



# 100 years of the Turgo Turbine

Gilkes' Turgo Turbine marks its centenary year in 2019. Here the company looks at the longevity of the original Turgo design and technology

**GILBERT GILKES AND GORDON** Ltd is this year celebrating the centenary of its Turgo Impulse Turbine, which was designed in 1919 by the Grandfather of Gilkes' current Chairman.

In 1913 young engineer Eric Crewdson graduated with Honours and Distinction in Machine Design and Thermodynamics from McGill University, Montreal,



Above: 2.2MW Turgo installed 2017, Zimbabwe

Right: 2.3MW Turgo installed 2015, Malaysia

Below: Eric Crewdson



Canada. Around the time of his graduation his family had become involved with Gilbert Gilkes & Company and on returning from university he worked as a trainee in the company before being called up to serve in the First World War.

Almost immediately after returning from the war Crewdson conceived the idea of a side entry impulse turbine where the unusual shape of the runner allowed one or two water jets to strike at an angle on one side and to discharge from the other side. This turbine would run, typically, at twice the speed of a Pelton turbine when operating on the same head. Thus the Turgo Impulse Turbine was born and a patent was applied for in 1919, and granted to the young engineer in 1920.

The first ever 30kW Turgo was installed at Invergeldie Lodge near Crieff in Scotland in 1919. The first installations showed the wisdom of Eric's concept and it was in 1934 that the company (by that date known as Gilbert Gilkes and Gordon) decided to install one of the first hydro turbine test installations in the UK. In 1936 and 1960, using the new test facility, the Turgo underwent successive patented improvements. Very recently R&D work at Gilkes has



Above: 53.7kW Turgo installed 1920 at Rydal Hall Ambleside

resulted in further improvements to performance and efficiency. Innovation is congruent with the company's business strategy and objectives, and over the last five years improvement processes have been driven by significant investment in research and development capabilities with the aim of producing new designs with enhanced efficiency.

To date there are now over 1000 installations worldwide, ranging from 25kW to 7.5MW. Gilkes have supplied Turgo turbines to 65 countries. Installations are located from Grytviken, South Georgia (the most southerly hydro installation in the world) to Alaska and from Japan to Zimbabwe. With hydro installations over 100 years old still generating today the enduring performance of Gilkes turbines is well proven, says the company. Unique benefits of the Turgo design include:

- Simplicity of construction.
  - Reliability especially when handling silty or abrasive water.
  - High efficiency for a wide range of flows.
- Eric Crewdson died in 1967 but his legacy to Gilkes lives on in the modern versions of the Turgo Impulse Turbine which Gilkes believes will continue to make a major contribution to hydropower around the world.

Charles Crewdson, Chairman of Gilkes said: "During four hard years on the Battlefields of World War One, my grandfather was already thinking to the future, and succeeded in patenting his design and selling the first Turgo within months of leaving the army. It is a truly astounding feat, and has great resonance today as the company attempts to think through the world's troubles and do what is best. We couldn't have a better role model."

All of this means the Turgo can quietly look forward to its next 100 years. ●



Left: Gilkes is to supply two Francis turbines for a new hydro project on the Balmoral Estate in Scotland

## News update from Gilkes

In one of its first announcements of 2019, Gilkes revealed in January that it is to supply two Francis turbines for a new hydro project on the Balmoral Estate in Scotland. As Royal Warrant Holders for the supply of hydroelectric turbines to HM The Queen, these will be the fourth and fifth turbines Gilkes have installed on the estate continuing a relationship for over 120 years. The first turbine was supplied to provide electric light to Queen Victoria in 1895. The Francis turbines were selected to maximise renewable energy generation from the available resource on the estate and will generate 2MW of power.

In December 2018, Gilkes was presented with the Class A award for performance in Planning & Control by Oliver Wight. The award is globally recognised as the industry standard for best practice business process integration and improvement. Class A is described as being a proven, integrated approach which delivers results that stick, and is awarded only to the highest performing companies who attain sustained performance levels of more than 95%. According to associates from Oliver Wight, the elements that Gilkes presented were some of the best they have seen.

Earlier, in November 2018 Gilkes received an order from Mulanje Renewable Energy (MRE) for the supply and commissioning of two Pelton Hydro Turbines and associated electro-mechanical package for the Ruo Hydroelectric Project in Malawi. The new scheme on the Lujeri Tea Estate will eventually replace all existing turbines and powerhouses on the estate.

Lujeri currently has two power houses situated on the Lujeri and Ruo rivers with five turbines in total, four of which are original Gilkes manufacture. The first turbine was installed in the Ruo powerhouse in 1934 to supply power to the factory and for domestic use. With a further two turbines being installed in 1946 and 1957, the fourth machine was installed in the Lujeri powerhouse in 1957.

Gilkes Head of Sales for Africa, Andy Eaton said: "It's exciting for Gilkes to be back in Malawi and again open up another region within Africa! Our team have worked tirelessly to win this sizeable contract and we hope it's the start of many orders to help electrify some very remote parts of Malawi, where people have never had power before."

Gilkes have supplied 13 turbines to Malawi since 1901, with the last being in 1968. Once commissioned the new scheme will produce in the region of 6MW which will be exported into the National Grids.

Other Gilkes projects in Africa include:

- Kupinga, 1.6MW, Twin Jet Turgo, Zimbabwe
- Kaptega, 230kW, Twin Jet Turgo, Kenya
- Ruo, 6MW, 2 x Twin Jet Pelton, Malawi
- Tsanga B, 2.8MW, Twin Jet Turgo, Zimbabwe
- Ndolela, 792kW, Twin Jet Turgo, Tanzania
- Sadiola, 176kW, Twin Jet Turgo, Mali

## Company information

Gilkes is based in the UK and employs over 200 people. Specialists in hydropower and pumping systems since 1856, Gilkes now exports to over 85 Countries around the world and has supplied over 6700 hydroelectric turbines around the globe.

[www.gilkes.com](http://www.gilkes.com)