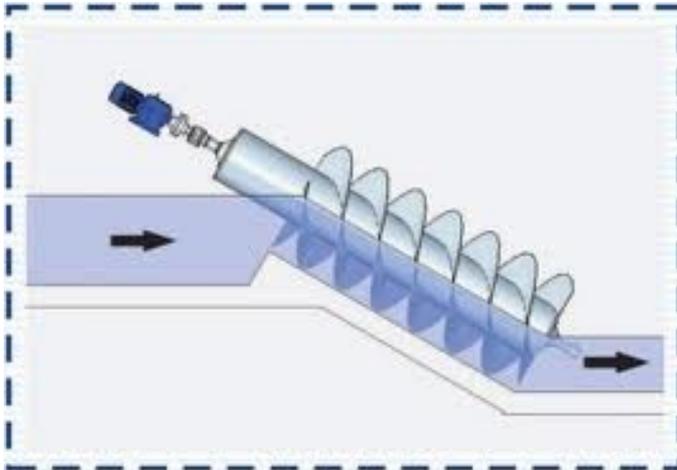


## What is an Archimedean Screw hydro turbine?



Archimedes is widely acknowledged as the inventor of the screw in 250 BC, but they were actually in use in Egypt many years before then. They were used in irrigation to lift water to a higher level.

As a hydro turbine the same principle acts in reverse. The water enters the screw at the top and causes the screw to rotate. This rotational energy is then extracted by an electrical generator connected to the main shaft at the top.

The waterfall will always have priority for water over the screw.

Archimedean screws for hydropower are ideal for low heads. **The head in Penllergare Valley Woods is 4.7 metres** (the difference in height between the lake and the river below the falls).

The main components include –

- A helical screw or ‘flights’ made from rolled flat steel plate welded to a central steel core.
- A gearbox, to increase the rotational speed to between 750 and 1500 rpm
- A generator

The screw is designed to rotate slowly and can be varied depending on the flow rate in the river. The screw **diameter is 1.5 metres** and the **length is 12.88 metres**.

The screw is being installed with a protective guarding, to prevent large debris, animals or even people falling in.

The screw was manufactured in Europe and has a **design life of 30 years**

Relatively large debris can pass through without causing damage, and leaves can pass through without any problems at all. Fish can also pass downstream through the screw in safety. We have **installed an eel pass** alongside the screw to encourage more eels to migrate upstream.

### **Why are we installing this screw?**

For two reasons, firstly to generate much need income for the future management of Valley Woods. Secondly, we believe that it is in the spirit of the progressive approach adopted by John Dillwyn Llewelyn in the 19<sup>th</sup> century

**Power Output = 24 kW**. The estimated annual output is 73,936 kWh, saving an estimated 32 Tonnes of Carbon Dioxide (CO<sub>2</sub>).

The electricity produced is fed by a cable to the new visitor centre and a connection to the National Grid. We will use some of the electricity ourselves and the rest will be ‘sold’. We estimate that this **will produce £10,000 each year** - to be used for the upkeep of Valley Woods.

For more information, please contact the Penllergare Trust at [contact@penllergare.org](mailto:contact@penllergare.org) or tel 01792 344224 or call in at the visitor centre by the car park.

*The Penllergare Trust is a local independent charity dedicated to caring for Penllergare Valley Woods for everyone to enjoy. Please support us. Visit - [www.penllergare.wordpress.com](http://www.penllergare.wordpress.com).*