Company:

VERBUND Innkraftwerke GmbH

Project name:

Refurbishment and Extension of the Hydropower Plant Töging-Jettenbach

Project location:

The run-of-river hydropower plant (HPP) Töging-Jettenbach is situated on the nearly 23 km long Inn River Canal in the city of Töging, in Bavaria, Germany. The Inn is one of the longest (> 500 km) and most abundant rivers in Europe and covers a catchment area of more than 26.000 km² with more than 820 glaciers. At the confluence with the Danube, the Inn river's average discharge amounts to > 735 m³/s.

Please provide a short project description (5 lines) with a link to any webpages which provide more detail:

The project "Refurbishment and Extension of the HPP Töging-Jettenbach" includes:

- new construction of a hydropower plant and increase of the power plant discharge capacity, including new construction of the Jettenbach weir and the increase of the operation level (head),
- the adaption of the existing channel to cope with the new boundaries resulting from water level increase of about 70 cm and discharge,
- the improvement of flood protection measures,
- compensation & mitigation measures as well as the improvement of ecological conditions. The project involves different measures (aquatic and terrestrial) that cannot be linked only to the WFD; it is more a holistic concept of measures targeting all relevant legislative requirements at the same time.

These measures will increase the annual renewable electricity generation of the Töging-Jettenbach hydropower plant site by approx. 120 GWh, hence, by more than 20% and strengthen the local renewable power generation and the stability of the grid. The refurbished and extended hydropower plant will be able to provide about 200,000 households with renewable, local electricity and will avoid 514,000 tons of CO_2 annually. The investment amounts to approximately €250mn. The envisaged start of operation of HPP Töging-Jettenbach is in 2022.

www.verbund.com/en-at/about-verbund/power-plants/our-power-plants/toeging-new

1. What are the technologies involved in this project (hydro, wind, grids, hybrid projects [e.g., agrisolar])?

   Hydropower, run-of-river

2. How did you take into account the relevant biodiversity and environmental protection legislation in this project? During which phase of the project were these considerations analysed and integrated into the project? Did you anticipate concerns around biodiversity

and environmental protection for this project, and if so, what did that process look like and during which phase of the project did this occur?

The project takes into account all EU, national/German as well as regional/Bavarian laws regarding the permitting process. Like any other project, it is compliant with the European environmental acquis, including specific legal provisions on air quality, water quality, waste management and nature protection.
The German, as well as the Bavarian environmental laws, include high-ranking standards serving environmental protection. The core area of environmental law consists of plant-, environmental media- and substance-related protection laws (immission control law, water law, soil protection law, waste law, chemicals law) as well as cross-sectional laws (Environmental Impact Assessment Act, Environmental Information Act, Environmental Rights Remedies Act, Environmental Damage Act) and environmental criminal law.
As part of the approval procedure for the HPP Töging-Jettenbach, the authorities scrutinized the submission documents and based their decision on a thorough examination of all legislation decisive for the approval.

The Environmental Impact Reports assess all possible project impacts that were part of the documentation submitted for the German Planning Approval Procedure with the integrated Environmental Impact Assessment (EIA). During the planning process, a wide range of measures has been defined to minimize and mitigate impacts on flora, animals and habitats of animals. They are based on the results of the impacts identification process of experts and are an intrinsic part of the project. In addition, the responsible Local Authority of Mühldorf prescribed additional measures to be carried out for specially protected animals, such as reptiles and butterflies.

An Environmental Impact Assessment (EIA) was carried out for the project by the local authority of Mühldorf. The basis for the EIA was a comprehensive Environmental Impact Study (EIS), together with all other technical and planning documents necessary for the approval procedure such as an assessment according to species protection law as well as an assessment under area protection law, specifically a flora-fauna-habitat (FFH) compatibility assessment.

The EIA includes the identification, description and evaluation of the effects of the project on the following subjects of protection:

- human beings, including human health,
- animals, plants and biological diversity,
- soil, water, air, climate and landscape,
- cultural assets and other material assets, and
- the interaction between the aforementioned subjects of protection.

The documents on the environmental impact contain the following information with reference to the subjects of protection:

1. description of the project with information on location, type and extent as well as land requirements,

2. description of the measures to avoid, reduce or, as far as possible, compensate for significant adverse environmental effects of the project, as well as the replacement measures in the case of non-compensable but priority interventions in nature and the landscape,
3. description of the expected significant adverse environmental effects of the project, taking into account the general state of knowledge and generally accepted assessment methods,
4. description of the environment and its components in the area affected by the project, taking into account the general state of knowledge and generally accepted assessment methods, as well as information on the population in this area, insofar as the description and information are necessary for the identification and assessment of significant adverse environmental effects of the project and their provision is reasonable for the project investee,
5. an overview of the most important alternative solutions to the project and an indication of the main reasons for their selection with regard to the environmental impact of the project.

In summary, the result of the EIA was that the project of HPP Töging-Jettenbach is environmentally sound. Unavoidable impacts can be offset with ecological compensation measures required by environmental protection law. For the Inn River there is a hydromorphological concept to achieve the targets set in the Water Framework Directive during an implementation period of 15 years.

Moreover, according to § 15 of the Federal Nature Conservation Act in Germany, it is stipulated that the party causing interference with nature and the landscape is obliged to refrain from avoidable impairments of nature and the landscape. Unavoidable impairments are to be compensated for by nature conservation and landscape management measures (compensatory measures) or replaced (substitute measures). With the specific purpose of meeting these legal requirements, a Landscape Conservation & Management Plan has been elaborated, which, defines a series of protection, avoidance and minimization measures to avoid or at least minimize the effects of the project on affected protected assets as far as possible during the construction, installation and operation phases. Only after all these protection, avoidance and minimization measures are exhausted, ecological compensation measures are defined and must be maintained. The loss of previously undeveloped areas is to be classified as an unavoidable, significant impact. Unavoidable impacts also include the material and functional effects of the individual project components on the protected assets of animals, plants and their habitats.

The following compensatory measures have been elaborated and planned in detail for the HPP Töging project:

- Design of an oxbow lake at the substation of the Töging hydropower plant with the development of reeds and willow scrub
- Development of species-rich herbaceous vegetation on the canal slopes
- Development of nutrient-poor grassland on the gravel surfaces near the powerhouse
- Development of nutrient-poor grassland and rough pastures from intensive grassland and arable land

- Development of softwood floodplain forests from poplar forest or arable land in the area of Großer Heuwinkel
- Development of hardwood floodplain forests and extensive grassland on arable land

All proposed measures have been assessed during the permitting procedures and are part of the final permitting issued by the authorities. The implementation of all the measures is monitored by the external ecological construction supervision as demanded by the authority and paid by the project developer.

3. What makes this project innovative?

One of the most outstanding features of the project is the extensive ecological accompanying measures designed to improve the total ecological value of the river stretch. These include:

- gravel bars & standing waters as new spawning grounds and fish habitats
- new downstream fish migration possibility (hydroelectric snail)
- structural and hydro-morphological improvements
- development of meadows on the banks to foster biodiversity
- realization of new nutrient-poor grasslands and wetlands (in total 20 ha)
- new habitats for reptiles
- and more…

4. Did you collaborate with stakeholders outside of your company (authorities, local communities, NGOs, etc.) and if yes, with whom? Can you describe your experiences with these external stakeholders? Were you able to integrate community concerns into this project?

Affected citizens, associations, nature conservation organizations and communities were involved in the planning process at every stage of the project, right from the beginning of the planning process. Suggestions and wishes were then taken into account as far as possible during planning and implementation.

For the HPP Töging-Jettenbach, an Environmental Impact Assessment had to be conducted. In every stage of this process, civil society had been given the possibility to participate: citizens have been involved in many working sessions and information events since the beginning of the planning process. But not only have citizens been regularly involved in the public consultation process, but also representatives of nature protection organizations (NGOs). In these consultations, extensive information has been presented by technical and environmental experts to stakeholders. All project information has been made available via presentations and printed plans so that questions and concerns could be discussed in detail with reference to the local situation. In the course of the process, some of the technical plans have been adapted and revised, e.g. some flood protection measures.

After a planning process of 1.5 years, the approval documents have been submitted to the authorities in October 2015. All documents have been made accessible to the public and all citizens had the opportunity to engage in the process and bring in their concerns. Many private and public groups participated in this consultation process and made their voices heard. Their feedback and statements have been discussed and answered. This process even led to the adaption of specific mitigation measures, such as air pollution and noise prevention. Due to additional official (by the authority) and technical demands, the project had to be further modified by the project promotor. The public hearings with the authority took place in March 2018, and the official planning approval was issued on 19 July 2019, nearly 4 years after the submission of the permitting documents.

5. How did data enable this project and what data did you collect? Of the collected data, what was provided to regulators and authorities as part of the permitting process?

During the construction of the HPP Töging-Jettenbach, various requirements defined by the authority had to be met to reduce possible risks and adverse effects. For this purpose, a specific management system has been implemented to accompany the construction phase and ensure that all requirements are met.

The permit that concluded the approval planning procedure prescribes 267 requirements/conditions for the Töging-Jettenbach project. These requirements refer to 12 different topics and relate to both, the construction as well as the operating phase. In addition, the landscape conservation plan prescribes 82 further measures. To ensure that compliance with all requirements/conditions can be documented without gaps and in time, a special database has been programmed for monitoring the requirements, it includes all requirements, deadlines and verification documents and serves as documentation and storage. With the help of this database, semi-annual reports are evaluated and sent to the permitting authority – this reporting started even before the construction works as it served also as a basis for the tendering process for construction and site inspection.

6. Please describe the experiences surrounding the permitting process for this project, including any bottlenecks you faced:

The permitting process started with a screening and scoping process. Studies on the potential of hydropower generation in Bavaria showed that the HPP Töging-Jettenbach would significantly contribute to the generation of green electricity and supports local security of supply. No regional planning procedure (Raumordnungsverfahren) was necessary because the project is/was consistent with the energy transition targets of the Free State of Bavaria.

During this screening and scoping process, an environmental impact assessment turned out to be necessary: In this comprehensive examination process, all potential impacts on the environment have been investigated and all interested stakeholders have been involved. Environmental associations, fishers and fishing associations, and nature and bird protection organizations have been informed in dedicated events. Additionally, several public information events have been conducted where citizens could express their opinion and

raise questions about the project. One of the main concerns has been flood protection which led to the elaboration of flood protection measures and their integration into the project. The community representatives of the project area have been informed in their community council meetings.
Apart from environmental aspects, the project HPP Töging-Jettenbach has been facing a particular challenge: a new powerhouse beside the existing historical ensemble has been created and the new weir needed to be integrated into the landscape. Architects have been involved in this demanding task.
After a well-organized planning process of only 1.5 years, the project documents were submitted to the authorities in October 2015. Due to additional official (by the authority) as well as technical demands, the project had to be further modified. After these modifications have been submitted, the project hearings took place in March 2018. The official planning approval was finalized in July 2019.

7. Please describe any permitting bottlenecks this project faced specific to land use change:

The land permanently or temporarily used by the project is depicted in the cadastral plans and listed in the land registers. The vast majority of the land required for the realization of the project is owned by VERBUND. For additional land, agreements have been negotiated with landowners and authorized users, respectively.
Impacts on the soil result from the removal, the temporary storage and the reapplication of soils and from the loss of soil functions coming along. Accordingly, measures to avoid and reduce functional losses in the course of construction are provided, e.g. the professional handling of soil during removal, interim storage and reapplication, all provided by external partners.
Permanent effects are reduced to sealed and, if necessary, built-over areas, on which the soil functions are permanently lost. Since the project is executed mostly on the existing power plant site, additional soils are required only to a minor extent for the new powerhouse.
In addition, impacts on soils are possible as a result of changes to the site caused by the project. In particular, operational changes in the groundwater floodplain distances and, as a consequence, in the hydromorphism of soils were investigated. In order to determine the increase in groundwater levels, a groundwater model has been developed for forecasts. The outcome was that there will be no lasting adverse effects on the soil due to changes in the groundwater level in the reservoir area.
Impacts also occur due to the permanent withdrawal of agriculturally used land for the creation of compensatory measures to fulfill the requirements of nature protection law. For nature conservation compensation, 14.4 hectares of agricultural land are claimed. However, these soils are merely undergoing a change of use and will deliver important nature conservation functions and contribute to increased biodiversity in the future.
By minimizing the land needed for the project and by using the land already owned by the project developer, embankment land, and waterlogged land, the permanent impact on soils could be reduced to a minimum.

8. Did you receive public funding for this project? If so, please describe from which funding source (local, national, EU-level, international) and the application process you faced in

attempting to secure this funding (including any special requirements conditional to the funding programme):
The overall project cost is €250mn. This project does not receive any public funding, neither from local, national or EU funds (such as LIFE). All ecologic measures are part of the permitting requirements and can therefore not be eligible for funding schemes, neither national nor EU funding). Public support (national funding) is possible for the surplus power generation compared to the old HPP: the German Renewable Funding Scheme foresees market premiums for hydropower depending on the market price – the actual price forecasts would reduce public support to zero.

9. Please choose at least **one** of the following questions to answer which is relevant to this project:
Does this project regenerate previously degraded natural habitats or ecosystems? If so, how was this achieved or how did your company integrate this restoration into the project?

Experts on biotopes, natural habitats, critical habitats, etc. have been engaged in setting up the project in such a way that it has no adverse impacts on fauna, flora and ecosystems. All the issues regarding the conservation of nature incl. animals, plants, biodiversity, landscape, aquatic ecology, as well as soil and forests were each handled by independent specialists who have many years of experience and specialist knowledge of the project area. The selection of experts to write expert reports on the various topics for the Environmental Impact Statement has been made in a public tender with a hearing.

Construction works are accompanied by experts within the scope of ecological construction site supervision.

In order to minimize the impact of the project on the environment, a set of measures for avoidance and minimization has been foreseen. The main measures to protect natural habitats are:

- Protection of groves and habitats that need to be preserved within and adjacent to construction activities
- Safeguarding of construction site areas and plant components from which a hazard may emanate
- Minimization of construction-related emissions (dust, vibrations, noise, light) from construction operations and site-related traffic
- Regulations of times during which construction activities are permitted and other regulations for the protection of animals at their reproduction and resting places
- If building-inhabiting bats are identified during building demolitions, replacement roosts are to be provided
- Minimization of impacts to wildlife and plant life due to loss of habitat.
- Minimization of impacts to fish fauna and aquatic life
- Adapted mowing and planting of host plants for the butterfly species dusky large blue (*Phengaris nausithous*) on the Inn channel embankments and dams in the Jettenbach reservoir area

After completion of the construction measures, all temporarily occupied sites for construction equipment and storage of construction material will be re-cultivated or

restored to the same condition as before and agricultural land can be used as such again. For re-cultivation, only seeds from the region will be used, which will be obtained from surrounding meadows that are valuable for nature conservation. In particular, the following re-cultivation measures are planned:

- Restoration of nutrient-poor grasslands on the dams of the Inn Canal
- Restoration of nutrient-poor pastures on the dams and slopes of the Inn Canal
- Natural landscaping of the dam embankments of Fraham and Jettenbach.

Overall, there is no loss of natural habitats. The project even supports new habitats by the transformation and creation of species-rich meadows and riparian forests. The implementation of the compensatory measures that will be maintained in the long term will strengthen biodiversity.

10. OR
11. Does this project protect or provide alternative, undisturbed, comparable habitats for protected species? If so, how is this achieved or how did your company integrate this protection into this project?

In order to minimize the impact of the project on protected species and critical habitats, measures regarding avoidance and minimization have been planned. The measures will be implemented before the start of construction and executed during the construction period and even during the operation of the hydropower plant. In the run-up to the implementation of the measures, experts have drawn up detailed concepts specific to each area.
Measures to ensure the continuous ecological functionality (so-called CEF measures, Continuous Ecological Functionality Measures) and "early compensation measures" guarantee the uninterrupted functional availability of reproduction and resting places in the spatial network. The Töging-Jettenbach project will result in the loss of a small number of such habitats for only 3 specially protected species. Therefore, several new habitats have been created in the functional habitat context ahead of schedule (before the start of construction):

- Creation of reptile habitats for the sand lizard and the smooth snake on the right bank directly around the Töging-Jettenbach power plant, on the canal embankment as well as around the Jettenbach weir
- Concept of measures for the butterfly species dusky large blue (*Phengaris nausithous*) in the perimeter of the Fraham dam in the Jettenbach reservoir area

All measures have been elaborated and described in the Landscape Conservation & Management Plan for the project and have been confirmed and included in the prescribed requirements by the authority during the approval process.

The project “Refurbishment and Extension of HPP Töging-Jettenbach” requires interventions in the Inn River. These will be carried out in the area of the already existing hydropower plant, in particular at the Jettenbach weir and in the upstream and downstream channels. In order to minimize the impact on these modified habitats and the fish fauna living there, avoidance and minimization measures have been planned.

In addition to general measures aimed at securing the construction site, the following aquatic ecological measures are being implemented during the construction phase:

- Stock recovery of fish before the start of construction in the Jettenbach weir area
- Control of drained construction pits for fish that had been enclosed in river stretches during construction
- Coordinated, controlled draining of the area in the headrace channel that needs to be drained for the construction work in order to minimize turbidities
- Limitation of the rate of rise and fall of the water level during changes in operating conditions
- Control of sensitive sections of the watercourse (e.g. sidearms) after the power plant operation is restarted
- Compensatory stocking for the fish species brown trout and burbot that are spawning in autumn and winter

Several additional environmental improvements, aimed especially at the aquatic population, are planned at the plant site and in the affected water bodies and will remain in place for the entire lifetime of the plant:

- Guiding system and improved downstream fish migration at the weir
- Improvement of existing fish connectivity (upstream)
- Pilot project for downstream migration with Archimedean screw
- Installment of fish friendly turbines
- to fulfill the legal requirements of the Water Framework Directive and the Natura 2000- targets, measures to achieve a good ecological status (GES) or good ecological potential (GEP) for the Inn river in the Jettenbach-Töging area and adjacent habitats including the reservoir. Across the project area, stretches are designated as either as natural or heavily modified water bodies.
- Creating living and habitat conditions for endangered species to enhance biodiversity

12. OR
13. If a previous project was found to be environmentally detrimental and your company was able to course correct to not only mitigate, but reverse the negative effects, how was this achieved?

    -

14. OR
15. Did this project take into account effects on soil composition or the GHG impacts of land use change? If so, does this project comply with existing regulations around maintaining soil quality or land use, or does this project go beyond what is required? If so, what did you do in excess of the existing regulations?

    The project „Refurbishment and Extension of HPP Töging-Jettenbach“ does not generate CO2 emissions, except for the temporary construction phase. In the long term, the new power plant will contribute significantly to reducing CO2 emissions and, thus, supports climate protection.

    On the basis of the Federal Nature Conservation Act, a landscape conservation plan (LCP) has been prepared for the HPP Töging project. The task of the LCP is to record and evaluate

the condition of nature and the landscape and to determine the expected effects of the project on nature and the landscape. The LCP integrates the legal requirements resulting from the European Flora-Fauna-Habitat regulation and species protection law. As a result of the comprehensive assessment, significant improvements could be identified for some environmental areas:

- Improvement of the site conditions for riparian forests as a result of higher water levels in the Jettenbach reservoir: The water level at the Jettenbach weir will be elevated by 70 cm, which will result in a rise of groundwater levels, which will, in turn, bring the existing silver willow riparian forests, located too high at present, into soil moisture levels that are more favourable for them. The higher groundwater levels and the improvement of the flood disposition will strengthen the riparian forest.

- Diversion route: The reduced overflow volume downscales the frequency of disturbance due to floodings of nests of gravel-breeding bird species such as the Little Ringed Plover and, thus, possibly improves breeding success.

- Hydromorphology: In case of the parameters considered at the Jettenbach reservoir (discharge, floodplains, etc.), there will be either adverse changes of low or very low significance or significant improvements (flood protection).

As a result of the watercourse development concept drawn up during the project, improvements in the watercourse morphology in the diversion stretch are to be expected (e.g. through extensive new creation of hydromorphological structures).

16. Photos (if available):

REALISATION:
WATER DEVELOPMENT PLAN - INN




RE-CREATION OF THE DAM FRAHAM
– BEFORE & AFTER


PLANTING 9,000 PIECES
OF RARE SPECIES

HARVESTING OF SEEDS
WITH E-BEETLE

TRANSPLANTATION OF SODS

EXIT AID FOR GAME (PILOT PLANT)