



Shaping the design of green energy fuel cells

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Since 2005, Voller Energy Group plc (LSE:VLR), has been developing its latest creation - the Emerald fuel cell. Voller Energy enlisted the services of PDD, a worldwide provider of integrated design and innovation skills, to bring cutting-edge product design input to the Emerald fuel cell project.

PDD, working closely with Voller Energy, had a number of challenges to overcome. Key to these were the creation of a strong visual brand identity, an easy-to-use operational interface, building an architecture to address different installation conditions and a design that could be readily scaled up to suit future customer demand.

Voller Energy Group was formed in 2002 with the aim of integrating emerging technologies to create mobile energy that is quiet, clean and more environmentally friendly. *Emerald* fuel cells reform hydrogen from hydrocarbons and create DC electricity to provide a safe alternative to the noisy and sometimes difficult process of recharging batteries using conventional technologies such as diesel generators.

Voller Energy Group's *Emerald* is the ideal design for use on sites where batteries need mobile recharging, such as within the construction, leisure, military and marine markets. *Emerald* is silent and does not vibrate as traditional generators do, making it ideal for a wide variety of commercial applications.

The *Emerald* fuel cell is an attractive option for personal use as well. Robin Francis, Chief Executive Officer, Voller Energy Group explains, "One of our target areas is the leisure marine industry as onboard passengers can enjoy the benefits of having electricity on the boat but without the vibrations, noise and environmental pollution that a diesel generator would bring." Another key sector is construction, where the fuel cell provides a welcome alternative to diesel power, since diesel spillages can occur and result in thousands of pounds of lost time, if an area or the whole site is forced to close.

Before the cell could be launched commercially, Voller Energy Group realised it must align its development with the needs of a segmented market, which had had little experience with this type of product. Therefore, Voller Energy Group enlisted the help of innovation and design consultancy, PDD, which was well aware of how essential it was to get the launch right to secure the necessary supply contracts. Francis continues, "Of all the organizations that we spoke to, PDD understood immediately what we needed and it was clear that they could deliver to our exacting standards. We have been impressed by their understanding and their ability to execute."

As fuel cell technology products are relatively new and there is not a public preconception of what a fuel cell should look like, it was essential to get the design right and ensure that *Emerald* did not disappoint from a visual perspective. Francis explains, "This is a completely new product area so there is no accepted design. We needed to set the style and the standard for a fuel cell. Our aim from a design perspective was to have the green fuel cell become synonymous with the visual image of *Emerald*."

All of the technology development was done in-house by a team of Voller engineers and chemists who then worked closely with PDD to develop the fuel cell's external design enclosures and interfacing. PDD semioticians aligned the strategic opportunity for Voller with specific semiotic codes that the product should exhibit by creating a visual brand language framework. PDD focused specifically on understanding and articulating the product attributes that would express positive values for the Voller brand.

Following this, design concepts were created, explored and evaluated in a team that included PDD industrial and interface designers and engineers, Voller's team and PDD's manufacturing partners. The designs that progressed from this collaboration were distinct in terms of visual language as well as being versatile and appropriate for manufacture, assembly and service.

Once agreed interface designs were in place, paper prototypes were produced and on-screen simulations were used by PDD's specialist interaction designers to create Graphical User Interfaces (GUIs). One GUI demonstrated a user interface for *Emerald* as a stand alone entity. The second GUI demonstrated an enhanced Emerald user interface as a part of an energy hub system and how the interface could be integrated into an existing navigation system. The enhanced GUI demonstrated the value of Emerald as an integral part of an energy system and acted as Proof of Principle to interested buyers.

Once design intent met the requirements of all parties involved with the project, PDD specified the design with CAD assembly and component drawings and arranged for the manufacture of the first exhibition model.

Francis continues, "PDD helped us to produce a high-end product which was reliable and robust, but not at the expense of its physical attributes which are sophisticated but simple. They fully understood that the product had to appeal to individuals buying the cell for a private yacht and at the other end of the scale it had to be solid and dependable for industrial users."

PDD suggested that the dimensions should be standardised so the product range is effectively interchangeable and customers are able to get the most out of their energy cell explains Francis, "As technology develops, we expect to be able to use the same casing to provide a product which has a higher output making it easy for customers to upgrade as they want to."

There are plans to extend the range says Francis, "This has been an exciting project working with PDD on *Emerald*. It will be interesting to see where it takes us and when we come to extend the range we will definitely choose to work with PDD again."

ENDS

About PDD Group Ltd

Founded in 1980, and based in Hammersmith, West London, PDD provides integrated design and innovation skills and works with organisations worldwide to develop novel products, services and business processes that drive revenues and create competitive advantage.

PDD targets markets that are undergoing rapid change, for example, those affected by the shift from mature to emerging markets, rapid technological change, climate & environmental issues and demographic changes.

PDD is an award winning agency, collecting eight awards in the last 12 months, and is certified to BSI 13485 medical quality assurance certification and quality assured to ISO 9001.

PDD has worked with over 200 clients in the last three to four years and today has approximately 30 active projects. Top customers in 24 countries include Orange, LG, Bristol-Myers Squibb, Nestle, Belron, Ford, Gillette, Samsung, Vocollect and Merck Serono.

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