



## Case Study

# The Ross Barlow Hybrid Canal Boat

Clean and silent hydrogen propulsion for the inland waterways

Nilar has collaborated with the University of Birmingham to convert a British Waterways maintenance craft into a hybrid canal boat for the future. The standard diesel engine of the boat has been replaced by an all-electric propulsion system with a hydrogen store that eliminates atmospheric, water and noise pollution – paving the way for more efficient and environmental transportation. Nilar's NiMH technology played a vital role in the success of the project.

## The Challenge

In 2005, Professor Rex Harris at the School of Metallurgy and Materials of the University of Birmingham initiated a project that would demonstrate the use of renewable energies and hydrogen to store energy. The idea was to convert a second-hand British Waterways maintenance craft into a hybrid canal boat – The Ross Barlow – to show a practical and zero-carbon alternative to the traditional diesel engine commonly used on the canals. In order to succeed, the project required a battery solution that would fit the new technologies being applied to the vessel.



With the support of Nilar, The Ross Barlow project managed to combine a range of new technologies and apply them to a traditional mode of transportation. The boat is now travelling throughout the UK as a successful demonstration of how to combat pollution and resource depletion by long-term sustainable means.



**Batteries** can be charged using solar panels, wind and water generators.

## The Solution

When looking for a suitable battery technology, lead batteries were dismissed for being too slow to charge, too heavy and too large. Li-Ion was not a viable option either due to safety concerns. Nilar's bi-polar NiMH technology, on the other hand, proved very interesting for Harris and his team. The School of Metallurgy and Materials was conducting its own NiMH research, so Nilar turned out to be a perfect choice. Since Nilar could provide a solution that was more or less ready to go, the collaboration went smoothly and the boat was soon fitted with a 25kWh battery bank – sufficient to power the entire boat – and a charger. Nilar also made sure that the supplied batteries could be "trickle-charged" using solar panels, wind and water generators.

When the conversion process was finished, the diesel engine of the boat had been replaced by an all-electric propulsion system, a battery stack and a metal hydride store linked to a proton exchange membrane (PEM) fuel cell. Nilar was present on-site during implementation to ensure that everything ran according to plan.

## The Result

With the support of Nilar, The Ross Barlow project managed to combine a range of new technologies and apply them to a traditional mode of transportation. The boat is now travelling throughout the UK as a successful demonstration of how to combat pollution and resource depletion by long-term sustainable means. There are about 3 540 km of navigable canals and rivers in the UK with numerous diesel-driven boats in the fleet. Many of them can take this next step towards more environmental-friendly transportation with the help of Nilar.

The demand for sustainable energy is rapidly growing and the development of effective energy storage technologies will be of paramount importance going forward. Nilar's products are designed with this exact progress in mind and offer several crucial benefits for various industrial applications.

### About Nilar

Nilar brings you the next generation in modular power technology with the bi-polar NiMH energy storage. The unique construction of the battery delivers incredible power and reliability from a lighter, smaller and greener unit. Furthermore, the modular design allows batteries to be coupled in parallel and series to deliver the power and capacity required to meet virtually any need. Put simply, Nilar batteries deliver more from less.

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Since it was founded in 2000 by two of the leading experts from the battery industry, Nilar has always sought to challenge the norms of the battery industry. From its two R&D departments in the USA and Sweden, the company has revolutionized the way industrial batteries are constructed – developing a unique energy storage system that can be easily scaled to fit different applications. Today, the batteries are produced at the company's state-of-the-art factory in Sweden.