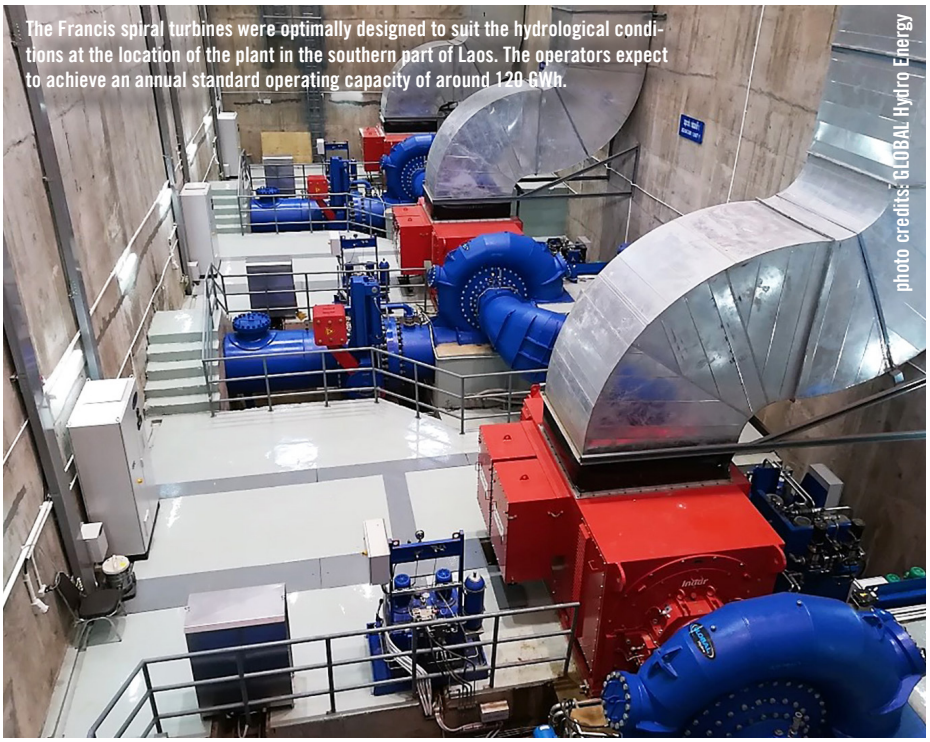
AUSTRIAN TURBINE MANUFACTURER DELIVERS FIRST PROJECT IN LAOS

With the commissioning of the "Xenamnoy 2 – Xekatam 1" power plant, GLOBAL Hydro Energy GmbH, the all-rounder when it comes to hydropower from Upper Austria, has successfully completed its first project in the South-East Asian country of Laos. The contract involved delivering all the electromechanical and process control equipment at the power plant as a turnkey solution. Power is generated by three highly effective Francis spiral turbines which together can generate a maximum power output of around 22 megawatts. The plant control for ensuring fully automated power production is performed by the "HEROS3" software, which GLOBAL Hydro Energy developed and programmed itself. The completion of the power plant was celebrated with a great ceremony at the end of August.



The Francis spiral turbines were optimally designed to suit the hydrological conditions at the location of the plant in the southern part of Laos. The operators expect to achieve an annual standard operating capacity of around 120 GWh.

photo credits: GLOBAL Hydro Energy

With an export ratio of around 20%, hydroelectric power represents one of the most important trading commodities for the South-East Asian country of Laos. In addition to several large-scale hydroelectric power plants on the Mekong River, whose course forms a natural border for several hundred kilometres with the neighbouring countries of Myanmar and Thailand, the many waterways in the country's interior also provide ideal conditions for producing electricity. The hydroelectric power plants in Laos produce electricity at full load particularly during the monsoon season with high levels of rainfall between May and November. With the "Xenamnoy 2 – Xekatam 1" power plant, which was completed a few months ago in the southern part of the country, a plant constructed to particularly high standards has started operating. The project was commissioned by the "B. Grimm" corporate group from Thailand. This multinational conglomerate is involved in the healthcare, industrial, real estate and energy sectors and operates more than 20 power plants in Thailand, Laos and Vietnam.

COMPLETE PACKAGE FROM AUSTRIA

The Upper Austrian hydroelectric power specialist GLOBAL Hydro Energy GmbH was able to secure the contract to deliver all the electromechanical and process control equipment for the power plant. The "Xenamnoy 2 – Xekatam 1" project marked the first project in Laos for the turbine manufacturer after a whole series of assignments in South-East Asia, for example in Sri Lanka, Indonesia, Malaysia and India. The plant concept is based on the classic diversion principle. This involves damming the Xekatam River with a dam structure with an overflow edge and feeding the nominal water through a turbine penstock. Furthermore, in the event of a future water shortage, the concept envisages utilising the adjacent River Xenamnoy via a discharge channel for the new hydroelectric power plant. The first 250 m of the existing discharge channel are guided in an open channel to a de-sanding basin, then the 2,7 km long penstock made of steel begins. In total, 12 m³/s of nominal water and a net height of 200 m is provided.

Commissioning engineer Robert Bierbaumer, project manager Thomas Kuffner and ET project manager Philipp Gumplmayr (left to right)

SHIPMENT WITH CONDITIONS

"After we were awarded the project, our engineering department began to construct the machines at the end of 2015. The turbines and generators were delivered around 10 months later in October 2016," reports GLOBAL Hydro project manager Thomas Kuffner. They were first transported by truck from the company's head office in Niederranna in the Upper Mühlviertel region of Austria to the Port of Hamburg for shipment. Once the equipment had arrived in Thailand by ship, the final stage of the journey was again by truck to the power plant construction site in the south of Laos. As the insurance company did not permit turbines and generators to be shipped together, the plant parts each had to be transported individually. After a journey time of six to eight weeks, the work of equipment installation at the construction site star-


View of the powerhouse and the high-voltage installation.


From the transverse structure a 2.7 km long penstock guides the works water down to the turbines in the centre of the plant.

ted at the beginning of 2017. The installation of the electromechanical plant parts was carried out under the supervision and instruction of GLOBAL Hydro Energy engineers together with local fitters. Project manager Kuffner describes the process of coordinating the different colleagues from Thailand, Vietnam and Laos as one of the project's biggest organisational challenges due to language barriers.

HIGHLY EFFECTIVE FRANCIS SPIRAL TURBINES

Three completely identical Francis spiral turbines with an nominal water quantity of 4 m³/s each are used to generate electricity. The runners of the horizontal-axis machines have a diameter of 703 mm and rotate at 1,000 rpm. Three synchronous generators from the Spanish manufacturer Indar, which are also of identical design and are coupled directly to the turbine shafts, are used as power transformers.

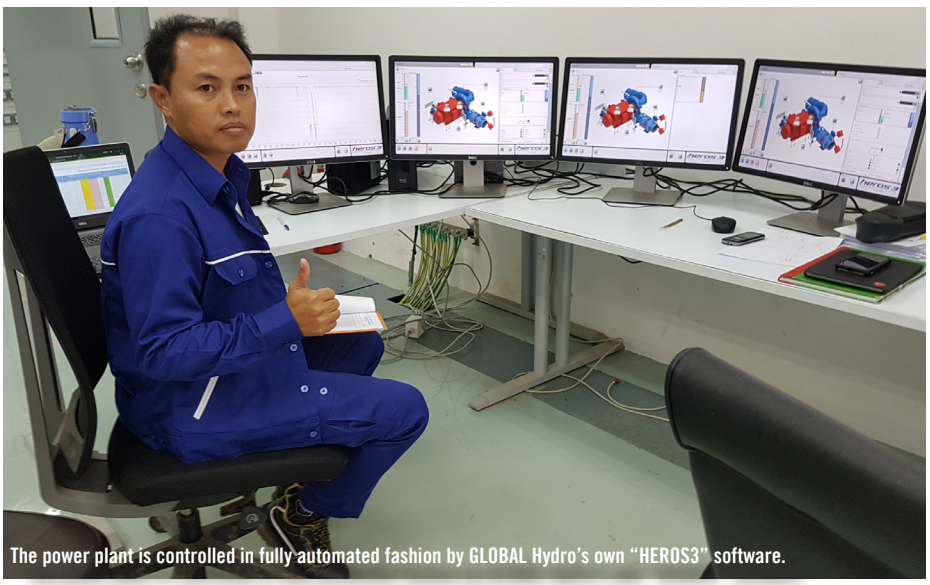
"The turbines are optimally designed to suit the hydrological conditions at the location of the plant and, when the water is at full capacity, they deliver a maximum electrical output of 7,215 kW. As in a project that was recently completed in Guatemala, our self-developed mechanical seals are used in the 'Xenamnoy 2 – Xekatam 1' plant too. These are perfectly configured to suit the turbines and represent vital components for efficient operation," states Kuffner. The overall electromechanical package was completed with the hydraulic equipment used to regulate the turbines, the lubrication and cooling equipment, the water treatment facility, the main inlet valves and the medium-voltage installation. All components originate from Austrian or European manufacturers. The high-voltage installation, which also formed part of the package delivered by GLOBAL Hydro, was purchased from a manufacturer from Vietnam, delivered directly to the construction site and installed by this manufacturer.

CEREMONIAL COMMISSIONING AT THE END OF AUGUST

For fully automated operation of the plant, GLOBAL Hydro installed the "HEROS3" automation solution, which was developed in-house, including the visualisation and SCADA system. The intelligent software ensures the highest possible effectiveness and efficient production of electricity in all operating states. Thanks to the comprehensive database archiving, all key technical and commercial figures for the plant can be reviewed and tracked at any time. An internet connection enables the operating personnel to access the plant remotely at any time. Thomas Kuffner can deliver a positive verdict after completing the project: "An assignment in a country that was previously unknown to us meant new challenges on both, a cultural and a technical level. But thanks to the efficient working relationship with the customer's representatives on site, it was undoubtedly one of the most interesting projects that I have been able to oversee for GLOBAL Hydro Energy." The completion of the power plant was celebrated in fitting style with a major event at the end of August. In a standard year, the operators expect to produce around 120 GWh of electricity on average.

Technical data

- Extraction water quantity: 12 m³/s
- Net height: 200 m
- Turbine: 3 x Francis spiral
- Rotational speed: 3 x 1,000 rpm
- Bottleneck output: 3 x 7,215 kW
- Manufacturer: GLOBAL Hydro Energy
- Generator: 3 x synchronous
- Manufacturer: Indar Electrics
- Annual output: approx. 120 GWh


The power plant is controlled in fully automated fashion by GLOBAL Hydro's own "HEROS3" software.