

Solving Shipping's Sustainability Challenge

Transforming Ship Waste Into Reusable Fuel

By Vincent Favier

The shipping industry is currently facing many sustainability challenges. In particular, issues from ballast water and ship recycling to sulphur emissions regulations and reducing the industry's impact on climate change are at the forefront of industry debate. Despite having a reputation as a conservative industry that is slow to evolve, in recent years, new technologies and innovations have been developed as potential solutions to some of these problems; scrubbers, air lubrication systems and wind-assisted propulsion to name just a few. While uptake is not as prevalent in recent times due to the slow implementation of regulations and the recent low cost of fuel, these new developments are certainly contributing to tackling some of the biggest environmental challenges being faced.

Among the environmental challenges affecting the industry is the disposal of marine oil residue, or "slops". Although this problem attracts less headlines, it is having a significant impact on ship owners and operators, port authorities and

traditional slops collectors. This should be high on the industry's sustainability agenda, given the fact that 98 million tonnes of slops are produced every year by the commercial fleet. Indeed, the European Sea Ports Organisation (ESPO) has recently placed ship and port waste as a "top 10" environmental priority for European ports in 2016.

The unregulated disposal of slops has the potential to cause serious damage to the environment. The 2009 *Trafigura* case highlighted this. The Dutch multinational commodity trading company was forced to settle a class action suit following the accusation that it knowingly released 500 tonnes of slops at the Port of Abidjan in the Ivory Coast in 2006. The gas caused by the release of the chemicals was blamed by the Ivory Coast government for the deaths of 17 and the injuries of over 30,000 Ivorians.

Even in the current climate, the safe disposal of slops continues to cause significant challenges for a number of reasons. First, for ship owners and operators, it is another

Ecoslops' microrefinery.





*(Top) The slops and the processed products.
(Right) A centrifuged slop.*

sustainability challenge that they have to act upon under IMO and EU regulations; with low freight rates, as well as pressures on operational and environmental efficiencies, it is a hassle they don't need. Second, slops used to be purchased by sectors such as the construction and cement industries and used as industrial fuel. However, the low cost of crude is encouraging these previous buyers to purchase purer virgin fuel products.

This is creating a negative cycle. Slops are now building up in ports, because many do not have adequate port reception facilities, and there are limited opportunities for waste collectors to sustainably dispose of slops. This means that tanks are becoming physically full and vessels can't afford to—nor would they want to—keep the waste product. Port authorities can't authorize vessels to leave port without discharging the slops, yet they have nowhere to dispose of them. In short, the situation is threatening to interrupt shipping operations, causing downtime, which no one can afford, as well as environmental and sustainability issues.

Microrefining, Repurposing Waste

This is the context in which Ecoslops has created a technology that sustainably treats slops through a microrefining process to turn them into compliant fuel and light bitumen for the marine and construction markets. Based on our history and understanding of engineering and the petrochemical industry, the company's founders, who were both engineers in the refining industry, were convinced that there was a more sustainable solution for treating slops. While the principle and design of the technology was well established, Ecoslops conducted further research to develop the concept for the Oil Waste Processing Plant (OW2P), which combines an innovative refining petroleum process and sophisticated techniques with an appropriate clean water regeneration scheme into one small treatment unit; essentially, a microrefinery.

The process and technology works in the following way: first, to optimize distillation, the slops are pretreated. They are heated and decanted, and using high-speed vertical centrifugation, the water, hydrocarbons and the sediments are separated before the refining and distillation process. As the reprocessing of the water from the slops is fully integrated within the treatment process, the water is then depolluted using the latest techniques. The water is then returned to its natural environment in line with international and local environmental laws. After the water and sediment are re-

moved, the slops are sent to the P2R vacuum distillation column, where they are heated to 400° C. Under vacuum conditions, as well as the "overflash" process implemented by Ecoslops, the hydrocarbons are vaporized, and at the end of the distillation process several fuels are produced, including naphtha, marine fuel (distillates and IFO) and light bitumen.

With the technology in place to solve the physical problem of treating slops, Ecoslops' business model is attractive to all stakeholders within the slops supply and disposal chain. For ports, it takes the hassle of slops disposal out of the equation, regenerating them rather than burning them, which has a positive impact in reducing pollution in port communities. It also helps ports to improve their sustainability profile, and enhances their competitiveness and reputation in the eyes of their customers and wider stakeholders. For ship owners and operators, they get the reassurance that their waste is treated appropriately and at the right cost, and they can also improve their brand and reputation by creating a sustainability cycle for their slops, reusing the fuel produced by the industrial unit. In tough market conditions, traditional slops collectors also benefit by being able to purchase the product at a fair price and alleviate the pressures on storage capacity.



Industry Inroads

As with any new technology, proving the concept is key to gaining buy-in within an industry that is naturally traditional and arguably skeptical in relation to innovations that break the mold. A considerable amount of time and resources have therefore been placed not just in developing and proving the technology, but also building networks within the shipping industry.

In 2012, Ecoslops won a tender in the Port of Sinès in Portugal to construct the company's first refinery. We have a 15-year subconcession agreement for the exclusive rights to collect slops and solid waste within this port. In 2015, Ecoslops commenced production at the plant, importing 3,200 tonnes of slops from northern Europe, in conjunction with slops collected at the port (mainly at the oil terminal and from the global container shipping company MSC at the container terminal). Following the refining process, 1,300 tonnes of fuel products were successfully produced, comprising distillates (MDO) and heavy fuel oil (IFO), as well as light bitumen (XFO), the heaviest cut of production, for the building and construction markets. Critically, validating the company's proposition, 98 percent of slops were regenerated for commercial use, which was beyond initial expectations of circa 80 percent.

In December 2015, the cycle was completed when the first volume of light bitumen was sold back into the market. A second shipment of 3,000 tonnes of slops was also imported, recently followed by a third shipment of 4,000 tonnes, further ramping up the refinery operations.

Following the success of the Port of Sinès operation, and validation of the technology, there is real enthusiasm within the industry to increase the sustainable treatment of slops; indeed, port authorities are seeing it as a genuine solution to their infrastructure challenges and competitive differentiation. Given this, Ecoslops has ramped up expansion plans. Also in December 2015, Ecoslops signed a letter of intent

“The unregulated disposal of slops has the potential to cause serious damage to the environment.”

(LOI) with Grup Servicii Petoliere (GSP), a leading offshore drilling and construction company. The LOI is based on conducting a feasibility study for the development of an oil residues processing plant in the Romanian Port of Constanta, on the west coast of the Black Sea, and one of the main ports in the region. Subject to a positive outcome of the feasibility study, a joint venture will be formed to implement the project, from building and managing the plant to selling the refined products. In conjunction with this, we have also received an agreement in principle from the Port of Abidjan to provide Ecoslops with five hectares of land within the port boundaries on which to establish a new oil residue plant; the process of commencing preliminary studies and analysis to evaluate the full financial and technical considerations of the project and establishing relationships with local partners has now begun. We are also looking at sites in the south of France and the ARA (Amsterdam, Rotterdam, Antwerp) region, the latter of which has over 250,000 tonnes of slops delivered each year.

In May 2016, Ecoslops signed an incentive agreement with the Green Award, a nonprofit quality assurance organization. As a result of this development, Ecoslops will provide a 25 percent discount to all Green Award-certified ships, reducing the costs of slops disposal for ship owners and ensuring their sustainable regeneration. The partnership

demonstrates Ecoslops’ commitment to sustainability and environmental causes, and further demonstrates the validity and potential of the technology.

The development and implementation of new technologies have the potential to transform the environmental impact of the shipping industry, not just so far as the current hot topics of greenhouse gas emissions and ballast water are concerned, but also regarding the lesser-known sustainability challenges, including slops disposal. The eradication of this issue was one of the core reasons for Ecoslops’ formation, and it is gratifying to see that the development of our technology is now recognized by the industry as a viable and credible solution for slops disposal and is part of the growing movement for technological answers to sustainability issues. **ST**

Vincent Favier has been heavily involved in Ecoslops since its inception, bringing with him an in-depth knowledge of the industry before becoming CEO of Ecoslops in 2015. Before joining Ecoslops, Favier was in charge of investments for Tikehau Capital Advisors for two years and has solid experience in renewable energies, infrastructure projects and building up new businesses. Having graduated from HEC Paris and l’École Centrale de Lyon, he began his career in strategy consulting at Oliver Wyman, where he remained until 1999.



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