



The Small hydropower award – Additional comments and explanations – Example 2

General description of the plant

	State 1	State 2
Name of the plant:	Power plant Walchau	
Type of the plant:	Diversion type	
Name of the river:	Schwarzache	
MQ of river:	2,37 m ³ /s	
Rated discharge:	1,55 m ³ /s	2,4 m ³ /s
Rated net head:	38 m	38 m
Power:	450	715
Annual production:	3,3 GWh/a	4,3 GWh/a
Number / Type of turbine:	1 Francis	2 Francis
Year of construction / latest renovation:	1972	2009

Alteration/Improvement:

The plant is owned by a local electricity supply company. This plant and a second one is the backbone of the electricity production. The plant is well maintained and in good condition but nevertheless after 35 years of continuous operation a technical modernisation has to be done. It is the intention of the operator to take this chance to also do some upgrading in environmental terms because in times of construction there was no need to meet environmental targets. Due to the fact that the entire plant has a quite low degree of exploitation it is foreseen to install a second additional turbine in the powerhouse and increase the rated discharge. In environmental terms it is foreseen to build a fish bypass system at the weir and to deliver an effective amount of reserved flow into the diversion reach. The new electronic devices will reduce the number of days out of operation but also help to increase safety in any phase of operation.

The evaluation compares the recent state (state 1) with the designed situation (state2) showing any alteration and its effect on the sustainability of the plant. Right now the project is under negotiation with the government.

The following comments refer to the structure of the SHP sustainability criteria catalogue and provide additional explanations for a better understanding of the figures in the evaluation table.

A1: Total energy consumption and portion of non-renewable energy

The target of the plant is of course the production instead of the consumption of electricity. In the plant itself there is some need for electricity mainly regulating the electromechanical equipment. To simplify the operation but also to increase the resistance against failure it is foreseen to replace a couple of electro motors by hydraulic drives. That will need less electrical energy due to better efficiency and operation modality. The electricity used comes 100% from the production of the plant – therefore RE.

The plant is located close to the head quarters of the electricity supply company and there is almost no energy consumption in terms of operation and maintenance.

A2: Chemicals needed for operation

The plant provides electricity for the local grid and there is a transformer station close to the powerhouse. Of course there is need for transformer oil.

Lubricants needed for moving parts within the plant (gates, generator, speed increaser etc.) have not yet been changed to biodegradable ones but for the new electromechanical equipment it is foreseen to change the type of lubricants.

A3: Water consumption

A SHP plant is using water but not consuming water. In the respective plant there is no direct water consumption. Besides “direct” water consumption, a kind of “indirect” water consumption meaning water losses along the water ways may happen in a SHPP.

To detect water losses and to consequently avoid them the pressure pipe with a length of 2 km will be checked during the modernisation phase when out of operation and empty.

A4: Emissions towards the compartments water, air and soil

The automatic trashrack cleaner is in good conditions and there is no oil emission into the water. Noise emissions to the air are recently very little coming from the power house located in about 100m distance from the nearest building. There is no need for additional measures. The intake and the trashrack is located remotely and some noise emissions possible will not impact anybody. No alterations are foreseen. There are no emissions towards soil.

A5: waste, particularly hazardous waste and its treatment

Naturally at any trashrack some material is taken out of the water and can be designated as waste “produced”. The respective plant is located in the upper reach of a river and there is quite little settlement and population in the catchment. Therefore the predominant component of the material is of biological origin like wood, leaves etc.

There is no governmental obligation to depose that material but to deliver it again back to the river. Within the renovation no change is envisaged.

A6: Tolerance towards failure (technically)

In case of flood the new intake gates will get closed automatically to avoid the intake of sand and gravel. The weir has a fixed crest. Failure due to flood is unlikely to happen.

The tolerance towards failure due to electrical reasons will be increased by the intended new regulation system being installed together with the new turbine.

A 7: waterproofing the ground due to construction works and roads

Within the renovation there was no need for constructing new roads or build new pavements. The plant is located in an industrial area. There was no alteration.

A8: Inundation and flood protection

As said before the weir is located remotely and within the previous years of operation there was no flood problem there. The powerhouse is located close to the river but safe against flooding. Within the renovation there is no intention to change the recently satisfying situation.

A9: River morphology and flora

When the plant was erected 35 years ago no changes have been set in the river. Nevertheless within the diversion reach several measures has been taken by the government in order to stabilise the riverbed by small ramps. These ramps cause a quite poor river morphology in a certain part of the diversion reach. Measures could be taken but this is not in the responsibility of the plant owner.

Any back water area is not existing in the usual sense of the word due to the high slope of the river and continuous sedimentation process.

A10: Safeguarding the river continuum

A new fish bypass system will be installed in cooperation with representatives of the fishermen according to the recent state of the art. Recently there is no fish bypassing possible.

Until now there is a kind of agreement between the plant operator and the fishermen to deliver some reserved flow into the diversion reach to safeguard the biotic conditions. Within the enlargement of the “water right” by increasing the rated flow the government will fix the amount of water and make it therefore “official”

A11: Protection of groundwater

The power plant is located in an alpine region. It can be assumed that along the riverbed there is

some groundwater level directly connected. Until now there is no knowledge about any impact. Consequently no measures have been taken and no measures will be taken.

B1: Safety at work

There is no need for continuous manpower in the respective plant. As said above the power plant is close to the headquarters of the company and by two-minutes walk an employee will be available in the plant if necessary. Nevertheless near the rotating parts in the power house security is provided.

The approach to the weir is restricted to avoid damage but also accidents.

B2: Quality of employment

There is no employee working at the power plant continuously. The work necessary is restricted to situations when problems have to be solved. That will happen mainly in times of flood when large debris has to be removed from the trashrack.

Even with a second turbine the situation described will not change. The plant will be operated fully automatically and the work is timely limited. The quality of the working conditions is therefore irrelevant.

B3: Safeguarding and creating qualified jobs

Directly there will be no option to create new jobs within the enlargement of the plant. But the fact, that the plant is the backbone of the company the shut down of the plant will destroy jobs in the company. The enlargement of the plant will increase the economical independency of the company, stabilise the company and therefore safeguard existing qualified jobs.

B4: Gender aspects

Within the company gender aspects are met The only company working in fact at the renovation was a construction company doing construction works. So it was not possible to meet gender aspects within the work done.

C1: Documentation/application/transfer of existing know how

The designing engineer of the project is working at university. That offered the previous two years the possibility for students to get involved in the design process and to make some training in connection with the plant concerning calculation, optimisation and environmental topics. The engineer himself has already published certain aspects of the renovation on national and international level.

The newly fish bypass channel will be monitored after construction to optimise the discharge making it working perfectly.

The operation data technically and environmentally will be used for future projects envisaged

along the same river upstream.

To fix the suitable amount of reserved flow an extensive field study is carried out recently and will provide results applicable not only for the respective plant but also for other plants and projects along the same river.

C2: Need for additional qualification of workforce in the plant

Due to the fact that all the important decisions are taken directly by the owners of the plant there is restricted need for improving qualifications. The owners have a very long experience in running a plant and are increasing their knowledge continuously by solving problems in their plants. The direct work at the plant does not need high qualification.

C3: Accompanying research during operation of plant

In terms of ecology it is foreseen to do some biological research in the diversion reach to obtain a reliable picture on the ecological functions within this impacted reach. That depends on the willingness of the government to co-finance these activities. Secondly it is foreseen to observe the discharge carefully to provide reliable data for the engineering of the plant upstream.

D1: Support of regional infrastructure

The power plant is situated in an semi-industrial area. A local road is passing the plant itself but also the weir. There was no need for building any new accession road.

100% of the electricity production is used in the distribution grid owned by the company supplying the village. Their distribution grid is in good condition and there will be no need for any enforcement. Nevertheless the owner of the plant himself is part of the regional infrastructure and therefore the modernisation and enlargement of the existing power plant will support the regional infrastructure significantly.

D2: Remaining regional profits

The construction of fish bypass will be carried out by a local or regional construction company. The electronic upgrading but also the manufacturing of the new turbine has to be done by a specialist. This qualification could not be found in the region.

D3: Conservation of man made environment as good to be protected

The new turbine will be mounted in the existing old power house. That will give enough reason to also renovate this 35 years old and not really attractive building.

No other construction work is foreseen. That means that a significant enlargement of the plant can be executed without any additional impact on landscape.

E1: Participation of parties concerned during licensing and operation

The area around the plant is mainly owned by the company. Consequently no other people or groups or parties are really interested in the enlargement. Despite this fact the village itself represented by the mayor is supporting the project as it strengthens a local company. Of course he has been informed about all steps of engineering.

The second party were the fishermen. Their representative was continuously contacted in the respective details like fish bypass channel and reserved flow. In case all the environmental aspects and needs will be met they also support the project due to overall increase of ecological functions in the river.

E2: Creation of social resources

The owner of the plant and the electrical distribution grid is well known and estimated in the village. Additional to the plant they are also running a well known hotel and a restaurant. Of course people know about the plans of the company. But in detail it is not really attractive to visit the plant. According to the experiences of the second plant which has been renovated three years ago there will be a public opening ceremony again.

E3: Multifunctionality of the plant

Due to the location and the system of the plant there is very little chance to find any additional function. One small aspect can be mentioned: there is a cross-country ski run passing the weir.

F1: Diverse indicators for the profitability of the plant

The plant was built in 1972 and was running satisfying for 35 years. It has earned lot of money. The enlargement asks for a very precise calculation because the economical performance depends mainly on the amount of reserved flow to be delivered for environmental reasons. It has been pre-calculated that some 120l/s will be acceptable. In that case the payback time will be about 14 years.

G1: Effective use of water as a resource

The main reason for the enlargement project was to strengthen the independency of the company by increasing the production. The degree of exploitation in the recent state is very low and a huge amount of natural flow passes the weir. The target of any project is to achieve the best possible relation between electricity production and environmental impact known as environmental efficiency. The respective project represents a win-win situation because of the increase of production but also increase the environmental conditions. The new designed rated discharge combined with a high quality turbine meets best the targets of optimal using the resource water.

