



NEWSLETTER 14

MAY 2014

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Dear Friends and Partners,

A year has passed since our last Newsletter. It is time to take stock again of the past months. In 2013, MJ2 progressed through several important phases.

First, we are pleased to announce that by the end of March 2014 more than 40 turbines will be connected to the grid and thirty more are currently on order for phased delivery until early 2016.

New countries were also added to those with existing VLH installations. In 2013 MJ2 also signed its first contracts in Switzerland and Romania (see Romanian Hydropower Section), and earlier this year a contract was signed for the supply of 3 VLH DN 4000 in Croatia.

In countries where MJ2 is already present, it is noteworthy to mention that the ALA plant started operating for the publicly traded company ENEL. There, 2 DN 3550 VLH high-head 400kW units were installed at the intake of the Bussolengo canal to operate with the regulated ecological flow and sediment discharges (see Section 1).

Business in France has also been successful with the signing of several contracts, including a very important contract with EDF to supply 4 DN 4000 VLH high-head units. These units will be installed in the "Mecca" of hydro in the heart of Grenoble, where the tailrace of the Rondeau hydropower plant on the Lower Drac reaches the Drac. We will provide a detailed report in our next edition. Talking about prestigious contracts, there is also the new La Cavaletade small hydro plant in Toulouse where 2 VLH DN 3550 high-head units will be commissioned for the Municipal Board in the Spring.

To manage the increased demand, the MJ2 team keeps growing and now stands at more than 30 employees. Producing the VLH now provides jobs to more than a hundred French and

European workers.

Finally, live fish passage tests, which began in 2007, culminated in May, with the 6th series of tests conducted at the new La Glacière site at Millau on the Tarn. This latest series of tests was aimed at validating the low impact of a partially opened VLH on a wide variety of migratory fish.

The results met expectations: they were outstanding. No other conventional hydroelectric turbine¹ has been able to demonstrate such a low impact on the downstream migration of migratory species (see Section 4 Tests at La Glacière). Based on this scientific data, the VLH was officially labelled as the "first fish-friendly turbine" by the ONEMA (water and aquatic habitats French national bureau) in France.

As you can see, there is a lot of news. It has been a very busy year with important events for our company and the development of the VLH concept.

Happy reading!

Marc Leclerc
President

1. Except for the Archimedes screw pump, not yet tested in France



ALA HYDROELECTRIC PLANT (ITALY)

CUSTOMER	HDE - Hydro Dolomiti Enel S.r.l.(Filiale de ENEL)
CONSTRUCTED	2012-2013
LOCATION	Ala (TN) Italy
CONTRACT TYPE	Design, manufacture, turnkey installation of electromechanical equipment
SPECIFICATIONS	4 x 400 kW VLH DN 3550 reinforced turbines Head of 4,2 m, with raising mechanism Lifting cylinders in the upper part Control valve on the downstream level

PROJECT DESCRIPTION

The new Traversa Ala plant has two VLH units installed, and can accommodate two more. The units are located on the ecological flow tail-races on the Adige River (channel feeding the Adige River), at the intake of the Bussolengo canal. The channel section where the turbines are installed, is also used for de-sedimentation, accommodating this function is therefore part of turbine operations. This allows the small hydro plant to produce energy that would otherwise be lost.

The new plant is designed for complete autonomous and automatic operation, with integrated remote control.

The 400 kW units are operated by the company HDE, a 100% subsidiary of the ENEL group. They are operated according to standard operating procedures for "non-regulated turbines" for continuous MV grid connected operation. The turbines are periodically raised to release the full flow through the bays in order to wash any sediment build-up out of the channel.

The new Traversa Ala plant is fully integrated into the dam management system on the Adige River and Bussolengo canal. It in particular assures meeting the ecological flow requirements, while maximizing energy production, and effectively safeguards against flooding in case the dam overflows, without the need to reduce the flow in the Bussolengo canal.





ROMAN HYDROELECTRIC PLANT (ROMANIA)

CUSTOMER	Construcii Hidrotehnice S.A
CONSTRUCTED	2013-2014
LOCATION	Roman, Moldavia, Romania on the Moldova
CONTRACT TYPE	Design, manufacture, turnkey installation of electromechanical equipment
SPECIFICATIONS	2 standard VLH DN 3550 turbines of 294 kW

PROJECT DESCRIPTION

In April 2013 a contract was signed for the delivery of 2 standard VLH DN 3550 turbines and associated auxiliary equipment with Construcii Hidrotehnice SA company, which is in charge of the construction. The project involves the construction of a completely new structure on the Moldova River, level with the city of Roman and for its Municipality.

The dam will be equipped with a sizeable (4.2 x 12 m) inflatable weir to help regulate upstream water levels in case of flooding. In order to build the dam, the river was completely diverted by using a temporary artificial bypass channel.

The construction site is in the final stages of preparation for installing the VLH turbines. The turbines are completed and ready at the factory to be delivered as soon as the site allows.





LA GLACIÈRE HYDROELECTRIC PLANT (FRANCE)

CUSTOMER	La Guinguette S.A.R.L
CONSTRUCTED	2012-2013
LOCATION	Millau
CONTRACT TYPE	Design, manufacture, turnkey installation of electromechanical equipment
SPECIFICATIONS	1 Standard VLH DN 5000 turbine of 345 kW

PROJECT DESCRIPTION

The small hydro plant at La Glacière was commissioned in April 2013. It makes use of the existing infrastructure from an abandoned industrial site – it used to be a tannery.

The site is equipped with a VLH DN 5000, you can see a video of its assembly on our website. La Glacière was also used in May and June for the last live fish passage testing (see Section 4).

The site has become a showcase for MJ2 with the kind cooperation of the owners, who allow us to do site visits. MJ2 now has two VLH operating on the Tarn in the town of Millau.

The first VLH was installed in 2007 at the Troussy site.





6TH LIVE FISH PASSAGE TESTS

Since the installation of the first VLH turbine at the Troussy plant in Millau in 2007, MJ2 Technologies S.A.S. have commissioned 6 series of tests to study the passage of live fish through operating turbines. The studies were implemented by ECOGEA at various sites in France. An additional study on the behavior of adult salmon migrating upstream towards a VLH equipped plant was conducted by EPIDOR at the Terrasson plant on the Vézère river in 2011 and 2012. The protocols established for these studies, and their on-site implementation, were approved and monitored by the ONEMA.

In May and June of 2013, the final tests of live fish passing through a VLH turbine in operation were carried out at the La Glacière plant on the Tarn river in Millau. These tests, like the previous ones, consisted of injecting live fish into an operating VLH and collecting the fish again downstream of the turbine, in order to assess the impact of an operating VLH on migratory fish species, as well as cyprinids, that typically migrate downstream.

Biological material involved:

The focus was on large salmonids (Atlantic salmon and sea trout) in two specific stages of their life cycle:

- adults at the “spent” stage: in post-breeding downstream migration,
- juveniles at the “downstream migrating smolt” stage: when descending the river to reach the ocean.

Since it was not possible to get salmon and sea trout for these tests, we used farmed rainbow trout (called FRT below).

Three size classes were used:

- Adult FRT, hereinafter referred to as “large trout”, between 43 and 57 cm long (1.1 to 2.9 kg), close to the size of large adult salmonids at the spent stage.
- Juvenile FRT, hereinafter referred to as “small trout”, between 20 and 26 cm long (96 to 163 g), close to the size of large salmonid smolts migrating downstream.
- In addition to this, a test was performed with some very large FRT adult specimens, herein after referred to as “very large trout”, between 64 and 72 cm long (4.5 to 5.6 kg) to simulate the downstream migration of large spent salmonid specimens.



Large Trout



Large Carp

2. The text in this section is taken from the minutes of the meeting with ONEMA held on 12/07/2013 in Toulouse and from the study report prepared by ECOGEA. The full report on these tests is available for download on MJ2's website at <http://www.vlh-turbine.com/testfish>

Each fish was thoroughly inspected before injection and after recovery. Any visible external marks were photographed before the fish were injected to identify them easily during retrieval and be able to differentiate these from other possible injuries caused by the turbine or the recovery device.

Finally, at the request of the German government, some additional tests were performed on common carp and tench, sized between 14 cm and 66 cm (40 g to 3.120 kg).

	Small tench		Small common carp		Large tench		Large common carp	
	L (cm)	W (g)	L (cm)	W (g)	L (cm)	W (g)	L (cm)	W (g)
Average	23.1	170	19.9	154	43.1	953	48.2	1414
Median	23.5	161	18.7	116	43.5	933	46.0	1308
Minimum	17.4	63	14.0	40	36.8	606	38.9	528
Maximum	30.5	358	25.6	316	47.5	1335	66.1	3120

Main characteristics of tench and common carp used for testing in Millau

The tests were reproduced with the turbine runner-blades at 3 different stages of opening: 50%, 75% and 100% open.

The 3 injection points on the runner-blades each covered an equal area, so that total mortality rate data at the turbine could be determined by averaging the observed mortality at the 3 points for each open setting, fish species and class of fish.



Positioning at the inside (hub) point



Position at the median point (mid-blade) on the left and external (at the runner periphery) on the right

SUMMARY OF RESULTS:

Opening %	VLH 3 points combined mortality rate			
	Large FRT	Small FRT	Large carp/tench	Small carp/tench
100	1.1%	0.0%	0.0%	0.0%
75	1.1%	0.0%	0.0%	0.0%
50	4.4%	0.0%	0.0%	1.1%

Mortality rates of fish tested on the VLH DN5000 with a spherical runner housing installed on the Tarn River at La Glaçière:

- Varied from 1.1% to 4.4% depending on the blade opening, for large rainbow trout that were similar in size and weight to large migratory salmonids at the spent stage,
- Were zero, regardless of the blade opening for small rainbow trout that are similar in size and weight to smolts migrating downstream,
- Were zero, regardless of the blade opening for large carp/tench,
- Varied from 0% to 1.1% for small carp/tench depending on the blade opening.

Given the overall results of all the tests and studies of how fish behave at an operating VLH turbine, the ONEMA officially labelled the VLH as a fish-friendly turbine. It is the first hydro turbine in France to be officially recognized as such.

BRIEFY

In Toulouse, the construction at the La Cavaletade site continues. Turbines were delivered in late March. A more detailed report will be published in our next Newsletter.

In Mayenne, the SHEMA (100% subsidiary of EDF) project consists of a series of 14 weirs. Seven units are already in service and 4 more, that have already been manufactured, should be commissioned before May. The last 3 turbines will be installed late 2015-early 2016.

RONDEAU PLANT ON THE DRAC IN GRENOBLE

EDF awarded MJ2 a contract to design, manufacture and commission 4 VLH DN 4000 turbines, reinforced for heads of more than 4 m, with an output power of 500 kW per unit. The site is where the Drac River meets the tailrace canal from the hydroplant on the lower Drac River, in Grenoble. This is the most important contract MJ2 has signed directly with EDF. Machines should be brought into service by year-end 2014.



ILOVAC PROJECT IN CROATIA

MJ2 signed a very good first contract with TEKONET Ltd., a company in Croatia. The contract has been six years in the making - initial contact was first established in late 2007 - and is the result of significant effort on the part of the developer and MJ2. It has been a very long administrative process prolonged by a complex financial arrangement enabling the first privately owned hydroelectric project to be established in Croatia. The project entails the construction of a new dam using inflatable weirs of more than 36 m long and 2.7 m high each. Three VLH DN 4000 turbines of 500 kW, at 3.4 m head, will be installed at the dam, which is on the Kupa River, about forty kilometers southwest of Zagreb.



Visit at La Cavalerie manufacturing facilities. Mr. Bové is impressed by the size of the machines

BEGINNING OF RESEARCH AND FIRST BENCH-TESTING FOR ISOLATED-GRID OPERATION

This year we will start to build a bench-testing facility and to develop control software that allows the VLH to operate in an isolated-grid. The research and testing program will take two years and will end with variable environmental testing on an industrial prototype in 2016. This new application of the VLH will allow it to be implemented in remote areas or in developing countries where there is an inadequate electrical distribution network.

VISIT OF MEP JOSÉ BOVÉ

On the 14th of February Mr. José Bové MEP (Member of the European Parliament) and a well-known French and European environmental movement leader, paid MJ2 a neighbourly visit – MJ2 is only a few kilometers from the MEP's home. Friendly, constructive dialogue on renewable energy and their future took place during the visit at MJ2's manufacturing facilities and the La Glacière hydro plant in Millau. The President of MJ2 did not miss the opportunity to share his concerns about the future of the small hydropower industry in France and Europe. Mr. Bové renewed his commitment to promote renewable energy, specifically hydropower (which is often neglected by renewable energy policies), and to improve policies in support of renewable energy. He also offered his support to the industry and his political support.



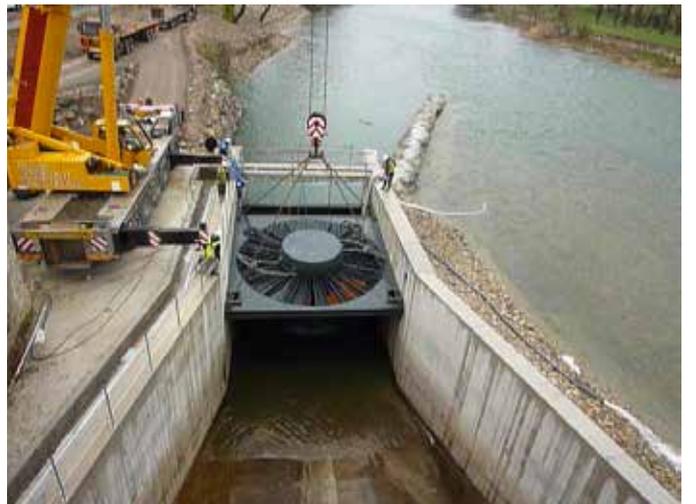
Visit at the La Glacière plant where silent operation and the aesthetic integration of the VLH were noted



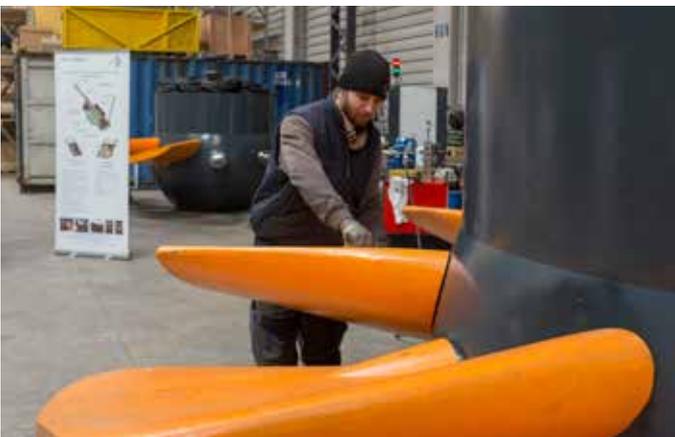
La Cavaletade



Ala



La Glacière



Visit at La Cavalerie manufacturing facilities



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