investment grants between 2013 and 2017. It has been notified as State aid to the European Commission and has been declared compatible with the Treaty. The aid consists in the payment of a share of the investment or research costs of projects aimed at renewable energy production, energy-saving or energy-efficiency measures, or an environmental impact reduction. All hydropower measures are technically eligible. Support is paid on application in arrears based on the progress of the project. The amount is calculated on the basis of project-specific criteria and proportionally to eligible costs. The normal maximum amount is fixed at 30% of the cost of the investment projects for RES facilities. The decree also specifies that at least 25% of the project's financing must be funded by non-governmental sources.

The authorities responsible for the assessment of grant applications and aid calculation are the Centre for Economic Development, Transport and the Environment, as well as the Ministry of Employment and Economy for investments higher than €5 million and research projects costing more than €250,000. The authorities have some degree of flexibility with regards to their assessment and support calculation.

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<sup>48</sup> Fortum, 2015. Fortum annual report 2014

## 2.4 France

Table 6. Summary of the French hydropower framework

Characteristics		Description	
Institutional framework	Authorities for granting the rights of use	<ul style="list-style-type: none"> <li>• Departmental prefecture for infrastructures &lt;100MW</li> <li>• The Ministry of Energy &gt; 100MW</li> </ul>	
	Types of hydropower rights and granting procedures	<ul style="list-style-type: none"> <li>• Authorisation &lt; 4.5 MW</li> <li>• Concession &gt; 4.5 MW</li> </ul>	
Framework for granting the right to use hydropower	Duration	<ul style="list-style-type: none"> <li>• Concession duration of up to 75 years. More recent concessions are granted for 40 years</li> <li>• Authorisation procedures can last more than 5 years</li> </ul>	
	Competitive process	For new concessions	<ul style="list-style-type: none"> <li>• 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</li> <li>• Authority selects the winning candidate based on the project application granting better environmental protection</li> </ul>
		For concession renewals	Ranking of tender <ul style="list-style-type: none"> <li>• Maximising energy</li> <li>• Limiting environment impact</li> <li>• Maximising expected royalties</li> </ul>
	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"> <li>• Watercourse minimum flow set at 10% on average by the national regulation</li> <li>• Local authorities often require a watercourse minimum flow of between 12% and 17%</li> </ul>	
	Investment obligations	To meet environmental requirements: <ul style="list-style-type: none"> <li>• e.g. modernising installations to increase power production with the same flow</li> <li>• ensuring land drainage</li> </ul>	
	Royalties	<ol style="list-style-type: none"> <li>1. Fee for the use of watercourses</li> <li>2. + Fee for the occupation of the hydroelectric public domain</li> <li>3. + Charge proportional to the MWh produced, or dividends or distributed profits</li> <li>4. + Charge proportional to the revenue from electricity sales</li> </ol>	
Small-hydro	Small hydro definition	< 4.5MW	
	Support	60.7 €/MWh (no time of use tariff) + a premium between 5 and 25 €/MWh (inversely proportional to capacity) + a winter bonus of up to 16.8 €/MWh depending on regularity of production	

### 2.4.1 Context of hydropower in France

Although the French electricity mix mostly relies on nuclear (75.5%), hydropower (11.4%) is the second energy source in the electricity mix (shortly ahead of conventional production – 9.7 %) <sup>49</sup>. It has been an important source of electricity since the 1920s and a highly debated topic in the current

<sup>49</sup> World Energy Council (2014), Data, Sustainability Index, <http://www.worldenergy.org/data/sustainability-index/>.

political arena. 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 in order to maintain the low CO<sub>2</sub> emission level of the electricity sector, but not to the detriment of the country's economic and competitive interests.

In France, national legislation requires that hydropower generation facilities have valid concessions in order 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 ruling<sup>50</sup>. 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.

#### 2.4.2 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 hydropower<sup>51</sup>;
- The Energy Code<sup>52</sup>, 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)<sup>53</sup>;
- 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 companies<sup>54</sup>; and

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<sup>50</sup> 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](http://europa.eu/rapid/press-release_IP-05-920_en.htm?locale=en).

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

<sup>51</sup> Legifrance (2014), Loi du 16 octobre 1919 relative à l'utilisation de l'énergie hydraulique, <http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000498687&dateTexte=20100713>.

<sup>52</sup> Legifrance (2014), Code de l'énergie, <http://www.legifrance.gouv.fr/affichCode.do?cidTexte=LEGITEXT000023983208&dateTexte=20110816>.

<sup>53</sup> 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).

<sup>54</sup> 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>.

- The Orders of 23 December 2008 relating to the letter of intent, the concession application file and concession end file<sup>55</sup>.

The stakeholders involved with hydropower installations are the following:

- The DGE (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 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).<sup>56</sup>
- The National Regulatory Commission<sup>57</sup> (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 the regulation of wholesale and retail electricity and gas markets.
- The Regional Directorate for Environment, Planning and Housing<sup>58</sup> (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 Authorities<sup>59</sup> (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 the permission to build/own hydropower installations.

### ***Types of rights 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.

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<sup>55</sup> 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>.

<sup>56</sup> 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>.

<sup>57</sup> Commission de régulation de l'énergie (n.d.), <http://www.cre.fr/en>.

<sup>58</sup> Direction régionale de l'environnement, de l'aménagement et du logement.

<sup>59</sup> Agences de l'Eau.



Authorisation procedures are normally lengthy and can last for two years and up to more than five years<sup>60</sup>.

### 2.4.3 Framework for granting the right to use hydropower

The maximum validity of most concessions is 75 years<sup>61</sup>. 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.

Before 2008, a preference was given to outgoing concession-holders when concessions for works using hydraulic power were 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 preference<sup>62</sup>. The French legislation was changed in 2006, thereafter preventing any further 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 the tendering process now appears to be suspended.

The current situation in France was well illustrated in the Battistel Parliamentary report that was published in October 2013<sup>63</sup>. The report, commissioned by the French Parliament, put forward several reasons that suggested the need for a thorough examination of the hydropower market opening (i.e. in particular: the lack of a reciprocal "opening" to access other European countries' hydropower market, mainly due to the countries' legislative framework for hydropower; jeopardising users' safety and the security of supply; the likely inevitable increase in electricity prices for consumers; 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 and, finally, the insufficient guarantees for local actors).

Some of the conclusions of the report<sup>64</sup> have been included in the current energy transition bill. The bill was passed in the summer of 2015, and seeks to introduce substantial changes to the hydropower concessions regime and management.

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<sup>60</sup> 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](http://www.developpement-durable.gouv.fr/IMG/pdf/DGALN_rapport_GT.pdf).

<sup>61</sup> 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](http://www.developpement-durable.gouv.fr/IMG/pdf/REC_hydroelectricite_mai_Octobre_2012.pdf).

<sup>62</sup> 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](http://europa.eu/rapid/press-release_IP-05-920_en.htm?locale=en).

<sup>63</sup> The Battistel Parliamentary report was an informational report on the future of hydroelectric concessions in France. This report had the three objectives: 1) To stress the importance of hydroelectricity in the French energy mix 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.

<sup>64</sup> 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. I. The first scenario is the "Barycentre" method, which was the government's preferred 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 weighing the maturity dates of the various contracts relative to the different revenue. II. 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 ; III. The third scenario consists of the operation of hydroelectric concessions by a public institution, meaning that EDF's hydropower activities would be spun off

The key features of the energy transition reform on this very topic should be<sup>65, 66</sup>:

- **'Barycentre' method for renewal of concessions:** the method allows the bundling together of several concessions located in the same valley and setting a single expiry date prior to the launch of the bidding process. The draft bill sets out the principle according to which the bundling of several concessions shall ensure that the concessionaire maintains an economic equilibrium, assessed on the basis of all bundled concessions.
- **Exceptional extension of some concessions:** the amendment reflects a provision of the EU Directive 2014/23/EC on the award of concession contracts. The directive provides that a concession contract can be modified in case additional works or services, not included in the initial concession, have become necessary.
- **New royalty scheme:** the energy transition bill sets out the basis of a new royalty scheme and provides that a revenue-based royalty shall be paid to the State for all new or renewed or extended concessions.
- **Public-private company system:** the energy transition bill foresees, under very specific conditions, the possibility for the State to establish dedicated public-private companies (*sociétés d'économie mixte hydroélectriques*, in French – SEMH ), held jointly with a private partner selected by tender and other public entities – which will be awarded concession agreements.

The new hydropower concession regime should then be implemented via the enactment of several decrees.

#### 2.4.4 Characteristics of the competitive process

##### ***The competitive concession procedure for new installations***

The procedure to obtain a concession can be summarised as follows<sup>67</sup>. 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 permitted 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 dialogue with the competent authorities where the admitted candidates can present their analysis of the project characteristics and variants. In a second and final phase, the administrative authority shall inform the applicant of the closing phase of dialogue and, where appropriate, of the changes in the quantitative and qualitative characteristics of the deliverables following the dialog with admitted candidates. They then submit their bids which are selected on previously specified criteria (granting better environmental protection) following opinions from services or Ministries (about Agriculture, Waterways, Finance, Marine & Fisheries, etc.) depending on the size of the plants (prefectural services below 100 MW and Ministries otherwise).

##### ***Competitive concession procedure for renewals***

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and bought by the State and converted into a public institution. IV. The fourth scenario consists of awarding authorisations to hydroelectric installations instead of concessions, as authorisations are not subject to the reopening of competition.

<sup>65</sup> <http://www.assemblee-nationale.fr/14/ta/ta0575.asp>

<sup>66</sup> 'Long-awaited reform of hydropower concessions', International Law Office, March 2015.

<sup>67</sup> 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](http://www.developpement-durable.gouv.fr/IMG/pdf/REC_hydroelectricite_maj_Octobre_2012.pdf).

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*)<sup>67</sup>, 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, which 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 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 the 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 relative to the revenues / turnover of the concession. Depending on the dimensions of the concessions (in terms of installed capacity - MW), the prefect of the department or the Ministry of Sustainable Development chooses the next concessionaire which best meets these criteria.

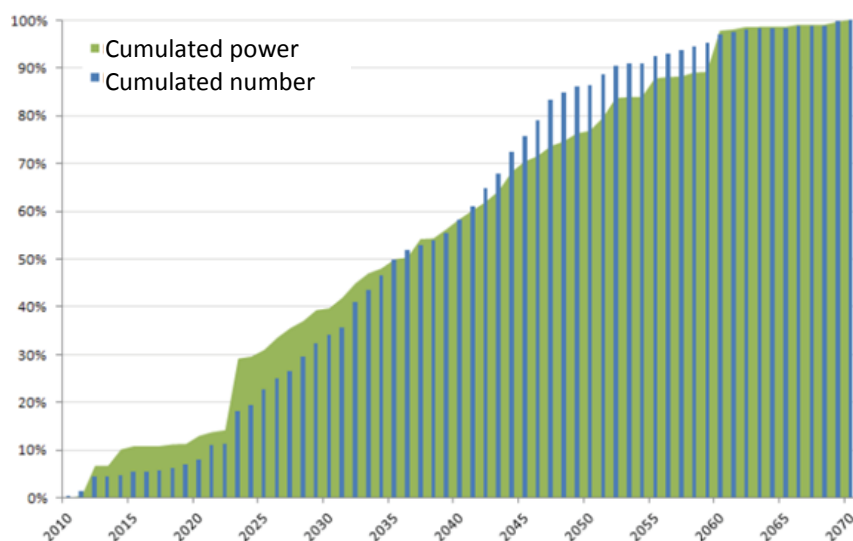
#### 2.4.5 Main schedule for renewal

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 2060<sup>68</sup>.

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<sup>68</sup> 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 12. Expiry date of hydropower concessions in cumulated number and cumulated power



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

#### 2.4.6 Obligations of hydropower operators

Aside from the right of use for 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 the 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 at around 10% of the average annual flow. Since 2006, local administrations have started to ask for higher levels of residual flows (between 12 to 17%), without any justification on improvement or the maintenance of a good ecological status. Since then, it is estimated that 2,000 GWh/y were lost due to these increased 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 installations<sup>69</sup>.

##### **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.

<sup>69</sup> 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](http://streammap.esh.a.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf).

### **Taxes, levies and royalties**

The legislative and regulatory framework currently provides for 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 MWh 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*)<sup>70</sup>. Royalties are shared among the State, departments and municipalities. Half of the royalties go to the State while a third goes to the concerned departments and a sixth to the concerned municipalities according to the energy potential along the watercourse<sup>71</sup>.

#### 2.4.7 Support for small hydropower

Small hydropower plants are subject to feed-in tariffs. The Arrêté 1<sup>st</sup> of March 2007 states that the FiTs are valid for a period of 20 years and consists of 60.7 €/MWh in addition to a premium of between 5 €/MWh to 25 €/MWh, as well as a winter bonus of up to 16.8 €/MWh depending on the regularity of the production<sup>72</sup>.

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<sup>70</sup> 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](http://www.vnf.fr/vnf/img/cms/Tourisme_et_domainehidden/BO63_complet_20131203134958.pdf).

<sup>71</sup> 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](http://www.developpement-durable.gouv.fr/IMG/pdf/REC_hydroelectricite_maj_Octobre_2012.pdf).

<sup>72</sup> Lapiere, 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](http://www.nortonrosefulbright.com/knowledge/publications/66831/european-renewable-energy-incentive-guide-france#pg_hdr).

## 2.5 Germany

Table 7. Summary of the German hydropower framework

Characteristics		Description	
Institutional framework	<b>Authorities granting the rights of use</b>	<ul style="list-style-type: none"> <li>• District councils</li> <li>• Local authorities</li> </ul>	
	<b>Types of hydropower rights and granting procedures</b>	<ul style="list-style-type: none"> <li>• Request for permit is made by the hydropower planner / operator</li> <li>• 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</li> <li>• Environmental requirements must be respected. EIA is compulsory except for small hydropower plants</li> <li>• Specific demands can be brought by the authority in each individual case</li> </ul>	
Framework for granting the right to use hydropower	<b>Duration</b>	30 years maximum	
	<b>Competitive process</b>	<b>For new concessions</b>	National legislation does not appear to provide for competitive procedure
		<b>For concession renewals</b>	National legislation does not appear to provide for competitive procedure
	<b>EC infringement proceedings or equivalent</b>	The European Commission took Germany to Court in 2012 over the incomplete cost recovery for water services, and in particular the exclusion of hydropower from the definition of water services. The procedure was dismissed in 2014 by the Advocate General, which judged that a narrow interpretation of secondary law does not constitute infringement.	
Obligations of hydropower operators	<b>Environmental obligations</b>	<ul style="list-style-type: none"> <li>• Minimum watercourse flow as a federal obligation for all hydropower stations, with regard to the Water Framework Directive</li> <li>• Compulsory EIA for medium and large hydropower</li> </ul>	
	<b>Investment obligations</b>	National legislation does not appear to provide for investment obligations	
	<b>Royalties</b>	There are no fees at the federal level, but specific taxes or rights can be negotiated by the authority and the stakeholders during the project assessment	
Small-hydro	<b>Small hydro definition</b>	No actual definition, all hydropower seems supported by a differentiated level of support	
	<b>Support</b>	FIT is available, whatever the hydro power capacity. For small hydropower specifically, it is at 125.2 €/MWh for capacity < 500 kW. The tariffs are guaranteed for 20 years	

### 2.5.1 Context and economics of hydropower in Germany

Compared to its neighbours, Germany only presents limited hydropower resources. In 2014, hydropower accounted for around 4% of the total electricity generation in Germany<sup>73</sup>. Within the 126.9 TWh of renewable electricity generated in 2014, hydropower represented only 11%, providing around 16 TWh. About 7.400 hydropower stations are currently operating in Germany, the biggest 400 presenting a capacity bigger than 1MW and producing 87% of the total output<sup>74</sup>. In 2014, the total hydropower capacity was 10.6 GW, including 6.3 GW of pumped storage energy.

<sup>73</sup> ENTSO-E, 2015. *Statistical factsheet 2014*.

<sup>74</sup> DWA, 2014. *DWA-Politikmemorandum*.

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 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 stabilise and increase with extensive support. The increase in capacity will come from refurbishment rather than new projects, with the potential of remaining non exploited basins being very low in Germany.

Germany is a federal country which delegates very significant power to each of its 16 Länder / States. The two States with the most concentrated hydropower capacity are the Southern Länder of Baden-Württemberg 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-Württemberg (BW) will be described.

## 2.5.2 The institutional framework for hydropower

### **Stakeholders and legislations**

The federal law has introduced major provisions regarding the 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 the construction and operation of hydropower plants.

#### At the federal level:

The legal structure for the use of the watercourse for hydropower is mostly based on federal legislations and documents. It is organised through the following acts<sup>75</sup>:

- Law on Environmental Impact Assessment Act (EIA Act) of February 24, 2010<sup>76</sup>. It regulates environmental impact assessments for projects with a potential impact on the environment.
- Federal Pollution Control Act of May 17, 2013<sup>77</sup>.
- Water Resources Act (WHG) of July 31, 2009<sup>78</sup>. It is the central law for assessing the lawfulness of the establishment and the operation of hydropower facilities. It contains provisions for water management, use of hydropower, permit authorisation and minimum water flow conditions with respect to the EU Water Framework Directive.

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<sup>75</sup> 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/>.

<sup>76</sup> 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/>.

<sup>77</sup> 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](http://www.bmub.bund.de/service/publikationen/downloads/details/artikel/bundes-immissionsschutzgesetz-bimschg/?tx_ttnews%5bbackPid%5d=966).

<sup>78</sup> 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](http://www.bmub.bund.de/service/publikationen/downloads/details/artikel/gesetz-zur-neuregelung-des-wasserrechts/?tx_ttnews%5bbackPid%5d=289).

- Federal Nature Conservation Act
- Renewable Energy Sources Act (EEG) of 2012<sup>79</sup>. The Act is complementary to the Energiewende and provides for 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 for economic incentives for the use of the watercourse for hydropower, but also includes the ecological requirements that must be reached 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.
- Other ordinance, policies, other regulations<sup>80</sup>

#### 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 the supervision, control, and authorisation are the district councils, which are the main authorities for the 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 adherence to environmental obligations.

#### ***The types of rights 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 licence or a permit. The authorisation is issued through a process involving stakeholders and the relevant authorities. During the process, objections can be raised and the environmental impact assessment must be performed if the project is characterised as a large hydropower (i.e., with a capacity higher than 1 MW), and is thus affected by the EIA Act. The permit/licence can be refused if the project is assessed as harmful, or if 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.

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<sup>79</sup> 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/>.

<sup>80</sup> 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/>.



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.

### 2.5.3 Framework for granting the right to use hydropower

According to the Water Resources Act, the licence / 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 non-existent. At the expiry date, the State can choose to grant the licence again to the same operator if the latter requests it, or it can choose to open a competitive process for licence granting. The legislation does not give any 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 holder<sup>81</sup>.

### 2.5.4 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 a hydropower authorisation renewal.

### 2.5.5 Main schedule for renewal

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

### 2.5.6 Obligations of hydropower operators

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

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<sup>81</sup> Interviews conducted by the 2010 FSR report authors (Florence School of Regulation, 2010. *Overview on hydropower regimes in Europe*).

### ***Environmental obligations***

The environmental obligations are defined in the Water Resources Act. In particular, provisions to comply with 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 for complementary environmental requirements for supported hydropower. Financial incentives are given to improve the ecological status 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.

### ***Taxes, levies and royalties***

There are no water use fees at the federal level, but special taxes or licence rights can be raised by competent authorities during permit negotiations. In 2012<sup>82</sup>, the European Commission referred Germany to Court, estimating that the country did not fully apply the principle of cost recovery for water services. Germany indeed applied a narrower approach, in which the cost recovery only concerns drinking water and wastewater, thus excluding other activities such as hydropower. However, the claim was dismissed in 2014<sup>83</sup>, after the Advocate General Jääskinen concluded<sup>84</sup> that a narrow interpretation of secondary law does not constitute infringement.

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 rate 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.

### 2.5.7 Support for 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/large hydropower facilities<sup>85</sup>. The support for hydropower should, in particular, give access to the expansion potential for small hydropower through the modernisation and reactivation of existing plants.

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<sup>82</sup> [http://europa.eu/rapid/press-release\\_IP-12-536\\_en.htm?locale=en](http://europa.eu/rapid/press-release_IP-12-536_en.htm?locale=en)

<sup>83</sup> Judgment of the Court (second chamber) – 11 September 2014  
<http://curia.europa.eu/juris/document/document.jsf?jsessionid=9ea7d2dc30ddcbc7c667f62e4671b9419ed42956b127.e34KaxiLc3qMb40Rch0SaxuQaxr0?text=&docid=157518&pageIndex=0&doclang=EN&mode=lst&dir=&occ=first&part=1&cid=418075>

<sup>84</sup> Opinion of Advocate General Jääskinen delivered on 22 May 2014 – Case C-525/12 European Commission v Federal Republic of Germany  
<http://curia.europa.eu/juris/document/document.jsf?jsessionid=9ea7d2dc30ddcbc7c667f62e4671b9419ed42956b127.e34KaxiLc3qMb40Rch0SaxuQaxr0?text=&docid=152659&pageIndex=0&doclang=EN&mode=lst&dir=&occ=first&part=1&cid=418075>

<sup>85</sup> <http://www.erneuerbare-energien.de/die-themen/wasserkraft/gesetzliche-regelungen/>.

In 2014, a new implementation of the EEG was enforced<sup>86</sup>. It represents a significant reform from the previous 2012 iteration, and seeks several distinct objectives in terms of the market integration of renewable energy sources, the cost reduction of financial support, and the competitiveness of energy-intensive industry. In particular, feed-in tariffs for renewable energy sources are globally reduced.

However, the support seems to remain stable with regards to hydropower. Tariffs applying for 2015 go from 125.2 €/MWh for capacities under 500 kW, to 35.0 €/MWh for capacities over 50 MW<sup>87</sup>. Beginning in 2016, the preferential tariffs should then be progressively decreased by 0.5% per year.

The financial support is guaranteed to all receivers for a 20-year duration period. It is available only if hydropower stations comply with the requirements of the Water Resources Act, especially the environment provisions. Existing installations, which were commissioned before 2009 and did not benefit from previous iterations of the EEG (which began in 2009), are also eligible for new tariffs if their average or installed capacity increases after December 2014.

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<sup>86</sup> [http://www.erneuerbare-energien.de/EE/Redaktion/DE/Dossier/eeg.html?cms\\_docId=73930](http://www.erneuerbare-energien.de/EE/Redaktion/DE/Dossier/eeg.html?cms_docId=73930)

<sup>87</sup> Gesetz für den Ausbau erneuerbarer Energien. [http://www.gesetze-im-internet.de/eeg\\_2014/](http://www.gesetze-im-internet.de/eeg_2014/)

## 2.6 Great Britain

Table 8. Summary of the British hydropower framework

Characteristics		Description	
Institutional framework	Authorities granting the rights of use	Environment Agency	
	Types of hydropower rights and granting procedures	3 permissions required prior to build and operate a hydropower scheme: <ul style="list-style-type: none"> <li>• Environmental licence (abstraction or transfer licence and impoundment licence)</li> <li>• Planning permission</li> <li>• Accreditation to generate and export electricity</li> </ul>	
Framework for granting the right to use hydropower	Duration	<ul style="list-style-type: none"> <li>• Before 2003, unlimited time</li> <li>• After 2003 (Water Act 2003): <ul style="list-style-type: none"> <li>○ Short-term licence: 12 years (most common as it's more adaptable)</li> <li>○ Long-term licence: 24 years (rather exceptional)</li> <li>○ Can be indefinitely extended (by periodically applying for a replacement licence)</li> </ul> </li> </ul> 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"> <li>• to propose a joint scheme</li> <li>• to share water</li> <li>• asked Environment Agency to choose one of them considering public interest based on <ul style="list-style-type: none"> <li>○ The most advantageous use of available water resources</li> <li>○ Local and wider environmental effects</li> <li>○ Assessment and mitigation of flood risk</li> <li>○ Impact on other water users of the proposed scheme</li> <li>○ The impact of the scheme in climate change terms</li> </ul> </li> </ul> 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"> <li>• There is no competitive process</li> </ul> For recent abstraction licences: <ul style="list-style-type: none"> <li>• Holders of long duration licences can apply for a replacement licence midway through the duration of their licence</li> </ul> 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"> <li>• Watercourse residual flow: 5% of natural flow (3% for a high base flow river)</li> <li>• EIA for plants in sensitive areas</li> </ul>	
	Investment	To meet environmental requirements (limiting adverse impacts in water resources creating a fish pass, limiting flood risk and ensuring land drainage)	
	Royalties	1. <b>Standard unit charges:</b> between 14.86 and 37.87 <sup>88</sup> €/1,000m <sup>3</sup> /year, depending on the region (with a minimum of 32 €/year). 2. <b>Application Charge</b> = 172 € 3. <b>Advertising Administration Charge</b> = 128 €	
Small-hydro	Small hydro definition	<ul style="list-style-type: none"> <li>• Small hydro &lt; 5 MW</li> <li>• Micro-scale hydro &lt;50 kW</li> </ul>	
	Support	<ul style="list-style-type: none"> <li>• FIT &lt; 5 MW: 34.5 – 301.0 €/MWh depending on the size of the plant and the tariff date</li> <li>• Renewables Obligation Certificates (&gt; 5 MW but &lt; 20 MW)</li> </ul>	

<sup>88</sup> €11.63 and €29.64. £ is converted in € with the following rate 1 £ = 1.277 € (average value 1-1-2014 to 23-6-2015, from European Central Bank).

### 2.6.1 Context of hydropower in 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 conventional thermal sources, 15.8% of nuclear energy, 6.7% of other renewables and only 1% of hydropower energy. The vast majority of the UK's hydropower facilities, located in the Scottish Highlands, 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.

According to recent government studies, it is estimated that there is only 850 to 1,550 MW of viable hydro potential remaining in the UK, which represents approximately 1 to 2% of the current UK generating capacity. This potential is rather modest, but can still contribute to the UK's overall renewable energy production and emission reduction targets<sup>89</sup>.

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.

### 2.6.2 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 defining 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 the 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

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<sup>89</sup> 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>.

- 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

- 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 Plans<sup>90</sup>. 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 the 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 Act<sup>91</sup>.
- Local Planning Authorities are consulted when works are planned to be built on their territory.

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<sup>90</sup> 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>.

<sup>91</sup> Planning Portal (n.d.), The Planning Inspectorate, <http://www.planningportal.gov.uk/planning/planninginspectorate>.

### ***The types of rights 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

Great Britain's hydropower schemes are subject to water abstraction licences, not to any concession. Hydropower schemes must obtain three permissions prior to building and operation 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, according to 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 (see table on the following page).

In Scotland, licence applications (called "CAR licences") are determined by the SEPA within four months, excluding the time for information requests and advertising<sup>92</sup>. 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 impact 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.

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

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<sup>92</sup> Scottish Environment Protection Agency (n.d.), Application process, [http://www.sepa.org.uk/water/hydropower/applying\\_for\\_a\\_licence/application\\_process.aspx](http://www.sepa.org.uk/water/hydropower/applying_for_a_licence/application_process.aspx).

Table 9. Hydropower licences<sup>93</sup>

Environmental licences	Description
<b>Abstraction licences</b>	<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>
<b>Transfer licences</b>	<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>
<b>Impoundment licence</b>	<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>

According to a 2011 report published by Anglian Water and Frontier Economics<sup>94</sup>, "*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*".

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 issued<sup>95</sup>.

## 2. Planning permission

Hydropower schemes must have the Planning Inspectorate's approval along with the Local Authority approval prior to commencement of 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

<sup>93</sup> DEFRA (2011), Water for life, HM Government, Gov.uk,

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/228861/8230.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228861/8230.pdf).

<sup>94</sup> 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>.

<sup>95</sup> 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](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297147/LIT_4122_5f91bb.pdf).



appearance of any buildings, noise, ecology, geomorphology, landscape, amenity, flood risk, and archaeology<sup>96</sup>.

### 3. Accreditation to generate and export electricity

This permit is granted by Ofgem through its ROO-FIT<sup>97</sup> 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.

#### 2.6.3 Framework for granting the right to use hydropower<sup>98</sup>

Before the Water Act was enforced 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 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 payments*<sup>98</sup>". 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

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<sup>96</sup> Planning Portal (n.d.), The Planning Inspectorate, <http://www.planningportal.gov.uk/planning/planninginspectorate>.

<sup>97</sup> Renewable Obligation Order Feed-in Tariff.

<sup>98</sup> 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>.

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 if under a permanent water rights' trade.

#### 2.6.4 Characteristics of the competitive process<sup>99</sup>

##### ***Competitive abstraction licence procedure for new installations***

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

- 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 terms<sup>100</sup>

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<sup>99</sup> 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](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297153/LIT_7517_8898b9.pdf).

<sup>100</sup> 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](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/299376/Appendix_2_Avoncliff_Hydropower_Good_Practice_Guidelines_-_Competing_Hydropower_Schemes_Annex.pdf).

### **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 met<sup>101</sup>.

#### 2.6.5 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.

#### 2.6.6 Obligations of hydropower operators

Aside from 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**

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*"<sup>102</sup>. 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 at 97%<sup>102</sup>. A similar rule applies in Scotland<sup>103</sup>

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 environment<sup>104</sup>.

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<sup>101</sup> Environment Agency (2013), Managing water abstraction, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/297309/LIT\\_4892\\_20f775.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297309/LIT_4892_20f775.pdf).

<sup>102</sup> 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](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297149/LIT_8836_394228.pdf).

<sup>103</sup> Scottish Environment Protection Agency (2005), Guidance for applicants on supporting information requirements for hydropower applications, <http://www.sepa.org.uk/water/ldoc.ashx?docid=358677fe-61f7-4fc9-baab-79cb93671387&version=-1>.

<sup>104</sup> Planning Practice Guidance (2014), Guidance Environmental Impact Assessment, <http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/legislation-covering-environmental-impact-assessment/>.

### **Investment obligations**

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

### **Taxes, levies and royalties<sup>105</sup>**

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:

Table 10. Standard unit charge value per region

Regions	2014/2015 Standard Unit Charge (€/1,000 m <sup>3</sup> )
Anglian	35.14
Midlands	19.10
Northumbria	37.87
North West	16.06
Southern	24.57
South West (incl. Wessex)	25.18
Thames	17.68
Yorkshire	14.86
Dee	19.37
Wye	19.37

Source: Environment Agency (2014)<sup>106</sup>

The application charge consists of €172 and the advertising charges total is €128. If the standard unit charge is quite low, a minimum annual charge of €32<sup>107</sup> is applied.

### 2.6.7 Support for small hydropower

FIT are also available to accredited (according to Ofgem's ROO-FIT procedure<sup>108</sup>) 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

<sup>105</sup> 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>.

<sup>106</sup> Environment Agency (2013), Abstraction Charges Scheme 2014/15, <https://www.gov.uk/government/publications/abstraction-charges-scheme-april-2014-to-march-2015>.

<sup>107</sup> £135, £100 and £25 respectively. £ is converted in € with the following rate 1 £ = 1.277 € (average value 1-1-2014 to 23-6-2015, from European Central Bank).

<sup>108</sup> Ofgem (n.d.), ROO-FIT, <https://www.ofgem.gov.uk/environmental-programmes/feed-tariff-fit-scheme/applying-feed-tariff/roo-fit>.

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 11. Feed-in tariff values

Description	Period in which Tariff Date falls	Tariff (€/MWh) <sup>109</sup>
<b>Hydro generating station with total installed capacity ≤ 15 kW</b>	1 April 2010 to 30 November 2012	301.0
	1 December 2012 to 31 March 2014	288.6
	1 April 2014 to 30 September 2014	274.2
	1 October 2014 to 31 March 2015	246.7
	1 April 2015 to 31 March 2016	219.3
<b>Hydro generating station with totalled installed capacity greater than 15 kW but not exceeding 100 kW</b>	1 April 2010 to 31 March 2014	269.4
	1 April 2014 to 30 September 2014	256.0
	1 October 2014 to 31 March 2015	230.3
	1 April 2015 to 31 March 2016	204.8
<b>Hydro generating station with totalled installed capacity 100 kW ≤ C ≤ 500 kW</b>	1 April 2010 to 14 March 2013	166.5
	15 March 2013 to 31 March 2014	213.0
	1 April 2014 to 30 September 2014	202.4
	1 October 2014 to 31 March 2015	182.0
	1 April 2015 to 31 March 2016	161.9
<b>Hydro generating station with totalled installed capacity 500 kW ≤ C ≤ 2 MW</b>	1 April 2010 to 31 March 2014	166.4
	1 April 2014 to 30 September 2014	158.0
	1 October 2014 to 31 March 2015	142.3
	1 April 2015 to 31 March 2016	126.5
<b>Hydro generating station with totalled installed capacity ≥ 2 MW</b>	1 April 2010 to 30 November 2012	67.3
	1 December 2012 to 31 March 2013	61.6
	1 April 2013 to 31 March 2014	43.1
	1 April 2014 to 30 September 2014	43.1
	1 October 2014 to 31 March 2015	38.8
	1 April 2015 to 31 March 2016	34.5

Source: Ofgem (2015)<sup>110</sup>

The export tariff rates<sup>111</sup> for the same period are:

- 62.0 €/MWh of electricity for infrastructures that were commissioned on or after 01/12/12; and
- 43.90 €/MWh<sup>112</sup> of electricity for infrastructures before 01/12/2012.

According to the Smartest Energy Market Update of February 2014, the "total FIT capacity is now over 2.1 GW. The Central FIT Register shows that there are 421 accredited hydro schemes, totalling 43 MW<sup>113</sup>".

<sup>109</sup> The table was modified to reflect tariffs in Euros. £ is converted in € with the following rate 1 £ = 1.277 € (average value 1-1-2014 to 23-6-2015, from European Central Bank).

<sup>110</sup> Ofgem (2015), Feed-in Tariff Payment Rate Table for Non-Photovoltaic Eligible Installations for FIT Year 6 (1 April 2015 to 31 March 2016), e-serve, <https://www.ofgem.gov.uk/ofgem-publications/92753/fitnonpvtariffstablefor1april2015.pdf>.

<sup>111</sup> Ofgem (2015), Feed-in Tariff Payment Rate Table for Non-Photovoltaic Eligible Installations for FIT Year 6 (1 April 2015 to 31 March 2016), e-serve, <https://www.ofgem.gov.uk/ofgem-publications/92753/fitnonpvtariffstablefor1april2015.pdf>.

<sup>112</sup> 4.85 p/kWh and 3.44 p/kWh respectively. £ is converted in € with the following rate 1 £ = 1.277 € (average value 1-1-2014 to 23-6-2015, from European Central Bank)

<sup>113</sup> Robertson, I. (2014), Market report, Smartest Energy. [http://www.british-hydro.org/Market\\_Reports/2014/Market%20Report%202014%2002%2024.pdf](http://www.british-hydro.org/Market_Reports/2014/Market%20Report%202014%2002%2024.pdf).

For large hydropower scheme owners (> 5 MW but < 20 MW), green certificates known as Renewables Obligation Certificates (ROCs) are available<sup>114</sup>. 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 scheme<sup>115</sup>.

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<sup>114</sup> 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>.

<sup>115</sup> 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>.

## 2.7 Greece

Table 12. Summary of the Greek hydropower framework

Characteristics		Description	
Institutional framework	Authorities for granting rights of use	<ul style="list-style-type: none"> <li>Ministry of Environment</li> <li>Decentralised administrative regions</li> <li>National regulatory authority RAE</li> </ul>	
	Types of hydropower rights and granting procedures	<ul style="list-style-type: none"> <li>Production licence is issued and published by RAE</li> <li>EIA is submitted to the competent authorities and published for consultation</li> <li>Opinions are collected</li> <li>Environmental terms approval is issued by the Minister of Environment</li> <li>Water licence is issued by the Secretary of the decentralised administrative region</li> </ul>	
Framework for granting the right to use hydropower	Duration	<ul style="list-style-type: none"> <li>25-year production licence</li> <li>10-year environmental term licence</li> <li>Renewed for equal periods of time</li> <li>All water use licences end in 2022, may be renewed according to new dispositions at that time</li> </ul>	
	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 took Greece to Court in April 2011 over its failure to comply with EU water legislation and submit plans for managing its river basin. As of 2015, 12 out of 14 River Basin Management Plans have been implemented.	
Obligations of hydropower operators	Environmental obligations	<ul style="list-style-type: none"> <li>Environmental Impact Assessment can be required</li> <li>The facility must be compliant with the River Basin Management Plan</li> <li>A special environmental assessment is realised if the hydropower plant is inside the NATURA 2000 network</li> <li>Residual water flow obligations for small hydropower</li> </ul>	
	Investment obligations	National legislation does not appear to provide for investment obligations	
	Royalties	<ul style="list-style-type: none"> <li>Only for small hydropower: annual fee to the municipalities (3% of the sales revenue of the hydropower plant) + fee for the production licence</li> </ul>	
Small-hydro	Small hydro definition	< 15 MW	
	Support	<ul style="list-style-type: none"> <li>Only for small hydropower: FiT 105 €/MWh for 20 year contracts for plants commissioned after April 2014</li> </ul>	

### 2.7.1 Context and economics of hydropower in Greece

Hydropower accounted for 11% of the Greek total electricity generation in 2014 with 4.6 TWh produced<sup>116</sup>. It is the country's primary renewable energy source, accounting for around 50% of RES

<sup>116</sup> International Energy Agency Statistics - <http://www.iea.org/statistics/statisticssearch/report/?year=2012&country=GREECE&product=ElectricityandHeat>



electricity generation. Hydropower generation is mostly provided by large hydropower capacities, with 10-MW or more installations representing 95% of the total installed capacity in 2010 (3,237 MW)<sup>117</sup>.

According to the National Energy Action Plan 2010, large hydropower should support most of the programmed increase in hydropower capacity, with a 35% growth expected from 2010 to 2020. A similar growth should however be observed for small hydropower, with a 2020 objective of 175 plants and a combined 350-MW capacity (from 98 facilities and 196-MW capacity in 2010)<sup>118</sup>. Despite these objectives, new hydropower development has been slow, in part due to the reinforcement of environmental constraints. The Ministerial Decision 518/2011 has led to the cancellation of projects which represented a combined 50-MW capacity, while residual water flow restrictions remain severe for small hydropower.

## 2.7.2 The institutional framework for hydropower

### **Stakeholders and legislations**

The legislation that regulates the development of hydropower in Greece is mostly based on:

- For management of water use:
  - Water use licence – Law 3199/2003 provides for permit issuing, including the use of water resources
  - Ministerial decree 146896/2014 on the procedure and terms for the issuance of the water use licence and of the project works execution licence (not valid for large hydro)
- For management of environmental protection through environmental terms approval (ETA)
  - Law 1650/1986 on the protection of the environment
  - Law 3937/2011 on biodiversity (designation of NATURA 2000 areas)
  - Law 4014/2011 for Environmental Authorisation
  - Legislative decree 170225/2014 on Environmental impact assessment documentation
  - Ministerial Decree 1958/2012 for categorisation of projects depending on their environmental impact
- For management of feed-in tariffs
  - Law 3468/2006 on generation of electricity using renewable energy sources and high efficiency cogeneration of electricity and heat
  - Law 3851/2010 on the acceleration of the development of renewables
  - Legislative decree 14810/2011 on the procedure/documentation for the issuance of the production licence
  - Law 4254/2014 on renewables new feed-in tariffs

The institutions to regulate hydropower in Greece are:

- The Regulatory Authority for Energy (RAE) is an independent administrative authority responsible for monitoring the operation of all fields of the energy sector (Electricity, Natural Gas, Oil Products, Renewable Energy Sources, Cogeneration of Electricity and Heat etc.). RAE is responsible for the issuance of the production licence of hydropower plants.

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<sup>117</sup> IEA, 2012. *Greece 2011 Review*

<sup>118</sup> Smallhydropower.org, 2013. *World Small Hydropower Development Report 2013 - Bulgaria*

- The Ministry of Environment and specifically the Special Secretary for Water Resources is responsible for the development and implementation of all programmes related to the protection and management of the water resources of Greece and the coordination of all competent authorities dealing with the aquatic environment. The Special Secretary for Water Resources is responsible of the execution of the river basins management plan in collaboration with the decentralised administrative Regions.
- The Minister of Environment is responsible for the issuance of the environmental terms approval for large hydropower plants.
- The Decentralised Administrative Regions are responsible for the issuance of the water use licence.

### ***The types of rights to use hydropower and granting procedures***

Hydropower plants are authorised through a progressive procedure which involves several licences and authorisations. The most important rights which hydropower development and operation requires are the production licence, the environmental terms approval, and the water use licence. The whole procedure can be summarised as follows:

- The application for production licence is submitted to the Regulatory Authority for Energy (RAE). The documentation includes a comprehensive hydrological study.
- RAE publishes the relevant application for the production licence to its official website and issues the production licence.
- The environmental impact assessment (EIA) study is submitted to the competent Authorities and is published for consultation.
- Opinions are collected from various administrative entities (Forest Authority, Board of Environmental Authorisations) and from public opinion for a period of 45 days from the publication of the EIA study.
- The environmental terms approval (ETA) is issued by the Minister of Environment. The complete environmental impact assessment is required for the process to be completed, and the opinion of other responsible entities is also taken into account<sup>119</sup>.
- The application for the water use licence is submitted to the relevant decentralised administrative region wherein the river basin is located. The water use licence is issued by the Secretary of the decentralised administrative region and its duration is until 2022, when there will be a revision of the river basins management plan for all of Greece. It may be renewed for a period of time up to the next revision of the drainage basins management plan for all of Greece.

#### 2.7.3 Framework for granting the right to use hydropower

The production licence for electricity generation by renewable energy sources and cogeneration is valid for a 25-year period. It can be renewed for an equal duration as long as (up-to-date) generation criteria are still verified. Likewise, the environmental terms approval ETA lasts 10 years and can typically be renewed for an equal period of time.

The framework for the water use licence works differently. It is issued after approval of the environmental terms, but it is only valid until 2022, when the drainage basins management plan will

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<sup>119</sup> Source : *Greece Renewables – the regulatory framework*

be reviewed for the whole country. All water use licences may then be renewed for a (not yet known) period of time, depending on the provisions of the next management plans.

#### 2.7.4 Characteristics of the competitive process

##### ***Competitive authorisation procedure for new installations***

The Greek legislative framework does not seem to provide for public and competitive procedures for the authorisation of new hydropower installations. Hydropower licences seem to be attributed on a first-come first-served basis.

##### ***Competitive procedure for authorisation renewals***

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

#### 2.7.5 Main schedule for renewal

The information available and the multiple licences and authorisation do not allow a coherent schedule to be drawn for renewal, except for the 2022 limit for the water use licence.

#### 2.7.6 Obligations of hydropower operators

##### ***Environmental obligations***

The Greek legislative framework does not seem to provide for the specific environmental obligations besides the respect of the criteria provided by the legislation on environmental authorisation and the environmental impact assessment. For small hydropower, binding residual flows are set during summer months. The minimum residual flow required is 30% from June to August and 50% in September<sup>120</sup>.

Hydropower is also subject to the requirements of the EU Water Directive, even though implementation at the Greek level is still not completed. In April 2011, The European Commission brought Greece to court alongside Portugal, Denmark and Belgium, for its “*failure to comply with EU water legislation and submit plans for managing their river basins*”<sup>121</sup>. The 4<sup>th</sup> Water Framework Directive implementation report was published in March 2015<sup>122</sup> and assessed that 12 out of 14 River Basin Management Plans have been adopted since 2012<sup>123</sup>. In its assessment, the European Commission concluded that implementation delays were mostly due to “technical issues, administrative barriers, socio-economic constraints” as well as the “lack of data compatible with the Water Framework Directive”<sup>124</sup>.

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<sup>120</sup> Smallhydroworld.org, 2013. *World Small Hydropower Development Report 2013 - Bulgaria*

<sup>121</sup> [http://europa.eu/rapid/press-release\\_IP-11-438\\_en.htm?locale=en](http://europa.eu/rapid/press-release_IP-11-438_en.htm?locale=en)

<sup>122</sup> [http://ec.europa.eu/environment/water/water-framework/impl\\_reports.htm#fourth](http://ec.europa.eu/environment/water/water-framework/impl_reports.htm#fourth)

<sup>123</sup> [http://ec.europa.eu/environment/water/participation/map\\_mc/countries/greece\\_en.htm](http://ec.europa.eu/environment/water/participation/map_mc/countries/greece_en.htm)

<sup>124</sup> European Commission, 2015. *Report on the implementation of the River Basin Management Plans according to the Water Framework Directive – Greece* - [http://ec.europa.eu/environment/water/water-framework/pdf/4th\\_report/MS%20annex%20-%20Greece\\_el.pdf](http://ec.europa.eu/environment/water/water-framework/pdf/4th_report/MS%20annex%20-%20Greece_el.pdf)

### **Investment obligations**

There is no specific investment obligation provided in the Greek legislation.

### **Taxes, levies and royalties**

Financial obligations imposed at the State level are limited to small hydropower (< 15 MW)<sup>125</sup>.

First, a fee for the reservation of the production licence is introduced. The annual fee amounts to 1,000 €/MW for all renewable energy sources plants, 3 years after the issuance of the production licence. The fee ends after submission of the guarantee letter of the final connection offer. The Guarantee Letter acts as insurance before plant authorisation, as the applicant is obliged to submit a Guarantee Letter as soon as it accepts the final connection offer from the independent power transmission operator ADMIE. The amounts specified in the Guarantee Letter are specified below:

Table 13. Guarantee Letter amounts

Capacity	Amount
Capacity up to 1MW	€ 60.000 per MW
from 1MW to 10MW	€ 30.000 per MW
from 10MW to 100MW	€ 20.000 per MW
from 100MW upwards	€ 10.000 per MW

Source: Greece Renewables –the regulatory framework

Second, an annual fee of 3.0% is imposed on pre-VAT gross sales income. 1% of the fee revenue is credited to the reduction of electricity fees for local consumers, 0.3% to the special fund of the environmental planning, and 1.7% to the municipality.

#### 2.7.7 Support for small hydropower

Small hydropower facilities benefit from feed-in tariffs, as specified in laws 3468/2006, 3851/2010 and 4254/2014. The tariffs are increased each year by 25% of the consumer price index.

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<sup>125</sup> Source : Source : Greece Renewables – the regulatory framework

Table 14. Feed-in tariffs for small hydropower (< 15 MW)

	<b>Feed in tariff with grants (Euro/MWh)</b>	<b>Feed in tariff without grants (Euro/MWh)</b>
Electrical energy from mini hydropower plants less than 1 MW	<b>85</b>	<b>105</b>
Electrical energy from small hydropower plants from 1MW to 5 MW	<b>83</b>	<b>105</b>
Electrical energy from small hydropower plants from 5MW to 15 MW	<b>80</b>	<b>105</b>

*Source: Greece Renewables – the regulatory framework*

## 2.8 Italy

Table 15. Summary of the Italian hydropower framework

Characteristics		Description	
Institutional framework	Authorities granting the rights of use	<ul style="list-style-type: none"> <li>Regions, and provinces if delegated</li> </ul>	
	Types of hydropower rights and granting procedures	<ul style="list-style-type: none"> <li>Concessions</li> </ul>	
Framework for granting the right to use hydropower	Duration	<ul style="list-style-type: none"> <li>20 to 30 years for large scale hydro; 30 years for small hydro</li> <li>Procedures from 3 to 7 years for small hydro</li> </ul>	
	Competitive process	For new concessions	Choice of competing applications <ul style="list-style-type: none"> <li>Based on economic offer</li> <li>Increasing installed capacity</li> <li>Other qualitative elements, e.g.               <ul style="list-style-type: none"> <li>Equipped with an environmental management system,</li> <li>Higher technical, financial and economic guarantees</li> </ul> </li> </ul>
		For concession renewals	Tender (awarding criteria) based on: <ul style="list-style-type: none"> <li>Economic offer</li> <li>Increasing energy generated or installed capacity and</li> <li>A plan for environmental improvement or restoration of the drainage basin concerned</li> </ul>
	EC infringement proceedings or equivalent	<ul style="list-style-type: none"> <li>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</li> <li>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</li> </ul>	
Obligations of hydropower operators	Environmental obligations	<ul style="list-style-type: none"> <li>Watercourse residual flow defined by regions</li> </ul>	
	Investment obligations	<ul style="list-style-type: none"> <li>Investment to increase plant capacity and efficiency as qualitative elements of response to call for tenders</li> </ul>	
	Royalties	Public rent to regions and Local Authorities	
Small-hydro	Small hydro definition	< 3 MW (nominal capacity)	
	Support	Available both for small and large hydro: 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; around 95 €/MWh in 2015 due to the decrease in power prices)	

### 2.8.1 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%<sup>126</sup>. 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.

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 were enforced in the past decade, following the Commission's (on the preferential right given to concession holders) and Italian Constitutional Court's interventions.

### 2.8.2 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. 134/2012 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

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<sup>126</sup> World Energy Council (2014), Data, Sustainability Index, <http://www.worldenergy.org/data/sustainability-index/>.

coordinating activities related to the operations of national and regional planning in the energy and mining sectors.

- Ministry of the Environment: the Ministry is responsible for national water management legislation and environmental/permitting procedures.
- AEEGSI – National Energy Authority: The Regulatory Authority for Electricity, Gas and Water 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.<sup>127</sup>
- Local authority (Regions and Provinces): in 1998<sup>128</sup>, 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.
- 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 rights to use hydropower and granting procedures***

The average duration of the authorisation procedure for small-scale project is between 2 to 3 years<sup>129</sup>, which is considered a shorter procedure than a large-scale project. The procedure, which was introduced in the Legislative Decree no. 387/2003 is called "single permit" and no EIA is required<sup>130</sup>. 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 plants can be summarised as follows:

- An application is filed with the relevant authority

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<sup>127</sup> Autorità per l'energia elettrica il gas e il sistema idrico (n.d.), <http://www.autorita.energia.it/it/inglese/index.htm>.

<sup>128</sup> Legislative Decree No 112 of 31 March 1998 and Legislative Decree No 79 of 16 March 1999.

<sup>129</sup> 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](http://streammap.esha.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf).

<sup>130</sup> 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](http://www.esha.be/fileadmin/esha_files/documents/publications/position_papers/ESHA_contribution_to_Administrative_barriers_workshop_IEEA_.pdf).



- 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.

### 2.8.3 Framework for granting the 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 essentially had 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 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 bids<sup>131</sup>.

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 a 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 Decree<sup>132</sup>. 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

<sup>131</sup> 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](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](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](http://ec.europa.eu/eu_law/docs/docs_infringements/annual_report_26/en_sec_statannex_vol1clean.pdf).

<sup>132</sup> It has been included in a 5-year extension for most of 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 a provincial public share of 30-40 %.

freedom of establishment. With sentence no. 205/2011, the Constitutional Court repealed the 2010 provisions<sup>133</sup>.

In 2012, the Law no. 134/2012 (conversion of the decree no. 83/2012) 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<sup>134</sup>;
3. The concession is awarded through a competitive bidding mechanism that rests on: i) an economic offer (difference between the offer and the auction base, to be granted to a Public Authority); ii) an increase of the installed power and iii) other qualitative elements (e.g. environmental recovery, investment for plant efficiency, technical, financial and economic guarantees of execution, etc.);
4. 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 proceeded with designing a legal framework allowing for concessions to be tendered in compliance with EU legislation. The government was expected to implement the new provisions adopting a new ministerial decree containing key provisions to determine modalities for asset transfer, the 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).

The ongoing infringement procedure seems to be slowing down the implementation process, and subsequently the launch of the tendering process.

#### 2.8.4 Characteristics of the competitive process

##### ***Competitive concession procedure for new installations***

As already mentioned, there is a competitive bidding mechanism that rests 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 amended 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

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<sup>133</sup> [http://ec.europa.eu/eu\\_law/eulaw/decisions/dec\\_20110314.htm#it](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](http://ec.europa.eu/eu_law/eulaw/decisions/dec_20130926.htm#it).

<sup>134</sup> In case of disagreement with the value of the 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).

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.

#### 2.8.5 Main schedule for renewal

The expiry date of hydropower concessions in Italy are set down by article 12 of the Legislative Decree no. 79/1999. In particular, most of the current concessions will progressively expire until 2029. Consequently, concession renewals will occur according to this schedule.

#### 2.8.6 Obligations of hydropower operators

Aside from the right to 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 a 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."*<sup>135</sup>

##### ***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

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<sup>135</sup> 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](http://streammap.esh.a.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf).

each hydropower installation. 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 charged 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)<sup>136</sup>
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)<sup>137</sup>.

### 2.8.7 Support for 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 eligibility for Green Certificates issued by the Italian Power Services Administrator (GSE). Plants then received certificates for a period of 15 years. Table 11 present the average market values of green certificates for 2010, 2011 and 2012. Since then, renewable plants are only subject to FIT or premium incentive schemes.<sup>138</sup> The Green Certificate programme is being progressively eliminated through the reduction to zero of quota obligations by 2015 and incentives to switch to the new types of support<sup>139</sup>.

Table 16. Green certificate 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 to receive regulated prices (*prezzo minimo garantito*) determined by the Regulator instead of market prices [...]. At the end of each year, in case market prices were higher than regulated ones, the positive difference is due to the operator. If production exceeds 1,500 MWh, the surplus is subject to the market price<sup>140</sup>.

<sup>136</sup> Public Land Agency, Decree 22 November 2013 concerning the review of hydropower rents.

<sup>137</sup> Ministry of Environment, Decree 22 November 2013.

<sup>138</sup> 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.

<sup>139</sup> Enel, 2015. Enel annual report 2014

<sup>140</sup> 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>.

The Type 2 Premium Tariff is for all renewable energy installations except PV<sup>141</sup>. 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.

Table 17. Support for small hydropower in Italy

Hydropower plant type	Type 1 FiT	Type 2 FiT	Type 2 Premium Tariff
Conventional <sup>142</sup> (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"> <li><math>1 \leq C &lt; 20 \rightarrow 257 \text{ €/MWh}</math></li> <li><math>20 \leq C &lt; 500 \rightarrow 219 \text{ €/MWh}</math></li> <li><math>500 \leq C &lt; 1 \text{ MW} \rightarrow 155 \text{ €/MWh}</math></li> </ul>	<ul style="list-style-type: none"> <li>For the first 250 MWh <math>\rightarrow 153.2 \text{ €/MWh}</math></li> <li>Between the 251<sup>st</sup> and 500<sup>th</sup> MWh <math>\rightarrow 105.4 \text{ €/MWh}</math></li> <li>Between the 501<sup>st</sup> and 1,000<sup>th</sup> MWh <math>\rightarrow 66.5 \text{ €/MWh}</math></li> <li>Between 1,001<sup>st</sup> and 1,500<sup>th</sup> MWh <math>\rightarrow 57.6 \text{ €/MWh}</math></li> <li>For outputs above 1,500 MWh <math>\rightarrow</math> market price</li> </ul>	<ul style="list-style-type: none"> <li><math>1 \leq C &lt; 20 \rightarrow 257 \text{ €/MWh}</math></li> <li><math>20 \leq C &lt; 500 \rightarrow 219 \text{ €/MWh}</math></li> <li><math>500 \leq C &lt; 1,000 \rightarrow 155 \text{ €/MWh}</math></li> <li><math>1 \text{ MW} \leq C &lt; 10 \text{ MW} \rightarrow 129 \text{ €/MWh}</math></li> <li><math>C \geq 10 \text{ MW} \rightarrow 119 \text{ €/MWh}</math></li> </ul>

Source: EC (2013)<sup>143</sup>

## 2.9 Norway

Table 18. Summary of the Norwegian hydropower framework

Characteristics		Description
Institutional framework	Authorities granting the rights of use	<ul style="list-style-type: none"> <li>Ministry of Petroleum and Energy</li> <li>Ministry of Environment</li> <li>The Norwegian Water Resources and Energy Directorate (NVE)</li> </ul>
	Types of hydropower rights and granting procedures	<ul style="list-style-type: none"> <li>Licences granted by King and government for waterfall purchase or long-term use (<math>\geq 1 \text{ MW}</math>) after discussion by the Parliament (<math>&gt; 10 \text{ MW}</math>) or the Ministry (<math>&lt; 10 \text{ MW}</math>) and consideration by the energy regulator NVE</li> <li>No licensing needed for micro (<math>&lt; 100 \text{ kW}</math>) and mini (<math>&lt; 1 \text{ MW}</math>) power plants if the NVE agrees on limited environmental impact</li> <li>Leasing to private companies</li> </ul>
Framework for granting the right to use hydropower	Duration	<ul style="list-style-type: none"> <li>Unlimited period of time for state-owned companies, municipalities and counties</li> <li>Previously, up to 60 years for private companies, reversion at expiry. No more concessions granted to private companies</li> <li>Current possibility of leasing public assets for 15 years only</li> </ul>

<sup>141</sup> The Type 1 Premium Tariff is for PV installations only.

<sup>142</sup> Conventional includes all hydropower plants with dams.

<sup>143</sup> 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>.

Characteristics			Description
	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 were granted a time-limited hydropower concession with the obligation to revert installation to the State without compensation at the concession expiry, whereas public companies benefited from time-unlimited concessions encroaching the freedom of establishment and movement of capital guaranteed by the EEA Agreement. Nevertheless, this agreement gives the right to Norway to 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"> <li>Mandatory EIA &gt; 40 GWh</li> <li>Protection of some river systems forbidding hydropower development in some watercourses, including from micro and mini power plants since 2005</li> </ul>	
	Investment obligations	<ul style="list-style-type: none"> <li>Make the necessary investments in order to ensure that these regulations are met</li> </ul>	
	Royalties	<ul style="list-style-type: none"> <li>Annual fees to the State: Minimum: 0.16 €/kW, Maximum: 1.62 €/kW</li> <li>Annual fees to counties and municipalities: Minimum: 0.16 €/kW, Maximum: 4.87 €/kW</li> <li>+ Resource rent tax: 31% (for excess returns only)</li> <li>+ Natural resource tax: 1.6 €/MWh</li> <li>+ Obligation to supply 10% generation at a low rate</li> </ul>	
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	

### 2.9.1 Context of hydropower in Norway

Norway has the world's largest hydropower production per capita, and is the sixth largest hydropower producer in the world<sup>144</sup>. The country's main source of electricity generation is hydropower, which consists of 95% of its entire production<sup>145</sup>. Norway's annual production was 142.4 TWh in 2014, of which 20 TWh were exported to neighbouring countries<sup>146</sup>. 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.

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 MW, or an average of 4.1 per cent per year<sup>147</sup>. Since then, new production capacity is much lower, consisting of small hydropower projects and power station refurbishments.

<sup>144</sup> Ministry of Petroleum and Energy (2007), Electricity Generation, <http://www.regjeringen.no/en/dep/oed/Subject/energy-in-norway/Electricity-generation.html?id=440487>.

<sup>145</sup> World Energy Council, 2014. *Data, Sustainability Index*, <http://www.worldenergy.org/data/sustainability-index/>.

<sup>146</sup> ENTSO-E, 2015. *Statistical factsheet 2014*

<sup>147</sup> Ministry of Petroleum and Energy (2007), Electricity Generation, <http://www.regjeringen.no/en/dep/oed/Subject/energy-in-norway/Electricity-generation.html?id=440487>.

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. Licences are granted for an unlimited time to state-owned companies while 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.

## 2.9.2 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 cases<sup>148</sup>.

The main legislation related to hydropower regulation<sup>149</sup> is the following:

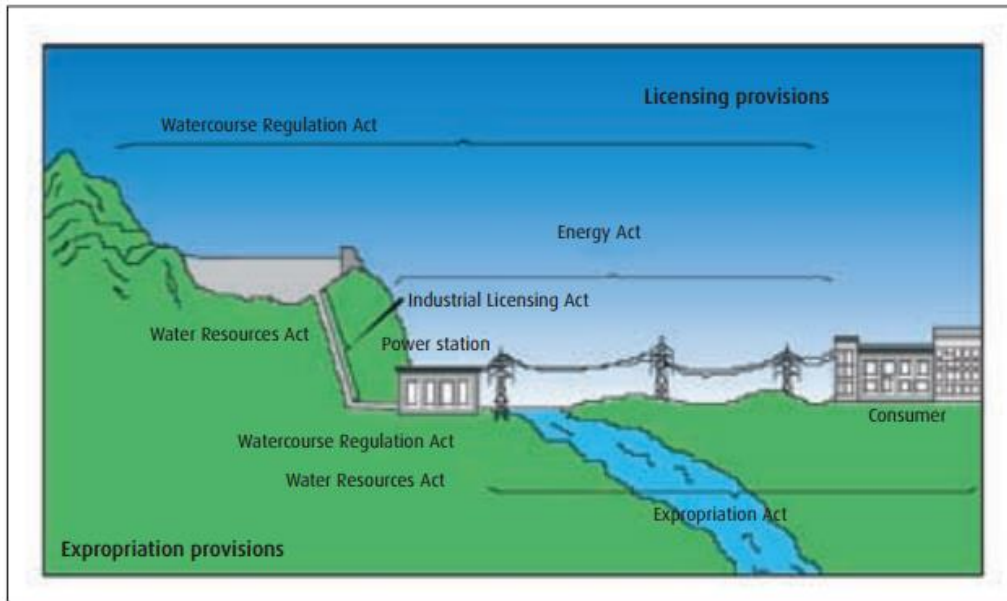
- Act No. 16 of 14 December 1917 on the acquisition of waterfalls, mines and other real properties (Industrial Licensing Act).
- Act No. 17 of 14 December 1917 on the regulation of watercourses (Watercourse Regulation Act).
- Act No. 50 of 29 June 1990 on the generation, conversion, transmission, trading, 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.

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<sup>148</sup> Ministry of Petroleum and Energy (2013), Licensing procedures, <http://www.regjeringen.no/en/dep/oed/Subject/energy-in-norway/licensing-procedures.html?id=440496>.

<sup>149</sup> 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 13. 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 as follows.

- 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. However, it does not play an active role in the hydropower sector or grant water licences.
- 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 the 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 hydrology<sup>150</sup>. It is also in charge of regulating the electricity and green certificates markets.

### ***Types of rights 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 Industrial Licensing Act. Furthermore, development of a waterfall and construction of a power plant usually requires an additional licence pursuant to the Water Resources Act and under the Energy Act.

<sup>150</sup> 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>.



This licence is required for the construction and operation of all installations for the generation, conversion, transmission and distribution of electricity, all the way from the power plant to the 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 negligible<sup>151</sup>.

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 the 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 met<sup>152</sup>.

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"*<sup>152</sup>.

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
- 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.

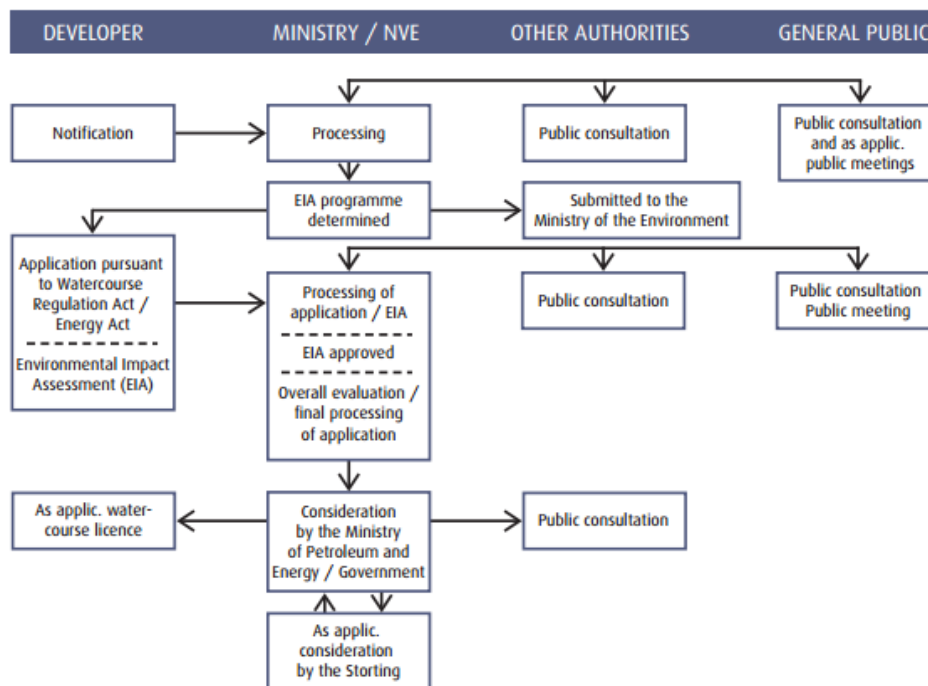
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<sup>151</sup> Ministry of Petroleum and Energy (2009), Facts 2008: Energy and Water Resources in Norway, The Legal Framework, [http://www.regjeringen.no/upload/OED/pdf%20filer/Faktaheftet/EVfakta08/EVfacts08\\_kap04\\_eng.pdf](http://www.regjeringen.no/upload/OED/pdf%20filer/Faktaheftet/EVfakta08/EVfacts08_kap04_eng.pdf).

<sup>152</sup> Norwegian Water Resources and Energy Directorate (2009), Handling procedures, <http://www.nve.no/en/Licensing/Handling-prosedures/>.

- Finally, licences are granted by the King and the government.

Figure 14. Administrative procedures involved in licensing hydropower developments (> 40 GWh/year) which require an EIA pursuant to the Planning and Building Act<sup>153</sup>



Source: Ministry of Petroleum and Energy (2009)<sup>154</sup>

### 2.9.3 Framework for granting the right to use hydropower

Prior to 2008, licences 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 licence however, and had to revert its installations to the State at concession expiry.

But in 2007, the international EFTA<sup>155</sup> 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 the freedom of establishment and the freedom of movement of capital guaranteed by the EEA Agreement. Nevertheless, this agreement gives the possibility to the State to decide whether hydropower resources and related installations should be exclusively in public ownership,

<sup>153</sup> The *Storting* (in the lower box) is the Parliament.

<sup>154</sup> 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](http://www.regjeringen.no/upload/OED/pdf%20filer/Faktaheftet/EVfakta08/EVfacts08_kap04_eng.pdf).

<sup>155</sup> The European Free Trade Association is a free trade organisation 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](http://www.eftacourt.int/uploads/tx_nvcases/2_06_Judgment_EN.pdf).

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 came 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 upon expiry will operate normally until the reversion date. The last major reversion will occur in 2057<sup>156</sup>.

In addition, the Regulations on the Lease of Hydropower Plants (text implementing the Industrial Licensing Act), which came into force on 1 July 2010, allow domestic and international, and public and private, companies the opportunity to lease pre-existing 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 a transfer of operational liability;
- leasing agreements without the transfer of operational liability; and
- agreements on the 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 invalidity if the lease system is found to violate obligations under the European Economic Area Agreement and 2) Agreements must be approved by the ministry<sup>157</sup>.

#### 2.9.4 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.

##### ***Competitive licence procedure for renewals***

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<sup>156</sup> 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](http://www.regjeringen.no/upload/OED/pdf%20filer/Faktaheftet/EVfakta08/EVfacts08_kap04_eng.pdf).

<sup>157</sup> 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>.

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

#### 2.9.5 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.

#### 2.9.6 Obligations of hydropower operators

Aside from the right to 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, the 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<sup>158</sup>.*" 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.

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<sup>158</sup> 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](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 value<sup>159</sup> for them, namely:

Table 19. Minimum and maximum values of annual fees to the State, counties and municipalities

Annual fees to the State <sup>160</sup>	Annual fees to counties and municipalities <sup>161</sup>
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 the ownership rights of waterfalls (Industrial Licensing Act);
- Acquisition of the 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 licence according to the Acquisition Act, are obliged to deliver power (10 %) at non- or low-profit cost to the local municipalities.

In parallel, a Resource rent tax was introduced in 1996 and consists of a levy of 31% on hydropower producers' excess returns<sup>162</sup>. 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 the corporation rate as any other company<sup>163</sup> and 31% for the return in excess). *"In addition, a profitability-independent natural resources tax of [1.57 €/MWh]<sup>164</sup> paid to the municipal authority and the county authority is levied on hydropower producers. Of this, [1.33 €/MWh]<sup>165</sup> is allocated to the municipal authority and <sup>166</sup>[0.24 €/MWh] to the county authority<sup>167</sup>".*

<sup>159</sup> Norwegian Water Resources and Energy Directorate (2009), Acts and regulations, <http://www.nve.no/en/About-NVE/Acts-and-regulations/>.

<sup>160</sup> 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 6<sup>th</sup> May 2014 from oanda.com).

<sup>161</sup> Minimum and maximum annual fees to counties and municipalities are respectively 1NOK/hp and 30NOK/hp.

<sup>162</sup> 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 returns are computed as follows: 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.

<sup>163</sup> KPMG (2014), Tax Facts Norway 2014,

<https://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/taxnewsflash/Documents/norway-april10-2014.pdf>.

<sup>164</sup> NOK 0.013/kWh.

<sup>165</sup> NOK 0.011/kWh.

<sup>166</sup> NOK 0.002/kWh

<sup>167</sup> KPMG (2014), Tax Facts Norway 2014,

<https://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/taxnewsflash/Documents/norway-april10-2014.pdf>.

Other costs due to hydropower facilities consist of the Natural Resource Tax and the Licence power supply obligation<sup>168</sup>. The Natural resource tax is due to the municipality and is based on the average power generation of the last seven years. The rate is 0.13 NOK/MWh (1.6 €/MWh). Meanwhile, hydropower facilities face the obligation to supply 10% of electricity generation to the municipalities at a very low rate.

### 2.9.7 Support for small hydropower

In January 2012, a common Norwegian-Swedish market for green certificates was created. This partnership has the 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 generated renewable energy<sup>169</sup>.

Eligible production is new power plants where construction of the plant started after 7 September 2009 or 1<sup>st</sup> 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 €/MWh<sup>170</sup>.

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

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<sup>168</sup> Nordenergi, 2014. Nordic Tax report 2014

<sup>169</sup> Ministry of Petroleum and Energy, 2012, Electricity certificates, <http://www.regjeringen.no/en/dep/oed/Subject/energy-in-norway/electricity-certificates.html?id=517462>.

<sup>170</sup> 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 Poland

Table 20. Summary of the Polish hydropower framework

Characteristics		Description	
Institutional framework	Authorities for granting rights of use	<ul style="list-style-type: none"> <li>Energy Regulatory Office</li> <li>Regional Directorate for Environment Protection</li> <li>Local Administration</li> <li>Regional Water Management Authority / Voivodship (Regional) Management of Drainage, Irrigation and Infrastructure Authority</li> </ul>	
	Types of hydropower right and granting procedures	<ul style="list-style-type: none"> <li>Building approval</li> <li>Approval of water management guidelines and water legal action plan</li> <li>Water permit for special use of water</li> <li>Concession to produce electric energy from the Energy Regulatory Office</li> </ul>	
Framework for granting the right to use hydropower	Duration	<ul style="list-style-type: none"> <li>20 years for water permit</li> <li>10 to 50 years for energy concession</li> </ul>	
	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 has referred Poland to court in February 2013 for failing to transpose European water legislation correctly. This comes after several years of back and forth with the European Commission, which assessed that in 2012 the global compliance on water protection was not yet ensured.	
Obligations of hydropower operators	Environmental obligations	<ul style="list-style-type: none"> <li>Environmental Impact Assessment mandatory for all hydropower projects</li> </ul>	
	Investment obligations	No specific investment obligation	
	Royalties	<ul style="list-style-type: none"> <li>Annual fees payable to the Energy Regulatory Agency and due from all generation licence holders (i.e. for all generation technologies; small hydropower is exempted)</li> </ul>	
Small hydropower	Small hydro definition	< 5 MW	
	Support	<ul style="list-style-type: none"> <li>Current Green Certificate scheme to remain active for certificates issued before 2016. Expiry after 15 years from beginning of generation, no later than 2035</li> <li>New Auction scheme consisting of feed-in tariffs (&lt; 500 kW) or feed-in premiums, with at least annual auctions between 2016 and 2021, and an end of support after 15 years, 2035 at the latest</li> </ul>	

### 2.10.1 Context and economics of hydropower in Poland

Hydropower accounts for around 2% of Polish power generation and less than 10% of installed capacity. Most hydropower plants are still controlled by the state-owned power generation and distribution companies, with PGE operating 23 power plants, or around 75% of total installed capacity<sup>171</sup>.

Most potential for new hydropower development is linked with the refurbishment of existing stations, and with the construction of new small hydropower plants. Small hydropower benefits from

<sup>171</sup> KPMG, 2010. *Central and Easter European Hydro Power Outlook*.

financial support along with other renewable energy sources. The new Renewable Energy Sources act will come into force in 2016, implementing a new support scheme based on feed-in tariffs and feed-in premiums set by auctions, while old capacities will still benefit from Green Certificates.

The Polish legislation requires that hydropower facilities go through a detailed permitting process which involves Regional Water authorities, the municipalities, as well as the energy regulatory agency. To operate, the facilities need both a water permit for special use of water, and a concession for electricity production under the terms of the Energy Law Act.

## 2.10.2 The institutional framework for hydropower

### **Stakeholders and legislations**

The legal structure for the use of the watercourse for hydropower is mostly based on the following pieces of legislation:

- The Energy Law Act provides legislation in issuance on hydroelectric licences. It regulates all issues regarding the power plant operation and connection to the grid.
- The Water Law Act introduces dispositions regarding water management and the issuance of water permits. It regulates planning procedures for hydropower plants.
- The Environmental Protection Act
- The Renewable Energy Sources Act regulates the support schemes for renewable energy sources. It was adopted in March 2015 after years of uncertainty<sup>172</sup>, and provides the dispositions for implementing the Green Certificate System as well as a new Auction Scheme to set feed-in tariffs and premiums, valid from January 2016.

The relevant stakeholders for supervision, control and authorisation are:

- The Energy Regulatory Office is responsible for the attribution of hydroelectric concessions on the basis of the Energy Law Act. It makes the final decision regarding the duration of the licence. It is also responsible for tendering the new auction schemes for renewable energy sources.
- The Regional Directorate for Environment Protection approves the Environmental Impact Assessment under the provisions of the Environmental Protection Act.
- The local administration (municipal level) is the recipient of the Environmental impact assessment. It issues the building approval for hydropower stations.
- The Regional Water Management Authority, or the Voivodship (Regional) Management of Drainage, Irrigation and Infrastructure Authority, are responsible for issuing the water permit for the special use of water.

Over the last few years, Poland has been involved several times with infringement procedures or inquiries launched by DG Environment for the non-compliance of national laws with the EU directives. In February 2012<sup>173</sup>, the European Commission sent a “reasoned opinion to ask Poland to correctly implement the EU’s Water Framework Directive”. This came after several past assessments that compliance was not ensured. In February 2013<sup>174</sup>, the Commission took Poland to court for “failing to transpose European water legislation correctly”. Gaps and shortcomings were indeed identified in the transposition of the Water Framework Directive.

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<sup>172</sup> Linklaters, 2015. *New Law on RES 6 The RES Act signed by the President* - <http://www.linklaters.com/Insights/Pages/New-law-RES-Act-signed-President.aspx>

<sup>173</sup> [http://europa.eu/rapid/press-release\\_IP-12-172\\_en.htm?locale=en](http://europa.eu/rapid/press-release_IP-12-172_en.htm?locale=en)

<sup>174</sup> [http://europa.eu/rapid/press-release\\_IP-13-144\\_en.htm](http://europa.eu/rapid/press-release_IP-13-144_en.htm)



### ***Types of rights to use hydropower and granting procedures***

The authorisation procedure for hydropower projects consists of a back-and-forth process between the applicant and local, regional and national-level authorities, during which several permits, licences or approvals are issued. The most important authorisations concern the rights to manage lands covered by water, and the concession to produce electric energy. The authorisation procedure is summarised as follows.

The applicant for a hydropower scheme first submits its application to the local administration, along with an Environmental Impact Assessment, which should be previously approved by the Regional Directorate for Environment Protection<sup>175</sup>. According to the Environmental Law, all hydropower projects are indeed considered as “*having a potentially considerable impact on the environment*”. Following a final environmental impact assessment, the local administration issues a building approval.

The next step regards the application of the provisions of the Water Law act. Water management authorities first validate the water management guidelines proposed by the applicant, and approve its legal water action plan. Afterwards, the *Voivodship* authority issues a water-legal consent. The applicant must then obtain the water permit for the special use of water from the Regional Water Management Authority or the Voivodship Management of Drainage, Irrigation, and Infrastructure Authority

After several intermediary authorisations (erection permit, grid connection agreement), the final stage involves the Energy Regulatory Office, which must attribute a concession to produce electric energy to the applicant.

#### 2.10.3 Framework for granting the right to use hydropower

Once the planning procedure is validated by the regional and local authorities, the planning permission is theoretically granted for an unlimited period.

Meanwhile, the water permit for the special use of water is usually issued for a 20-year period. Permits can be withdrawn or limited against compensation if the authorities assess it is justified by the public interest or critical economic criteria.

Finally, the concessions to produce electric energy are “granted for a period no less than 10 years, and no longer than 50 years, unless the enterprise applies for a licence for a shorter time”. It is possible to submit an application for a concession renewal; in that case, the application must be submitted at least 18 months before expiry.

#### 2.10.4 Characteristics of the competitive process

##### ***Competitive authorisation procedure for new installations***

The Polish legislative framework does not seem to provide for public and competitive procedures the issuance of permits for special usage of water or hydropower concessions, even when several applicants exist for a same site.

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<sup>175</sup> Restor-Hydro, 2014. *Small and Micro Hydropower Restoration Handbook*.

### **Competitive procedure for authorisation renewals**

The Polish legislative framework does not appear to provide for public and competitive procedures for the renewal of the different hydropower authorisations.

#### 2.10.5 Main schedule for renewal

The information available and the multiple levels of authorisation do not allow a coherent schedule for renewal to be drawn.

#### 2.10.6 Obligations of hydropower operators

##### **Environmental obligations**

Under the provisions of the Environmental Law, all hydropower project applicants must carry out an Environmental Impact Assessment. The assessment is performed in cooperation with the public authority. The environmental decision must be issued prior to all other authorisation proceedings.

The hydropower developer must also respect all criteria of environmental nature contained in the Water Management Guidelines and in the Water Act Law. However, there does not seem to be any specific environmental obligations which distinguish hydropower from other uses of water.

##### **Investment obligations**

There is no specific investment obligation provided in the Polish legislation.

##### **Taxes, levies and royalties**

Besides the administrative costs linked to the planning procedures, hydropower operators are subject to annual fees payable to the Energy Regulatory Agency and due from all generation licence holders. The fees are the product of the yearly revenue and a coefficient set at 0.06%<sup>176</sup>.

Legislation seems to exempt small hydropower from the annual concession fee.

#### 2.10.7 Support for small hydropower

The new Renewable Energy Sources Act was adopted in February 2015<sup>177</sup> and introduced major changes in the way hydropower and other renewable energy sources are remunerated. It complements the existing Green Certificate system with a new Auction Scheme. The Green Certificate scheme will go on until the expiry for old RES installation, while new installations will

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<sup>176</sup> Polish Information and Foreign Investment Agency. *Legal framework for renewable energy projects in Poland*. [http://www.paiz.gov.pl/polish\\_law/renewable\\_energy](http://www.paiz.gov.pl/polish_law/renewable_energy)

<sup>177</sup> Source Linklaters, 2015. *New Law on RES 6 The RES Act signed by the President* - <http://www.linklaters.com/Insights/Pages/New-law-RES-Act-signed-President.aspx>

benefit from feed-in tariffs or premiums under the Auction Scheme. In both schemes, support is only valid for hydropower capacities of up to 5 MW<sup>178</sup>.

On the one hand, existing RES systems will still benefit from the existing Green Certificates, under which quota obligations are imposed on energy traders and producers. Quotas obligations are set for each year by the Minister of Economy<sup>179</sup>, while certifications must be presented to the Energy Regulatory Office. A substitution fee is set every year by the regulator in order to frame the market, and is to be frozen from 2016 at 300.03 PLN (75 €) / MWh in order to avoid volatility<sup>180</sup>. The system will remain binding until December 2015. Afterwards it will remain valid for no longer than 15 years after the commissioning of installations, by December 2035 at the latest<sup>181</sup>.

On the other hand, new RES systems will benefit from either feed-in tariffs or feed-in premiums, according to their size:

- Installations with capacity lower than 500 kW cannot participate in the main system. They are supported through power purchase agreements, under which the entire energy generated must be bought for a period of 15 years, at a fixed price (feed-in tariff) calculated during the Auction Scheme procedure. The RES Act already provides the fixed prices for capacities below 40 kW: hydropower capacities up to 3 kW will sell their energy at 750 PLN (180 €) / MWh, while the capacities between 3 and 10 kW will sell it at 650 PLN (160 €)/MWh.
- Installation with capacity higher than 500 kW will participate in official auctions by the Energy Regulatory Authority, which will take place at least once a year between 2016 and 2021, and at the end of which an official tender price will be fixed. Installations will sell their energy on the market and will also be entitled to the difference between the energy price and the tender price when the tender price is higher. The feed-in premium will be restricted to a 15-year period, which must, however, end by the end of 2036. Separate auctions are to be organised for installed capacities under 1 MW and for capacities over this threshold.

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<sup>178</sup> Norton Rose Fulbright, 2015. *The new Polish renewables legislation*. <http://www.nortonrosefulbright.com/knowledge/publications/127474/the-new-polish-renewables-legislation>

<sup>179</sup> Note that GCs are, however, not year-specific – Source : Wholf Theiss 2013. *Generating Electricity from Renewable Sources in Central, Eastern & Southeastern Europe*.

<sup>180</sup> Source : Schoenherr, 2015. *Poland: new support scheme for renewable energy sources already adopted* - <http://www.schoenherr.eu/knowledge/knowledge-detail/poland-new-support-scheme-for-renewable-energy-sources-already-adopted/>

<sup>181</sup> PnP law, 2015. *Update on Polish Act on Renewable Energy Sources*

## 2.11 Portugal

Table 21. Summary of the Portuguese hydropower framework

Characteristics		Description
Institutional framework	Authorities granting the rights of use	<ul style="list-style-type: none"> <li>• Directorate General for Energy and Geology (DGEG)</li> <li>• Regulatory Authority of Energy Services (ERSE)</li> <li>• Basin authorities (Administração da Região Hidrográfica -ARH)</li> </ul>
	Types of hydropower rights and granting procedures	Concessions for the hydropower scheme via <ul style="list-style-type: none"> <li>• Project application, or</li> <li>• Calls for bidding (auctions) conducted by the government</li> </ul>
Framework for granting the right to use hydropower	Duration	Concession: up to 75 years Procedures from 3 to 11 years
	Competitive process	For new concessions <ul style="list-style-type: none"> <li>• Case of application by a private investor</li> <li>• Request concession licence with ARH</li> <li>• ARH call for tender if the project is in the interest of the river</li> <li>• Opening to competing projects</li> <li>• Applicant selection based on highest bid for up-front payment with a possibility to outbid for the first applicant</li> </ul> Case of ARH identifying the need for hydropower installations: applicant selection based on highest bid for up-front payment with no priority to any applicant
		For concession renewals
	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"> <li>• EIA</li> <li>• No regulation on the watercourse residual flow but 5 to 10% of modular flow on average</li> </ul>
	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) Extraordinary contribution for electricity operators (<20 MW exempt)
Small hydropower	Small hydro definition	< 10 MW
	Support	95 €/MWh for a maximum of 25 years Specific regime for micro and mini-generation (up to 250 kW). Support seems to be closed to new installations.

### 2.11.1 Context of hydropower in Portugal

Since the mid-20<sup>th</sup> 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 energy (36.1%), hydroelectricity (31%) and other renewables (31%)<sup>182</sup>. The hydropower capacity is mainly located in the North and centre of Portugal.

Over the following decades, the country will increase its hydropower capacity thanks to the National Programme for Dams with High Hydroelectric Potential (PNBEPH)<sup>183</sup> 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 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 sources<sup>184</sup>.

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.

### 2.11.2 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 the responsibilities to govern water.
- Decree-Law no. 97/2008 of 11 June defining the calculation method for water royalties.
- 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.

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<sup>182</sup> ENTSO-E, 2015. *Statistical factsheet 2014*

<sup>183</sup> Programa Nacional de Barragens de Elevado Potencial Hidroeléctrico.

<sup>184</sup> EDP (n.d.), Programa Nacional de Barragens, [http://www.a-nossa-energia.edp.pt/mais\\_melhor\\_energia/programa\\_nacional\\_barragens.php](http://www.a-nossa-energia.edp.pt/mais_melhor_energia/programa_nacional_barragens.php).

- 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 the quality of service and security of supply.
- The Regional Basin Authorities<sup>185</sup> (ARH) (five in total) were created in 2008. The ARHs are public institutions responsible for licensing hydropower concessions, which was previously under the government's jurisdiction.

In the past, Energias de Portugal (EDP), which was a 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 Institute<sup>186</sup> (Inag), a situation that changed in 2008 with the creation of the basin authorities (ARHs). Since 2008, Inag's main mission is ensuring 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 rights 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 or not the project application is suitable for the river basin. If the project is considered to be 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 for 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 a 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 licence<sup>187</sup>.

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<sup>185</sup> Administração da Região Hidrográfica.

<sup>186</sup> Instituto das Águas

<sup>187</sup> 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](http://pnbeph.inag.pt/np4/np4/?newsId=25&fileName=AH_Alvito_RNT.pdf).

### 2.11.3 Framework for granting the 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 schemes<sup>188</sup>.

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 to use 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 the anticompetitive effect of preventing the entry of interested competitors to the Portuguese 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 in addition to 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 Portugal<sup>189</sup>, the Commission concludes that "*[it casts] 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*"<sup>189</sup>.

In the coming 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.

### 2.11.4 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 the renewal of hydroelectric concessions.

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<sup>188</sup> European Small Hydropower Association (2009-2012), Small hydropower roadmap: Condensed research data for EU-27 (Stream Map Project),

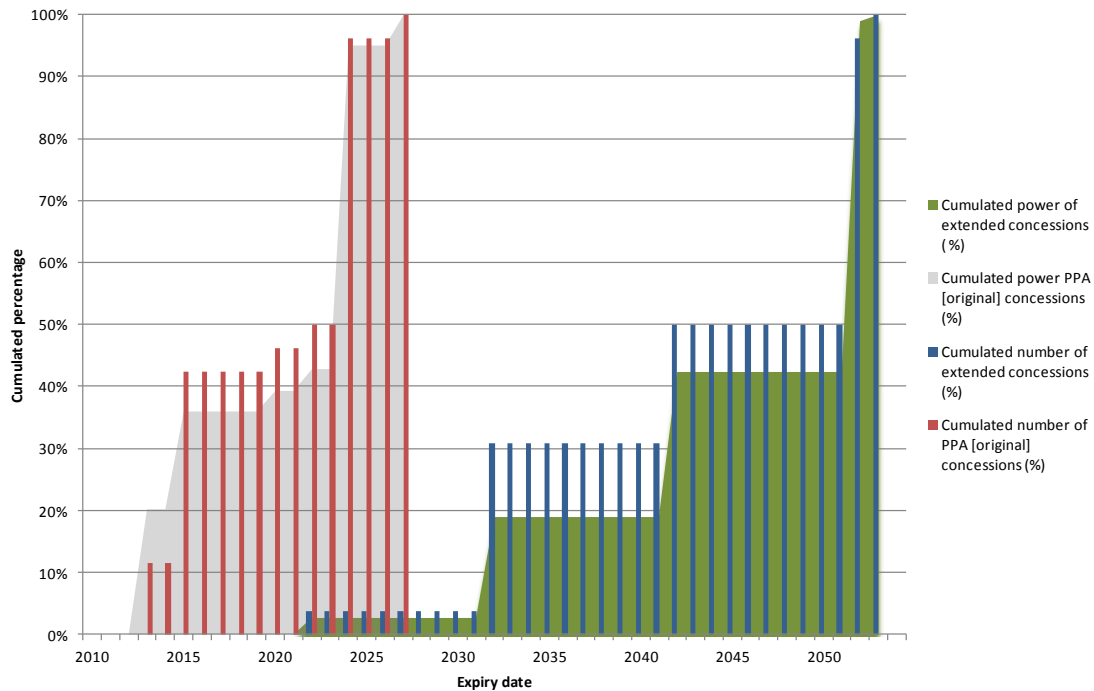
[http://streammap.esha.be/fileadmin/documents/Press\\_Corner\\_Publications/SHPRoadmap\\_FINAL\\_Public.pdf](http://streammap.esha.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf).

<sup>189</sup> European Commission (2013), State Aid SA.35429 (2013/C, ex 2012/CP) —Portugal: Extension of the use of public water resources for hydro electricity generation.

### 2.11.5 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.

Figure 15. Expiry date of hydropower concessions in cumulated number and cumulated power



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

### 2.11.6 Obligations of hydropower operators

Aside from the right to 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 3<sup>rd</sup> May 2000) issued by the federal government or a favourable Evaluation of Environmental Incidences (AlnCa regulated by the Decree-Law no. 225/2007 of 31<sup>st</sup> May 2001) issued by the Basin Authority, according to the each project's characteristics.

In Portugal, there is still no regulation on the watercourse residual flow. Nevertheless, *"there are indications stating that the ecological flow in Portugal should be, on 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 of the natural hydrological regime and to the spawning seasons. The residual flow would*



be the sum of the ecological flow with the flow necessary for the existing uses as irrigation and water supply<sup>190</sup>."

### 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 worth<sup>191</sup>.

The TRH is composed of the following five elements<sup>192</sup>:

TRH = A + E + I + O + U	
<b>A = V<sub>base</sub> · m<sup>3</sup> · SC</b>	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
<b>E = V<sub>base</sub> · kg</b>	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
<b>I = V<sub>base</sub> · m<sup>3</sup></b>	The aggregate extraction of public water resources, calculated by multiplying the base value to the volume of aggregate extracted, expressed in cubic meters
<b>O = V<sub>base</sub> · m<sup>2</sup></b>	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
<b>U = V<sub>base</sub> · m<sup>3</sup></b>	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)<sup>193</sup>*

<sup>190</sup> European Small Hydropower Association (2009-2012), Small hydropower roadmap: Condensed research data for EU-27 (Stream Map Project),

[http://streammap.ेशa.be/fileadmin/documents/Press\\_Corner\\_Publications/SHPRoadmap\\_FINAL\\_Public.pdf](http://streammap.ेशa.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf).

<sup>191</sup> Agencia Portuguesa Do Ambiente (2010), Report on Portuguese Environmental Economic Instruments, [http://www.apambiente.pt/\\_zdata/Divulgacao/Publicacoes/Guias%20e%20Manuais/report\\_peeи\\_2010.pdf](http://www.apambiente.pt/_zdata/Divulgacao/Publicacoes/Guias%20e%20Manuais/report_peeи_2010.pdf).

<sup>192</sup> For computational details, please refer to pp. 15 to 24 of this document

[http://www.apambiente.pt/\\_zdata/Divulgacao/Publicacoes/Guias%20e%20Manuais/report\\_peeи\\_2010.pdf](http://www.apambiente.pt/_zdata/Divulgacao/Publicacoes/Guias%20e%20Manuais/report_peeи_2010.pdf).

<sup>193</sup> Souza d'Alte T. (2010), Report on Portuguese Environmental Economic Instruments 2010, [http://www.apambiente.pt/\\_zdata/Divulgacao/Publicacoes/Guias%20e%20Manuais/report\\_peeи\\_2010.pdf](http://www.apambiente.pt/_zdata/Divulgacao/Publicacoes/Guias%20e%20Manuais/report_peeи_2010.pdf).

Values are updated yearly according to the CPI. In 2013, the base value ( $V_{\text{base}}$ ) for hydroelectricity was fixed at 0.00002 €/m<sup>3</sup>. The value of the shortage coefficient (SC) varies between 1, 1.1 and 1.2 depending on the water basin<sup>194</sup>.

In addition, a new contribution from economic operators in the energy sector was introduced in 2014: *the Contribuição Extraordinária sobre o Sector Energético*<sup>195</sup>. Under the new legislation, a 0.85% contribution is levied on the value of economic assets for operators involved in generation, wholesale trade, transport and distribution. Small hydropower (lower than 20 MW) is exempt from the contribution.

### 2.11.7 Support for 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 years<sup>196</sup>.

Since then, the Portuguese RES support system has been faced with several major changes. First, bailout agreements led in 2011 to the suspension of licence awarding for new renewable generation capacity<sup>197</sup>. Second, two decrees were voted in 2013 which respectively brought changes and extension provisions to the general support scheme (Decree law no 35/2013) and separated support for micro and mini-generation from the main regime (Decree law no 25/2013)<sup>198</sup>. This was followed by the enforcement of a new regime for Small Production Units (DL 153/2014), which provides support to (existing before 2015) small renewable generation units up to 250 kW. A distinction is drawn between micro-production (up to 3.68 kW) and mini-production (up to 250 kW)<sup>199</sup>.

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<sup>194</sup> Gabinete de Planeamento e Políticas (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](http://www.gpp.pt/ambiente/agua/REF_RH.pdf).

<sup>195</sup> Source: Practical Law – *Electricity regulation in Portugal*

<sup>196</sup> 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](http://streammap.esh.a.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf).

<sup>197</sup> <http://www.ey.com/GL/en/Industries/Power---Utilities/RECAI-Feb-2012---Portugal>

<sup>198</sup> CEER, 2015. Status Review of Renewable and Energy Efficiency Support Schemes in Europe in 2012 and 2013. [http://www.ceer.eu/portal/page/portal/EER\\_HOME/EER\\_PUBLICATIONS/CEER\\_PAPERS/Electricity/Tab4/C14-SDE-44-03\\_Status%20Review%20on%20RES%20Support%20Schemes\\_15-Jan-2015.pdf](http://www.ceer.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_PAPERS/Electricity/Tab4/C14-SDE-44-03_Status%20Review%20on%20RES%20Support%20Schemes_15-Jan-2015.pdf)

<sup>199</sup> <http://www.res-legal.eu/search-by-country/portugal/single/s/res-e/t/promotion/aid/feed-in-tariff-tarifas-feed-in/lastp/179/>

## 2.12 Spain

Table 22. Summary of the Spanish hydropower framework

Characteristics		Description	
Institutional framework	Authorities granting the rights of use	<ul style="list-style-type: none"> <li>Ministry of Energy for capacities &gt; 5 MW</li> <li>Local Authorities (<i>Comunidades Autonomas</i>), capacities &lt; 5 MW</li> <li>Basin Authorities</li> </ul>	
	Types of hydropower rights and granting procedures	<ul style="list-style-type: none"> <li>Water concessions</li> </ul>	
Framework for granting the right to use hydropower	Duration	<ul style="list-style-type: none"> <li>Up to 75 years + potential 10 year extension, if considerable investments have been made close to the expiry date of the concession</li> <li>Procedure duration between 6 to 10 years</li> </ul>	
	Competitive process	For new concessions	<ul style="list-style-type: none"> <li>Competing projects on a vacant section of a river chosen from the more rational use of water and with better environmental protection will be preferred</li> <li>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</li> </ul>
		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	<ul style="list-style-type: none"> <li>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</li> <li>DG Environment took Spain to Court in 2011 over its failure to comply with EU water legislation and submit plans for managing its river basins</li> </ul>	
Obligations of hydropower operators	Environmental obligations	<ul style="list-style-type: none"> <li>Mandatory EIA for plants located in environmentally sensitive areas</li> <li>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</li> </ul>	
	Investment obligations	<ul style="list-style-type: none"> <li>For the protection of the environment and watercourses</li> <li>For functional state of installations at concession expiry (reversion to the State)</li> </ul>	
	Royalties	<ul style="list-style-type: none"> <li>Production tax (<i>Canon de producción</i>)</li> <li>Regulation tax (<i>Canon de regulación</i>)</li> <li>Taxes on water use (<i>Tarifa de Utilización del Agua</i>)</li> </ul>	
Small hydropower	Small hydro definition	< 5 MW	
	Support	<ul style="list-style-type: none"> <li>Up to 2012: FIT for capacities &lt; 50 MW</li> <li>After 2012: no incentive mechanisms due to stringent tariff deficit measures</li> </ul>	

### 2.12.1 Context of hydropower in Spain

Since Spain has very irregular precipitation patterns, it has developed a large number of dams, which have enabled the construction of hydro facilities. Thus, the country's electricity generation mix includes a significant amount of hydropower. As early as the 1900s, Spain experienced substantial hydropower development, especially during the 40s, when a number of public companies were created<sup>200</sup>. 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 latest statistics from ENTSO-E (2014), Spain's electricity generation is largely based on conventional thermal (37.2%), nuclear energy (20.1%), renewables such as wind (26.2%) and finally hydroelectricity with 15.9%<sup>201</sup>. Hydropower capacity is spread across the different Spanish regions.

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.

It is worth noting that hydropower generation has been impacted by the measures adopted to reduce the annual tariff deficit since 2012. Along with the new Electricity Sector Act 24/2013, new taxes were introduced and incentives for renewable energy sources were modified<sup>202</sup> and a temporary moratorium on new RES was introduced.

### 2.12.2 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 May<sup>203</sup>
- Law 6/2001, of May 8, amending the Royal Legislative Decree 1302/1986 of 28 June, on the environmental impact assessment<sup>204</sup>.
- Law 10/2001 of 5 July, establishing the National Hydrological Plan<sup>205</sup>.

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<sup>200</sup> 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](http://www.provincia.cremona.it/ambiente/all/SMART_HANDBOOK_draftontheweb-v2.pdf).

<sup>201</sup> ENTSO-E, 2015. *Statistical factsheet 2014*.

<sup>202</sup> Practical Law, 2014. *Spanish electricity generation*. <http://uk.practicallaw.com/4-529-8116>

<sup>203</sup> 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.

<sup>204</sup> Ley 6/2001, de 8 de mayo, de modificación del Real Decreto legislativo 1302/1986, de 28 de junio, de evaluación de impacto ambiental.

<sup>205</sup> Ley 10/2001, de 5 de julio, del Plan Hidrológico Nacional.

- Royal Legislative Decree 1/2001 of 20 July, approving the amended text of the Water<sup>206</sup>.
- Royal Decree 661/2007 of 25 May, on the regulation of electricity production activities under the special regime<sup>207</sup>.
- Royal Decree 907/2007 of 6 July, approving the Regulation of the Hydrological Planning<sup>208</sup>.
- 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 waste<sup>209</sup>.
- Royal Decree 1290/2012 of 7 September, amending the Public Water Regulation<sup>210</sup>.

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.
- 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 Competition<sup>211</sup> (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 for separation as well as transparency and competition.
- The Local Authorities/Autonomous Communities<sup>212</sup> are responsible for further developing the regulation and legislation at the local level and for authorising hydropower plants with installed capacity lower than 5 MW.
- The River Basin Institutions<sup>213</sup> (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 Authorities<sup>214</sup> 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.

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<sup>206</sup> Real Decreto Legislativo 1/2001, de 20 de julio, por el que se aprueba el texto refundido de la Ley de Aguas.

<sup>207</sup> Real Decreto 661/2007, de 25 de mayo, por el que se regula la actividad de producción de energía eléctrica en régimen especial.

<sup>208</sup> Real Decreto 907/2007, de 6 de julio, por el que se aprueba el Reglamento de la Planificación Hidrológica.

<sup>209</sup> 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.

<sup>210</sup> Real Decreto 1290/2012, de 7 de septiembre, por el que se modifica el Reglamento del Dominio Público Hidráulico.

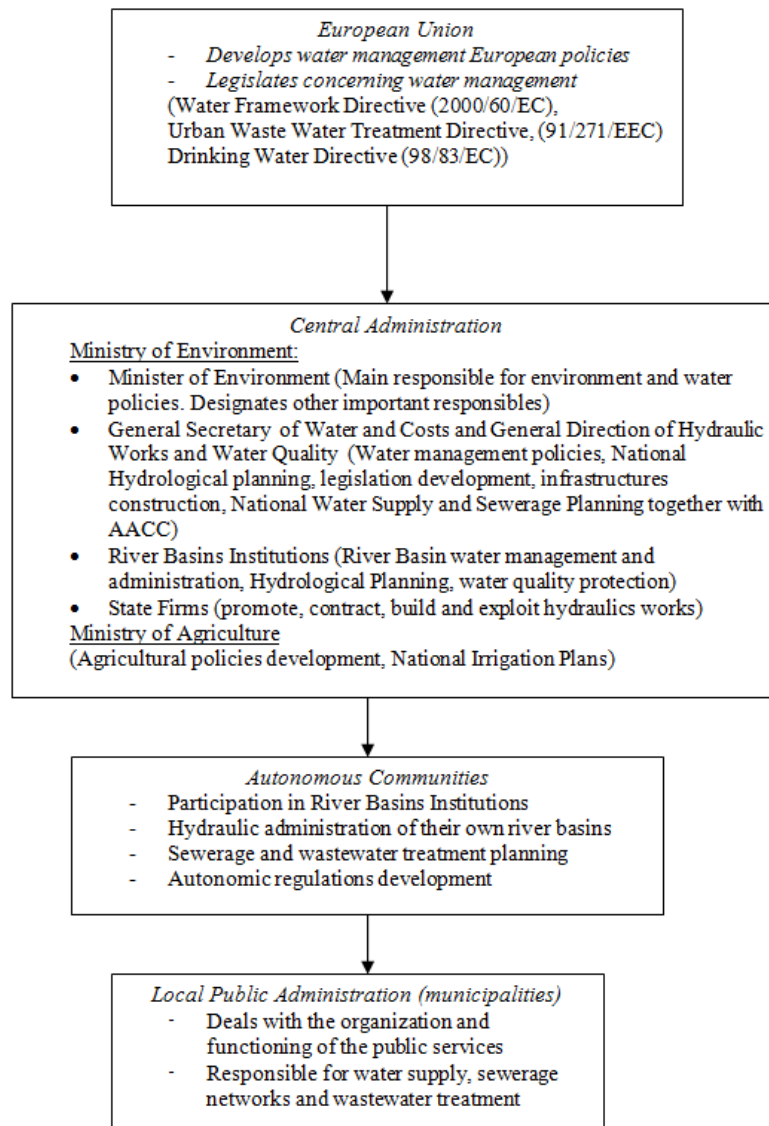
<sup>211</sup> Comisión Nacional de Mercados y Competencia.

<sup>212</sup> Comunidades Autonomas.

<sup>213</sup> Confederaciones Hidrográficas.

<sup>214</sup> Organismos de Cuenca.

Figure 16. Regulatory management of water resources in Spain



Source: Water time (2004)<sup>215</sup>

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;
- Administrating project construction and exploitation of own works or entrusted by State agreement, or by the Autonomous Communities, or the Town Halls; and

<sup>215</sup> Water time (2004), D10K: Water time national context report – Spain, [http://www.watertime.net/docs/WP1/NCR/D10k\\_Spain.doc](http://www.watertime.net/docs/WP1/NCR/D10k_Spain.doc).

- Granting authorisations 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 the 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 the 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 Plan<sup>216</sup> 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 Plan<sup>217</sup> is suggested by the Ministry of Environment and is approved by the Parliament.

Since 2011, Spain has been under the scrutiny of the European Commission over its management of river basins. In 2011, the EC brought Spain to court over its failure to submit more than one (over 24) plan for managing its river basins, as required in the Water Framework Directive<sup>218</sup>. As of 2015, the compliance with the Water Framework Directive was still not achieved<sup>219</sup>. In its fourth implementation report of March 2015, the Commission assessed that only 18 out of 25 River Basins Management Plans had been adopted, while other WFD requirements were still not verified in terms of exemption procedures, cost recovery instruments or water abstraction.

### ***Types of rights 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 authorisations 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 communities<sup>220</sup>.

<sup>216</sup> It covers such important issues as the updated inventory of hydraulic resources; the uses and existing and forecasting demands; the criteria of priority of uses; the assignment and reserve of resources for use 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 the recharge and protection of aquifers; basic infrastructures needed by the Plan; and the measures to anticipate damages due to floods or other hydraulic phenomena.

<sup>217</sup> 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; anticipated modifications of the resource use planning; and the necessary infrastructures for the development of the National Hydrological Plan.

<sup>218</sup> [http://europa.eu/rapid/press-release\\_IP-11-729\\_en.htm?locale=en](http://europa.eu/rapid/press-release_IP-11-729_en.htm?locale=en)

<sup>219</sup> European Commission, 2015. *Report on the implementation of the River Basin Management Plans according to the Water Framework Directive – Spain* - [http://ec.europa.eu/environment/water/water-framework/pdf/4th\\_report/MS%20annex%20-%20Spain.pdf](http://ec.europa.eu/environment/water/water-framework/pdf/4th_report/MS%20annex%20-%20Spain.pdf)

<sup>220</sup> 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\\_espanaversion\\_final.pdf](http://www.minetur.gob.es/energia/desarrollo/energiarenovable/documents/20100630_paner_espanaversion_final.pdf).

The procedure for concession granting is summarised below<sup>221</sup>:

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.
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 authorised water users according to law.

### 2.12.3 Framework for granting the right to use hydropower

According to the European Small Hydropower Association, the average duration of the authorisation procedure is between 6 to 10 years<sup>222</sup>.

There are two types of concessions:

- Concessions granted for "Central pie de presa" (impoundment power plant), associated with a fully or partially State-funded dam, built to regulate the river flow, secure water supply during the dry summer months and avoid floods, and which has the possibility of being used for hydropower generation.
- Concession granted to 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 date<sup>223</sup>. 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 54<sup>224</sup> states that for the Ebro River, the maximum validity of a concession is 40 years, although a longer concession, up to 75 years,

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<sup>221</sup> 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>.

<sup>222</sup> 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](http://streammap.esha.be/fileadmin/documents/Press_Corner_Publications/SHPRoadmap_FINAL_Public.pdf).

<sup>223</sup> 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>.

<sup>224</sup> 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>.



may be granted if the hydropower project needs a longer period to amortise 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 decided to send Spain a reasoned opinion concerning the 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 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 concessions<sup>225</sup>. The infringement proceeding was closed in 2008 by DG Internal market and services<sup>226</sup>.

#### 2.12.4 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 Basin funds<sup>227</sup>.

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. the project with a more rational use of water and better environmental protection will be preferred.

##### ***Competitive procedure for concession renewals***

Since 7<sup>th</sup> 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 Basin 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 procedure<sup>228</sup>.

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<sup>225</sup> 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](http://europa.eu/rapid/press-release_IP-05-920_en.htm?locale=en).

<sup>226</sup> 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](http://ec.europa.eu/eu_law/docs/docs_infringements/annual_report_26/en_sec_statannex_vol1clean.pdf).

<sup>227</sup> 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](http://www.boe.es/diario_boe/txt.php?id=BOE-A-1986-10638).

<sup>228</sup> 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

### 2.12.5 Main schedule for renewal

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

### 2.12.6 Obligations of hydropower operators

Aside from the right of use of 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 the protection of surface water or groundwater, or the conservation of habitats and species directly depending on water.

#### ***Investment obligations***

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

#### ***Taxes, levies and royalties***

Hydropower installations are subject to the following taxes<sup>229</sup>:

- 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 MWh produced.

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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>.

<sup>229</sup> 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%20cuencia/Precios\\_y\\_costes\\_de\\_los\\_servicios\\_del\\_agua\\_en\\_Espa%C3%B1a.pdf](http://www.chi.es/es-es/ciudadano/participacion_publica/Documents/Plan%20Hidrol%C3%B3gico%20de%20cuencia/Precios_y_costes_de_los_servicios_del_agua_en_Espa%C3%B1a.pdf).

- Regulation tax (*Canon de regulación*) is a tax levied on the 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 proportionate to the benefit it offers to the one paying. In the case of hydropower it is charged by MWh 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.

Specific taxes and obligations also exist depending on the type of hydropower installation or its localisation. Concession fees and taxes are thus applied to run-of-river installations, even when the facility was privately funded. Besides, owners of hydropower stations in Catalonia must pay a tax related to the right of the water consumer (DUCA). The obligation to provide back-up power at a reduced price also exists in some cases.

Finally, a new tax on energy was introduced in January 2013 with the Law 15/2012, of 27 December on tax measures for sustainability<sup>230</sup>. It is not an environmental tax per se, as it will rather be used to finance the tariff deficit<sup>231</sup>. Hydroelectricity is subject to that tax, through a specific tax on the use of inland waters. The tax was finally implemented (with retroactive effect) in March 2015 through the Royal decree 198/2015 amending article 112bis of the Waters Act.

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 revenues<sup>232</sup>. Since 2013, the FiT and other RES remuneration schemes have been replaced with a new mechanism based on remuneration on capacity and energy produced, additional to market revenues.

### 2.12.7 Support for 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 revenues<sup>233</sup>.

<sup>230</sup> Ley 15/2012, de 27 de diciembre, de medidas fiscales para la sostenibilidad.

<sup>231</sup> 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>.

<sup>232</sup> 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>.

<sup>233</sup> 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>.

Table 23. Support for small-hydro in Spain until 2012

	<b>Support for installed capacity &lt; 10 MW (2012 values)</b>	<b>Support for installed capacity between 10 MW and 50 MW (2012 values)</b>
<b>FiT</b>	First 25 years :FiT → 27.795 €/MWh After 25 years: FiT → 14.920 €/MWh	First 25 years :FiT → 23.355 €/MWh After 25 years: FiT → 14.920 €/MWh
<b>Cap and floor revenues with a market premium</b>	Cap → 94.557 €/MWh Floor → 72.360 €/MWh	Cap → 88.785 €/MWh Floor → 67.921 €/MWh

However, in 2012, due to the increasing tariff deficit which threatened the sustainability of the Spanish electricity sector, the government decided to introduce a temporary moratorium for the economic incentive schemes for new Special regime generators for an indefinite period of time<sup>234</sup>. In 2013 a new remuneration scheme for renewable energy and cogeneration was introduced. Since this modification, small hydro generators are receiving, in addition to market revenues, a further remuneration on investment.

<sup>234</sup>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>.

## 2.13 Sweden

Table 24. Summary of the Swedish hydropower framework

Characteristics		Description	
Institutional framework	Authorities granting the rights of use	Five regional Land and Environment Courts	
	Types of hydropower rights and granting procedures	Water operation permits for hydropower operators Legal force of concession, meaning that the specified operating conditions are not directly altered by new substantive law or policy changes before a completed judicial concession	
Framework for granting the right to use hydropower	Duration	<ul style="list-style-type: none"> <li>No time limit</li> <li>Some examples of procedure lasting 5 years and leading to no approval</li> </ul>	
	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"> <li>The objectives of the Environmental Code,</li> <li>the general rules of consideration,</li> <li>the adopted environmental quality standards</li> <li>and the rules on special protection areas</li> </ul>	
	Investment obligations	Environmental obligations contained in the original permit. Obligations for new installations are more and more stringent	
	Royalties	Industrial property tax = 2.8% of the property's value + 70% increase of the hydropower real estate value	
Small hydropower	Small hydro definition	< 1.5 MW	
	Support	Green certificates allocated for 15 years in renewable sources, in particular, to measure the increase of production at new and existing hydropower stations valued at around 20 €/MWh in 2012-2013	

### 2.13.1 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 2014, 42.5% of Sweden's electricity demand was generated by hydropower installations. Nuclear power consisted of 41%, other renewables totalled 14.1% and conventional thermal only accounted for 2.3%<sup>235</sup>. Hydropower capacity is mainly located in the North of Sweden.

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

<sup>235</sup> ENTSO-E, 2015. *Statistical factsheet 2014*

account for 93% of the country's hydropower production, according to the Swedish Agency for Marine and Water Management<sup>236</sup>.

In Sweden, national legislation requires that hydropower generation facilities have concessions in order 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 the following decade.

### 2.13.2 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 the limit values for various operations, and it does not go into detail when it comes to striking a balance between various interests<sup>237</sup>.
- 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 older<sup>238</sup>.
- 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*"<sup>239</sup>. 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

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<sup>236</sup> 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>.

<sup>237</sup> 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>.

<sup>238</sup> 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](http://www.ep.liu.se/ecp/057/vol10/053/ecp57vol10_053.pdf).

<sup>239</sup> 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 2020<sup>240</sup>.
- The Renewable Energy Directive (RES) (EC 2009/28): Is a common EU framework which aims at promoting energy generation from various renewable sources<sup>240</sup>.
- The Kammarkollegiet public agency initiates agency reviews and defends environmental and public interests in the environmental courts.

Sweden, like Norway, Finland and Denmark, is renowned for its 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 facilities<sup>241</sup>.

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

- The Ministry of Environmental Protection is responsible for the 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 the mitigation of climate change.
- The Land and Environment Courts have replaced 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*"<sup>242</sup>. The Courts are also involved in reviewing local land use plans and building permits as they arise 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 rights to use hydropower and granting procedures***

Hydropower installation owners must have a valid water operation permit 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

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<sup>240</sup> 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>.

<sup>241</sup> Katko, T. (2004), D10I: WaterTime National Context Report – Sweden, [http://www.watertime.net/wt\\_cs\\_cit\\_ncr.html](http://www.watertime.net/wt_cs_cit_ncr.html)

<sup>242</sup> 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](http://law.pace.edu/sites/default/files/IJIEA/jciBjallas_Final%203-17_cropped.pdf).

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 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 SEC<sup>243</sup>:

- 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 supply 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*"<sup>244</sup>. 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

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<sup>243</sup> Ministry of the Environment (n.d.), The Swedish Environmental Code, <http://www.government.se/content/1/c6/02/05/49/6736cf92.pdf>.

<sup>244</sup> 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>.



recent laws and regulations as the polluter pays principle is limited to 5% of the value of the 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 court<sup>245</sup>.

Concession modification can be rather long. For example, Rudberg (2013) mentions how the legal process for the 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 the Hedefors hydropower station concession review, the legal process took over two years, but the Land and Environment Court of Appeal ruled in favour<sup>246</sup>.

### 2.13.3 Framework for granting the 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"*<sup>246</sup>.

As of 2013, there were more than 3,700 concessions in force, which translates into approximately 2,000 hydropower plants<sup>246</sup>. 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 year<sup>247</sup> will be needed until 2020, to refurbish existing large-scale hydropower plants<sup>248</sup>.

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)<sup>249</sup>.

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<sup>245</sup> Sveriges Domstolar (2012), Land and Environment Courts, <http://www.domstol.se/Funktioner/English/The-Swedish-courts/District-court/Land-and-Environment-Courts/>.

<sup>246</sup> 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>.

<sup>247</sup> MSEK 2,500 per year. SEK is converted to € with the following rate 1 SEK = 0.11 € (value of 6<sup>th</sup> May 2014 from [www.oanda.com](http://www.oanda.com)).

<sup>248</sup> 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](http://www.elforsk.se/Rapporter/?download=report&rid=10_66).

<sup>249</sup> 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>.

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 concessions<sup>250</sup>.

#### 2.13.4 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.

#### 2.13.5 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.

#### 2.13.6 Obligations of hydropower operators

Besides the right of use of 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 purposes<sup>251</sup>.

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

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<sup>250</sup> 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](http://www.ep.liu.se/ecp/057/vol10/053/ecp57vol10_053.pdf).

<sup>251</sup> Ministry of the Environment (n.d.), The Swedish Environmental Code, <http://www.government.se/content/1/c6/02/05/49/6736cf92.pdf>.

It is worth noting that most environmental obligations only apply to a fraction of hydropower facilities, as facilities must only respect the obligations in the original permits, and obligations have only been implemented since 1999 and SEC signature.

### ***Investment obligations***

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

### ***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%<sup>252</sup>, together with a revaluation of real estate values for hydropower plants, which climbed by 70% in 2013 and led to a 200-million-euro increase in tax contributions<sup>253</sup>. The new rule should remain in force until 2018.

#### 2.13.7 Support for small hydropower

Sweden has had 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 system<sup>254</sup>.

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 €20.26<sup>255</sup>. Only hydro power plants whose capacity is smaller than 1.5 MW are eligible for this support.

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<sup>252</sup> Energimyndigheten (2012), Energy in Sweden 2012, [http://www.energimyndigheten.se/Global/Engelska/Facts%20and%20figures/Energy\\_in\\_sweden\\_2012.pdf](http://www.energimyndigheten.se/Global/Engelska/Facts%20and%20figures/Energy_in_sweden_2012.pdf).

<sup>253</sup> Nordenergi, 2014. Nordic Tax Report 2014.

<sup>254</sup> 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>.

<sup>255</sup> 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/>.

## 2.14 Switzerland

Table 25. Summary of the Swiss hydropower framework

Characteristics		Description	
Institutional framework	Authorities granting the rights of use	Cantonal authorities can delegate, in particular to communal authorities	
	Types of hydropower rights and granting procedures	Water concession	
Framework for granting the right to use hydropower	Duration	Set by negotiation, with a maximum of 80 years	
	Competitive process	For new concessions	Preference given to the company most serving the public interest. If the competing companies serve it likewise, preference is given to the company offering the best use of the watercourse Not open to foreign entities
		For concession renewals	<ul style="list-style-type: none"> <li>Right holder can ask for renewal of the concession in case of major works and refurbishments, or by request at minimum 15 years prior to the end of the concession</li> <li>Concession can expire and be reverted with a negotiated compensation for the "dry" part (electric installations). Reopening to confirm</li> </ul>
	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"> <li>Watercourse residual flow above a minimum level</li> </ul>	
	Investment obligations	<ul style="list-style-type: none"> <li>Ask for renewal minimum 15 years before expiry date</li> <li>Necessary work to prevent danger in case of end of operation</li> </ul>	
	Royalties	<ul style="list-style-type: none"> <li>Maximum charge per gross capacity at 90 €/kW<sup>256</sup> set at federal level</li> <li>Authorities flexible as to which charge collected on which producer (e.g. linear tariff in Vaud canton for capacity below 2 MW)</li> <li>Pumping tax and storage tax in Valais canton set at 1.64 €/kW and 0.12 €/kW<sup>257</sup></li> </ul>	
Small hydropower	Small hydro definition	< 10 MW	
	Support	<ul style="list-style-type: none"> <li>Maximum amount of 290 €/MWh<sup>258</sup> for 25 years</li> <li>Specific to each project depending on installed capacity, yearly production, hydraulic head, etc.</li> </ul>	

### 2.14.1 Context of hydropower in Switzerland

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

<sup>256</sup> That is 110 CHF/kW. CHF is converted in € with the following rate 1 CHF = 0.82 € (value of 6<sup>th</sup> May 2014 from oanda.com).

<sup>257</sup> 2 CHF/kW and 0.15 CHF/kW respectively.

<sup>258</sup> 350 CHF/MWh.

supply<sup>259</sup>. 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 Swiss nuclear plants has reduced the dependence of the country on its water resources. In 2014, hydropower only represented about 56% of its domestic production, while nuclear power accounted for 38% 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 the higher use of hydropower in Switzerland. In 2011, the national parliament decided not to replace any of the current reactors, which would lead to a progressive nuclear phase-out until 2034 and the need for progressive restructuring in order to maintain security of supply<sup>260</sup>. As a result, the Federal Council has been establishing a new long-term energy policy<sup>261</sup> based on hydropower and new renewable energy sources. The federal government is planning to promote hydropower through the renovation and the expansion of hydropower capacities. The objective of a production increase of 4 TWh/year by 2050 is deemed manageable by the Federal Council.

The 2013 hydropower mix of Switzerland is made up 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 MW<sup>262</sup>. 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*)<sup>263</sup>. 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.

## 2.14.2 The institutional framework for hydropower

### **Stakeholders and legislations**

The development of hydropower in Switzerland is organised through different legislations and levels of control and authorisations which 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 that all cantons must comply with. The main piece of legislation is the Water Right Law (LFH, 1916), recently updated, in 2012. The law provides the global framework for the use of hydropower resources, water sovereignty, and environmental obligations and water royalties. Other pieces of federal legislation include the

<sup>259</sup> Swiss Federal Office of Energy (SFOE) (2014), Hydropower, <http://www.bfe.admin.ch/themen/00490/00491/?lang=en>.

<sup>260</sup> It should however be noted that public opinion on the 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.

<sup>261</sup> "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>.

<sup>262</sup> Swiss Federal Office of Energy (SFOE) (2011), Large-scale hydropower, <http://www.bfe.admin.ch/themen/00490/00491/00492/index.html?lang=en>.

<sup>263</sup> 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).

2000 ordinance over utilisation of hydraulic power at the federal level, the 1995 ordinance on the compensation for foregone hydropower utilisation revenue, or the 1988 Energy Act (LENE). In particular, federal legislation provides for 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 authorisation 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 the 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 the granting of rights. Finally, it is responsible for the allocation and supervision of water concessions entering 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 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 rights to use hydropower and granting procedures***

Operators and investors of hydropower plants of more than 300-kW capacity are required to present an authorisation for the use of hydropower resources. This authorisation takes the form of a water concession granting for a limited period 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 an environmental impact assessment (EIA). Local negotiations and consultations are then carried out with communes and cantons, before a final request is submitted to vote by the local population. 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 utilisation right for the entire concession period. This right can only be diminished in the 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.

### 2.14.3 Framework for granting the 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 limited to public interest situations and are subject to compensation.

There are two cases that 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 a minimum of 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 the property of the operator, which can then be sold at a negotiated price<sup>264</sup>.

### 2.14.4 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 organised besides that provision. A law in 2011<sup>265</sup> has restated that a tender is not mandatory to grant a hydropower concession. Moreover, the concession rights are not open to foreign entities.

### 2.14.5 Main schedule for renewal

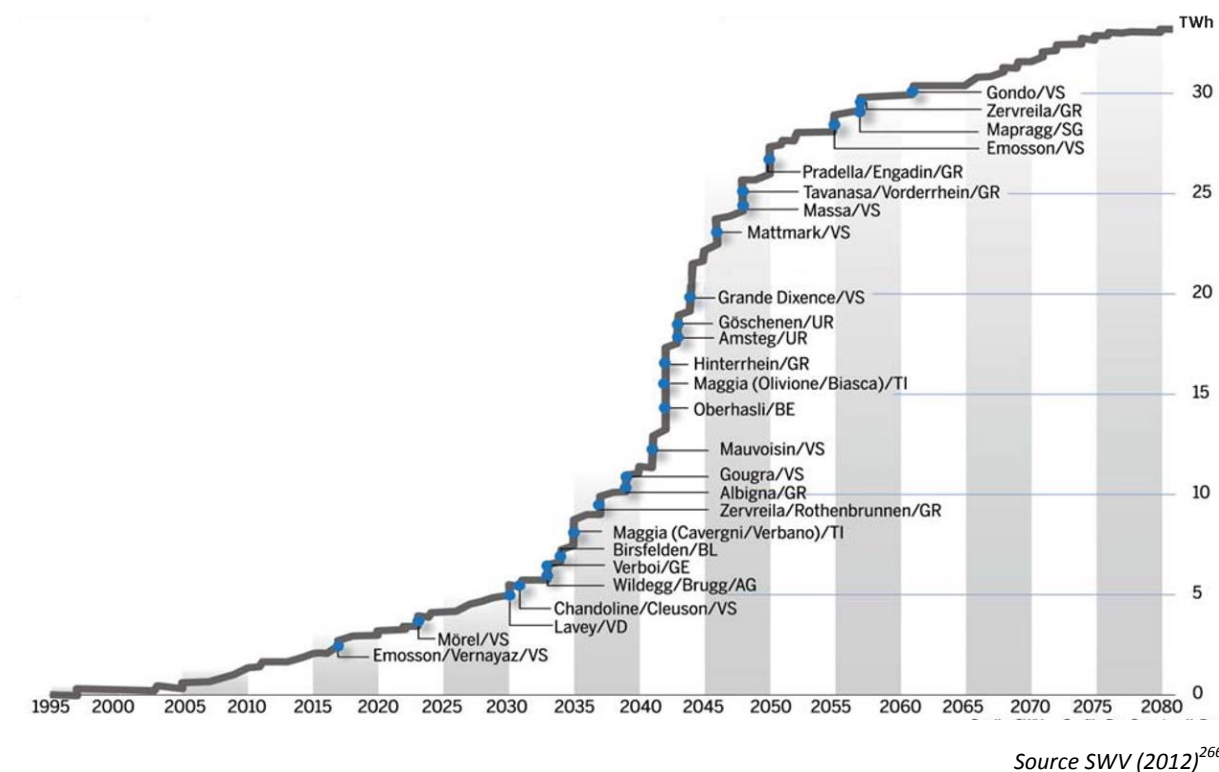
In terms of capacity, most concession reversions or renewals will occur between 2035 and 2045<sup>264</sup>. This broadly corresponds to the boom in hydropower investment which happened between 1945 and 1970.

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<sup>264</sup> 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>.

<sup>265</sup> Federal law modifying the law on the use of hydropower and the law on electricity supply of 23<sup>rd</sup> December 2011. <http://www.admin.ch/opc/fr/official-compilation/2012/3229.pdf>.

Figure 17. Expiry date of Swiss hydropower concessions in cumulated number and cumulated power



#### 2.14.6 Obligations of hydropower operators

Aside from the right to 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 respect the environment provisions of the applicable laws, and in particular in the water rights act. Requirements especially concern 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 by 1.4 TWh/y by 2050<sup>267</sup> due to the inability of respecting the environmental requirements while ensuring profitability (in comparison to a production of 36 TWh in 2012).

<sup>266</sup> 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>.

<sup>267</sup> 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](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 Act, the rights holder must also provide the necessary work to prevent any future danger in case of the 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 rights 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 a maximal charge per gross capacity. The cap is fixed by the government at 82€/kW from 2011 to 2014, and at 90 €/kW<sup>268</sup> 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, provided that the sum of the taxes is not 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 to 120 €/MWh and 1.64 €/kW<sup>269</sup> 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.

#### 2.14.7 Support for small hydropower

As a renewable energy source, small hydropower (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 out 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 290 €/MWh<sup>270</sup>, 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 at 50% of the total supporting cost (for all the renewable energy sources).

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<sup>268</sup> 100 CHF/kw and 110 CHF/kw respectively. CHF is converted in € with the following rate 1 CHF = 0.82 € (value of 6<sup>th</sup> May 2014 from oanda.com).

<sup>269</sup> 0.150 CHF/MWh and CHF 2 CHF/kW respectively.

<sup>270</sup> 350 CHF/MWh.

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 has been considered.

### 3 Conclusion

The main objective of this study is to provide a benchmarking of hydropower concession regimes in Europe, describing them in 14 European countries (Austria, Bulgaria, Finland, France, Germany, Great Britain, Greece, Italy, Norway, Poland, Portugal, Spain, Sweden and Switzerland) and relevant regions (e.g. cantons in Switzerland or Lands/federal states in Germany).

Hydropower regimes were illustrated and examined through a unified analysis framework to ensure their equal comparison. This framework is structured around 4 blocks: (1) the institutional framework of hydropower regimes (e.g. the type of rights to use hydropower, the relevant authorities granting the rights to use hydropower), (2) the framework for granting rights to use hydropower in itself (the duration of rights and procedure, competitive process and the existence of a possible EC infringement procedure), (3) the obligations of the hydropower operator (the environmental and investment obligations and royalties) and (4) small hydropower 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 (tables 26 and 27), the framework for granting the right to use hydropower (tables 28 to 30, and figures 18 to 21), a comparison of national situations and currently engaged procedures for competitive infringement (table 31), the obligations applying to the hydro power operators (tables 32 to 34 and figure 22) and the small hydropower definition and support as RES (table 35 and figures 23 and 24). To sum up,

- in Austria, concessions to use hydropower and renewals are negotiated;
- in Bulgaria, permits for water use and renewals are attributed on a first-come first-served basis, but new permit issuance seems unlikely due to severe restrictions on hydropower development;
- in Finland, permits for water use are normally attributed for an undefined duration, unless the previous (or new) provisions of the permits are not respected;
- in France, a competitive process exists for granting concession and renewal, but its implementation still awaits while concessions have already expired;
- in Germany, national legislation does not seem to provide for a competitive process to grant permits 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 Greece, water use licences are granted on a non-competitive basis, with expiration scheduled for all licences in 2022 when a new scheme is implemented;
- in Italy, a competitive process exists for granting concession and renewal;
- in Norway, hydro concessions are granted without a time limit to public companies whereas private companies must revert their concession right at the expiry date. Only the leasing of hydropower plants is currently possible for private companies;
- in Poland, time-limited water permits for the special use of water are attributed on a first-come first-served basis following a strict approval process.

- 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, permits for water utilisation are granted without a time limit under the condition that hydropower operators respect environmental conditions stated in the original permit;
- in Switzerland, concessions to use hydropower and grant renewals are negotiated and tenders are not mandatory for granting them.

Table 26. Summary of the institutional framework for Austria, Bulgaria, Finland, France, Germany, Great Britain, Greece and Italy

Characteristics	Austria	Bulgaria	Finland	France
Authorities granting the rights of use	<ul style="list-style-type: none"> <li>Facilities with &lt;500 kW, authorisation granted by regional district authority,</li> <li>Otherwise by federal States</li> </ul>	<ul style="list-style-type: none"> <li>Minister of Environment and Water</li> <li>Directors of Basin Directorates</li> <li>Regional Inspectorates</li> </ul>	<ul style="list-style-type: none"> <li>Regional State Administrative authorities</li> <li>Centre for Economic Development, Transport and the Environment</li> </ul>	<ul style="list-style-type: none"> <li>Departmental prefecture &lt;100MW</li> <li>The Ministry of Energy &gt; 100MW</li> </ul>
Types of hydropower rights and granting procedures	Applications for authorisations validated in compliance with environmental criteria only	Water use permit validated by the Environment authority and local authorities	Water use permit	<ul style="list-style-type: none"> <li>Authorisation &lt; 4.5 MW</li> <li>Concession &gt; 4.5 MW</li> </ul>
Characteristics	Germany	Great Britain	Greece	Italy
Authorities granting the rights of use	<ul style="list-style-type: none"> <li>District councils</li> <li>Local authorities</li> </ul>	<ul style="list-style-type: none"> <li>Environment Agency</li> </ul>	<ul style="list-style-type: none"> <li>Ministry of Environment</li> <li>Decentralised administrative regions</li> </ul>	<ul style="list-style-type: none"> <li>Regions and Provinces, if delegated</li> </ul>
Types of hydropower rights and granting procedures	<ul style="list-style-type: none"> <li>Assessment of applications for permit made by competent authorities on the basis of Water Acts and a discretionary final decision</li> <li>Specific demands from the authority possible in each case</li> </ul>	<ul style="list-style-type: none"> <li>Environmental licence (Abstraction or transfer licence and impoundment licence)</li> <li>Planning permission</li> <li>Accreditation to generate and export electricity</li> </ul>	Licence for water use, set to expire by 2022 before a new regime is defined	Water concessions

Table 27. Summary of the institutional framework for Norway, Poland, Portugal, Spain, Sweden and Switzerland

Characteristics	Norway	Poland	Portugal
Authorities granting the rights of use	<ul style="list-style-type: none"> <li>Ministry of Petroleum and Energy</li> <li>Ministry of Environment</li> <li>The Norwegian Water Resources and Energy Directorate (NVE)</li> </ul>	<ul style="list-style-type: none"> <li>Regional directorate for environmental protection</li> <li>Regional water management authority</li> </ul>	<ul style="list-style-type: none"> <li>Directorate General for Energy and Geology (DGEG)</li> <li>Regulatory Authority of Energy Services (ERSE)</li> <li>Basin authorities (Administração da Região Hidrográfica - ARH)</li> </ul>
Types of hydropower rights and granting procedures	Licences granted by King and Government for waterfall purchase or long-term use ( $\geq 1$ MW) after discussion by the Parliament ( $> 10$ MW) or the Ministry ( $< 10$ MW) and consideration by the energy regulator NVE.	Water permit for the special use of water	Concessions for hydropower scheme via: <ul style="list-style-type: none"> <li>Project application, or</li> <li>Calls for bidding (auctions) conducted by the Government</li> </ul>
Characteristics	Spain	Sweden	Switzerland
Authorities granting the rights of use	<ul style="list-style-type: none"> <li>Ministry of Energy (capacities <math>&gt; 5</math> MW)</li> <li>Local Authorities - Comunidades Autonomas (for capacities <math>&lt; 5</math> MW)</li> <li>Basin Authorities</li> </ul>	<ul style="list-style-type: none"> <li>Five regional Land</li> <li>Environment Courts</li> </ul>	Cantonal authorities can delegate, in particular to communal authorities
Types of hydropower rights and granting procedures	Water concessions	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	Water concessions

Table 28. Summary of the framework for granting the right to use hydropower in Austria, Bulgaria, Finland, France, Germany

Characteristics		Austria	Bulgaria	Finland	France	Germany
Duration		<ul style="list-style-type: none"> <li>Maximum authorisation duration: 90 years</li> <li>On average between 25 and 75 years</li> </ul>	<ul style="list-style-type: none"> <li>35 years for water use permit</li> </ul>	Unlimited under the provisions (which can be changed) of the water use permit	<ul style="list-style-type: none"> <li>Concession duration up to 75 years. More recent concessions are granted for 40 years</li> <li>Procedures can last more than 5 years</li> </ul>	<ul style="list-style-type: none"> <li>30 years maximum</li> </ul>
Competitive process	For new concession	National legislation does not appear to provide for competitive procedure	National legislation does not appear to provide for competitive procedure	National legislation does not appear to provide for competitive procedure	National legislation does not appear to provide for competitive procedure	Choice of competing applications <ul style="list-style-type: none"> <li>Based on economic offer</li> <li>Increasing installed capacity</li> <li>Other qualitative elements (quality, environment, etc.)</li> </ul>
	For concession renewals	National legislation does not appear to provide for competitive procedure	National legislation does not appear to provide for competitive procedure	No (competitive or negotiated) procedures regarding permit renewals	National legislation does not appear to provide for competitive procedure	Tender based on: <ul style="list-style-type: none"> <li>Economic offer</li> <li>Increasing energy generated or installed capacity</li> <li>A plan for environmental improvements or restoration of the relevant drainage basin</li> </ul>
EC infringement proceedings or equivalent		<ul style="list-style-type: none"> <li>DG environment took Austria to Court in April 2014 over the failure to protect water quality on a river contrary to the requirements of the Water Framework Directive</li> <li>In 2003, the European Commission sent a formal notice concerning the lack of competitive tenders and the maximal duration of authorisation. The case was, however, closed in 2006</li> </ul>	No infringement procedure appears in the European archives	No infringement procedure appears in the European archives	No infringement procedure appears in the European archives	The European Commission took Germany to Court in 2012 over incomplete cost recovery for water services, and in particular the exclusion of hydropower from the definition of water services. The procedure was dismissed in 2014 by the Advocate General, which judged that a narrow interpretation of secondary law does not constitute infringement.

Table 29. Summary of the framework for granting the right to use hydropower in Great Britain, Greece, Italy, Norway, Poland

Characteristics	Great Britain	Greece	Italy	Norway	Poland
Duration	<p>Before 2003, unlimited period of time After 2003 (Water Act 2003):</p> <ul style="list-style-type: none"> <li>Licence: 12 or exceptionally 24 years, but with possibility for indefinite extension (replacement licence)</li> <li>Procedure duration 1-3 years.</li> </ul>	<ul style="list-style-type: none"> <li>No specified duration</li> <li>All water licences to expire in 2022, before a new regime is defined</li> </ul>	<ul style="list-style-type: none"> <li>20 to 30 years for large scale hydro</li> <li>30 years for small hydro</li> </ul>	<ul style="list-style-type: none"> <li>Unlimited period of time for public companies</li> <li>No more concession granted to private companies</li> <li>Leasing to private firms for 15 years</li> </ul>	<ul style="list-style-type: none"> <li>20 years for water permit for special use</li> </ul>
Competitive process	<p>For new concession</p> <p>Competing licence proposal</p> <ul style="list-style-type: none"> <li>to propose a joint scheme</li> <li>to share water</li> <li>asked Environment Agency to choose one of them considering public interest</li> </ul> <p>Existence of a secondary market for transferring or leasing water rights</p>	National legislation does not appear to provide for competitive procedure	National legislation does not appear to provide for competitive procedure	National legislation does not appear to provide for competitive procedure	National legislation does not appear to provide for competitive procedure
	<p>For concession renewals</p> <ul style="list-style-type: none"> <li>None for authorisation granted before 2003.</li> <li>Otherwise as 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.</li> </ul>	National legislation does not appear to provide for competitive procedure	National legislation does not appear to provide for competitive procedure	National legislation does not appear to provide for competitive procedure	National legislation does not appear to provide for competitive procedure
EC infringement proceedings or equivalent	No infringement procedure appears in the European archives	DG Environment took Greece to Court in April 2011 over its failure to comply with EU water legislation and submit plans for managing its river basin. As of 2015, 12 out of 14 River Basin Management Plans have been implemented.	<ul style="list-style-type: none"> <li>Closed in 2007 after elimination of preference for outgoing concession-holder</li> <li>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</li> </ul>	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 legitimately pursue the objective of establishing a system of public ownership over these properties	DG Environment referred Poland to court in February 2013 for failing to transpose European water legislation correctly. This comes after several years of back and forth with the European Commission, which assessed that in 2012 the global compliance on water protection was not yet ensured.



Table 30. Summary of the framework for granting the right to use hydropower in Portugal, Spain, Sweden and Switzerland

Characteristics		Portugal	Spain	Sweden	Switzerland
Duration		<ul style="list-style-type: none"> <li>Concession: up to 75 years</li> <li>Procedures from 3 to 11 years</li> </ul>	<ul style="list-style-type: none"> <li>Up to 75 years + 10 year extension, if considerable investments are made</li> <li>Procedure duration from 6 to 10 years</li> </ul>	<ul style="list-style-type: none"> <li>No time limit</li> <li>Some examples of procedure lasting 5 years and leading to no approval</li> </ul>	<ul style="list-style-type: none"> <li>Set by negotiation, with a maximum of 80 years</li> </ul>
Competitive process	For new concession	<p>Application by a private investor:</p> <ul style="list-style-type: none"> <li>Request concession licence with ARH that calls for tender if project is in the interest of the river</li> <li>Open to competing projects</li> <li>Applicant selection based on highest bid</li> </ul> <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"> <li>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.</li> <li>For partially or publicly-owned dams, the operation may be offered to public tender through the Basin Authority</li> </ul>	National legislation does not appear to provide for competitive procedure	Preference given to the company most serving the public interest. If the competing companies serve it likewise, preference is given to the company offering the best use of the watercourse
	For concession renewals	National legislation does not appear to provide for competitive procedure	Expiring hydropower concessions that are reverted to the State may be subject to a call for tender procedure	National legislation does not appear to provide for competitive procedure	National legislation specifies that tenders are not mandatory
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	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	No infringement procedure appears in the European archives	It appears there was no infringement procedure from EFTA

Figure 18. Local or regional authorities can play a large role in the decision making process

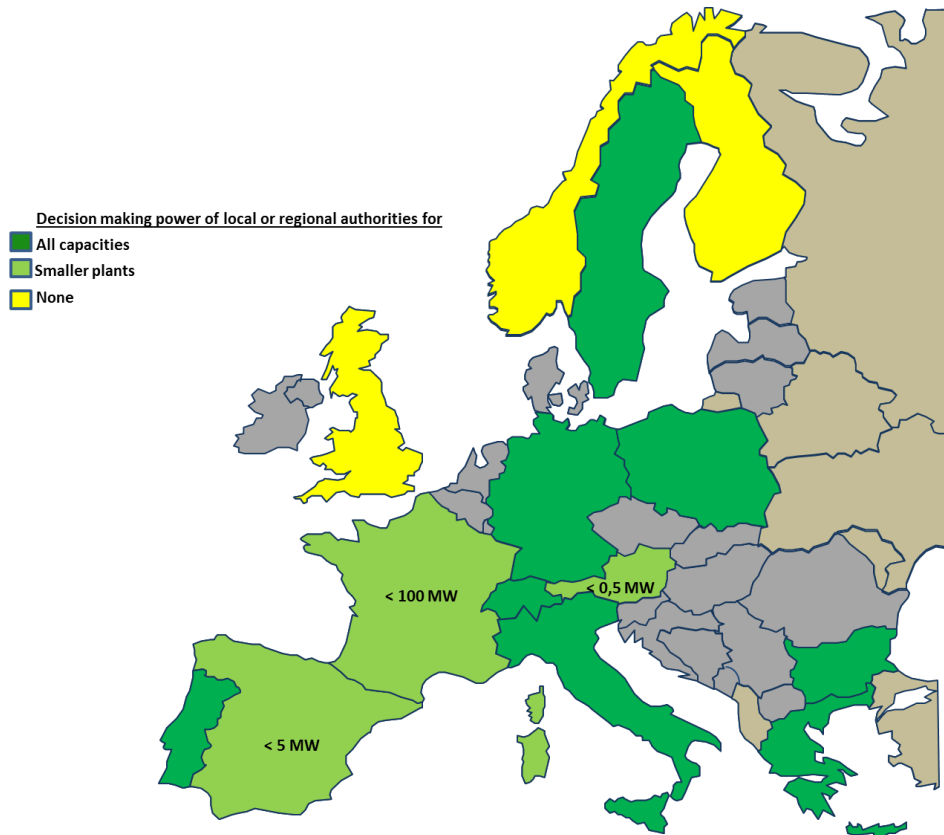


Figure 19. Different forms of rights to use hydropower granted for different durations

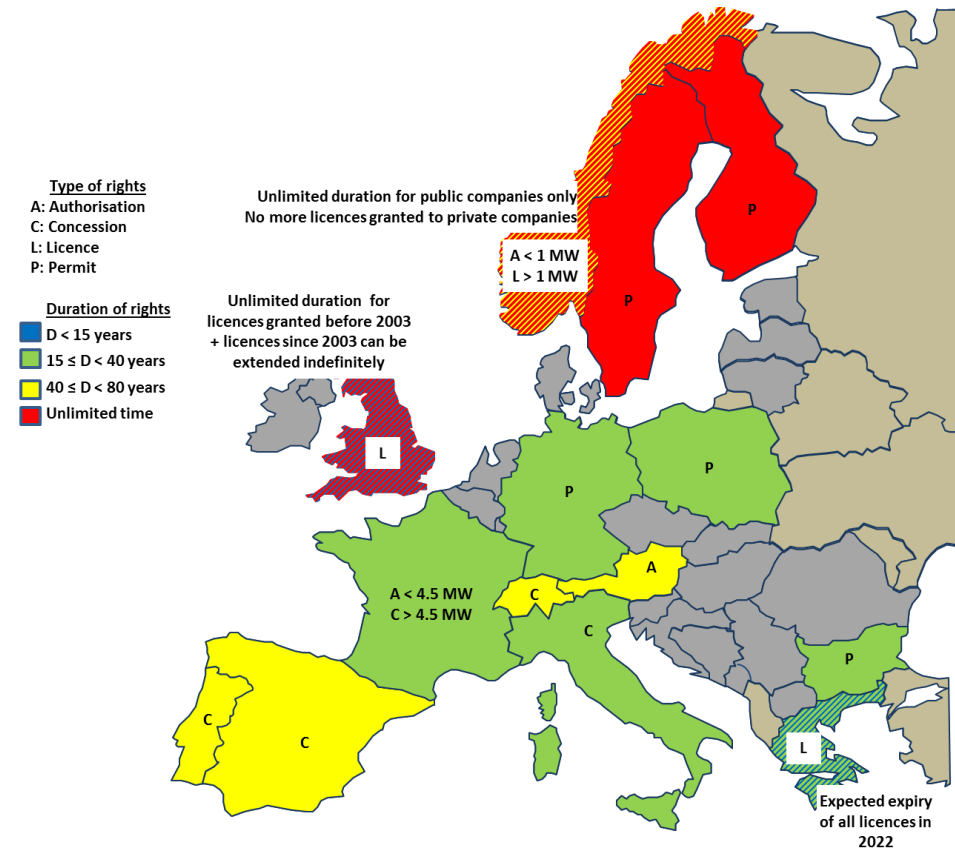


Figure 20. Several countries have been subject to infringement procedures

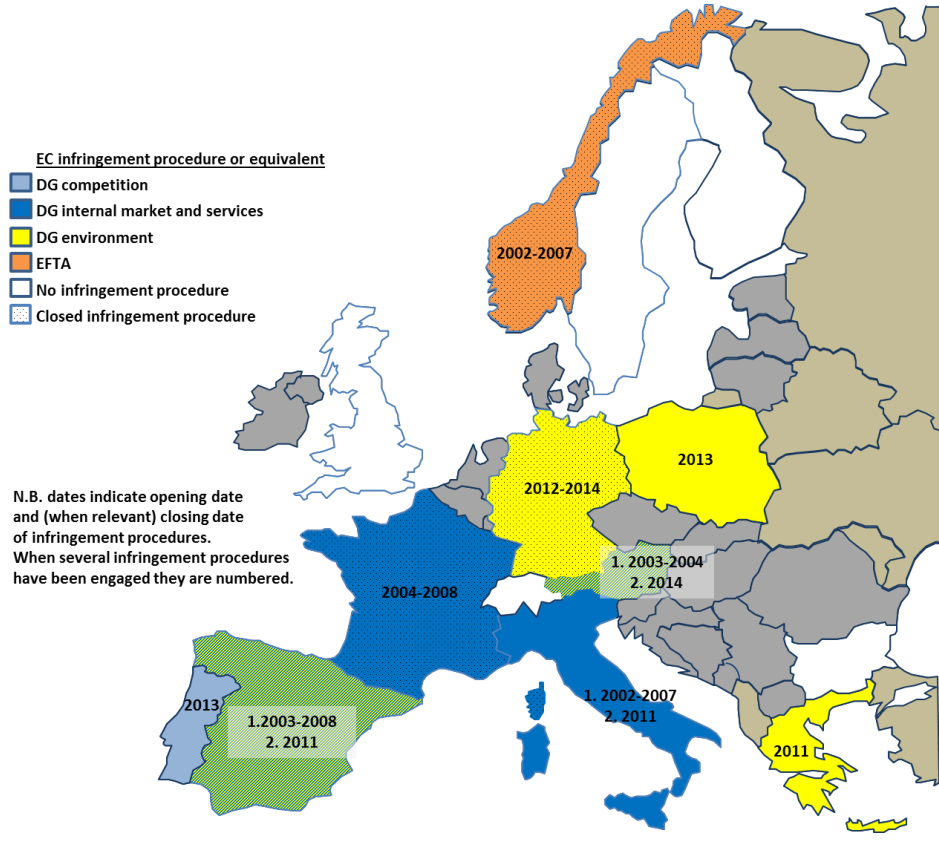


Figure 21. Competitive process to grant the right to use hydropower

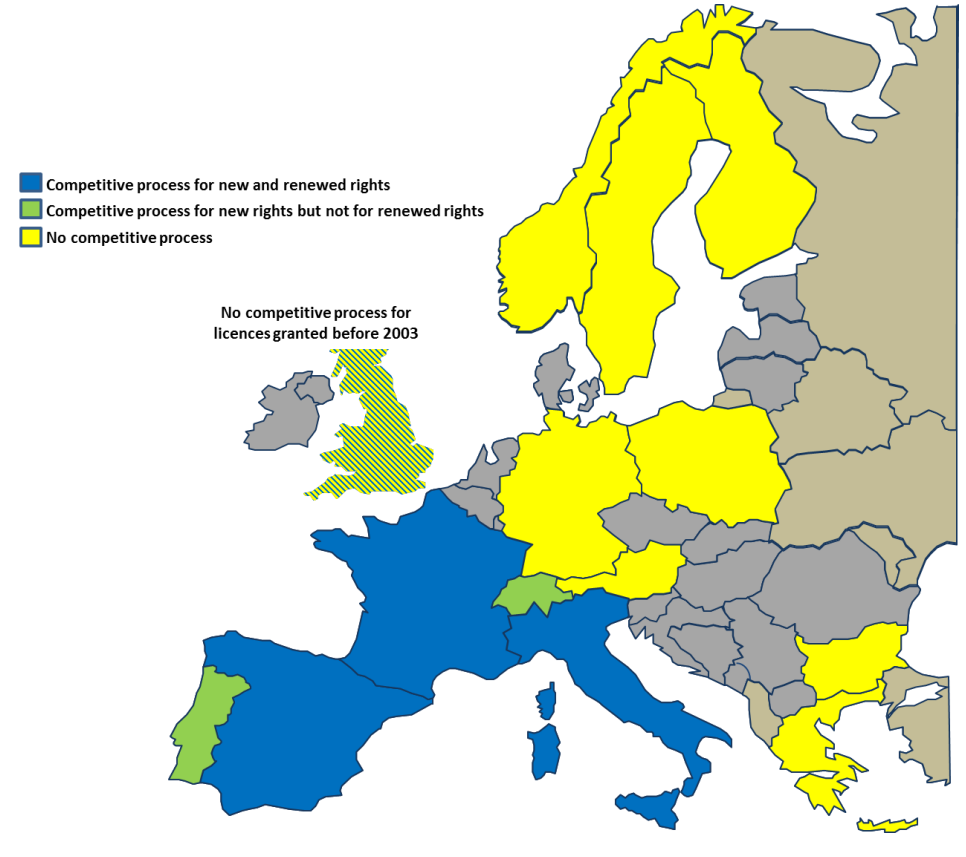


Table 31. Comparison of national situations and currently engaged procedures for competitive infringement

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

Table 32. Obligations of hydropower operators in Austria, Bulgaria, Finland, France, Germany

Country	Environmental obligations <sup>271</sup>	Investment obligations	Royalties
<b>Austria</b>	<ul style="list-style-type: none"> <li>EIA mandatory over 15 MW</li> <li>Ecological minimum flow to be restored until 2027 in existing hydropower plants</li> </ul>	National legislation does not appear to provide for investment obligations	<ul style="list-style-type: none"> <li>Energy taxes</li> <li>Local taxes</li> <li>Mandatory participation to special funds</li> <li>Licence fees directly negotiated between competent authorities and applicants</li> </ul>
<b>Bulgaria</b>	<ul style="list-style-type: none"> <li>Environmental Impact Assessment appears as quasi-compulsory during the permission process</li> <li>High level of constraints linked with environmental protection.</li> </ul>	<ul style="list-style-type: none"> <li>National legislation does not appear to provide investment obligations.</li> <li>A “compensation flow” must however be provided by the hydropower plant for irrigation and water supply in the area.</li> </ul>	There does not seem to be specific fees or royalties for hydropower plants, except for regular administrative costs linked to the permission procedure
<b>Finland</b>	<ul style="list-style-type: none"> <li>Environmental Impact Assessment can be required</li> <li>Environmental obligations are otherwise limited and are inexistent for old permits</li> </ul>	National legislation does not appear to provide for investment obligations	<ul style="list-style-type: none"> <li>Real estate tax levied based on the value of the property: max 2.85% for large hydropower plants (&gt; 10MW), max 1.3% for small hydropower plants</li> <li>Environmental compensation to fish population: 0.3-0.5 €/MWh; discussions to make it 5 to 7 times higher</li> </ul>
<b>France</b>	<ul style="list-style-type: none"> <li>Watercourse residual flow is often set between 12% and 17%</li> </ul>	<p>To meet environmental requirements:</p> <ul style="list-style-type: none"> <li>e.g. modernising installations to increase power production with the same flow and</li> <li>ensuring land drainage.</li> </ul>	<ul style="list-style-type: none"> <li>For the use of watercourses</li> <li>For the occupation of hydroelectric public domain</li> </ul> <p>Charge proportional to the MWh produced, or dividends or distributed profits + charge proportional to the revenue from electricity sales</p>
<b>Germany</b>	<ul style="list-style-type: none"> <li>Environmental requirements to be respected</li> <li>EIA compulsory except for small hydro</li> <li>Minimum watercourse flow as a federal obligation for all hydropower stations, with regard to the Water Framework Directive</li> </ul>	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.

<sup>271</sup> The review of EU legislation is ongoing e.g. the 2000 water framework directive.

Table 33. Obligations of hydropower operators in Great Britain, Greece, Italy, Norway

Country	Environmental obligations <sup>272</sup>	Investment obligations	Royalties
Great Britain	<ul style="list-style-type: none"> <li>Watercourse residual flow: 5% of natural flow (3% for high baseflow river)</li> <li>EIA for plants in sensitive areas</li> </ul>	To meet environmental requirements (limiting adverse impacts on water resources, creating a fish pass, limiting flood risk and ensuring land drainage)	<ul style="list-style-type: none"> <li>Standard unit charges: between 14.86 and 37.87 €/1000m<sup>3</sup>/year, depending on the region.</li> <li>Application Charge = 172 €</li> <li>Advertising Administration Charge = 128 €</li> </ul>
Greece	<ul style="list-style-type: none"> <li>Environmental Impact Assessment can be required</li> <li>The facility must be compliant with the River Basin Management Plan</li> <li>A special environmental assessment is realised if the hydropower plant is inside the NATURA 2000 network</li> <li>Residual water flow obligations for small hydropower</li> </ul>	National legislation does not appear to provide for investment obligations	<ul style="list-style-type: none"> <li>Only for small hydropower: annual fee to the municipalities (3% of the sales revenue of the hydropower plant) + fee for production licence</li> </ul>
Italy	<ul style="list-style-type: none"> <li>Reserve flow defined by regions</li> </ul>	Investment to increase plant capacity and efficiency as qualitative elements of response to call for tenders	<ul style="list-style-type: none"> <li>Public rents to regions and Local Authorities (Municipalities, Provinces)</li> <li>Real estate tax</li> </ul>
Norway	<ul style="list-style-type: none"> <li>Mandatory EIA &gt; 40 GWh</li> <li>Protection of some river systems forbidding hydropower development in some watercourses, including from micro and mini power plants since 2005</li> </ul>	Make the necessary investments to ensure that environmental regulations are met	<ul style="list-style-type: none"> <li>Annual fees to the State: between 0.16 and 1.62 €/kW</li> <li>Annual fees to counties and municipalities: between 0.16 €/kW and 4.87 €/kW</li> <li>Resource rent tax: 31% (for excess returns only)</li> <li>Natural resource tax: 1.6 €/MWh</li> <li>Obligation to supply 10% generation at a low rate</li> </ul>

<sup>272</sup> The review of EU legislation is ongoing e.g. the 2000 water framework directive.

Table 34. Obligations of hydropower operators in Poland, Portugal, Spain, Sweden and Switzerland

Country	Environmental obligations <sup>273</sup>	Investment obligations	Royalties
<b>Poland</b>	Environmental Impact Assessment mandatory for all hydropower projects	No specific investment obligation	<ul style="list-style-type: none"> <li>Annual fees payable to the Energy Regulatory Agency and due from all generation licence holders (i.e. for all generation technologies; small hydropower is exempted)</li> </ul>
<b>Portugal</b>	<ul style="list-style-type: none"> <li>EIA</li> <li>No regulation on the watercourse residual flow but 5 to 10% of modular flow on average</li> </ul>	For the protection of the environment (e.g. acceptable levels of residual and ecological flows of watercourses)	<ul style="list-style-type: none"> <li>Rate on water resources (Taxa de recursos Hidricos - TRH)</li> <li>Extraordinary contribution for electricity operators (&lt;20 MW exempted)</li> </ul>
<b>Spain</b>	<ul style="list-style-type: none"> <li>Mandatory EIA for plants located in environmentally sensitive areas</li> <li>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</li> </ul>	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"> <li>Production tax (Canon de producción)</li> <li>Regulation tax (Canon de regulación)</li> <li>Taxes on water use (Tarifa de Utilización del Agua)</li> </ul>
<b>Sweden</b>	<p>Compliance with</p> <ul style="list-style-type: none"> <li>The objectives of the Environmental Code</li> <li>the general rules of consideration</li> <li>the adopted environmental quality standards</li> <li>and the rules on special protection areas</li> </ul>	Environmental obligations in original permit are more and more constraining for new installations	Industrial property tax = 2.8% of the property's value + 70% increase of hydropower real estate value
<b>Switzerland</b>	Watercourse residual flow above a minimum level	<ul style="list-style-type: none"> <li>Ask for renewal of minimum 15 years before expiry date</li> <li>Necessary work to prevent danger in case of end of operation</li> </ul>	<ul style="list-style-type: none"> <li>Maximum charge per gross capacity at 90€/kW set at federal level</li> <li>Authorities flexible as to which charge collected from which producer (e.g. linear tariff in Vaud canton for capacity below 2 MW)</li> <li>Pumping tax and storage tax in Valais canton set at 1.64 €/kW and 0.12 €/kWh</li> </ul>

<sup>273</sup> The review of EU legislation is ongoing e.g. the 2000 water framework directive.

Figure 22. Environment impact assessment and residual flow obligations

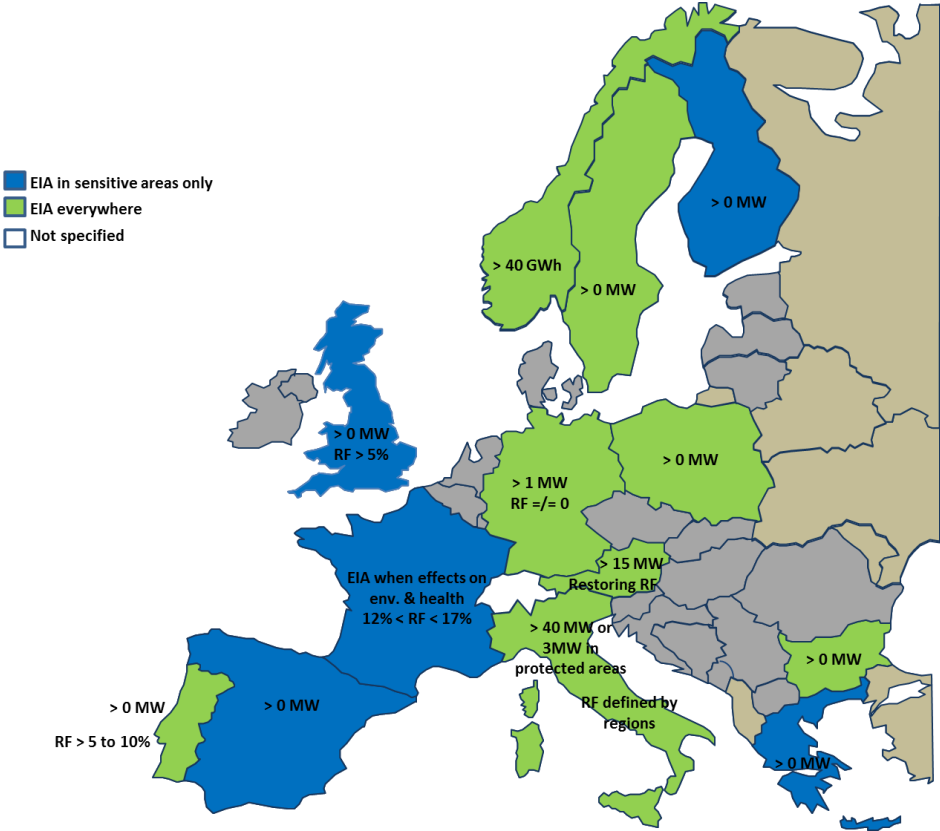




Table 35. Small hydro definition and support schemes

Country	Small hydro definition	Support schemes
Austria	< 2 MW	<ul style="list-style-type: none"> <li>New or revitalised plants increasing efficiency by at least 15 % 32.3 – 105.5 €/MWh for 13 years, depending on revitalisation and the amount of electricity fed into the grid.</li> <li>Obligations to purchase hydropower at market price &lt; 10 MW</li> <li>Alternative possibility of investment aid</li> </ul>
Bulgaria	< 10 MW	<ul style="list-style-type: none"> <li>Feed-in tariffs are available for small hydropower, with preferential price between 47.9 and 121.1 €/MWh (before VAT).</li> <li>The current price reform in Bulgaria may be driven to end the hydropower feed-in tariff after July 2015, as is already the case for PV and wind power.</li> </ul>
Finland	< 10 MW	<ul style="list-style-type: none"> <li>Same mechanism for all hydropower</li> <li>“Energy aid” grant attributed to RES plants for up to 30% of their eligible investment cost</li> <li>End of the programme in 2017</li> </ul>
France	< 4.5MW	60.7 €/MWh (no time of use tariff) + a premium between 5 and 25 €/MWh (all the higher as the capacity is small) + a winter bonus of up to 16.8 c€/MWh depending on regularity of production
Germany	< 1 MW	FiT is available whatever the hydro power capacity. For small hydropower specifically, the FiT at 125 €/MWh for capacity below 500 kW and goes up to 35 €/MWh for capacity > 50 MW
Great Britain	Small hydro < 5 MW Micro-scale hydro <50 kW	<ul style="list-style-type: none"> <li>FiT &lt; 5 MW: between 34.5 and 301.0 €/MWh depending on the size of the plant and the tariff date</li> <li>Renewables Obligation Certificates for capacity &gt; 5 MW but &lt; 20 MW</li> </ul>
Greece	< 15 MW	Only for small hydropower: FiT 105 €/MWh for 20 years contracts for plants commissioned after April 2014
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. Measures to increase production at new and existing hydropower stations are eligible (contrary to old power plants) and valued around 20 €/MWh in 2012-2013
Poland	< 5 MW	<ul style="list-style-type: none"> <li>Current Green Certificate scheme to remain active for certificates issued before 2016. Expiry after 15 years from commencement of generation, no later than 2035</li> <li>New Auction scheme consisting of feed-in tariffs (&lt; 500 kW) or feed-in premiums, with at least annual auctions between 2016 and 2021, and end of support after 15 years, 2035 at the latest</li> </ul>
Portugal	< 10 MW	95 c€/MWh 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, measures to increase production at new and existing hydropower stations valued around 20 €/MWh in 2012-2013
Switzerland	< 10 MW	Maximum amount = 290 €/MWh for 25 years Specific to each project depending on installed capacity, yearly production, hydraulic head, etc.

Figure 23. Small hydro definition

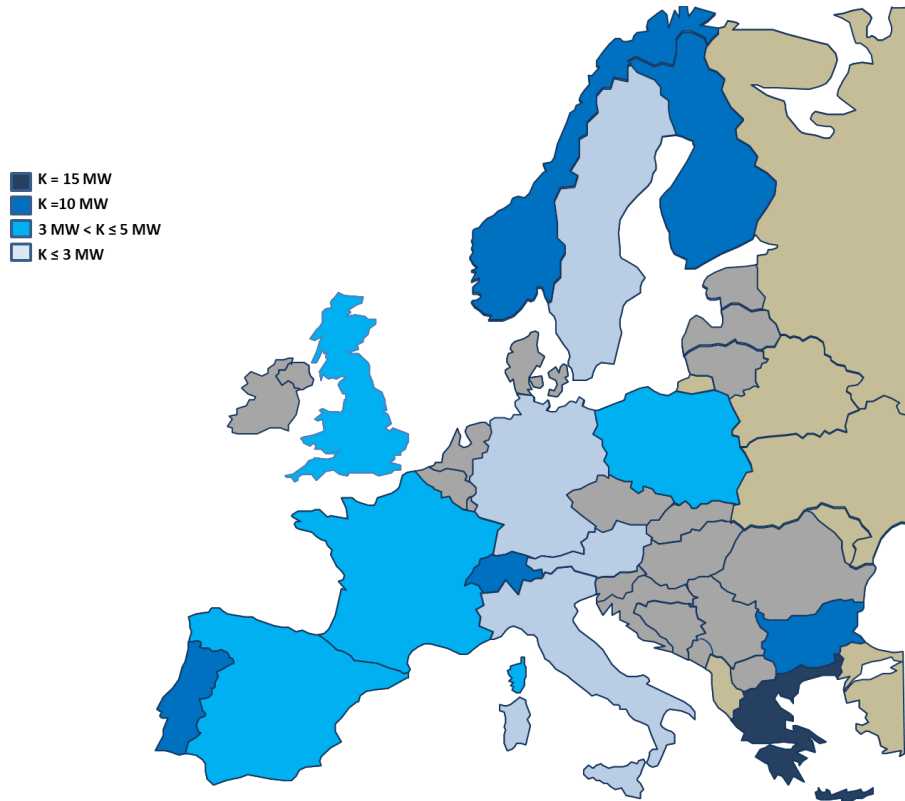


Figure 24. Small hydro support

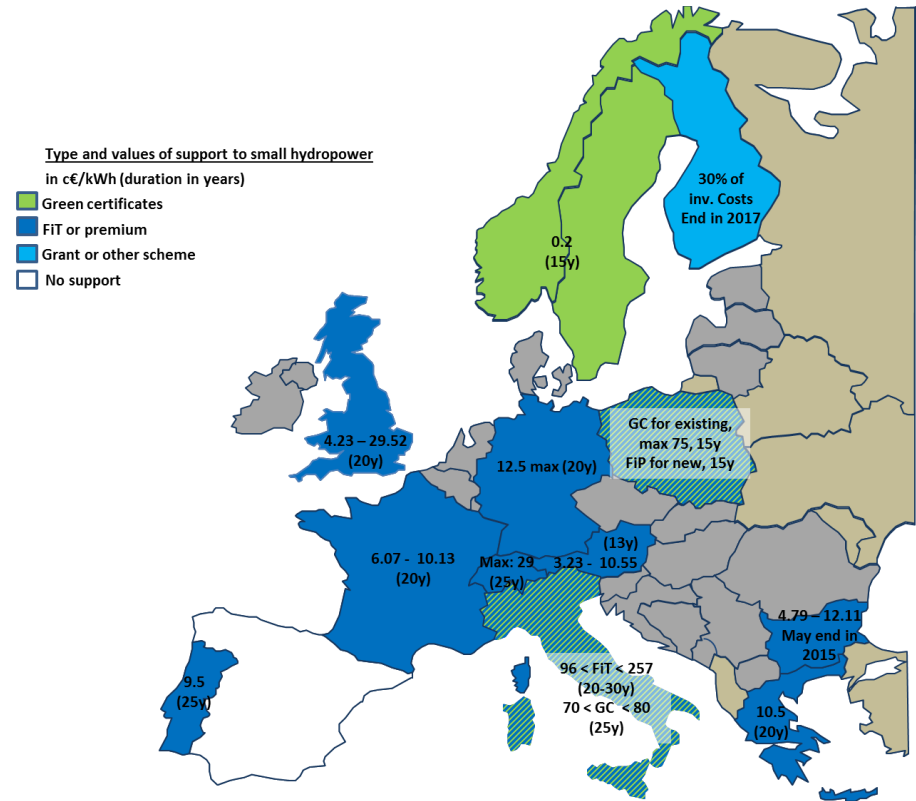
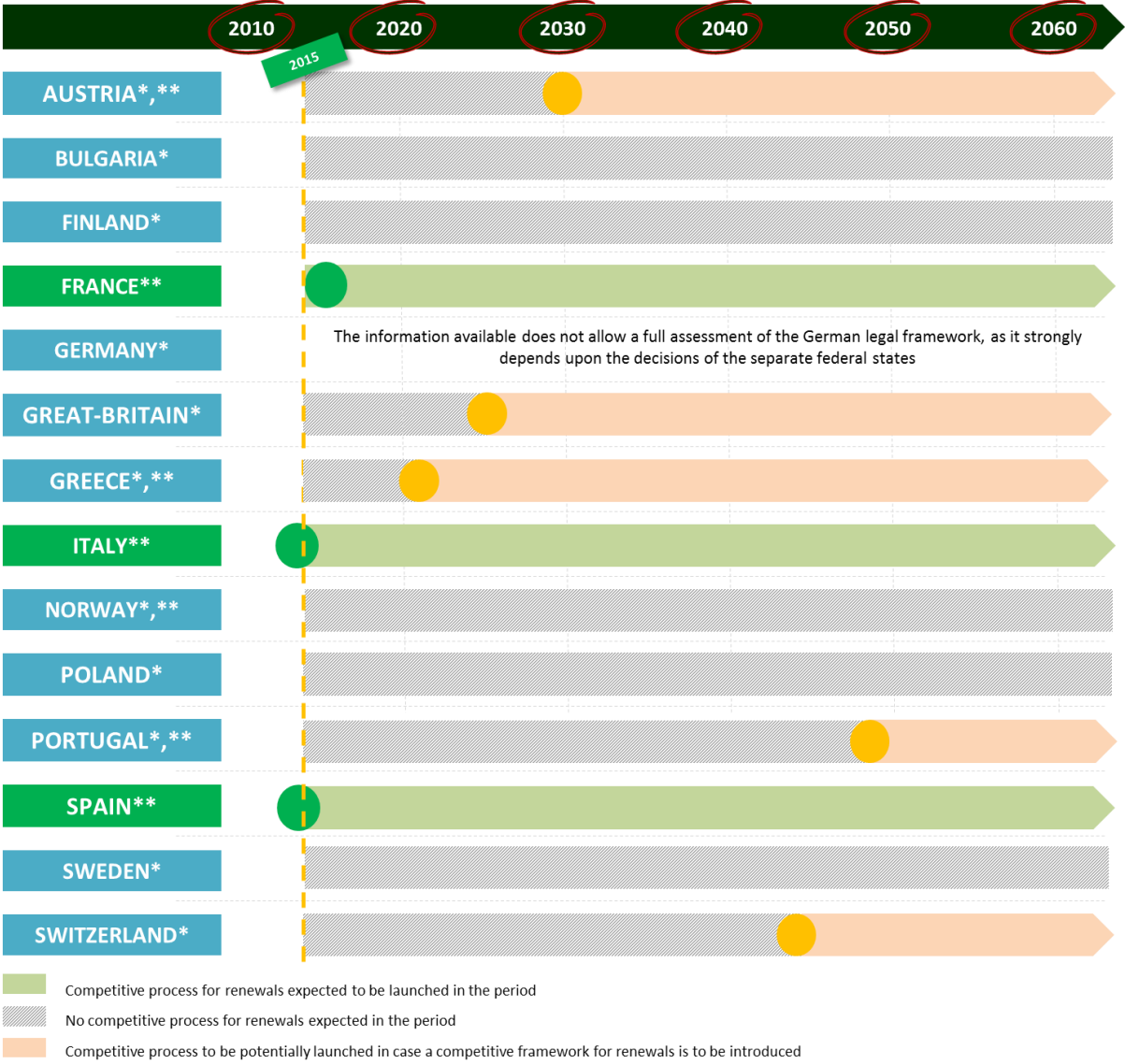


Figure 25 also presents the schedule in graph form. Each country is described by a timeline. A dot indicates an estimation of a potential renewal start date for the national hydropower park, considering available information. Countries in green boxes have a legislation providing public and competitive procedures for the renewal of all hydroelectric concessions while countries in blue boxes do not have such legislation for the renewal of all the hydroelectric concessions.

Figure 25. Indicative schedule of hydropower renewals



\* National legislations do not seem to provide public and competitive procedures for the renewal of all the hydroelectric concessions  
 \*\* Countries that were subject to EU infringement procedures (or similar procedures from the European Free Trade Association for Norway) over the past decade, which led to a revision of the national framework

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

4. Firstly, **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 to national authorities. Trade-offs between these interests are then needed to reach decisions regarding the right of hydropower usage. In this regard, the national and local interests carry a significant weight because of the environmental impact of hydropower on watercourses. This is also reinforced by the role of hydropower in the security of supply or climate change policy, even if this is also true to a variable extent for other types of generation technology;

5. For the same reasons, the precise definition of the **liabilities of hydropower operators is actually very consequential**. The operators' 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 the rights to use hydropower, as much for the operators' qualifications regarding the terms of rights and the quality of assets during the transfer of liabilities at renewals;
6. Analysing the framework for granting the right to use hydropower, it is noteworthy that the implementation of competitive process remains secondary, in this respect, in the EU Member States as well in other external countries. A number of countries implement authorisations (e.g. Austria), grant concessions for unlimited time (e.g. Finland and Sweden), or directly negotiate concession without a transparent competitive process. Different levels of opening are observed for the initial granting process 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 to be 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). 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 the right to use hydropower for an unlimited time, Austria grant the right to use hydropower for a very long duration period and Germany does not implement any competitive process to grant the right to use hydropower. Nevertheless, they are not under any pressure to open their granting process or make it more transparent. From this perspective, it is worth noting that the lack of uniformity in the methodology employed by the hydropower regimes will impact investment and decision making regarding this resource among Member States. Competition in the progressively integrated energy market would imply homogeneous rules for this strategic sector across Europe. It is worth emphasising that hydropower generation has lately become paramount in achieving a balanced portfolio; consequently, uneven treatment of access to this crucial resource may prove a severe and distortive hindrance to the completion of the Internal Energy Market.

Beside these main conclusions, it can be noted that **competition framing should not be the only concern with regard to hydropower since distortions can also come from unharmonised obligations, taxation and support**. Due to interdependencies among the national hydro sources through the European power market, the question of 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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