

Kaiji Press

## Market Introduction of Energy Storage System

### 3DOM, the Developer of Next Generation Batteries, Goes for Electrification of Cabotage Vessels in Japan

3DOM, a Japan originated entrepreneurial venture company developing next generation batteries, has developed, through its related company, a new type of Energy Storage System (ESS) that can be used for electrification of vessels. With the idea of electrifying products in various fields in addition to vessels, the Company maintains that the reliability, quality and cost efficiency are substantially improved. First application will be realized very soon for the electric power supply system to be used in shale oil and gas drilling rigs. Other business discussions are being conducted. Along with the development of next generation batteries that can reduce ignition and fire risks, the Company strives to be “in the mainstream of electrification of various products in addition to vessels”, according to Mr Hiromichi Aoki, Executive Vice President of 3DOM and Director of LAVLE. In the Japanese market, the Company “deploys hybridization and full electrification of cabotage vessels”. Toward that end, the Company ties up with cabotage operators and manufacturers of marine components to conduct tests to investigate energy usage situation during vessels navigation. Through these activities, the Company aspires to introduce its battery technologies.

#### ■ Resolving Social Issues by Battery Technology

3DOM, established in 2014, is an entrepreneurial venture company originated by Tokyo Metropolitan University, and is tackling with developing next generation battery technologies and with establishing new business models to resolve social issues such as global warming, aging society, deterioration of infrastructures, etc., making use of the battery technologies. The Company delineates business models including power generation without using fossil fuels, electrification and networking of all the mobility of land, sea and air, and production revolution by digitalization. For the technology development, the Company propels development and commercialization of next generation lithium battery with high reliability that can prevent the occurrence of ignition and firing accidents, making use of its proprietary separator technology. In addition to Mr Aoki who used to work for “K” Line, many capable individuals with various background, such as shipbuilding, battery manufacturing, auto makers, trading companies, consulting firms and oil & gas development, have been joining 3DOM Group.

3DOM is a Japan originated entrepreneurial venture company and established LAVLE in the U.S. in 2018 for first deployment of businesses in North American markets and started working on electrification in marine vessels and oil and gas markets. In June this year, the joint venture with Ockerman who invested in LAVLE was dissolved for

further development of businesses into the future, thereby reorganizing LAVLE with 3DOM's ownership in excess of 90%. With such reorganization, LAVLE aims at wider business arenas including defence, railroad, construction machinery, etc.

LAVLE, this time, has announced the introduction of "Proteus", a new Energy Storage System. From some time toward the end of this year to the beginning of the next year, LAVLE plans to start operating the production plant in Burlington, Washington for volume production. "Proteus" is installed with a Battery Management System that allows maintenance of highly healthy operation of battery through complementing cells that begin deteriorated by healthy cells. Also, the Proteus ESS monitors not on the temperature that is required by certification authority but also the voltage, thereby securing high redundancy, detecting the risks at the earlier timing. By liquid cooling, the life cycle of batteries is lengthened. Further, Proteus can shut down on the level of cells or modules and secures scalability. One of the characteristics of Proteus is the fact that the modules can be replaced in future by most advanced lithium ion battery, lithium metal battery or solid electrolyte battery that 3DOM is separately developing. The capacity of the battery can be flexibly adjusted depending on the requirements of energy by customers.

#### ■ Strengthening the Organization for Deploying Businesses in the Japanese Market

Electrification of vessels is one of the most important targets of the next generation batteries and ESS of 3DOM. In a few states in the U.S., hybridization and electrification of ferries, etc. Have already been started. Full-fledged marketing will be started in Japan where the Company was originated.

Mr Aoki indicated that "Full electrification of ocean-going vessels has a long way to go yet. Some electrification of cabotage vessels has started. 3DOM will deploy hybridization and full electrification of cabotage vessels, making full use of our Company's strength of being able to optimize battery modules and battery packs (chain of modules) by self-production."

Proteus anticipates being adopted for both hybrid vessels that make use of internal combustion engine and battery and pure-battery operated vessels that make use of electric power alone as the power source. For hybrid vessels, Mr Aoki mentioned that "a vessel that has a plural number of diesel power generators can store excess power from generation at high efficiency in Proteus and can use the stored power, if necessary, at the time of incoming into or outgoing from ports. By reducing the frequency of use of power generator, it is possible to reduce the fuel consumption and CO<sub>2</sub> emission. Also, there is a possibility of reducing the number of generators. Further, adoption of Proteus can lead to reducing maintenance and alleviating the burdens on the part of crew members." Full electrification can lead to minimizing the engine room dimensions and enlarging cargo space. Applications to either newly built vessels or to retrofitting on existing vessels are being considered for making inroad to maritime clusters in Japan.

As to the relationship between the electrification cost and resulting effects, Mr Aoki showed his recognition that “In the case of hybrid vessels, in consideration of the reduced uptime of diesel power generators, reduced maintenance costs and possible future introduction of CO<sub>2</sub> taxation, the retrofiting and battery costs can be recovered within a few years. For full electrification by newly built vessels with the main drive train of motor and battery, the operation for shorter navigation hauling will be economically viable.”

Electrification of vessels is an area that various trials and efforts are being taken in Japan to tackle with resolving the issues of environmental load and paucity of ship crews, etc. 3DOM aspires to deploly its own battery technologies.