ALPINE CONVENTION
PLATFORM WATER MANAGEMENT IN THE ALPS

SITUATION REPORT ON HYDROPOWER GENERATION IN THE ALPINE REGION FOCUSING ON SMALL HYDROPOWER

ANNEX
NATIONAL QUESTIONNAIRES ON HYDROPOWER GENERATION IN ALPINE COUNTRIES

The annex in hand is part of the document

"Situation Report on Hydropower Generation in the Alpine Region focusing on Small Hydropower"

published by the Platform Water Management in the Alps.

The annex includes national questionnaires with data and information on different aspects of small hydropower generation in the individual countries. This was used as a basis for the elaboration of the Situation Report on Hydropower Generation in the Alpine Region focusing on Small Hydropower.

The national questionnaires are subdivided into 3 different categories of information: (1) statistical data, (2) promotion for the development of small hydropower and (3) the general framework conditions for authorisation. Statistical data provided refer to the year 2005, except where annotated differently.

INDEX

ALPINE CONVENTION
PLATFORM WATER MANAGEMENT IN THE ALPS

Situation Report
Hydropower Generation in the Alpine Region
focusing on Small Hydropower

Annex

NATIONAL QUESTIONNAIRE ON HYDROPOWER GENERATION AUSTRIA

---

1. STATISTICAL DATA ON HYDROPOWER GENERATION IN ALPINE COUNTRIES

Please indicate if given figures for point 1.1 and 1.2 refer to the whole territory of your country or the share within the Alpine perimeter (with a preference for the latter):

AUSTRIA

X Whole territory

X Share within Alpine perimeter of the country *- in particular for table 1.2 (see figures [ ])*

1.1 Basic statistical data

Country	Description	Unit	Value	Comment
Austria	Total electricity production in 2005 (all sources, e.g. hydropower, solar, biomass, nuclear energy, thermal power plants, etc.)	[GWh]	66.479	Whole territory
	Total electricity production from hydropower in 2005	[GWh]	39.019 [22.659]	Smalls and large hp Whole territory [Alpine perimeter]
	Threshold value for hydropower stations considered as "small hydropower"	[kW]	10.000	10 MW
	Share of electricity production from small hydropower compared to total electricity production from hydropower in 2005	[%]	9,2 [13,5]	Whole territory [Alpine perimeter]
	Total national emissions of greenhouse gases (CO_2 equivalents) in 2005*	Mio. t	93,2	Whole territory
	Emissions of greenhouse gases from domestic electricity production in 2005*	Mio. t	ca. 14 - 16	Whole territory

* **Figures are needed for calculation of contribution of electricity production from small hydropower to reduction of greenhouse gas emissions (conversion factor: 1 GWh = 500 t CO_2 – gas turbine).**

1.2 Classification of hydropower stations

Country	Classification Bottleneck Capacity (= Maximum Capacity) of Hydropower Stations [kW]*	Number of Hydropower Stations	Energy Output 2005** [GWh] (sum for each category)	Comment
Austria	--	--	--	Indicated in [ ]: Figures for the share within Alpine perimeter of the country. See indication below the table
	< 300 [1]	1.656 [1.176]	568,9 [484]	
	< 1.000 [1]	362 [257]	879,7 [748]	
	< 5.000 [1]	201 [143]	1.515,1 1.288]	
	< 10.000 [1]	31 [22]	623,4 [530]	
	> 10.000 [2]	146 [115]	35.432 [19.609]	
	Total	**2.396 [1.713]**	**39.019 [22.659]**	

* **In case data is not available according to the proposed classification, please try to provide data for alternative classification and change table accordingly.**

** **Indicate if other reference year**

[1] Data Basis for the energy output as well as number of hydropower stations of each class are based on http://www.e-control.at/ for the territory of Austria. These figure result from the entire territory of Austria. No precise data can de provided for the Alpine Perimeter. To get a rough approximation for the Alpine Perimeter, energy output as well as number of hydropower stations for all small hydropower plants (< 10 MW) has been calculated according to the share of the Alpine Perimeter within the entire territory of each individual "Bundesland" (federal state).

[2] The energy output and number of large hydropower stations (> 10 MW) outside the Alpine Perimeter is known from different sources. Hydropower Stations >10 MW outside the Alpine Perimeter: 9x Danube (without Greifenstein), 6x Mur, 3x Enns, 3x Traun, 5x Inn, 3x Kamp, 1x Große Mühl, 1x Ranna
The number of Hydropower and energy output of the Alpine Perimeter has been calculated by subtracting those figures from the total provided via e-control.

2. PROMOTION OF THE DEVELOPMENT OF SMALL HYDROPOWER

2.0 Targets for renewable energy

Please indicate targets for renewable energies as set in national legislation (for EU Member States, targets as set in Annex I of directive 2009/28/EC)

- Share of energy from renewable sources in gross final consumption of energy, 2005: 23,3 %

- Target for Share of energy from renewable sources in gross final consumption of energy, 2020: 34,0 %

Comments:

Targets for renewable energies as set for EU member States in Annex I of directive 2009/28/EC.

2.1 Existence of economic development schemes for small hydropower

Do there exist economic development schemes (subsidies) for the promotion of small hydropower in your country?

x Yes

☐ No

2.2 Type of economic development schemes and amount of payments

If such schemes do exist in your country, what kind are they and what is the amount of payments granted (including details on the grant and tariff schemes, e.g. with respect to power output)?

x Investment grants

Comments:

According to "Ökostromgesetz - BGBl. I Nr. 149/2002" (Eco-Electricity Act). Link: http://ris.bka.gv.at/Dokumente/BgblPdf/2002_149_1/2002_149_1.pdf and "Ökostrom-verordnung 2010" - www.oem-ag.at

Every project has to follow the European grant threshold value. There are just investment grants:

50 kW	50 - 500 kW	500 - 2.000 kW	2000 - 10.000 kW
max. 1.500 EUR/kW	max 1.500 EUR/kW	max. 1.000 - 1.500 EUR/kW	max. 400 - 1.000 EUR/kW
	max. 30% of investment costs	max. 20 - 30% of investment costs	max. 10 - 20% of Investment costs

(x) Tariff subventions

Comments:

Feed-in tariffs ended 2009.

☐ Others (please indicate): _____

Comments:

2.3 New applications for small hydropower stations

Do you have figures on the number of new small hydropower stations which are intended / planned / projected to be realised as a consequence of the development schemes mentioned under 2.1?

In case quantitative data is available please fill the following table:

Country	Classification Bottleneck Capacity (= Maximum Capacity) of Hydropower Stations [kW]*	Number of Hydropower Stations	Energy Output projected** [GWh] (sum for each category)	Comment
	< 50			
	< 300			
	< 1.000			
	< 5.000			
	< 10.000			
	> 10.000			
	Total			

* **In case data is not available according to the proposed classification, please try to provide data for alternative classification and change table accordingly.**

** **Figures are needed for calculation of contribution of electricity production from small hydropower to reduction of greenhouse gas emissions (conversion factor: 1 GWh = 500 t CO_2 – gas turbine).**

In case no quantitative data is available please try to provide a qualitative description of the situation:

A considerable number of small hydropower projects are trying to get an approval. No precise number is available as authorisations are provided at district level.

2.4 Problems with new applications for competent authority

Does an (in case) increase in the number of applications for new small hydropower plants pose any problems to the competent authority (e.g. difficulties during approval procedure, lengthy proceedings due to unclear legal requirements, etc.)?

x Yes

☐ No

In case 'yes' please provide a brief description of the situation:

The main challenge is to cope with the non-deterioration provision of the EU-Water Framework Directive, respectively to comply with article 4.7 WFD (exemptions). So far only limited practical experience with these approaches is in place.

2.5 Legal regulation for ecological upgrading of existing facilities

If legal regulations for upgrading existing facilities in order to enhance the ecological situation exist in your country, please provide relevant information.

The Austrian River Basin Management Plan was published in March 2010. The next step is to adapt the Austrian Water Act to the new requirements (autumn 2010). The remediation targets of the rivers are addressed in the § 33 of the Austrian Water Act.

Link: Nationaler Gewässerbewirtschaftungsplan / Austrian River Basin Management Plan: http://wisa.lebensministerium.at/article/archive/29367

2.6 Incentives for ecological upgrading of existing facilities

If incentives for upgrading existing facilities in order to enhance the ecological situation exist in your country, please provide relevant information.

Measures to improve the ecological conditions of the rivers are promoted by the Austrian state. The relevant legal framework is constituted by the "Umweltförderungsgesetz" (§ 17a) (Environmental Promotion Act). 140 Mio. Euro are provided by the Federal State in form of investment grants up to 2015 for environmental measures such as restructuring of morphologically modified river beds, enhancement of river continuity and habitat connectivity or mitigation measures in case of hydro-peaking.

Furthermore there is a "double-strategy" in place in Upper Austria, where the refurbishment of existing facilities (e.g. renewal of turbines and technical equipment) is combined with the implementation of environmental measures (e.g. sufficient residual water and fish passes). In such a way upgraded hydropower facilities can generate more electricity while at the same time fulfilling modern environmental standards.
In the Austrian provincial state Upper Austria for instance, 258 small hydropower facilities were modernised in the last 5 years, resulting in an increase of electricity production by 40% (76 GWh per year) while at the same time respecting environmental needs.

Link: „Umweltförderungsgesetz BGBl. Nr. 185/1993" (Environmental Promotion Act).

http://ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10010755

3. FRAMEWORK CONDITIONS FOR AUTHORISATION OF FACILITIES

3.1 Criteria for decision on sites for construction of new facilities

Please indicate criteria applied in your country for the decision on whether the construction of new small hydropower plants is to be allowed or rejected.

3.1.1 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities is generally approved (e.g. Heavily Modified Water Bodies according to WFD, etc.)?

☐ Yes

x No

Work on specific criteria is in progress. However no final list is in place. Up to now it has to be proved during the approval process that no public interests are infringed for every individual plant.

If yes, please briefly describe applied criteria:

3.1.2 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities can be approved under certain circumstances (e.g. under application of Art. 4(7) of the WFD)?

X Yes

☐ No

If yes, please briefly describe applied criteria:
No specific assignment of water bodies /types/ regions for small hp generation, but approval is given

- In case that no public interest are infringed;
- In water bodies with good status small hydropower plants (abstraction type) will not cause a deterioration of status class provided an ecological minimum flow and continuity is guaranteed: project can be approved therefore if no other public interests (i.e. drinking water supply,…) are infringed.

3.1.3 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities is generally rejected (e.g. Nature2000 sites, river stretches in “High Status” according to WFD, etc.)?

☐ Yes

X No

If yes, please briefly describe applied criteria:

Comments:

Work in progress:
The Austrian River Basin Management Plan (March 2010) provides the framework for new installation of hydropower plants. The next step is to adapt this framework by the Austrian Federal States (Bundesländer).

3.1.4 Do economic criteria exist for not granting authorisation for the construction of new small hydropower facilities?

☐ Yes

X No

If yes, please briefly describe applied criteria:

3.2 Development plans

3.2.1 Do concrete plans exist for future development of small hydropower in your country ("master plan" or strategies) – on a national or regional level - based on geographical information like for specific rivers or river sections, specific regions or certain catchment areas for instance?

☐ Yes

☐ No

X Others (please indicate): _____

Comments:

Work in progress:
In the Austrian River Basin Management Plan (March 2010) the Austrian Federal States (Bundesländer) are supposed to proceed with a regional planning which i.e. leads to an assignment of water bodies where the high status will be protected in any case for the future.

3.2.2 If yes, please indicate the legal status of those plans.

☐ Statement of will by the competent authority but not legally binding

☐ Effective in law

X Still under preparation

☐ Others (please indicate): _____

Comments:

See above.

3.2.3 Has your country expressed any intentions or reflections aimed at a spatial prioritisation for hydropower generation, i.e. to delineate areas / catchments /

regions designated as “for hydropower use” (with e.g. less stringent ecological requirements) and conversely other areas designated as “not for hydropower use”?

See above.

3.3 Authorisation / licensing of new facilities

3.3.1 Please indicate the competent authority for granting authorisation / licences for new small hydropower facilities (e.g. cantons, provincial government, regional authority, district council, etc.).

Facilities < 500 kW: Regional District Authority (= Bezirkshauptmannschaft)

Facilities > 500 kW: Austrian Federal States (= Bundesländer)

3.3.2 Is there any difference between small and large (e.g. larger than 5 / 10 MW) hydropower stations with regard to the granting / authorisation procedure (e.g. different competent authorities)? In which cases is an Environmental Impact Assessment (EIA) needed?

Competent authorities see above:

In Austria small hydropower plants are plants < 10 MW bottleneck capacity and large hydropower plants are plants > 10 MW bottleneck capacity.

An Environmental Impact Assessment becomes necessary over 15 MW bottleneck capacity.

3.3.3 What is the legal status for the owner/constructor of new small hydropower facilities?

X Authorisation for the construction granted by competent authority

☐ Licensing system

☐ Others (please indicate): _____

Comments:

3.3.4 For how long is the authorisation / licence / others for new facilities granted (please describe)?

Usually 90 years

3.3.5 For how long was the authorisation / licence / others for existing facilities granted (please describe)?

Usually 90 years but there still a number of facilities in place with authorisations without any limitation in time.

3.3.6 Does the competent authority charge dues / taxes / levies / payments / etc. for the use of water for small hydropower generation?

☐ Yes

X No

If yes, please briefly describe payments in further detail:

3.3.7 Is this also the case for large hydropower stations (e.g. larger than about 5 / 10 MW) or is there a differentiation between small and large hydropower stations?

No dues/taxes/ … for any hydropower plant for use of water to the Austrian Water Act.

3.4 Ecological conditions imposed for new facilities

Please give brief information of ecological conditions imposed on construction of new small hydropower facilities.

3.4.1 Do newly constructed small hydropower facilities need to be equipped with fish migration aids for upstream migration?

X Yes

☐ No

☐ Under certain circumstances (please indicate):

_____

Comment:
But only in water bodies where fish naturally live (natürlicher Fischlebensraum). This requirement is usually requested since the Wasserrechtsgesetz-Novelle 1990; but according to the Austrian River Basin Management Plan (March 2010) it s planned to strengthen this requirement by implementing a specific Ordinance (upstream migration has to be guaranteed for fish as being 'state of the art' concerning river continuity)

3.4.2 Do newly constructed small hydropower facilities need to be equipped with fish migration aids for downstream migration?

☐ Yes

X No

☐ Under certain circumstances (please indicate):

_____

Comment:
At present there are no specific legal provisions for downstream migration in place.

3.4.3 Are conditions imposed for residual water for newly constructed small hydropower facilities (if yes, please indicate if a biotic or abiotic threshold value or guidance value is being used)?

x Yes

☐ No

☐ Under certain circumstances (please indicate):

_____

Comment:

Good ecological status has to be guaranteed with specific regard to the biological elements.
As for new installations the reaction of biology has to be predicted the "Qualitätszielverordnung Ökologie - BGBl. II Nr. 99/2010" (Ordinance on ecological quality standards) includes a guiding value for ecological minimum flow. This abiotic value means that with this minimum flow the good status of the biological elements can be guaranteed with high confidence.

Corner stones "Qualitätszielverordnung Ökologie":

- Residual water flow (dependent on the natural water flow)
- Fish migration measures (fish passes)
- Seasonal, dynamic water flow (spawning grounds)
- Typical oxygen and temperature conditions
- Proportion downsurge : flood = max. 1:3

Link Qualitätszielverordnung Ökologie (Ordinance on ecological quality standards)
http://wisa.lebensministerium.at/article/articleview/81496/1/29384

3.4.4 Are conditions imposed for the maintenance of the bed-load balance for small hydropower stations?

☐ Yes

X No

☐ Under certain circumstances (please indicate):

_____

Comment:

At present there are no specific legal provisions in place.

3.4.5 Is there any difference between small and large hydropower stations with regard to ecological conditions imposed on the construction of new facilities?

No – all have to meet the environmental objectives of WFD

ALPINE CONVENTION
PLATFORM WATER MANAGEMENT IN THE ALPS

Situation Report
Hydropower Generation in the Alpine Region
focusing on Small Hydropower

Annex

NATIONAL QUESTIONNAIRE ON HYDROPOWER GENERATION GERMANY

---

1. STATISTICAL DATA ON HYDROPOWER GENERATION IN ALPINE COUNTRIES

Please indicate if given figures for point 1.1 and 1.2 refer to the whole territory of your country or the share within the Alpine perimeter (with a preference for the latter):

☐ Whole territory

X Share within Alpine perimeter of the country

1.1 Basic statistical data (whole territory)

Country	Description	Unit	Value	Comment
Germany	Total electricity production in 2005 (all sources, e.g. hydropower, solar, biomass, nuclear energy, thermal power plants, etc.)	[GWh]	620600	Value for the **whole territory**. (Federal Ministry of Economics and Technology; www.bmwi.de)
	Total electricity production from hydropower in 2005	[GWh]	26700	Value for the **whole territory**. (Federal Ministry of Economics and Technology; www.bmwi.de)
	Threshold value for hydropower stations considered as "small hydropower"	[kW]	1.000	
	Share of electricity production from small hydropower compared to total electricity production from hydropower in 2005	[%]		
	Total national emissions of greenhouse gases (CO_2 equivalents) in 2005*	Mio. t	1013	Data for the **whole territory**. (Umweltbundesamt; National Trend Tables for the German Atmospheric Emission Reporting - 1990 - 2008 (Version: EU-Submission 15.01.2010)
	Emissions of greenhouse gases from domestic electricity production in 2005*	Mio.t.	366	Data for the **whole territory** – The value refers to the emissions from energy industries. No data available for the domestic electricity production only. (Umweltbundesamt; National Trend Tables for the German Atmospheric Emission Reporting - 1990 - 2008 (Version: EU-Submission 15.01.2010)

* **Figures are needed for calculation of contribution of electricity production from small hydropower to reduction of greenhouse gas emissions (conversion factor: 1 GWh = 500 t CO_2 – gas turbine).**

1.2 Classification of hydropower stations

Country	Classification Bottleneck Capacity (= Maximum Capacity) of Hydropower Stations [kW]*	Number of Hydropower Stations	Energy Output 2005** [GWh] (sum for each category)	Comment
	< 50	468	35	These values (Energy Output) were calculated from estimated values and do not show the real electricity production of the year 2005. The indication of the number of hydroelectric power plants reflects the conditions of the year 2009.
	< 300	178	115	
	< 1.000	48	126	
	< 5.000	32	302	
	< 10.000	10	305	
	> 10.000	16	2040	
	Hydroelectric power plants without indication of the max. capacity	9	0	
	Total	**761**	**2923**	

* **In case data is not available according to the proposed classification, please try to provide data for alternative classification and change table accordingly.**

** **Indicate if other reference year**

2. PROMOTION OF THE DEVELOPMENT OF SMALL HYDROPOWER

2.0 Targets for renewable energy

Please indicate targets for renewable energies as set in national legislation (for EU Member States, targets as set in Annex I of directive 2009/28/EC)

- Share of energy from renewable sources in gross final consumption of energy, 2005: 6,7 %

- Target for Share of energy from renewable sources in gross final consumption of energy, 2020:

20%

Comments:

According to the current parameters (2009) of the Federal Environment Ministry. Source:

http://www.erneuerbare-energien.de/files/pdfs/allgemein/application/pdf/leitszenario2009_kurzfassung_bf.pdf

2.1 Existence of economic development schemes for small hydropower

Do there exist economic development schemes (subsidies) for the promotion of small hydropower in your country?

X Yes

☐ No

2.2 Type of economic development schemes and amount of payments

If such schemes do exist in your country, what kind are they and what is the amount of payments granted (including details on the grant and tariff schemes, e.g. with respect to power output)?

☐ Investment grants

Comments:

X Tariff subventions

Comments:

Renewable Energy Sources Act (EEG, federal law) provides guaranteed tariff schemes for contributing to public energy supply.:

New plants: < 500 kW 500 kW < X < 2 MW 2 MW < X < 5 MW	 12,67 ct/kWh 8,65 ct/kWh 7,65 ct/kWh
Modernisation of existing plants: < 500 kW 500 kW < X < 5 MW	 11,67 ct/kWh 8,65 ct/kWh

An improvement of the ecological status is indispensable.

☐ Others (please indicate): _____

Comments:

2.3 New applications for small hydropower stations

Do you have figures on the number of new small hydropower stations which are intended / planned / projected to be realised as a consequence of the development schemes mentioned under 2.1?

In case quantitative data is available please fill the following table:

Country	Classification Bottleneck Capacity (= Maximum Capacity) of Hydropower Stations [kW]*	Number of Hydropower Stations	Energy Output projected** [GWh] (sum for each category)	Comment
	< 50			
	< 300			
	< 1.000			
	< 5.000			
	< 10.000			
	> 10.000			
	Total			

* **In case data is not available according to the proposed classification, please try to provide data for alternative classification and change table accordingly.**

** **Figures are needed for calculation of contribution of electricity production from small hydropower to reduction of greenhouse gas emissions (conversion factor: 1 GWh = 500 t CO_2 – gas turbine).**

In case no quantitative data is available please try to provide a qualitative description of the situation:

EEG shows positive effects esp. on modernisation of existing small hydropower stations in combination with ecological improvements.
Further Information given by Renewable Energy Sources Act (EEG) Progress Report 2007 by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

2.4 Problems with new applications for competent authority

Does an (in case) increase in the number of applications for new small hydropower plants pose any problems to the competent authority (e.g. difficulties during approval procedure, lengthy proceedings due to unclear legal requirements, etc.)?

☐ Yes

X No

In case 'yes' please provide a brief description of the situation:

Remark: approval procedures for **new** hydropower plants are mostly difficult due to variety of aspects and interests.

2.5 Legal regulation for ecological upgrading of existing facilities

If legal regulations for upgrading existing facilities in order to enhance the ecological situation exist in your country, please provide relevant information.

In principle there are the same or similar legal regulations and procedures as described in the Suisse template. Though we actually don't have a legally binding "protection & utilisation plan", similar approaches are being carried out at least in single cases. Those ideas are also picked up in some basic principles to deal with HP in Bavaria, as well as the task to ecologically optimise hydro-peaking (as yet no special legal regulation exists on this point).

In 2006 a voluntary agreement on general principles for the sustainable use of hydropower was made between the Bavarian state government and operators of large HP. The key points are:

- a building block for the implementation of the Bavarian climate protection, flood management and energy policy
- commitment to the implementation of the EC Water Framework Directive and Natura 2000 Directive in keeping with the principle of sustainability
- coordinated framework concept for promoting the use of hydroelectric power and for the development of best possible solutions for other environmental issues
- platform for working together in the development and use of water bodies – ongoing process

Although the key points primarily apply to large HP, many ideas and approaches behind can easily be transferred to small HP as well.

2.6 Incentives for ecological upgrading of existing facilities

If case incentives for upgrading existing facilities in order to enhance the ecological situation exist in your country, please provide relevant information.

Incentives to improve the ecological status of existing hydropower plants are given by the Renewable Energy Sources Act (EEG, federal law) by providing guaranteed increased tariff schemes for contributing to public energy supply.

If an existing power plant is being modernised and thereby the ecological status is going to be improved significantly, tariff schemes can be increased up to 12,67 ct/kWh for power plants < 500 kW and up to 8,65 ct/kWh for power plants < 5 MW. There also exist similar (degressive) regulations of increased tariff schemes for power plants up to 150 MW. The restriction here is that the increased tariff schemes are only provided for the amount of electricity which is additionally generated due to the modernisation of the power plant (in order to avoid taking along effects).

Certificates where modernisation leads to a significant improvement of the ecological status are issued by state authorities or by certified private environmental consultants.

3. Framework Conditions for Authorisation of Facilities

3.1 Criteria for decision on sites for construction of new facilities

Please indicate criteria applied in your country for the decision on whether the construction of new small hydropower plants is allowed or being rejected.

3.1.1 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities is generally approved (e.g. Heavily Modified Water Bodies according to WFD, etc.)?

☐ Yes

X No

If yes, please briefly describe applied criteria:

3.1.2 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities can be approved under certain circumstances (e.g. under application of Art. 4(7) of the WFD)?

☐ Yes

X No

If yes, please briefly describe applied criteria:

3.1.3 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities is generally rejected (e.g. Nature2000 sites, river stretches in "High Status" according to WFD, etc.)?

☐ Yes

X No

If yes, please briefly describe applied criteria:

Remark concerning 3.1.1 to 3.1.3: "go / no go" areas do not exist. Always decision in each single case by weighing all pros and cons.

3.1.4 Do economic criteria exist for not granting authorisation for the construction of new small hydropower facilities?

☐ Yes

X No

If yes, please briefly describe applied criteria:
Remark: economic criteria are up to the enterprise carrier.

3.2 Development plans

3.2.1 Do concrete plans exist for future development of small hydropower in your country ("master plan" or strategies) – on a national or regional level - based on geographical information like for specific rivers or river sections, specific regions or certain catchment areas for instance?

☐ Yes

☐ No

X Others (please indicate): New Federal Water Act (new Act on the Regulation of Matters Pertaining to Water - WHG, on the way) contains surface covering examination of existing transversal structures for being suitable for hydropower use (§35 (3) WHG).

Comments:
A master plan for promoting larger hydropower (> 1000 kW) is on the way.

3.2.2 If yes, please indicate the legal status of those plans.

☐ Statement of will by the competent authority but not legally binding

☐ Effective in law

X Still under preparation

☐ Others (please indicate): _____

Comments:

Criteria have to be defined under which hydro power use is conceivable at existing transversal structures.

3.2.3 Has your country expressed any intentions or reflections aimed at a spatial prioritisation for hydropower generation, i.e. to delineate areas / catchments / regions designated as “for hydropower use” (with e.g. less stringent ecological requirements) and conversely other areas designated as “not for hydropower use”?

Reflections have been made but no concrete intentions.

3.3 Authorisation / licensing of new facilities

3.3.1 Please indicate the competent authority for granting authorising / licences for new small hydropower facilities (e.g. cantons, provincial government, regional authority, district council, etc.).
District council.

3.3.2 Is there any difference between small and large (e.g. larger than 5 / 10 MW) hydropower stations with regard to the granting / authorising procedure (e.g. different competent authorities)? In which cases is an Environmental Impact Assessment (EIA) needed?
No. For some projects with supposed larger spatial effects there also exist additional area planning procedures.
By latest corresponding federal law (Feb. 2010) the following regulations apply: For reservoirs larger than 10 Mio. m^3 an EIA is compulsory. For smaller reservoirs a general preliminary survey has to be done on an individual basis, which is also the case for every other hydropower plant. EIA has to be carried out, if the project could have a substantial unfavourable impact on the environment in the estimatation of the responsible authority due to rough examination. Therefore special examination criteria have been defined in a legal annex and are binding.

3.3.3 What is the legal status for the owner/constructor of new small hydropower facilities?

X Authorisation for the construction granted by competent authority

☐ Licensing system

☐ Others (please indicate): _____

Comments:

3.3.4 For how long is the authorisation / licence / others for new facilities granted (please describe)?
30 years at most.

3.3.5 For how long was the authorisation / licence / others for existing facilities granted (please describe)?

Varies, up to unlimited old permission.

3.3.6 Does the competent authority charge dues / taxes / levies / payments / etc. for the use of water for small hydropower generation?

☐ Yes

x No

If yes, please briefly describe payments in further detail:

3.3.7 Is this also the case for large hydropower stations (e.g. larger than about 5 / 10 MW) or is there a differentiation between small and large hydropower stations?

From 1100 k'W upwards there is a special fee for hydropower generating.

3.4 Imposed ecological conditions for new facilities

Please give brief information on ecological conditions imposed on the construction of new small hydropower facilities.

On 1st March 2010 the revised water law entered into force. The extension of provisions on the management of surface water bodies is particularly relevant for the use of hydropower. Pursuant to Article 33 of the Federal Water Act, damming, abstracting or diverting water is only admissible if a sufficient minimum water flow is guaranteed. Article 34 of the Federal Water Act stipulates that the construction, substantial modification or operation of a dam is only admissible if the continuity of the water body is maintained or restored where this is necessary to achieve the management goals. Article 35 of the Federal Water Act specifies the ecological requirements for hydroelectric power plants. They may only be operated if adequate measures for the protection of the fish population are taken.

3.4.1 Do newly constructed small hydropower facilities need to be equipped with fish migration aids for upstream migration?

x Yes

☐ No

☐ Under certain circumstances (please indicate):

_____

Comment:

3.4.2 Do newly constructed small hydropower facilities need to be equipped with fish migration aids for downstream migration?

☐ Yes

x No

☐ Under certain circumstances (please indicate):

_____

Comment:
New federal water act (WHG, 03/2010) demands also fish protection measures for downstream migration. Problem: research work has still to be done to provide suitable solutions for practical use.

3.4.3 Are conditions imposed for residual water for newly constructed small hydropower facilities (if yes, please indicate if a biotic or abiotic threshold value or guidance value is being used)?

X Yes

☐ No

☐ Under certain circumstances (please indicate):

_____

Comment:

Bavarian guideline for **existing** small hydropower facilities < 500 kW with ecologic and economic threshold value. According to the Bavarian guideline residual water in general limited by 5/12 MNQ for existing plants - idea of inventory protection.

For **new** hydropower facilities special residual water studies are carried out including all relevant biotic and abiotic aspects.

Often in situ discharge investigations. Individual survey considering single case circumstances rather than fixed threshold values. Often dynamic components such as percentage of actual supply are added (e.g. good practice example EV Oberstdorf).

General approach for residual water studies is summarised in already conveyed information from Bavarian environment agency.

3.4.4 Are conditions imposed for the maintenance of the bed-load balance for small hydropower stations?

☐ Yes

x No

☐ Under certain circumstances (please indicate):

_____

Comment:

Usually there are certain facilities within the weirs to drift bed-load downstream, e.g. in case of flood discharge.

3.4.5 Is there any difference between small and large hydropower stations with regard to ecological conditions imposed on the construction of new facilities?

No.

ALPINE CONVENTION
PLATFORM WATER MANAGEMENT IN THE ALPS

Situation Report
Hydropower Generation in the Alpine Region
focusing on Small Hydropower

Annex

NATIONAL QUESTIONNAIRE ON HYDROPOWER GENERATION ITALY

1. STATISTICAL DATA ON HYDROPOWER GENERATION IN ALPINE COUNTRIES

Please indicate if given figures for point 1.1 and 1.2 refer to the whole territory of your country or the share within the Alpine perimeter (with a preference for the latter):

☒ Whole territory

data for the whole national territory are reported only in tab. 1.1. in square brackets

☒ Share within Alpine perimeter of the country
territory of the Provinces inside the Alpine Convention

1.1 Basic statistical data

Country	Description	Unit	Value	Comment
ITALIA	Total electricity production in 2005 (all sources, e.g. hydropower, solar, biomass, nuclear energy, thermal power plants, etc.)	[GWh]	[302.555 (gross)] 60.553 (gross)	Data source Terna spa
	Total electricity production from hydropower in 2005	[GWh]	[42.927 (gross)] 29.633 (gross)	Data source Terna spa
	Threshold value for hydropower stations considered as "small hydropower"	[kW]	1.000 3.000	Double definition
	Share of electricity production from small hydropower compared to total electricity production from hydropower in 2005	[%]	[3,5] 3,8	Calculated for power plants <1.000 kW Data source Terna spa
	Total national emissions of greenhouse gases (CO_2 equivalents) in 2005*	Mio. t	[579,5]	Data source APAT/ISPRA
	Emissions of greenhouse gases from domestic electricity production in 2005*	Mio. t	[169,2]	Data source APAT/ISPRA

* **Figures are needed for calculation of contribution of electricity production from small hydropower to reduction of greenhouse gas emissions (conversion factor: 1 GWh = 500 t CO_2 – gas turbine).**

1.2 Classification of hydropower stations

Country	Classification Bottleneck Capacity (= Maximum Capacity) of Hydropower Stations [kW]*	Number of Hydropower Stations	Energy Output 2005** [GWh] (sum for each category)	Comment
ITALIA	< 50	54	22	
	50 - 300	379	232	
	300 - 1.000	422	871	
	1.000 - 5.000	347	2.529	
	5.000 - 10.000	74	1.625	
	> 10.000	211	24.354	
	Total	1487	29.632	

* **In case data is not available according to the proposed classification, please try to provide data for alternative classification and change table accordingly.**

** **Indicate if other reference year**

2. PROMOTION OF THE DEVELOPMENT OF SMALL HYDROPOWER

2.0 Targets for renewable energy

Please indicate targets for renewable energies as set in national legislation (for EU Member States, targets as set in Annex I of directive 2009/28/EC)

- Share of energy from renewable sources in gross final consumption of energy, 2005: 5,2 %

- Target for Share of energy from renewable sources in gross final consumption of energy, 2020:

17 %

Comments:

Targets for renewable energy as set for EU member States in Annex I of directive 2009/28/EC.

2.1 Existence of economic development schemes for small hydropower

Do there exist economic development schemes (subsidies) for the promotion of small hydropower in your country?

☒ Yes

☐ No

2.2 Type of economic development schemes and amount of payments

If such schemes do exist in your country, what kind are they and what is the amount of payments granted (including details on the grant and tariff schemes, e.g. with respect to power output)?

☒ Investment grants

Comments:

In some regions, European funds are used to promote the development of renewable energy production schemes (including hydropower plants) according to the economic development policy of the area. These kind of incentives cannot be added to the other form of incentives on the production such as Green Certificates (see below).

☒ Tariff subventions

Comments:

CIP6/92: starting in 1992 the government began to support renewable energy production mainly by grants provided for the CIP6/92 Programme. These prices are based on the concept of "avoiding costs". The price includes a premium as an incentive for the higher cost of different conversion technologies.
The CIP6/92 is no longer in force, but there are plants that still benefit from this system. These are plants which came into operation or signed a preliminary agreement when the CIP6/92 was still in force.
The main problem with CIP 6/92 Programme concerned linking the incentive of plants to energy sources. Efficient plants powered by fossil origin sources with a low environmental impact were also boosted, indeed 70% or more of the contributions was directed to this type of plants, instead of to renewable source plants.

Green Certificates: under the system of the Green Certificates (GC) foresees, if a plant produces less CO_2 than a traditional plant, the management gets Green Certificates that

can resold to industries or initiatives that are forced to produce a quota of energy with renewable sources, but are not able to do it on their own.

All new hydropower plants and refurbished/re-powered plants qualified as Renewable Energy Plants receive a number of Green Certificates in proportion to their energy production (1 GC for each MWh). This incentive regime, that started in 1999 and was recently reformed in 2008, lasts from 12 to 15 years, depending on the law in force when plant was authorised (i.e., plants that were authorised in 2008 have right to 15 years, whereas plants that started their production in 2006 have right to 12 years of GC).

Comprehensive feed-in tariff: in order to simplify the financial accounting for micro-generation (GC market can be complex for the small producers), starting from the 1st January 2008 hydropower plants with P<1MW can chose instead of Green Certificates a "comprehensive feed-in tariff" (electricity price + incentive) which for the first 3 years (2008-2010) has been set to 22 €cent/kWh.

☒ Others (please indicate): Minimum tariff

Comments:

Minimum tariff: a special minimum tariff (decree n. 280/07 of the Energy Authority) is applied for the Renewable Energy Plants implemented as micro-generation (< 1 MW of installed power). In the decree of the Energy Authority it is clearly stated that the tariff isn't an incentive but an acknowledgement of the higher managing costs of the micro generation, which is important for the country as a consequence of the economic, social and environmental advantages brought about by these plants. Basically the Authority recognises the cost and the value of the socio-economic and environmental externalities of micro-generation. That's why the new micro-plant can add the incentives (i.e. Green Certificates for the first 15 years) to the above mentioned tariff. Basically the producers with plants (new and old) below 1 MW of capacity have right to a guaranteed minimum tariff, progressively structured as follow:

- 140,4 €/MWh for the first 250 MWh;
- 107,3 €/MWh between the 251st MWh to the 500th MWh
- 86,7 €/MWh between the 501st and the 1.000th MWh
- 80,5 €/MWh between 1001st and 2.000th MWh of production.

These values are valid for 2009, but there is now ongoing an administrative assessment about the amounts.

2.3 New applications for small hydropower stations

Do you have figures on the number of new small hydropower stations which are intended / planned / projected to be realised as a consequence of the development schemes mentioned under 2.1?
In case quantitative data is available please fill the following table:

Country	Classification Bottleneck Capacity (= Maximum Capacity) of Hydropower Stations [kW]*	Number of Hydropower Stations	Energy Output projected** [GWh] (sum for each category)	Comment
ITALIA	< 50			
	< 300			
	< 1.000			

	< 5.000			
	< 10.000			
	> 10.000			
	Total			

* **In case data is not available according to the proposed classification, please try to provide data for alternative classification and change table accordingly.**

** **Figures are needed for calculation of contribution of electricity production from small hydropower to reduction of greenhouse gas emissions (conversion factor: 1 GWh = 500 t CO_2 – gas turbine).**

In case no quantitative data is available please try to provide a qualitative description on the situation:

The number of new small hydropower stations which are intended / planned / projected to be realised within the Alpine Convention Italian area is high. No precise figure is available as authorisations are provided at Provincial level.

2.4 Problems with new applications for competent authority

Does an (in case) increase in the number of applications for new small hydropower plants pose any problems to the competent authority (e.g. difficulties during approval procedure, lengthy proceedings due to unclear legal requirements, etc.)?

☒ Yes

☐ No

In case 'yes' please provide a brief description of the situation:

Approval procedures for new hydropower plants are mostly difficult due to variety of aspects:

- lack of a territorial plan for hydropower;
- lack of a diffused monitoring system: often there is not a comprehensive data base with information about all diversions;
- there is no substantial difference between the concession for small hydro and large hydro diversions, so even for very small power plants the procedure is very complex;
- to build a hydropower plant it is first necessary to get a concession for the use of water, and secondly an authorisation to set up and run the plant. The license for the use of water isn't generally integrated with the authorisation procedure to set up and run the plant. A discussion on the possibility to integrate them is ongoing;
- competition procedure: if two applications for a concession go into the competition procedure, there is no set term for presentation of the documentation and so the procedure can be indefinitely long.

2.5 Legal regulation for ecological upgrading of existing facilities

If legal regulations for upgrading existing facilities in order to enhance the ecological situation exist in your country, please provide relevant information.

There are no legal regulations for upgrading existing facilities.

2.6 Incentives for ecological upgrading of existing facilities

If incentives for upgrading existing facilities in order to enhance the ecological situation exist in your country, please provide relevant information.

There are no incentives for upgrading existing facilities.

3. Framework Conditions for Authorisation of Facilities

3.1 Criteria for decision on sites for construction of new facilities

Please indicate criteria applied in your country for the decision on whether the construction of new small hydropower plants is to be allowed or rejected.

3.1.1 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities is generally approved (e.g. Heavily Modified Water Bodies according to WFD, etc.)?

☐ Yes

☒ No

If yes, please briefly describe applied criteria:

Low impact plants (e.g. HP in aqueducts, sewers, artificial canals) located within an artificial or antropic context, that have a limited environmental impact compared to the ones set up on natural rivers, are generally allowed.

3.1.2 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities can be approved under certain circumstances (e.g. under application of Art. 4(7) of the WFD)?

☐ Yes

☒ No

If yes, please briefly describe applied criteria:

3.1.3 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities is generally rejected (e.g. Nature2000 sites, river stretches in "High Status" according to WFD, etc.)?

☒ Yes

☐ No

If yes, please briefly describe applied criteria:

As a rule, construction of new facilities is forbidden in areas like Nature2000 sites, Sites of Community Importance (SCI) and Special Protection Areas (SPA). There are also areas classified as exposed to high natural hazards, where the construction of new hydropower plants is not allowed.

3.1.4 Do economic criteria exist for not granting authorisation for the construction of new small hydropower facilities?

☒ Yes

☐ No

If yes, please briefly describe applied criteria:

Security deposit: the Regio Decreto n. 1775 of 1933 (art. 11) establishes that the applicant must deposit a sum equal to 6 months fees when he signs the disciplinary of concession. This sum is due because there is a public interest which requires protection from the consequences of the default to perform the obligations under the concession contract.

Best and certain technical-financial and economic guarantee: If applications for a concession go into the competition procedure, between criteria for evaluating competing applications there is also an economic and financial criteria: between projects that are equivalent, the public administration gives preference to the application that offers higher and assured technical-financial and economic guarantee of immediate execution and use. (Regio Decreto n. 1775 of 1933 art.9).

3.2 Development plans

3.2.1 Do concrete plans exist for future development of small hydropower in your country ("master plan" or strategies) – on a national or regional level - based on geographical information such as for specific rivers or river sections, specific regions or certain catchment areas for instance?

☐ Yes

☐ No

☒ Others (please indicate): few plans at provincial level

Comments:

At the moment there is a general lack of a territorial planning for hydropower. Only a few public authorities, generally at the province level, have made a territorial plan for hydropower development.
On the base of WFD criteria, the Province of Sondrio identified suitable and less suitable areas for the construction of hydropower plants. Outside the Alps, also the Province of Florence produced a territorial plan indicating that new hydroelectric plants have to utilise existing weirs.

3.2.2 If yes, please indicate the legal status of those plans.

- ☐ Statement of will by the competent authority but not legally binding
- ☒ Effective in law
- ☐ Still under preparation
- ☐ Others (please indicate): _____

Comments:

3.2.3 Has your country expressed any intentions or reflections aimed at a spatial prioritisation for hydropower generation, i.e. to delineate areas / catchments / regions designated as “for hydropower use” (with e.g. less stringent ecological requirements) and conversely other areas designated as “not for hydropower use”?

Yes, at provincial level.

3.3 Authorisation / licensing of new facilities

3.3.1 Please indicate the competent authority for granting authorising / licences for new small hydropower facilities (e.g. cantons, provincial government, regional authority, district council, etc.).

Big concessions, with a nominal capacity >3MW, are generally granted by regional authorities, while small concessions, with a nominal capacity <3MW, are granted by provincial authorities (Regio Decreto n. 1775 of 1933).

3.3.2 Is there any difference between small and large (e.g. larger than 5 / 10 MW) hydropower stations with regard to the granting / authorisation procedure (e.g. different competent authorities)? In which cases is an Environmental Impact Assessment (EIA) needed?

There is no substantial difference between the concession for small hydro and large hydro diversions.
Producers have to make an EIA if there is a dam and they have to go through a screening procedure if the capacity is > 100kW or if the discharge is > 200 l/sec (D.Lgs. 152/06). However several Regions may ask for an EIA even for smaller plants.

Renewal: If the owner of a small concession asks for a renewal, the authority can decide to release it or not, when there is a public interest against it. If the owner of a big concession asks for a renewal, the authority calls for tenders, because in principle everybody can apply to use the water for hydroelectric purposes in place of the former concessionary. Up to now there's no significant example of such a situation, even though some concessions are going to expire by 2010.

3.3.3 What is the legal status for the owner/constructor of new small hydropower facilities?

☒ Authorisation for the construction granted by competent authority

☒ Licensing system

☐ Others (please indicate): _____

Comments:

To build a hydropower plant it is first necessary to obtain a concession for the use of water, and secondly an authorisation to set up and run the plant.
The D.Lgs. n. 387/2003 (implementation of the RES-e Directive) has introduced the "single permit", that is a one-stop shop for all RES project developers. Responsible for this rests with the Region, or the Province if the Region has delegated it. However, in some Italian Regions this process has not developed yet and also in some Regions where it has been developed there are often problems related to the difficulty of coordinating the different authorisation processes.

3.3.4 For how long is the authorisation / licence / others for new facilities granted (please describe)?

The concept of concession was introduced by the law (Regio Decreto No. 1775/1933). The concession for hydropower use lasts a maximum of 30 years, but recently authorities haved tended to allow shorter concessions as well.

3.3.5 For how long was the authorisation / licence / others for existing facilities granted (please describe)?

In Italy all the concessions are temporary.

3.3.6 Does the competent authority charge dues / taxes / levies / payments / etc. for the use of water for small hydropower generation?

☒ Yes

☐ No

If yes, please briefly describe payments in further detail:

The Italian concessionaries have to pay an annual fee calculated on the basis of the concession capacity (kW) and the unitary value (€/kW) is fixed by each Region and updated every year. For 2008 the medium value was around 12-14 €/kW.

Concessionaries have also to pay two additional annual fees (only if the capacity of the plant is more than 220 kW):

a. one fee to the province and the municipalities located on the river between the intake and the tail race (for 2008 it was 5,09 €/kW),
b. one fee to the Bacino Imbrifero Montano, a consortium of the municipalities, which are included in the catchment area (usually only for mountain areas above 500 m. on the sea level) (for 2008 it was 20,35 €/kW).

These two additional annual fees have the same value all over Italy.

3.3.7 Is this also the case for large hydropower stations (e.g. larger than about 5 / 10 MW) or is there a differentiation between small and large hydropower stations?

Also for large hydropower stations the same fees are due.

3.4 Imposed ecological conditions for new facilities

Please give brief information on ecological conditions imposed on the construction of new small hydropower facilities.

3.4.1 Do newly constructed small hydropower facilities need to be equipped with fish migration aids for upstream migration?

☐ Yes
☐ No
☒ Under certain circumstances (please indicate):

_____

Comment:

All fish species present in the specific site must be able to pass into the structure in every discharge condition. So, the design of the passage geometry has to take into account the local fish characteristics and guarantee proper hydraulic conditions (i.e. flow velocities and water depths). If there are some anadromous species a hydropower plant needs to be equipped with some system that can make possible the upstream migration.

3.4.2 Do newly constructed small hydropower facilities need to be equipped with fish migration aids for downstream migration?

☒ Yes
☐ No
☐ Under certain circumstances (please indicate):

_____

Comment:

A fish pass is generally required.

3.4.3 Are conditions imposed for residual water for newly constructed small hydropower facilities (if yes, please indicate if a biotic or abiotic threshold value or guidance value is being used)?

☒ Yes

☐ No

☐ Under certain circumstances (please indicate):

_____

Comment:

In order to make hydropower production more compatible with the natural life of rivers, a minimum flow must be released so as to assure the preservation of the hydrological continuity of the river and the consequent conservation of natural habitat and ecological life.
For each river district the general criteria to evaluate residual flow are fixed by the Basin Authority within a wide range of possible methods. The effective value for each river stretch is regulated by the Regions. A very common approach is to use parametric formulae, where the reserved flow is imposed as a fraction of the mean river flow. This fraction takes into account hydrological, morphological and environmental aspects.

3.4.4 Are conditions imposed for the maintenance of the bed-load balance for small hydropower stations?

☐ Yes

☒ No

☐ Under certain circumstances (please indicate):

_____

Comment:

In general for small hydropower there are no mandatory conditions for the bed load management. Only for dams higher than 10 m or with a basin storage with a volume of more than 100.000 m^3 does the hydropower plant owner have to prepare a management plan for dam addressing requirements on base load managing.

3.4.5 Is there any difference between small and large hydropower stations with regard to imposed ecological conditions in case of the construction of new facilities?

In general the compensation measures required in EIA phase are more important for big plants, because of their bigger impacts.

ALPINE CONVENTION
PLATFORM WATER MANAGEMENT IN THE ALPS

Situation Report
Hydropower Generation in the Alpine Region
focusing on Small Hydropower

Annex

NATIONAL QUESTIONNAIRE ON HYDROPOWER GENERATION LIECHTENSTEIN

---

1. Statistical Data on Hydropower Generation in Alpine Countries

Please indicate if given figures for point 1.1 and 1.2 refer to the whole territory of your country or the share within the Alpine perimeter (with a preference for the latter):

☒ Whole territory **PRINCIPALITY OF LIECHTENSTEIN**

☐ Share within Alpine perimeter of the country

1.1 Basic statistical data – Whole territory

Country	Description	Unit	Value	Comment
	Total electricity production in 2005 (all sources, e.g. hydropower, solar, biomass, nuclear energy, thermal power plants, etc.)	[GWh]	**67.7**	
	Total electricity production from hydropower in 2005	[GWh]	**62.7**	
	Threshold value for hydropower stations considered as "small hydropower"	[kW]	**10'000**	
	Share of electricity production from small hydropower compared to total electricity production from hydropower in 2005	[%]	**72**	
	Total national emissions of greenhouse gases (CO_2 equivalents) in 2005*	Mio. t	**0.27**	
	Emissions of greenhouse gases from domestic electricity production in 2005*	Mio. t	**0.003**	

* **Figures are needed for calculation of contribution of electricity production from small hydropower to reduction of greenhouse gas emissions (conversion factor: 1 GWh = 500 t CO_2 – gas turbine).**

1.2 Classification of hydropower stations

Country	Classification Bottleneck Capacity (= Maximum Capacity) of Hydropower Stations [kW]*	Number of Hydropower Stations	Energy Output 2005** [GWh] (sum for each category)	Comment
	< 50	**1**	**0.18**	
	< 300			
	< 1.000	**3**	**4.67**	
	< 5.000	**1**	**12.44**	
	< 10.000			
	> 10.000	**1**	**45.37**	
	Total		**62.66**	

* **In case data is not available according to the proposed classification, please try to provide data for alternative classification and change table accordingly.**

** **Indicate if other reference year**

2. PROMOTION OF THE DEVELOPMENT OF SMALL HYDROPOWER

2.0 Targets for renewable energy

Please indicate targets for renewable energies as set in national legislation (for EU Member States, targets as set in Annex I of directive 2009/28/EC)

- Share of energy from renewable sources in gross final consumption of energy, 2005:

  ...

- Target for Share of energy from renewable sources in gross final consumption of energy, 2020:

  ...

Comments:

The share of renewable energies from hydropower in gross final consumption of energy was about 17% in 2005. For 2020 no precise goals are set at the moment.

2.1 Existence of economic development schemes for small hydropower

Do there exist economic development schemes (subsidies) for the promotion of small hydropower in your country?

☐ Yes

☒ No

2.2 Type of economic development schemes and amount of payments

If such schemes do exist in your country, what kind are they and what is the amount of payments granted (including details on the grant and tariff schemes, e.g. with respect to power output)?

☐ Investment grants

Comments:

☐ Tariff subventions

Comments:

☐ Others (please indicate): _____

Comments:

2.3 New applications for small hydropower stations

Do you have figures on the number of new small hydropower stations which are intended / planned / projected to be realised as a consequence of the development schemes mentioned under 2.1?

In case quantitative data is available please fill the following table:

Country	Classification Bottleneck Capacity (= Maximum Capacity) of Hydropower Stations [kW]*	Number of Hydropower Stations	Energy Output projected** [GWh] (sum for each category)	Comment
	< 50			
	< 300			
	< 1.000			
	< 5.000			
	< 10.000			
	> 10.000			
	Total	**0**	**0**	

* **In case data is not available according to the proposed classification, please try to provide data for alternative classification and change table accordingly.**

** **Figures are needed for calculation of contribution of electricity production from small hydropower to reduction of greenhouse gas emissions (conversion factor: 1 GWh = 500 t CO_2 – gas turbine).**

In case no quantitative data is available please try to provide a qualitative description of the situation:

No new hydropower stations are projected. The hydropower plant Samina is supposed to be transformed into a pumped-storage power station in 2010/11.

2.4 Problems with new applications for competent authority

Does an (in case) increase in the number of applications for new small hydropower plants pose any problems to the competent authority (e.g. difficulties during approval procedure, lengthy proceedings due to unclear legal requirements, etc.)?

☐ Yes

☒ No

In case 'yes' please provide a brief description of the situation:

2.5 Legal regulations for ecological upgrading of existing facilities

If legal regulations for upgrading existing facilities in order to enhance the ecological situation exist in your country, please provide relevant information.

At present there are no legal regulations.

2.6 Incentives for ecological upgrading of existing facilities

If incentives for upgrading existing facilities in order to enhance the ecological situation exist in your country, please provide information relevant.

At present there are no incentives for upgrading existing facilities.

3. Framework Conditions for Authorisation of Facilities

3.1 Criteria for decision on sites for construction of new facilities

Please indicate criteria applied in your country for the decision on whether the construction of new small hydropower plants is to be allowed or rejected.

3.1.1 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities is generally approved (e.g. Heavily Modified Water Bodies according to WFD, etc.)?

☐ Yes

☒ No

If yes, please briefly describe applied criteria:

3.1.2 Do criteria existfor sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities can be approved under certain circumstances (e.g. under application of Art. 4(7) of the WFD)?

☐ Yes

☒ No

If yes, please briefly describe applied criteria:

3.1.3 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities is generally rejected (e.g. Nature2000 sites, river stretches in “High Status” according to WFD, etc.)?

☐ Yes

☒ No

If yes, please briefly describe applied criteria:

3.1.4 Do economic criteria exist for not granting authorisation for the construction of new small hydropower facilities?

☐ Yes

☒ No

If yes, please briefly describe applied criteria:

3.2 Development plans

3.2.1 Do concrete plans exist for future development of small hydropower in your country ("master plan" or strategies) – on a national or regional level - based on geographical information such as specific rivers or river sections, specific regions or certain catchment areas for instance?

☐ Yes

☒ No

☐ Others (please indicate): _____

Comments:

3.2.2 If yes, please indicate the legal status of those plans.

☐ Statement of will by the competent authority but not legally binding

☐ Effective in law

☐ Still under preparation

☐ Others (please indicate): _____

Comments:

3.2.3 Has your country expressed any intentions or reflections aimed at a spatial prioritisation for hydropower generation, i.e. to delineate areas / catchments / regions designated as "for hydropower use" (with e.g. less stringent ecological requirements) and conversely other areas designated as "not for hydropower use"?

No

3.3 Authorisation / licensing of new facilities

3.3.1 Please indicate the competent authority for granting authorising / licences for new small hydropower facilities (e.g. cantons, provincial government, regional authority, district council, etc.).

According to the Water Rights Act, the use of hydropower requires a concession from the government.

3.3.2 Is there any difference between small and large (e.g. larger than 5 / 10 MW) hydropower stations with regard to the granting / authorisation procedure (e.g. different competent authorities)? In which cases is an Environmental Impact Assessment (EIA) needed?
No

3.3.3 What is the legal status for the owner/constructor of new small hydropower facilities?

☒ Authorisation for the construction granted by competent authority

☐ Licensing system

☐ Others (please indicate): _____

Comments:

3.3.4 For how long is the authorisation / licence / others for new facilities granted (please describe)?

3.3.5 For how long was the authorisation / licence / others for existing facilities granted (please describe)?

All hydropower plans were built before the entry into force of the Water Rights Act in 1976. Their authorisations are not limited in time.

3.3.6 Does the competent authority charge dues / taxes / levies / payments / etc. for the use of water for small hydropower generation?

☒ Yes

☐ No

If yes, please briefly describe payments in further detail:
According to the Water Rights Act, the annual water charge for the use of water for hydropower generation is CHF 6 per gross horsepower.

3.3.7 Is this also the case for large hydropower stations (e.g. larger than about 5 / 10 MW) or is there a differentiation between small and large hydropower stations?

No

3.4 Imposed ecological conditions for new facilities

Please give brief information on ecological conditions imposed on the construction of new small hydropower facilities.

3.4.1 Do newly constructed small hydropower facilities need to be equipped with fish migration aids for upstream migration?

☒ Yes

☐ No

☐ Under certain circumstances (please indicate):

_____

Comment:

According to the Water Conservation Act, fish migration has to be ensured.

3.4.2 Do newly constructed small hydropower facilities need to be equipped with fish migration aids for downstream migration?

☒ Yes

☐ No

☐ Under certain circumstances (please indicate):

_____

Comment:

According to the Water Conservation Act, fish migration has to be ensured.

3.4.3 Are conditions imposed for residual water for newly constructed small hydropower facilities (if yes, please indicate if a biotic or abiotic threshold value or guidance value is being used)?

☒ Yes

☐ No

☐ Under certain circumstances (please indicate):

_____

Comment:

The Water Conservation Act demands that for water derivations a sufficient residual flow remains in the waters and it describes criteria for the determination of the minimum acceptable flow.

3.4.4 Are conditions imposed for the maintenance of the bed-load balance for small hydropower stations?

☐ Yes

☒ No

☐ Under certain circumstances (please indicate):

_____

Comment:

3.4.5 Is there any difference between small and large hydropower stations with regard to ecological conditions imposed on the construction of new facilities?

No

ALPINE CONVENTION
PLATFORM WATER MANAGEMENT IN THE ALPS

Situation Report
Hydropower Generation in the Alpine Region
focusing on Small Hydropower

Annex

NATIONAL QUESTIONNAIRE ON HYDROPOWER GENERATION SLOVENIA

---

1. Statistical Data on Hydropower Generation in Alpine Countries

Please indicate if given figures for point 1.1 and 1.2 refer to the whole territory of your country or the share within the Alpine perimeter (with a preference for the latter):

☒ Whole territory

☐ Share within Alpine perimeter of the country

1.1 Basic statistical data

Country	Description	Unit	Value	Comment
	Total electricity production in 2005 (all sources, e.g. hydropower, solar, biomass, nuclear energy, thermal power plants, etc.)	[GWh]	15116	Gross electricity generation
	Total electricity production from hydropower in 2005	[GWh]	3460	Gross electricity generation
	Threshold value for hydropower stations considered as "small hydropower"	[MW]	10	Up to 10 MW
	Share of electricity production from small hydropower compared to total electricity production from hydropower in 2005	[%]	11,07	Gross electricity generation
	Total national emissions of greenhouse gases (CO_2 equivalents) in 2005*	Mio. t	20,37	
	Emissions of greenhouse gases from domestic electricity production in 2005*	Mio. t	5,89	

* **Figures are needed for calculation of contribution of electricity production from small hydropower to reduction of greenhouse gas emissions (conversion factor: 1 GWh = 500 t CO_2 – gas turbine).**

1.2 Classification of hydropower stations

Country	Classification Bottleneck Capacity (= Maximum Capacity) of Hydropower Stations [kW]*	Number of Hydropower Stations	Energy Output 2005** [GWh] (sum for each category)	Comment
	< 50	107	6,916747	
	< 300	113	50,7659058	
	< 1.000	50	79,756736	
	< 5.000	15	73,140143	
	< 10.000	2	22,553719	
	> 10.000	16	3.027,942416	
	Total	**303**	**3.261,0756668**	

* **In case data is not available according to the proposed classification, please try to provide data for alternative classification and change table accordingly.**

** **Indicate if other reference year**

2. PROMOTION OF THE DEVELOPMENT OF SMALL HYDROPOWER

2.0 Targets for renewable energy

Please indicate targets for renewable energies as set in national legislation (for EU Member States, targets as set in Annex I of directive 2009/28/EC)

- Share of energy from renewable sources in gross final consumption of energy, 2005:

  ...

- Target for Share of energy from renewable sources in gross final consumption of energy, 2020:

  ...

Comments:

2.1 Existence of economic development schemes for small hydropower

Do there exist economic development schemes (subsidies) for the promotion of small hydropower in your country?

☒ Yes

☐ No

2.2 Type of economic development schemes and amount of payments

If such schemes do exist in your country, what kind are they and what is the amount of payments granted (including details on the grant and tariff schemes, e.g. with respect to power output)?

☐ Investment grants

Comments:

☒ Tariff subventions

Comments:

Support for the production of electricity from renewable energy sources (RES) is based on the stipulations of the Energy Act:
If the cost of production of electricity from RES including a proper market return on investment exceeds the price of electricity that can be achieved in the market for this type of electricity, the electricity producers may be granted support.
Support from the scheme is available for those units producing electricity from renewable energy sources that do not exceed the nominal power capacity of 125 MW.
Support is implemented as:

- the guaranteed purchase of electricity produced, supplied to public electricity network at a price fixed by the Government for the units producing electricity from renewable energy sources with nominal power capacity below 5 MW;
- financial support for the current operations of other producers.

Support may be obtained only for the net generated electricity for which a valid guarantee of origin was submitted.
Support may be implemented for 15 years.

☐ Others (please indicate): _____

Comments:

2.3 New applications for small hydropower stations

Do you have figures on the number of new small hydropower stations which are intended / planned / projected to be realised as a consequence of the development schemes mentioned under 2.1?

In case quantitative data is available please fill the following table:

Country	Classification Bottleneck Capacity (= Maximum Capacity) of Hydropower Stations [MW]*	Number of Hydropower Stations	Energy Output projected** [GWh] (sum for each category)	Comment
	< 10	200		
	> 10	7		
	Total	**207**		

* **In case data is not available according to the proposed classification, please try to provide data for alternative classification and change table accordingly.**

** **Figures are needed for calculation of contribution of electricity production from small hydropower to reduction of greenhouse gas emissions (conversion factor: 1 GWh = 500 t CO_2 – gas turbine).**

In case no quantitative data is available please try to provide a qualitative description of the situation:

2.4 Problems with new applications for competent authority

Does an (in case) increase in the number of applications for new small hydropower plants pose any problems to the competent authority (e.g. difficulties during approval procedure, lengthy proceedings due to unclear legal requirements, etc.)?

☒ Yes

☐ No

In case 'yes' please provide a brief description of the situation:

We have problems due to lengthy proceedings.

2.5 Legal regulation for ecological upgrading of existing facilities

If legal regulations for upgrading existing facilities in order to enhance the ecological situation exist in your country, please provide relevant information.

2.6 Incentives for ecological upgrading of existing facilities

If incentives for upgrading existing facilities in order to enhance the ecological situation exist in your country, please provide relevant information.

3. Framework Conditions for Authorisation of Facilities

3.1 Criteria for decision on sites for construction of new facilities

Please indicate criteria applied in your country for the decision on whether the construction of new small hydropower plants is to be allowed or rejected.

3.1.1 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities is generally approved (e.g. Heavily Modified Water Bodies according to WFD, etc.)?

☐ Yes

☒ No

If yes, please briefly describe applied criteria:

Construction of new facilities potentially can be approved in all areas except areas defined with criteria listed in 3.1.3.

3.1.2 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities can be approved under certain circumstances (e.g. under application of Art. 4(7) of the WFD)?

☐ Yes

☒ No

If yes, please briefly describe applied criteria:

Construction of new facilities potentially can be approved in all areas except areas defined within criteria listed in 3.1.3.

3.1.3 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities is generally rejected (e.g. Nature2000 sites, river stretches in “High Status” according to WFD, etc.)?

☒ Yes

☐ No

If yes, please briefly describe applied criteria:

Criteria for sites / certain type of rivers or river stretches / catchments / regions where the construction of new facilities is generally rejected are:

- areas of highest morphological preservation according to the ecomorphological classification (1. class);
- reference reaches, delineated by WFD provisions;
- wetlands;
- drinking water protection areas;
- catchment areas of less than 10 km^2.

3.1.4 Do economic criteria exist for not granting authorisation for the construction of new small hydropower facilities?

☐ Yes

☒ No

If yes, please briefly describe applied criteria:

3.2 Development plans

3.2.1 Do concrete plans exist for future development of small hydropower in your country ("master plan" or strategies) – on a national or regional level - based on geographical information such as specific rivers or river sections, specific regions or certain catchment areas for instance?

☐ Yes

☒ No

☐ Others (please indicate): _____

Comments:

Draft of National action plan for renewables 2010-2020 (Akcijski načrt za OVE 2010-2020-osnutek) in measure 45 defines, that Ministry of the Environment and Spatial Planning should define areas where the placement of small hydropower plants is an unacceptable interference in the aquatic environment.

3.2.2 If yes, please indicate the legal status of those plans.

☐ Statement of will by the competent authority but not legally binding

☐ Effective in law

☒ Still under preparation

☐ Others (please indicate): _____

Comments:

3.2.3 Has your country expressed any intentions or reflections aimed at a spatial prioritisation for hydropower generation, i.e. to delineate areas / catchments / regions designated as “for hydropower use” (with e.g. less stringent ecological requirements) and conversely other areas designated as “not for hydropower use”?

The “go “– “no go” areas approach is under development for diverse water uses, among them hydropower use. See answer 3.1.3. for details.

3.3 Authorisation / licensing of new facilities

3.3.1 Please indicate the competent authority for granting authorising / licences for new small hydropower facilities (e.g. cantons, provincial government, regional authority, district council, etc.).

The competent authority is the government.

3.3.2 Is there any difference between small and large (e.g. larger than 5 / 10 MW) hydropower stations with regard to the granting / authorisation procedure (e.g. different competent authorities)? In which cases is an Environmental Impact Assessment (EIA) needed?

There are no differences between small and large.

3.3.3 What is the legal status for the owner/constructor of new small hydropower facilities?

☒ Authorisation for the construction granted by competent authority

☐ Licensing system

☐ Others (please indicate): _____

Comments:

3.3.4 For how long is the authorisation / licence / others for new facilities granted (please describe)?

The authorisation is granted for max. 30 years.

3.3.5 For how long was the authorisation / licence / others for existing facilities granted (please describe)?

The authorisation was granted for max. 30 years.

3.3.6 Does the competent authority charge dues / taxes / levies / payments / etc. for the use of water for small hydropower generation?

☒ Yes
☐ No

If yes, please briefly describe payments in further detail:

We have payments for water rights and for use of water.

3.3.7 Is this also the case for large hydropower stations (e.g. larger than about 5 / 10 MW) or is there a differentiation between small and large hydropower stations?

There is differentiation between small and large hydropower stations.

3.4 Imposed ecological conditions for new facilities

Please give brief information on ecological conditions imposed on the construction of new small hydropower facilities.

3.4.1 Do newly constructed small hydropower facilities need to be equipped with fish migration aids for upstream migration?

☒ Yes
☐ No
☐ Under certain circumstances (please indicate):

_____

Comment:

The Freshwater Fishery Act demands fish passes on all new constructions which could interrupt the continuity of rivers. The Act does not relate this demand specifically to upstream migration.

3.4.2 Do newly constructed small hydropower facilities need to be equipped with fish migration aids for downstream migration?

☒ Yes
☐ No
☐ Under certain circumstances (please indicate):

_____

Comment:

The Freshwater Fishery Act demands fish passes on all new constructions which could interrupt the continuity of rivers. The Act does not relate this demand specifically to downstream migration.

3.4.3 Are conditions imposed for residual water for newly constructed small hydropower facilities (if yes, please indicate if a biotic or abiotic threshold value or guidance value is being used)?

☒ Yes

☐ No

☐ Under certain circumstances (please indicate):

_____

Comment:

Yes, conditions are determined according to the Decree on Criteria for Determination and the Mode of Monitoring and Reporting of Ecological Acceptable Flow, 2009. Abiotic threshold value is applied.

3.4.4 Are conditions imposed for the maintenance of the bed-load balance for small hydropower stations?

☐ Yes

☒ No

☐ Under certain circumstances (please indicate):

_____

Comment:

3.4.5 Is there any difference between small and large hydropower stations with regard to ecological conditions imposed on the construction of new facilities?

Yes. However, with the proposed measure on assessment of impact on water status, the procedures and demands will become same regardless to the size of the planned hydropower station.

ALPINE CONVENTION
PLATFORM WATER MANAGEMENT IN THE ALPS

Situation Report
Hydropower Generation in the Alpine Region
focusing on Small Hydropower

Annex

NATIONAL QUESTIONNAIRE ON HYDROPOWER GENERATION SWITZERLAND

---

1. Statistical Data on Hydropower Generation in Alpine Countries

Please indicate if given figures for point 1.1 and 1.2 refer to the whole territory of your country or the share within the Alpine perimeter (with a preference for the latter):

☒ Whole territory

☐ Share within Alpine perimeter of the country *if available, estimated values given in [ ]*

1.1 Basic statistical data

Country	Description	Unit	Value	Comment
Switzerland	Total electricity production in 2005 (all sources, e.g. hydropower, solar, biomass, nuclear energy, thermal power plants, etc.)	[GWh]	65'000	Average value. 2005 was a dry year, the actual electricity production for the whole territory was 57'918 GWh
	Total electricity production from hydropower in 2005	[GWh]	38'600 *[27'900]*	These values correspond to the estimated production for 2005, but do not show the real electricity production of the year 2005. The actual hydropower production of 2005 was 32'759 GWh for the whole territory.
	Threshold value for hydropower stations considered as "small hydropower"	[kW]	10'000	In Switzerland, the term small-scale hydropower plant refers to facilities that have a mean mechanical gross capacity of up to 10 MW.
	Share of electricity production from small hydropower compared to total electricity production from hydropower in 2005	[%]	9.1% *[9.2%]*	
	Total national emissions of greenhouse gases (CO_2 equivalents) in 2005*	Mio. t	53,7	
	Emissions of greenhouse gases from domestic electricity production in 2005*	Mio. t	2,6	The value refers to the emissions from domestic fuel combustion activities for public electricity and heat production. No data available for the emissions of electricity production only. In Switzerland, electricity production is dominated by hydroelectric power (56.6%) and nuclear power stations

				(38%). There are no major GHG-emissions from the operation from this type of electricity production. Most of the indicated emissions originate from waste incineration plants.

* **Figures are needed for calculation of contribution of electricity production from small hydropower to reduction of greenhouse gas emissions (conversion factor: 1 GWh = 500 t CO_2 – gas turbine).**

[…] Values corresponding to the Alpine Perimeter only

1.2 Classification of hydropower stations

Whole territory

Country	Classification Bottleneck Capacity (= Maximum Capacity) of Hydropower Stations [kW]*	Number of Hydropower Stations	Energy Output 2005** [GWh] (sum for each category)	Comment
Switzerland	~~< 50~~	No data	No data	These values refer to approximated output estimates for the year 2005. There are no official statistical data for hydropower stations with a maximum capacity up to 300 kW. The indicated number of hydropower stations in this category gives only an order of magnitude, however the indications about energy output can be considered as being more exact.
	< 300	700	250	
	301 - 1.000	175	510	
	1.001 - 5.000	130	1’400	
	5.001 - 10.000	46	1’340	
	> 10.000	175	35’100	
	Total	1’226	38’600	

Only Alpine Perimeter

Country	Classification Bottleneck Capacity (= Maximum Capacity) of Hydropower Stations [kW]*	Number of Hydropower Stations	Energy Output 2005** [GWh] (sum for each category)	Comment
Switzerland	~~< 50~~	No data	No data	These values refer to approximated output estimates for the year 2005. There are no official statistical data about hydropower stations with a maximum capacity up to 300 kW. The indicated number of hydropower stations in this category gives only an order of magnitude, however the indications about energy output can be considered as being more exact.
	< 300	420	150	
	301 - 1.000	110	330	
	1.001 - 5.000	100	980	
	5.001 - 10.000	41	1’120	
	> 10.000	132	25’300	
	Total	803	27’880	

* **In case data is not available according to the proposed classification, please try to provide data for alternative classification and change table accordingly.**

** **Indicate if other reference year**

2. PROMOTION OF THE DEVELOPMENT OF SMALL HYDROPOWER

2.0 Targets for renewable energy

Please indicate targets for renewable energies as set in national legislation (for EU Member States, targets as set in Annex I of directive 2009/28/EC)

- Share of energy from renewable sources in gross final consumption of energy, 2005:

  16.2%[1]

- Target for Share of energy from renewable sources in gross final consumption of energy, 2020: ....

Comments:

The Swiss Parliament has decided to increase the production of renewable energies by at least 5'400 GWh by 2030 in order to stabilise or reduce CO_2 emissions as quickly as possible. For hydroelectricity the goal is to increase Swiss hydroelectricity production by 2'000 GWh by 2030. (Swiss Federal Energy Act; EnG, dated 26 June 1998; SR 730.0).

The goal of Switzerland's energy policy to increase the proportion of electricity produced from renewable energy by at least 5'400 GWh by 2030; this corresponds more or less to an increase of 10% of the country's present-day electricity consumption.

2.1 Existence of economic development schemes for small hydropower

Do there exist economic development schemes (subsidies) for the promotion of small hydropower in your country?

☒ Yes

☐ No

2.2 Type of economic development schemes and amount of payments

If such schemes do exist in your country, what kind are they and what is the amount of payments granted (including details on the grant and tariff schemes, e.g. with respect to power output)?

☐ Investment grants

Comments:

☒ Tariff subventions

Comments:

[1] http://www.bfe.admin.ch/php/modules/publikationen/stream.php?extlang=de&name=de_915766185.pdf&endung=Schweizerische Statistik der erneuerbaren Energien

Energy Act (EnG; dated 26 June 1998; (Status 1 January 2009; SR 730.0) and corresponding Energy Ordinance (EnV; dated 7 December 1998; Status 1 January 2009; SR 730.01) provide for renewable energy production a cost-covering remuneration for feed-in to the electricity grid (CRF). New installations (plants put into operation after 1 January 2006) are entitled to apply for the CRF as well as extended and renewed plants. The conditions for extended and renewed plants are laid down in the revised energy ordinance. The compensatory feed-in remuneration will not be paid until electricity is actually fed into the grid.

To finance the compensatory feed-in remuneration scheme, the Energy Act stipulates that, with effect from 1 January 2009, a maximum surcharge of 0.6 cents per kilowatt hour for Swiss electricity final consumption will be levied, corresponding to a potential budget of 320 millions Swiss Francs per year. E.g. in 2009 the surcharge was fixed at 0.45 cents per kWh. The Energy Act (EnG, Article 7a, para 4) stipulates a cost cap for each technology, corresponding to the maximum percentage of the total amount of compensatory feed-in remuneration to which a particular technology is entitled. The cap for hydropower generation from small hydropower plants (< 10MW) is 50%. For small hydropower plants, the subvention period for compensatory feed-in remuneration is 25 years.

For small hydropower installations, the CRF is composed by a base compensation and different bonuses calculated as follows:

Base compensation:

The base compensation depends on the equivalent capacity of the installation. The equivalent capacity of an installation corresponds to the electricity fed into the grid in one calendar year divided by the number of hours of the calendar year less the hours before the entry into service of the installation or following the cessation of the service. The base compensation is calculated based on the equivalent compensation of the installation, pro rata according to the following capacity classes:

Equivalent capacity class	Base compensation [SFr./kWh]
≤ 10 kW	0.26
≤ 50 kW	0.20
≤ 300 kW	0.145
≤ 1 MW	0.11
≤ 10 MW	0.075

Example:

Installed capacity of 100 kW; Electricity fed into the grid: 540'000 kWh.

Equivalent capacity = 540000 kWh / 8760 h = 61,6 kW

Base compensation:

(10 * 0,26+ 40*0,2 + 11,6*0,145) / 61,6 = 0,199 SFr./kWh

Hydraulic engineering bonus:

Analogous to the base compensation, the hydraulic engineering bonus depends on the equivalent capacity of the installation and is calculated pro rata according to the following capacity classes. If costs of hydraulic engineering are less than 20% of total capital outlays (including pressure pipes), this value is zero. If the costs of hydraulic engineering are more than 50% of the total capital outlays, the bonus amount corresponds to the maximum (full hydraulic engineering bonus). Between 20% and 50% the bonus amount is calculated by linear interpolation.

Equivalent capacity class	Hydraulic engineering bonus [SFr./kWh]
≤ 10 kW	0.055
≤ 50 kW	0.04
≤ 300 kW	0.03
> 300 kW	0.025

Example:

Equivalent capacity = 61,6 kW;

Full hydraulic engineering bonus:
(10*0,055+40*0,04+11,6*0,03)/61,6=0,041 SFr./kWh

Costs of hydraulic engineering = 30% total capital outlays

Hydraulic engineering bonus = 0,333*0,041 = 0.014 SFr./kWh

Hydraulic head bonus:

Analogous to the other parts of the CRF, the hydraulic head bonus is calculated depending on the hydraulic head, pro rata according to following hydraulic head classes:

Hydraulic head [m	Hydraulic head bonus [SFr./kWh]
≤ 5	0.045
≤ 10	0.027
≤ 20	0.02
≤ 50	0.015
> 50	0.01

Example:

Hydraulic head = 23 m

Hydraulic head bonus:

(5*0,045+5*0,027+10*0,02+3*0,015) / 23 = 0,026 SFr./kWh

The maximal value of the CRF, including bonus is fixed at 0,35 SFr./kWh.

Please note that before the introduction of the compensatory feed-in remuneration scheme, small hydropower installations with a nominal capacity smaller than 1 MW being operated by independent producers were already benefiting from an additional cost financing system with an incentive of 0.15 SFr./kWh. The Swiss Energy Act foresees that these cost financing agreements will remain in force until 2035. However, from 2009 accounts will be settled using the compensatory feed-in remuneration surcharge and the settlement schedule will change from annual to quarterly payments. The transition of the incentive scheme will result in one-off costs for additional cost financing being much higher in 2009 than in previous years: on the one hand because the additional costs for the whole of 2008 will have to be increased, and on the other hand because the additional costs for 2009 have already been increased. As of 2010, these additional costs will once again be within the normal range. However, accumulated costs will decrease since some of the previously authorised parties will have to switch to the new scheme.

☐ Others (please indicate): _____

Comments:

2.3 New applications for small hydropower stations

Do you have figures on the number of new small hydropower stations which are intended / planned / projected to be realised as a consequence of the development schemes mentioned under 2.1?

In case quantitative data is available please fill the following table:

The only available data refer to received applications (state 22.4.2009) for tariff subvention. On the one hand, these applications are being submitted to the national institution granting the tariff subventions. The decision about the economic support is not part of the regular authorisation procedure. On the other hand these projects need to be submitted to the whole regular authorisation procedure by the competent authorities (cantons and municipalities) in order to get a concession.
Due to the uncertainty of the authorisation procedures' outcomes, the actual number of new implemented small hydropower stations will probably be quite a bit smaller than the number of received applications.

Entered applications for tariff subvention (whole territory):

Country	Classification Bottleneck Capacity (= Maximum Capacity) of Hydropower Stations [kW]*	Number of Hydropower Stations	Energy Output projected** [GWh] (sum for each category)	Comment
Switzerland	< 50	241	35.0	The only available data refer to received applications (state 22.4.2009). These applications have to be submitted to various authorisation processes, so the number of new small hydropower stations that will be realised could still undergo important changes.
	< 300	193	167.3	
	< 1.000	100	330.2	
	< 5.000	72	834.7	
	< 10.000	13	480.5	
	> 10.000	0	0	
	Total	**619**	**1847.7**	

Entered applications for tariff subvention (alpine perimeter only):

Country	Classification Bottleneck Capacity (= Maximum Capacity) of Hydropower Stations [kW]*	Number of Hydropower Stations	Energy Output projected** [GWh] (sum for each category)	Comment
Switzerland	< 50	152	24.1	The only available data refer to received applications (state 22.4.2009). These applications have to be submitted to various authorisation processes, so the number of new small hydropower stations that will be realised could still undergo important changes.
	< 300	129	120.7	
	< 1.000	77	267.2	
	< 5.000	55	654.6	
	< 10.000	11	379.4	
	> 10.000	0	0.0	
	Total	**424**	**1446**	

* **In case data is not available according to the proposed classification, please try to provide data for alternative classification and change table accordingly.**

** **Figures are needed for calculation of contribution of electricity production from small hydropower to reduction of greenhouse gas emissions (conversion factor: 1 GWh = 500 t CO_2 – gas turbine).**

In case no quantitative data is available please try to provide a qualitative description on the situation:

2.4 Problems with new applications for competent authority

Does an (in case) increase in the number of applications for new small hydropower plants pose any problems to the competent authority (e.g. difficulties during approval procedure, lengthy proceedings due to unclear legal requirements, etc.)?

☒ Yes

☐ No

In case 'yes' please provide a brief description of the situation:

The evaluation processes for tariff subventions and for authorisation are made independently and by different competent institutions/authorities, so the approval for subventions does not mean that this same project will be authorised for implementation. The compensatory feed-in remuneration will not be paid until electricity is actually fed into the grid, which means that remuneration will only take place if the project has been authorised by the competent authority and the subsidies have been approved by the competent institution.

Approval for subsidies by the competent institution comes generally earlier than cantonal/municipal authorisation. The decision about the approval or not of the described tariff subvention does not consider aspects of cost-benefit analysis, local planning and environmental protection. Only general capacity criteria and the registration date are considered. Thus, subsidies are often granted to projects that are not yet sufficiently developed, that are located on natural river stretches and that do not take into consideration cantonal planning.

All the projects, independently of the evaluation procedure for tariff subvention, have to be submitted to the competent authorities (cantons or municipalities) for the authorisation procedure. The authorisation procedure will consider legal conditions, local planning, and environmental protection. This situation can present conflicts of interests between the production of renewable energy (willingness to subsidise) and the environmental protection and local planning (authorisation).

The Swiss Parliament's decision to increase Swiss hydroelectricity production by 2'000 GWh by 2030 and the subsidies for small hydropower plants has caused an increasing volume of applications and substantial extra work for the competent authorities. National guidelines, recommendations and instruments for the adequate and efficient evaluation of all the received applications according to the cantonal priorities are needed.

2.5 Legal regulation for ecological upgrading of existing facilities

If legal regulations for upgrading existing facilities in order to enhance the ecological situation exist in your country, please provide relevant information.

For all hydropower plants, new ones and existing ones, the protection of water bodies and of the environment is guaranteed by the measures required by the corresponding laws, where requirements concerning the following aspects are defined:

- Residual water flow
- Maintenance of the natural line and structure of the water bodies
- Flushing and emptying dammed-up waters
- Removal of floating debris
- Fish migration measures
- Submission to an environmental impact assessment
- Permission for construction outside the building zones

For existing facilities, the water concession already granted provides, according to the specific conditions of the Water Concession Act, a legally consistent rightfully-acquired water utilisation right. This means that during the period for which the concession has been granted, this right can be diminished only for reasons of higher public interests and against full compensation. For this reason, the effectiveness of the application of new

regulations for upgrading existing facilities in order to enhance ecological situation is limited.
With respect to existing facilities, it is noteworthy to mention that there exists also a class of water rights from the past that have no concession period at all, i.e. water rights for an unlimited time period.
In the following, the different regulatory possibilities for upgrading of existing facilities in order to enhance ecological situation are described:

Granting a new concession, renewal or extension of the concession
For water abstractions from watercourses a concession is required. The conditions for granting the concession are fixed according to the legal instruments applicable at the time when the decision about the concession is taken. The maximum duration of the concession fixed by national law is 80 years. For some old installations concession periods are unlimited.

When an existing concession has to be renewed or extended (significant changes of the concession's scope e.g. changes on water quantity, head, type of use), or when a new concession for water use is granted, the conditions for the water use are set based on the actual environmental legislation. Thus, if existing hydropower facilities request and need a renewal, extension or a new concession then they have to comply and adjust to the new requirements of the actual environmental legislation, such as, for example, the actual residual water flow conditions.

From an economic point of view, the most relevant adjustments will probably concern the increased residual water requirements and for ensuring free fish migration. For the residual water requirements, some specific exceptions are foreseen by the law: for example in the framework of a so called "protection and utilisation plan" for a limited area forming a topographical-hydrological unit. The idea is that in parts of this area more water can be used if at the same time in other parts less or no water is used. Thus, this regulation aims for a given area at an appropriate balance between protection and utilisation. E.g. within the planning area lower minimum residual water flow rates can be applied or existing facilities can continue to be operated with the ancient residual water flow rates if in other parts of the area there is refraining from water abstractions. These protection and utilisation plans need the approval of the Federal Council.

Rehabilitation of river stretches with residual water flow without changes of the existing water concession
The federal law on water protection stipulates the following regulations with respect to existing facilities:
In cases where a watercourse is substantially affected by existing water withdrawals, it shall be examined if rehabilitation below the point of the water abstraction is possible according to the specification of the authorities in so far as such rehabilitation is economically bearable and does not cause an infringement of the existing water utilisation right which would require compensation.
The authorities shall specify more extensive rehabilitation measures in cases which concern watercourses situated in landscapes or including biotopes which are listed in national or cantonal inventories, or in case of other overriding public interest. The procedures for ascertaining whether indemnities must be paid and fixing their amount shall be based on the procedures contained in the Federal Law on Expropriation.
The authorities shall ensure that the rehabilitation of river stretches with residual water flow is completed at latest by end 2012.

Hydro-peaking regulations
According to the Federal Water Protection Act amendment (GSchG) recently (Dec. 2009) approved by the Swiss Parliament, regulations for river stretches affected by hydro-peaking are foreseen in order to prevent new impairments and reduce existing

impairments. In order to respect existing rights for hydropower facilities, the necessary measures for hydro-peaking rehabilitation will be fully compensated (only structural measures like retention basins to attenuate the peak flows are required but no interventions in the operation of the plant itself).

2.6 Incentives for ecological upgrading of existing facilities

If incentives for upgrading existing facilities in order to enhance the ecological situation exist in your country, please provide relevant information.

Certification of electricity with labels that get a higher price on the electricity market can be regarded as an economic incentive for reducing the ecological impacts of hydropower plants, provided that granting the label is based on ecological criteria.
In this respect Switzerland recognises the “Naturemade” labelling scheme, developed and organized by a private organisation. The certification system has two levels:
The first level, Naturemade Basic, needs a declaration of the source and origin of electricity (requiring that plants use renewable energy). Large hydropower plants (>10 MW) have to establish an environmental management system within five years of receiving the Naturemade Basic certificate.
The second level, Naturemade Star, was defined for environmentally preferable electricity. Power plants can be granted the Naturemade Star label if they fulfil Naturemade Basic criteria as well as additional criteria. To achieve this level, hydropower plants must have a lower environmental impact than traditional hydropower plants. For example, they have to leave sufficient water in the rivers (i.e. respect residual flow limits) and allow fish to pass through weirs.

Hydropower installations with more than 0.1 MW capacity must establish a fund to improve the ecological situation of the power plant site or in its vicinity. The funds are financed from a levy on certified electricity; Naturemade Star producers pay CHF 0.009/kWh whereas Naturemade Basic producers pay only CHF 0.001/kWh.
Specific provisions were developed to protect other renewables from competition with large hydropower plants and to create an incentive to develop non-hydro renewables. The marketers of Naturemade certified electricity must guarantee that at least 5% of their certified electricity sales have the Naturemade Star certificate.
[Source: http://www.iea.org/Textbase/pm/?mode=re&id=1169&action=detail]

3. Framework Conditions for Authorisation of Facilities

3.1 Criteria for decision on sites for construction of new facilities

Please indicate criteria applied in your country for the decision on whether the construction of new small hydropower plants is to be allowed or rejected.

Please note that the evaluation and authorisation criteria can vary depending on the canton where the small hydropower plant will be located. Hence only general criteria can be given hereafter.

3.1.1 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities is generally approved (e.g. Heavily Modified Water Bodies according to WFD, etc.)?

☐ Yes

☒ No

If yes, please briefly describe applied criteria:
Infrastructure hydropower plants (residual flow plant, water supply plant and sewage system plant) have very good chances of being approved since they normally do not lead to additional environmental deterioration.

3.1.2 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities can be approved under certain circumstances (e.g. under application of Art. 4(7) of the WFD)?

☐ Yes

☒ No

If yes, please briefly describe applied criteria:

3.1.3 Do criteria exist for sites / certain type of rivers or river stretches / catchments / regions, where the construction of new facilities is generally rejected (e.g. Nature2000 sites, river stretches in “High Status” according to WFD, etc.)?

☐ Yes

☒ No

If yes, please briefly describe applied criteria:
If sites are located in inventoried national or cantonal sites with strong relation to water/groundwater/fish (floodplains, moorland areas, spawning areas, …), this is normally taken as a strong argument by the competent authority for rejecting applications.

The Federal Act on the Protection of Nature and Cultural Heritage (NCHA) and its corresponding ordinances provide a particular protection of alluvial zones of

national importance and moorland areas. According to this legislation applications for projects located in such zones are generally rejected.

3.1.4 Do economic criteria exist for not granting authorisation for the construction of new small hydropower facilities?

☐ Yes

☒ No

If yes, please briefly describe applied criteria:

3.2 Development plans

3.2.1 Do concrete plans exist for future development of small hydropower in your country ("master plan" or strategies) – on a national or regional level - based on geographical information such as specific rivers or river sections, specific regions or certain catchment areas for instance?

☒ Yes

☐ No

☐ Others (please indicate):

Some cantons have already elaborated or are elaborating strategies based on geographical information.

Comments:

With the entry into force of the new Energy Act which provides the cost-covering remuneration for feed-in to the electricity grid (CRF), a "strategy for hydropower utilisation in Switzerland" was elaborated and can be downloaded on this page: http://www.bfe.admin.ch/themen/00490/00491/index.html?lang=de&dossier_id=00803

In this strategy the contribution of new small hydropower to the evolution of Swiss hydropower until 2050 is estimated at 1100 GWh/year. For the promotion of small hydropower, the strategy only remarks that the database of small hydropower should be updated and appropriate potential sites should be determined.

Considering the important number of applications for new small hydropower plants, the competent authorities for authorisation are demanding instruments and strategies for the global evaluation of the incoming applications. Thus, diverse institutions are working on the development of new decision-making aids such as a classification system of river stretches, inventory of hydropower potential or recommendations for assessment criteria.

The federal administrations are developing a guidance document for cantonal strategies on small hydropower. This national recommendation on the use of small hydropower[2] is to be published by the beginning of 2011. At cantonal level, the situation is different from canton to canton: some cantons have already developed strategies for the use of hydropower, some are developing such a strategy and others have not yet started.

3.2.2 If yes, please indicate the legal status of those plans.

[2] http://www.bafu.admin.ch/UD-1037-D

☒ Statement of will by the competent authority but not legally binding

☐ Effective in law

☒ Still under preparation

☐ Others (please indicate): _____

Comments:

The guidance document under preparation by the federal administrations will correspond to a statement of will at national level aiming to guide the competent authorities in the development of cantonal / regional strategies of how to deal with small hydropower. This national document is to be published by the beginning of 2011.

At cantonal level, the situation is different from canton to canton: in some cantons (e.g. canton of Fribourg, canton of Berne) the developed strategies are binding for the administrations. In other cases the strategies may have only the status of "statements of will".

3.2.3 Has your country expressed any intentions or reflections aimed at a spatial prioritisation for hydropower generation, i.e. to delineate areas / catchments / regions designated as "for hydropower use" (with e.g. less stringent ecological requirements) and conversely other areas designated as "not for hydropower use"?
Yes, see 3.2.1.

3.3 Authorisation / licensing of new facilities

3.3.1 Please indicate the competent authority for granting authorising / licences for new small hydropower facilities (e.g. cantons, provincial government, regional authority, district council, etc.).
For international rivers: the Confederation, cantons or municipalities for inland rivers

3.3.2 Is there any difference between small and large (e.g. larger than 5 / 10 MW) hydropower stations with regard to the granting / authorisation procedure (e.g. different competent authorities)? In which cases is an Environmental Impact Assessment (EIA) needed?

The authorisation is the same, but the procedure can vary according to the gross capacity: stations with a capacity between 300 kW and 3 MW have to be audited by the Federal Office for the Environment FOEN, stations with a gross capacity of more than 3 MW have to be submitted to an environmental impact assessment (EIA).

According to the Environmental Conservation Act, installations having a significant impact on the environment have to be submitted to an EIA. For hydropower, installations with a capacity of more than 3 MW are amenable to the EIA obligation in case of new construction, of significant changes of the installation, of significant changes of the existing concession and in case of renewal of the concession.

3.3.3 What is the legal status for the owner/constructor of new small hydropower facilities?

☒ Authorisation for the construction granted by competent authority

☐ Licensing system

☒ Others (please indicate): water concession

Comments:

3.3.4 For how long is the authorisation / licence / others for new facilities granted (please describe)?
Duration is fixed by canton or municipalities but never exceeding the maximum duration of 80 years, fixed by national law.

3.3.5 For how long was the authorisation / licence / others for existing facilities granted (please describe)?
Duration is fixed by canton or municipalities but usually not exceeding the maximum duration of 80 years, fixed by federal law. For some very old installations unlimited periods still exist.

3.3.6 Does the competent authority charge dues / taxes / levies / payments / etc. for the use of water for small hydropower generation?

☒ Yes

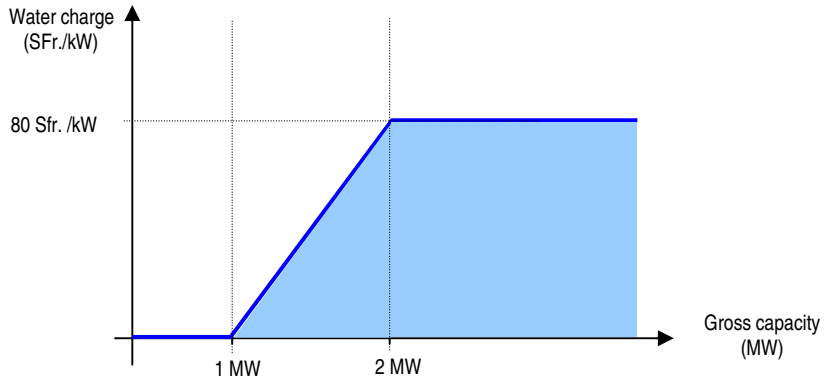
☐ No

If yes, please briefly describe payments in further detail:

In Switzerland a water charge must be paid by the holder of a concession to abstract and use water for hydropower purposes. This water charge is paid to the competent authority (canton or municipalities) that grants the concession.

The federal government establishes the maximum water charge per kilowatt gross capacity, which currently amounts to 80 Sfr./kW gross capacity. Small hydropower plants with less than 1 MW gross capacity have been exempt from the water charge since 1997. The water charge for plants with capacities between 1 and 2 MW can maximally be increased linearly until reaching the maximal water charge of 80 Sfr./kW.

Within this limit, the competent authorities are free to demand the payment based on their principles (blue zone in the following graphic).



3.3.7 Is this also the case for large hydropower stations (e.g. larger than about 5 / 10 MW) or is there a differentiation between small and large hydropower stations?
There are no differences at federal level. Cantons are free to choose other specifications if respecting the conditions described under point 3.3.6.

3.4 Imposed ecological conditions for new facilities

Please give brief information on ecological conditions imposed on the construction of new small hydropower facilities.

3.4.1 Do newly constructed small hydropower facilities need to be equipped with fish migration aids for upstream migration?

☒ Yes

☐ No

☐ Under certain circumstances (please indicate):

_____

Comment:

The Swiss Fishery Act from 21 June 1991 (SR 923,0) stipulates that in case of water uses, appropriate arrangements have to be foreseen to allow free fish migration. However no distinction between upstream and downstream migration is made.

3.4.2 Do newly constructed small hydropower facilities need to be equipped with fish migration aids for downstream migration?

☒ Yes

☐ No

☐ Under certain circumstances (please indicate):

_____

Comment:

The Swiss Fishery Act from 21 June 1991 (SR 923,0) stipulates that in case of water uses, appropriate arrangements have to be foreseen to allow free fish migration. However, no distinction between upstream and downstream migration is made and downstream migration is not explicitly mentioned. So far, only facilities for the upstream migration are generally provided. Efforts are actually being made for the implementation of the equipment with facilities for downstream migration as well.

3.4.3 Are conditions imposed for residual water for newly constructed small hydropower facilities (if yes, please indicate if a biotic or abiotic threshold value or guidance value is being used)?

☒ Yes

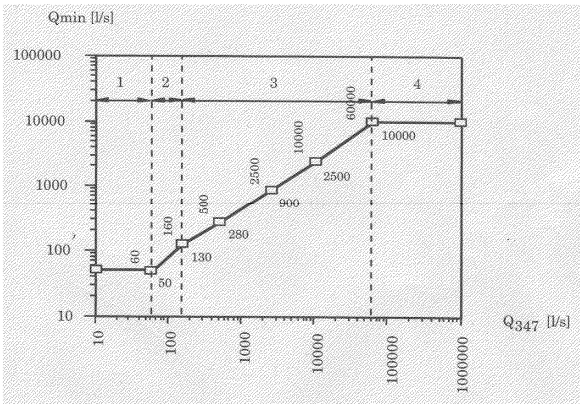
☐ No

☐ Under certain circumstances (please indicate):

_____

Comment:

The minimum, residual water flow requirements (Q_{min}) are in principal derived from the Q_{347} flow rate (see following graph) with further specifications to increase resp. decrease this value. Thus, the main reference value for Q_{min} is based on abiotic grounds, deviations therefrom can also consider biotic-ecologic criteria and further socio-economic concerns.



3.4.4 Are conditions imposed for the maintenance of the bed-load balance for small hydropower stations?

☒ Yes

☐ No

☐ Under certain circumstances (please indicate):

_____

Comment:

Under the Federal Water Protection Act amendment (GSchG) recently approved by the Swiss Parliament, the bed-load balance has to be maintained so that no significant impact will result for the endemic fauna and flora, for habitats, for the groundwater balance and for the flood protection. Harmful modifications of the morphological structures or the morphological dynamics of the river stretch will have significant consequences for an installation.

Necessary measures have to be taken by the installation's owner. In the watershed of the affected river, measures for the installations concerned have to be coordinated. Measures for maintenance of the bed-load balance depend on following aspects:

- the impact's intensity
- ecological potential of the river stretch
- proportionality of the investments necessary for rehabilitation measures
- interest for flood protection
- energy goals for renewable energy

For hydropower installations, the bed-load should pass through the installations to the extent deemed possible.

The installations' owners have to grant access to the competent authority and provide all necessary information on bed-load handling, measures, and operational and structural changes.

3.4.5 Is there any difference between small and large hydropower stations with regard to ecological conditions imposed on the construction of new facilities?
No