

Sustainable fish farming

Aquaculture, the farming of fish and crustaceans, is the fastest growing food industry in the world right now. But fish farming can create sewage runoffs and other local environmental problems. Can we meet the increasing demand for fish while ensuring that the production is carried out in an eco-friendly way? One solution can be found on the mountain tops of the Swiss Alps.



Food production is one of the most critical issues for our future. By the year 2050, food demand is expected to double and will create new requirements on how we produce and consume food. Aquaculture is one of the fastest growing food sectors in the world. Demand is driven primarily by emerging economies where the middle class is growing. The increasing demand has made fish farming into a global industry with enormous significance for the social development in many parts of the world. But this development does not come without challenges to be solved. In many countries, a large amount of antibiotics and fertilizers are used to prevent diseases and to maximize fish size. Pesticides used on fish farms can leak into surrounding waters and soil, which can have a devastating environmental effect. Fish farmed in pools or containers on land are becoming more common and do not affect the surrounding waters in the same way. However, the concept of pool farming requires a large amount of energy and the need to transport the fish between different farms during its lifetime, also contributing to emissions.

On the one hand, fish farming is a vital source of income for many; on the other hand, it can have a potential negative environmental impact. Can we harness the potential of farmed fish without harming the environment? Someone who seems to have the answer is British business leader Julian Connor. Julian is CEO and Founder of Swiss Lachs – a unique pilot project with the ambition to transform the aquaculture industry. With the support of AFRY, Julian has built Switzerland’s first land-based salmon farm – right in the middle of the Swiss Alps.

Located in the municipality of Lostallo, the facility was finished in 2016 and has the capacity to produce 600 tons of Atlantic salmon per year. Because of innovative technology and smart use of natural resources, it has significantly lower environmental impact than sea-

based salmon farms. No additives, chemicals or antibiotics are used. The waste from the farm is delivered to a biogas plant.

The level of innovation has placed high demands on the technical functionality. It has not only been about building a facility – it has also been about reproducing the life cycle of the fish, from hatching to fully grown fish.

“The challenge has been the integration of the various smart systems that the plant consists of – the different phases of production require different technologies that come from different suppliers. The end product is a coherent system that can be monitored from a centralized control system”, continues Claudio.

In August 2018, the first batch of salmon was harvested in Lostallo. There has already been a great interest from consumers, researchers and investors.

“This is one of those hopeful and promising developments we sometimes see, where a project can transform and disrupt the way things have been done. The next step is to improve sustainability by replacing the feed that today is fish based, with an insect and algae-based alternative, which has an even lower climate impact”, says Claudio Ferro

AFRY & Emtunga

AFRY & Emtunga Project Delivery

AFRY and Emtunga have a long experience of delivering modular pharmaceutical production plants together and have completed several global joint ventures projects historically. Both companies also have long documented experience working with Scandinavian clients in segments such as Pharmaceutical, Food and Oil&Gas industry. We offer our clients a complete project delivery covering pre-studies, permitting, engineering expertise, procurement, construction, commissioning and validation up to the handover, everything to manage a successful project execution.

Emtunga Solutions is a Swedish company 100% owned by the Norwegian Moreld group. **Emtunga is a leading supplier of complex modular EPC projects.** Over 45 years of experience from the offshore industry and 25 years from the pharmaceutical industry, gives us the ability to deliver fast and effective offsite construction based on world class execution. Emtunga Solutions is ISO certified according to ISO 9001, 14001 and 45001.

AFRY is an international engineering, design and advisory company. AFRY supports clients to progress in sustainability and digitalization. AFRY is 17 000 devoted experts within the fields of infrastructure, industry and energy, operating across the world to create sustainable solutions for future generations. AFRY is also ISO certified according to ISO 9001, 14001 and 45001.

AFRY and Emtunga have a global network of several hundred suppliers. We work with suppliers who aims for high quality deliveries in both equipment and service. Being a supplier to AFRY/Emtunga means being a gear in a technically advanced project delivery. We aim at continuously developing co-operations with our suppliers. We also have a broad network of sub-contractors for all disciplines who offer high quality services and workmanship. We have a history of working together with many of them going back 30 years.

Within our two companies we have a number of expertise areas which helps our clients realizing the ideas. Let us present some of them!

Water Management

We help our clients with top-class engineering, technical and management consultancy services for water supply, waste water treatment and waste management, as well as waterways, storm water and flood management. Whether you need a trusted partner in implementing new projects or support in operating your utilities we have hundreds of specialists at your service.

The scarcity of water, tightening legislation and public opinion will force water-intensive industries to further reduce their water consumption - their "water footprint" - and improve the quality of their wastewater treatment. At the same time, digitalization and smart water technology provide the entire water sector with new opportunities.

Environmental assistance in permit procedure

We offer the competence needed to help our clients meet their environmental goals at all levels of operations. Environmental legislation means that certain actions are a prerequisite for environmental permits. We provide the studies, mappings, risk assessments and monitoring plans required for environmental permits. Consequently, we take care of monitoring during construction and operations, keeping our clients well informed of the status of the environmental impacts of their activities.

AFRY has solid experience of permitting and EIA and we continuously participate in the development of knowledge in the area. This strategic and tactical experience in combination with advanced technical know-how allows us to help our clients in the best possible way.

AFRY has expert competence in a number of areas that are often the subject of investigations within the framework of permit matters. Examples of such areas are greenfield studies, water purification, air purification, odor problems, transport issues, environmental risk assessments, noise issues, waste issues, investigations regarding soil pollution, geotechnics and recipient assessments. We can therefore tailor a project group for each specific case and thereby produce an appropriate application basis in an efficient manner.

AFRY has a large team of sustainability experts, who often are involved in our projects and ensure sustainable solutions. In order to get a first understanding of opportunities and risks when it comes to sustainability, the projects often start with a sustainability scanning, using our own sustainability scanning tool based on Agenda 2030 (17 Sustainability Goals).



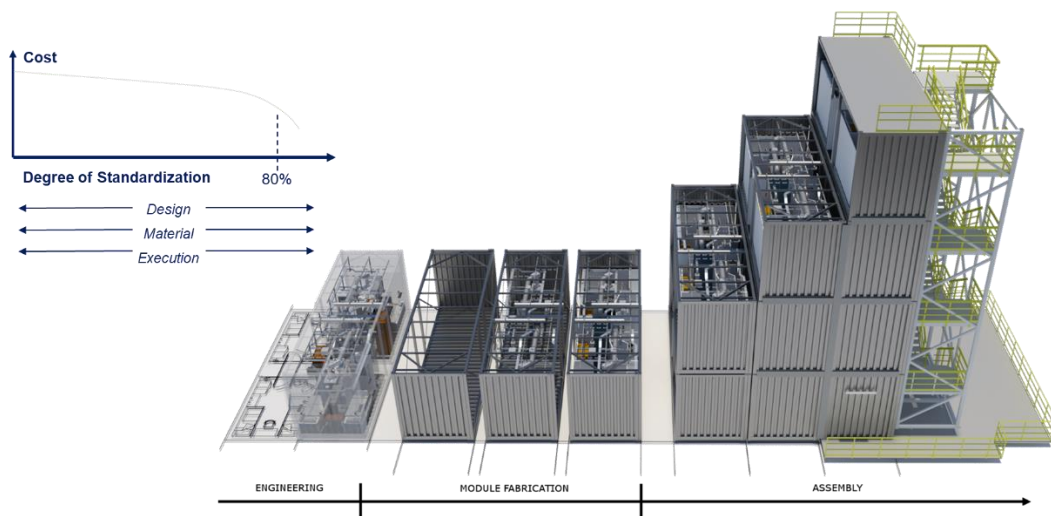
Our experts can also provide other services such as Life Cycle Assessment, Environmental product declarations, help to introduce Circular Economy and/or industrial symbiosis in business models, Environmental Impact Assessment, Ecodesign, Legal Compliance and much more.

AFRY Circular Economy Services: Strategic advisory, Circular product- and service design, Development of business models, Resource efficiency and waste minimization, Lectures and workshops, Life Cycle Assessment and much more

The Emtunga Modular Way

Our modular production principle is fast, predictable and robust. The facility is modularized into a number of smaller module sections, which allows to complete the design and start fabrication for each production batch sequentially in any order. Each module section is fully outfitted and pre-tested separately on the workshop floor, which allows for an effective production process and a safe working environment.

The modular sections can be transported individually to the final site for assembly. Our construction principle suits independently of delivery method and can be tailored to fit each unique project.



Contacts for more information

This is just some part of our offer. We have more references cases from the fish industry and much more expertise to present.

If You are interested to know more about us, please contact us;

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