



## Archimedean Screw: Fish-friendly generation

### What site?

- Fall (head) of 1m to 10m
- Flow from 100 l/s to 10,000 l/s



### Why an Archimedean Screw?

- High level of efficiency maintained across a wide flow variation
- Environment Agency approved
- No need for expensive fine screening
- Robust, simple machinery - low maintenance
- Minimal construction work necessary
- Dry running and debris in the water flow do not harm the machinery
- No complex control system required
- Design life: 25 - 40 years



### Efficiency

- Achieves an efficiency of up to 87%
- 'Water to wire' efficiency of 77%
- Highly efficient down to 20% of maximum flow



Ancient technology - 21st century application

## Fish friendly

Extensive fish passage tests have conclusively demonstrated that the large water chambers and slow rotation of the Archimedean Screw allow fish of all sizes, and debris safe passage through the turbine. As a result, the Environment Agency has agreed that no screening is required.

Literally thousands of fish passages have been monitored and recorded using underwater cameras at the intake, inside the chamber of the Screw itself and at the outflow to assess the effect of the Screw on salmonids (including smolts and kelts), brown trout and eels. The trials looked at fish passage across a broad spectrum of sizes and turbine speeds, possibly the most impressive of which was the safe passage of a kelt measuring 98cm in length and weighing 7.6kg. In addition, behavioural and migrational patterns across the species have been shown to be entirely unaffected by the turbine.

The implication of these findings is extremely positive for the economics of micro-hydro in the UK. Sites previously written off for hydro development owing to fish protection issues can be revisited, and the cost of installation for an Archimedean Screw turbine will be significantly reduced by the requirement for only minimal screening.



## Fish and debris pass through without problem

## One year on - a customer testimonial

Mark Simpson, owner of the River Dart Country Park at Ashburton in Devon decided to install an Archimedean screw to replace an old Kaplan system which had been beset by problems in the past. "The screw suits this environment so well, particularly given the vagaries of the River Dart and the way that it copes with the debris and leaves which were a problem with the old Kaplan system."

The new system produces a maximum of 48kW, more than enough to run all the visitor facilities on site, Holme Park House (used as a conference centre and wedding venue) plus two visitor bungalows.

"We have been running through the summer at pretty near full capacity (45-48kW). During the dry spell it did drop down to 35kW, purely because of

the limited amount of water we could take out of the river and down the leat."

Mark is a great advocate of the Archimedean screw as a satisfied customer: "The power output is more than I budgeted for or envisaged in the planning stages and I'm delighted at how the whole scheme has come together".

