

FRAMO SUBMERGED TURBINE

Boost your sustainability



Be smart – save energy
and reduce your CO₂ footprint



FRAMO
Power
Regeneration
Technology

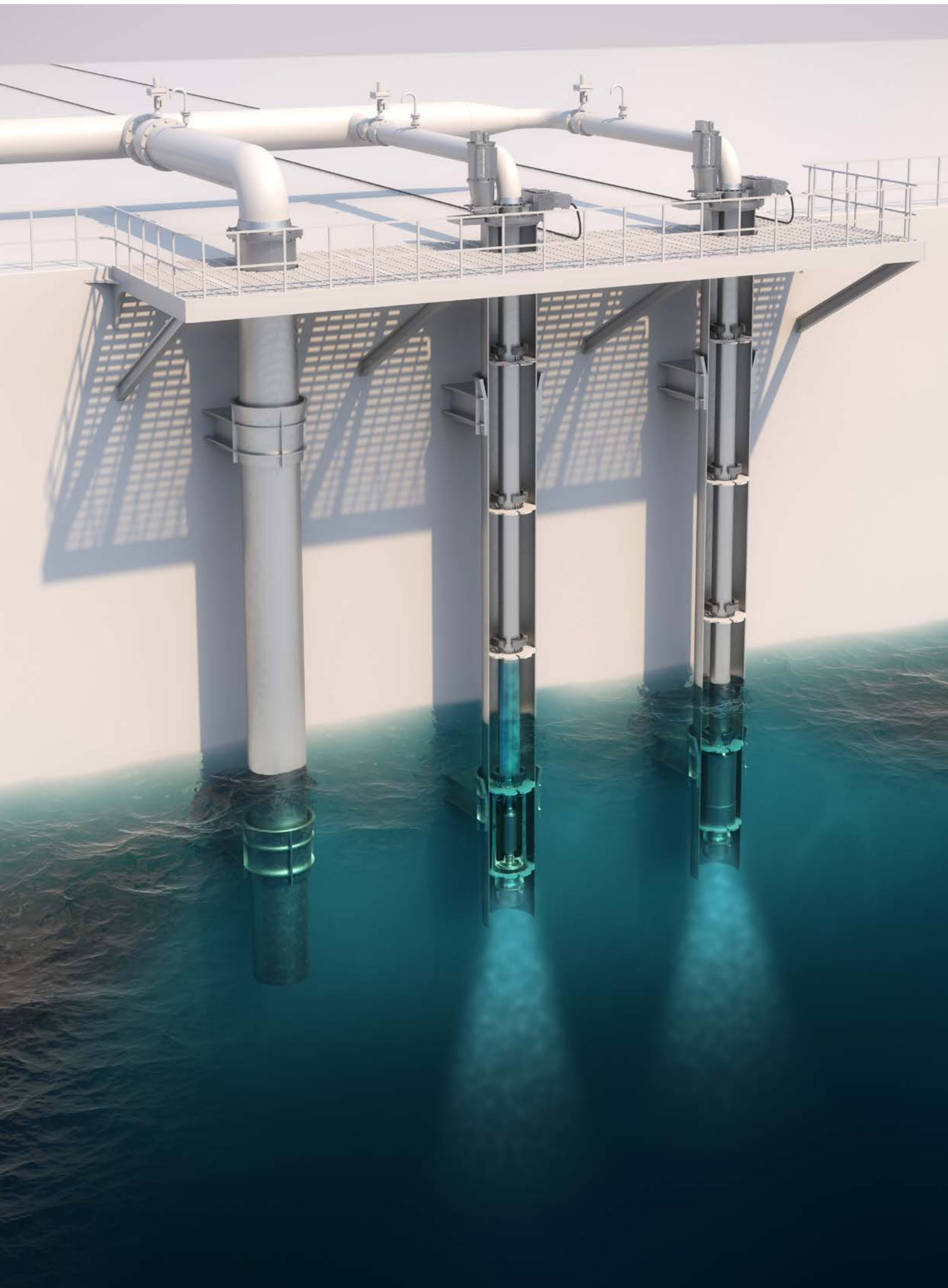
Why pour money into the sea when you can regenerate the energy and become more sustainable



During offshore oil production, a massive amount of seawater is pumped up from the sea to deck level at great energy costs. Once the sea water has served its purpose of cooling down the oil, it is simply dumped back into the sea. Substantial energy goes to waste.

By installing a submerged turbine in the overboard dump line, the residual pressure and static head can be used to generate electric power to regain unexploited energy.

The generated power will contribute to the total power supply on the facility and reduced gas consumption for power generation. This will reduce carbon footprint and can give increased gas export.



The ingeniously simple way to save money and improve your sustainability

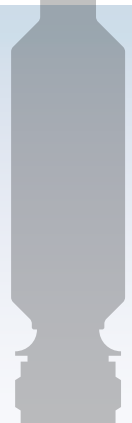
For the last four decades, Framo has supplied the Framo SE pump to numerous installations around the world. The Framo SE pump has built a reputation for robustness and reliability, and is the preferred seawater lift pump for numerous operators. Due to its unique design features, the Framo SE pump concept is also well-suited to operate as a submerged turbine.

This may sound too good to be true, but the Framo Submerged Turbine actually operates on a very straightforward principle. It's an asynchronous generator, directly coupled to an impeller, which in this case acts like a turbine driven by the water from the overboard dump line.

What makes Framo's solution unique is the submerged placement of the turbine which allows for a longer descent of the water and increases the energy regained.

Installation is easy. The Framo Submerged Turbine is installed just like the Framo SE pump. The units can be installed in dedicated caissons or a caisson-free version in guide funnels, both on new projects and retrofitted on existing facilities.

Added vertical drop for submerged turbine



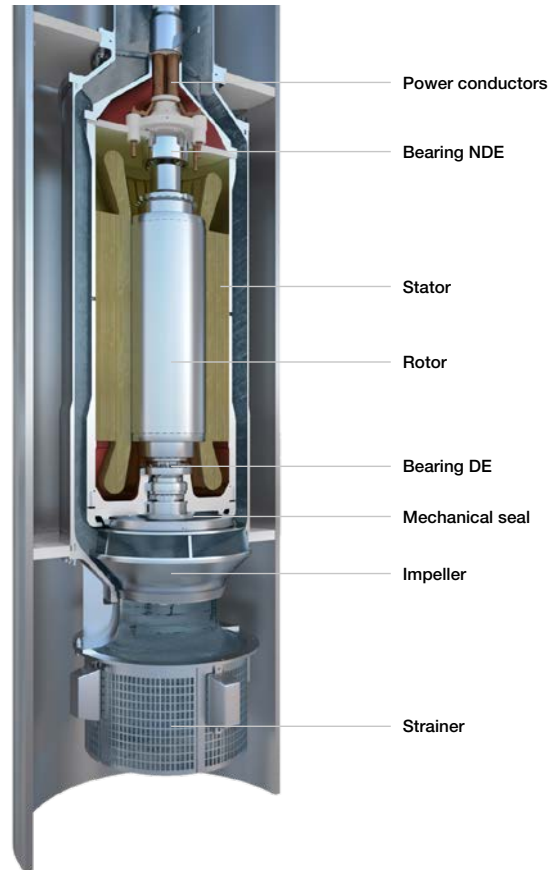
Framo Submerged Turbine

– the smart solution to save energy

- Robust, reliable and proven technology with a long track record
- Simple and easy installation
- No control system required
- Available for new projects and retrofitting on existing facilities in operation

The many benefits

- Reduced operating costs
- Increased output and revenue
- Reduced carbon footprint
- Reflects positively on your corporate sustainability profile



Power regeneration examples

Unexploited power will depend on available head and flow. Figures below are examples of regenerated power with estimated reduced CO₂ emission and cost savings.

Flow (m ³ /h)	Head (m/c)	Regen. power (kW)	EI power (MWh/year)	Red. CO ₂ emission (ton/year)	CO ₂ tax saving (EUR/year)	EI saving (EUR/year)
5000	30	300	2500	1000	160,000	250,000
10,000	30	600	5000	2000	320,000	500,000
12,500	40	1000	8250	3500	560,000	825,000
15,000	40	1200	10,000	4200	672,000	1,000,000

- CO₂ tax is based EUR 160/ton
- Electric power saving is calculated based on EUR 100/MWh



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