Natel

High-performance, FishSafe™ turbines



Hydro's modernization solution

Natel Energy delivers FishSafe™ turbines that combine competitive power performance — efficiency, output, and annual energy — with >98% fish survival.

Patented FishSafe™ Restoration Hydro Turbin pass directly through the unit at the same shaft speed and within the same generator and civil envelope as a conventional runner. Planned equipment replacements become the fish passage solution.

Broadly applicable
Kaplan, Francis, and propeller-style designs across a wide range of head

High performance
60193-validated efficiency on par with conventional designs

FishSafe™
>98% demonstrated fish passage survival

From feasibility to commissioning

We use proprietary computational fluid dynamics simulations and hydraulic laboratory fish passage testing to create site-specific FishSafe™ designs based on owner and agency-provided power production and fish survival targets. We collaborate with experienced manufacturing partners to deliver, commission and validate the final product.

Phase 1

Feasibility study

Initial FishSafe™ runner design. Report includes efficiency, cavitation, predicted survival, and preliminary cost.

Phase 2

Detailed design & testing

Final geometry and full hill plots for performance and loads. Optional scale-model testing.

Phase 3

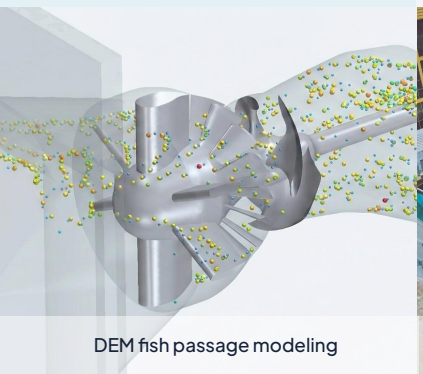
Manufacture & install

Established turbine manufacturers build to Natel specification. Delivery in as little as 12–24 months.

Phase 4

Validate & operate

Warranty and performance guarantees, field validation, and support passage testing.



DEM fish passage modeling



Natel test facility



FishSafe™ RHT runner



FishSafe™ RHT installation in France

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1. Life extension + energy gain + fish passage

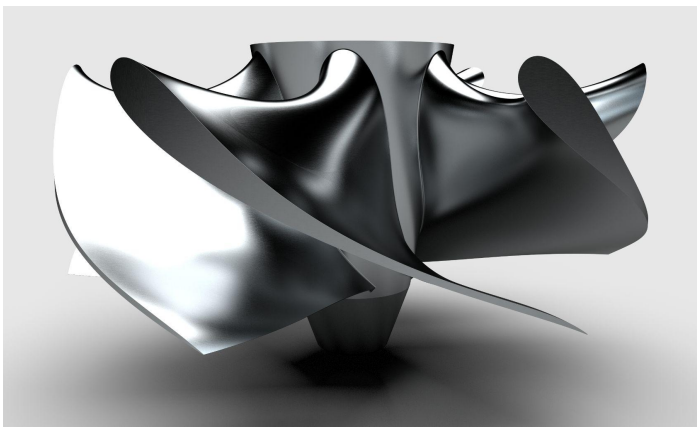
A Northeast US project with two horizontal pit Kaplan units, ~13 MW, 22–25 ft (6.7–7.5 m) gross head needed downstream passage for Atlantic salmon smolts and kelts, American eel, and adult and juvenile alosines. The owner's engineering consultant costed the alternatives.

	Floating guidance boom	Inclined screen	FishSafe™ RHT runners
Fish protected	Smolts only	All species of concern	**All species of concern**
Technical feasibility	Feasible	Major concerns at this scale	**Feasible**
Construction cost	$27.8M	$93.3M	**$12–20M**
Energy lost over a 40-year license	$7.2M	$31.1M	**None**
Total cost	**$35.0M**	**$124.4M**	**$16M**
			Prescribed by agencies in Section 18 conditions

Final design met owner and agency targets for survival (>96%) and efficiency (>91%) with an expected ~6% annual energy gain—no change to the generator.

2. High efficiency, high survival at a 940 MW plant

Selected by the Fish Enhancement, Mitigation and Research Fund and working with the New York Power Authority, Natel developed preliminary FishSafe™ Restoration Hydro Turbine (RHT) designs for both unit types at the 940 MW St. Lawrence-FDR Power Project. CFD simulations predict above 98% American eel survival across all simulated operating conditions, at peak hydraulic efficiencies of 94.6% and 94.3%, within the existing units' measurement uncertainty and maintaining annual energy production and capacity. The designs are in-place replacements requiring no major changes to the dam, powerhouse, or plant operations.



Natel FishSafe™ RHT design for St. Lawrence-FDR Power Project



FishSafe™ RHT installation in Oregon, USA



FishSafe™ RHT retrofit in France



European eel & Atlantic salmon smolt passage testing

Reach out to scope a feasibility study

sales@natelenergy.com

Read our peer-reviewed papers

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