

NOME Is Where The Energy Is

Jack McGuinn, Senior Editor

According to the U.K.-based WITT Energy website (*witt-energy.com*), **“The WITT is the only device in the world that can capture energy from all movement and turn it into electricity. No other energy system can exploit the full spectrum of movement, enabling it to harvest power from water (sea, river or tidal), wind and human or animal motion.”**

It continues...

“Motional energy is all around us—on land, sea and in the air. And now there is a technology that can capture this motion and convert it into usable electrical power. We have global companies working with us to bring out first product—the Marine WITT—into production, and many customers wanting product.”

Make that natural occurring motional energy—NOME—to be precise.

We saw that Gibbs Gears (*gibbsgears.com*), another British outfit, was entrusted with the gearbox design-and-build for the WITT. Intrigued by the project and its potential, we sent Gibbs a few questions. They were quickly and completely answered by Dave Worthington (IEng MIET), Gibbs Gear operations director.

How involved was the design process for this gearbox? What, if any, unique challenges were there to overcome? Can you share the specs with us?

“Martin Wickett, chief technical officer and co-founder, is a senior civil engineer who designed and built the original WITT prototypes, and holds the design patents for the mechanism.

“Gibbs Gears reviewed the original designs and, working with Martin, have designed a larger unit working to the design specifications. All of the original prototype units were built using ‘stock gears.’ Gibbs Gears have optimized the gear design for the most efficient arrangement.

“The Wave Energy Converter (WEC) we are currently manufacturing is designed to be contained within a sealed spherical buoy that will be anchored to the sea bed. Independently acting pendulums drive the transmission system—three modular gearboxes, converting all motion, in any combination of the six degrees of freedom, into a single unidirectional rotation of a flywheel, to produce electricity. The WITT unit harvests chaotic motion—fast, slow or erratic—turning it into useable power.

“The WITT WEC has two 50kg weights at the end of 0.5m pendulums. Each pendulum is connected to a gear box assembly that convert the motion of the swinging pendulum into a unidirectional rotation. The assembly is mounted on a central axis which can also rotate about its own axis. The output shaft is connected to an alternator via an electronic control panel that monitors the speed and power in order to harvest the energy generated.”

Did Gibbs have to bid on the contract or did you “earn it” via reputation?

“Gibbs Gears met with founders Martin and Mairi Wickett when they were looking for a suitable partner for the next stage in the development of their product. It was a case of being in the right place at the right time initially, but it was our reputation and personality that led to the decision to choose to work



The WITT wave energy converter (WEC) gearbox supplied by Gibbs Gears. (Illustration courtesy Gibbs Gears.)

with Gibbs Gears. We were happy to have Martin

become part of the design team, so rather than working in isolation and submitting a final product, Martin and Mairi have

been involved in every step of the design—a true working partnership. Our track record of delivering prototype development design-and-build projects was also a key factor in their decision. In particular WheelTug, where Gibbs Gears designed and built the gearboxes in conjunction with an international, multi-disciplined team for the M1 ground tests that were undertaken in Prague, June 2012. The WheelTug e-taxi system is a nose-wheel-mounted motor- and-drive unit powered by the aircraft’s APU.”

I noticed this gearbox referred to as a “one-off.” So it cannot be adapted for a different application?

“The WEC unit we are currently building is a one-off prototype development unit. A series of tank tests will be undertaken once we have delivered the unit at the end of June, and from the data recorded there may be some changes required to the final design of the product. The design concept can, however, be scaled. Larger and smaller designs are currently being investigated.”

Witt chairman Admiral Sir James Burnell-Nugent described the technology as “the most exciting development in renewable energy since the solar panel.”

The WEC currently being manufactured is the soul of the machine. It is designed to be contained within a sealed spherical buoy that will be anchored to the sea bed. Independently acting pendulums drive the transmission system—three modular gearboxes—converting all motion, in any combination of the six degrees of freedom, into a single, unidirectional rotation of a flywheel, to produce electricity. The WITT unit harvests chaotic motion, fast, slow or erratic, turning it into useable power.

This is serious stuff. The firm’s Crowdfunding bid was wildly successful, recently announcing that they had reached in April their stated goal of £2 million (\$2,855,600 U.S.) in very short order.

And if they are looking for other scaled-down applications beyond capturing wave and wind movement, I’ve got just the ticket—an array of WECs situated within both chambers of the U.S. Congress. The lip-flapping-captured energy conversion possibilities are practically limitless. ⚙️