Norwegian Energy Partners

Unique Value Propositions

ASIA 2023 Hydropower and Dams Exhibition and Conference

14-16 March 2023

Companies

Representative:

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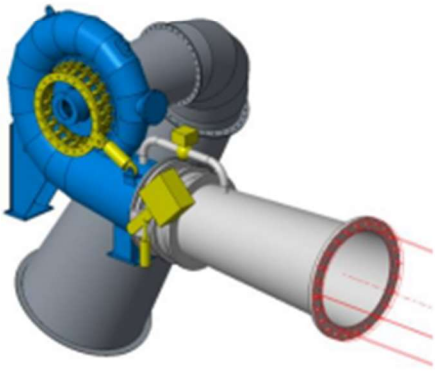
Company Profile

DynaVec designs, manufactures, and installs *innovative tailor-made fully HVOF protected* Francis- & Pelton Monsoon turbines and pumps for customers worldwide.



DynaVec´s *patented and proven technology* enables design and delivery of fully hard-coated (HVOF) erosion resistant turbines in the entire waterway regardless of size.

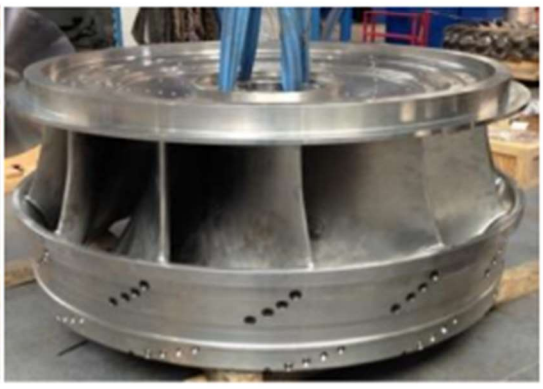
The turbines are optimized to withstanding large amounts of sediment load with minimal erosion, and the technology ensures practically no operational down-time due to high sediment levels, maintained efficiency, 2-5X increased time between maintenance, and hence significantly increased energy generation, revenues, and margins for end-customers.

DynaVec Monsoon turbines are intended for *both the refurbishment and the new hydropower plant segment* and delivered customized to each individual project and supplied with a complete electromechanical equipment package.

The proven technology has a *significant competitive advantage* for approx. 20% of all hydropower projects worldwide. As an example, Statkraft, Peru has since 2009 enabled an *10-15% annual increase of energy generation* by changing to the DynaVec technology.

DynaVec comprises of highly qualified professionals with many years of experience within the hydropower and renewable energy sector.

DynaVec has its origin from the Norwegian University of Science and Technology (NTNU). DynaVec is headquartered in Trondheim, Norway with sales offices in Lima, Peru and New Delhi, India.

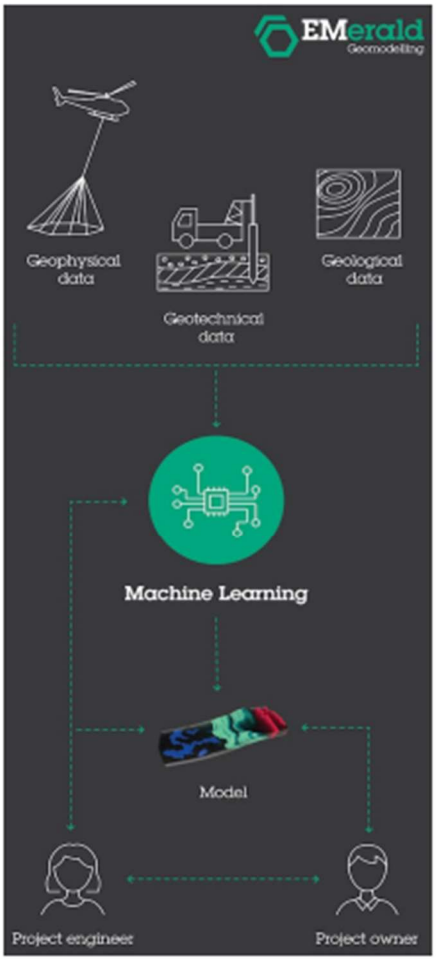


EMerald Geomodelling

Reducing Geological Risk in Infrastructure projects

Building on 10+ years of R&D at the Norwegian Geotechnical Institution (NGI) we provide a full 3D coverage of ground conditions linking the geophysical and geotechnical data by machine learning.

We contribute to reducing ground uncertainty, project costs, time, and CO2 emissions.



1 Fast survey for large-scale project area

We collect electromagnetic data by conducting an airborne geoscanning survey in days.

2 30% fewer drillings

Drilling is strategically executed by our clients at optimized locations, based on the uncertainty map.

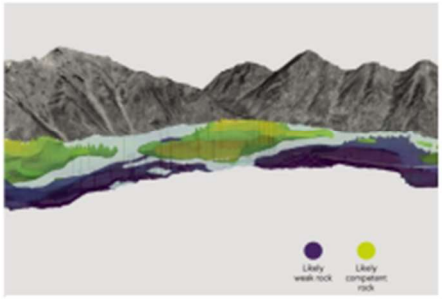
3 Intelligent and efficient decision-making

We build a 3D model powered by the ML algorithm to provide critical geological insights.

Deliverables

Geological risk identification

The model identifies geological risks, such as weakness zones, quick clay and soft soils, landslides and hazardous rock types.



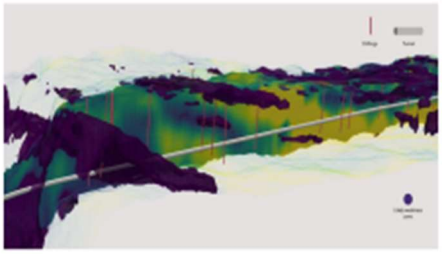
Rock units mapping – NHIDCL project, India

Bedrock topography

The 3D model ascertains sediment and rock thickness.

Volume estimates of geological materials

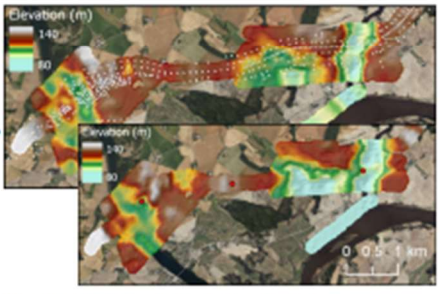
The modelling distinguishes rock and soil types, providing clear insights into the boundary among different geological materials and their thickness.



Weakness zone detection – BaneNOR project, Norway

Ground Investigations inputs

Dividing into zones of similar geological conditions, it enables the costumer to plan strategically the subsequent investigations.



Elevation of the bedrock: 100s x 3 drillings

25
Large scale projects

30+
Years of A.I. tools

1500
Km² mapped in all continents

ENERQUIP

We Make Water Flow

Look out, the Wikings are here!

Enerquip is a Norwegian specialist in Trash Rack cleaning machines manufacturing. Norway has been powered by hydropower only for a long time, hence we have exceptional competency and knowledge in this sector. Our TRCMs (trash rack cleaning machines) are completely different from everyone else, cleaning the trash racks much more efficiently.

We are a proud technology leader in TRCM sector. So far, we have 130+ TRCMs installed, globally.

Here are some key points about us:

- We clean **OPPOSITE** of others – due to our experience!
  - Our TRCMs extend their boom and clean **IN FRONT** of the trash racks first, removing logs and other heavy debris that could damage the boom.
  - Once surface is clean, we clean **TOP DOWN, BETWEEN THE BARS**, removing everything as our grippers have "teeth" that are tailored to fit the openings between the bars.
  - Since surface is clean when machine starts cleaning trash racks, the machine is much lesser prone to damage as no heavy trash can hit it.
  - No pressure is exerted on the bars, other than the weight of the boom and gripper.
- Our machines are equipped with an **Absolute Encoder**: when manual cleaning is performed, the machine will continue from the point is located at – as it "knows" where it is on the rail. No need to restart from the starting position!
- Enerquip machines weight is 25-30% less than other hydraulic cleaners.
- Lazer sensors ensure debris collected (such as long logs) don't hit structure on the dam when removing trash in auto mode.
- Manual, semi-auto and auto modes.
- A special oil surveillance feature prevents leakage of more than 6 liters oil, should an accident occur, and a pipe is cut.
- Can be supplied with a cabin (with AC).
- Cleans faster than anyone else: Fastest in ascend, descend and sideways movements.
- Enerquip also offers machines using an elevated monorail. This way, installation can be done in areas where traditional rails are not possible to be used, or in areas where floods occur.



Pic 1: "Odin" TRCM with cabin.
Pic 2: Cleaning sequence 1 – removal of trash outside of trash racks.
Pic 3: "Loke" TRCM – installed on elevated monorail on location where rails were not possible, and floods occur.

Let us help you make your water flow smoother! Our expertise is at your service!

For further information, please visit our stand in the Norwegian pavilion and contact:

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Norconsult

World leading hydropower consultants

We help you plan, design and build your hydropower, pumped storage and hybrid projects. Our value proposition:

Focus on sustainability

- We help you measure the impact of your projects and make intelligent design choices to ensure they are sustainable
- Sustainable projects get financed and built

No. 1 on digital execution of hydro projects

- Consultant for the world's first hydro project, Vamma 12 to be built completely without use of paper drawings
- Digital execution gives more efficient and less risky projects

Collaborating for success

- Working efficiently with clients in integrated teams
- Digital tools enabling collaboration across geographies & teams
- Mix of more than 500 junior and senior inhouse hydro staff

Some of our recent South-East Asia references:

BALEH – Sarawak/Malaysia

1285 MW Hydro, Feasibility study, design review, construction supervision and commissioning. Ongoing.

MENTARANG INDUK - Indonesia

1375 MW Hydro with 220 m high CFRD dam, gated spillway, intake, underground penstock. Feasibility study completed in 2019.

KERINCI-MERANGIN - Indonesia

350 MW Hydro with 63 m high concrete dam, intake, waterway and air-cushion surge chamber. Basic design and detail design. Ongoing.

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Tinfos is a Turnkey supplier of hydropower plants in the range of 1-50MW installed capacity.

Tinfos is a technology company that develops, finance, builds, sells, and operates hydropower plants. We produce clean, renewable energy from our own power plants. Together with our customers and our partners, we make hydropower profitable, and contribute to a cleaner energy future.

Looking to the future

Our history dates back to 1894 when the establishment of energy-intensive industry and energy production in Norway started at the end of the 19th century. Today, we are a fast-moving technology company that, on the back of our experience and our established position, is creating new opportunities in renewable energy production for small and medium-sized power plants in Norway, Indonesia, and the Balkans.

Every day, we work to help our customers secure a sustainable small power plant that is financially profitable, and that safeguards values that are important for people, communities, nature, and the environment.

Tinfos and World Heritage

Our power plants in Notodden and our head office are centrally located by the Tinne river in Notodden, in Tinfo's cultural environment.

This is a protected area with three generations of hydropower plants that offers a cultural-historical perspective on industrial beginnings that were based on hydropower, and a perspective on social development in Norway, in the late 1800s and early 1900s.

Ever since Tinfos was established in 1894, we have stayed in the area – and left our mark on it. Now, modern business and lifestyle are combined with culture and tradition. The area is an important part of UNESCO's Rjukan – Notodden World Heritage Site.

Vision

We accelerate the global transition towards a clean energy future.

Mission

Develop, finance, construct and operate high quality hydroelectric powerplants creating environmental, social and financial value in selected markets.

Tinfos Values

agility • interaction • enthusiasm • integrity

Tinfos make hydropower profitable.

Our ambition is to make hydropower sustainable for our customers and stakeholders. We deliver the best technology in combination with market knowledge and business understanding.

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