

CASE STUDY IDENTIFICATION SHEET

This document has been developed as part of the activities under Task 3.2 of the “GREENPORT Alliances” project, for which MAR.TE. S.c.ar.l. serves as the responsible entity. Task 3.2 focuses on identifying and analyzing case studies that exemplify best practices for behavioral change among operators aimed at reducing the environmental impact of port operations.

The primary objective of this activity is to collect, document, and analyze concrete examples of technological, managerial, or behavioral innovation that have proven effective in contributing to the environmental, economic, and social sustainability of the port services sector. Through a structured selection and evaluation process, the document highlights the specific features of each case study and assesses their performance against key environmental and economic impact indicators.

The information gathered will be integrated into the overall framework of the GREENPORT Alliances project to promote the dissemination of sustainable solutions and the development of curricula for: a. higher education students (future personnel); b. current professionals (professional training); c. educators (train-the-trainer courses).

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1. GENERAL INFORMATION

A. Case study title

Use of biofuels in tugboats by Svitzer and development of a new business model, EcoTow.

B. Green practice implemented

Use of biofuels for tugboats

1. Practice 1: Active involvement of pilots in the planning of port initiatives

Description: Involve pilots and other stakeholders in the planning and implementation of sustainability initiatives at the port level. This may include designing greener infrastructure and adopting eco-friendly operational practices.

2. Practice 2: Active participation of pilots in research and development projects for new green technologies

Description: Directly involve pilots in R&D initiatives to contribute to the development and implementation of innovative ecological technologies that can reduce the environmental impact of the maritime sector.

3. Practice 3: Behavioral change through training and awareness

Description: A proposal for training programs to promote behavioral change by raising awareness among operators about the environmental impact of their actions. These programs include ongoing training, visual reminders, and incentives to adopt sustainable behaviors.

4. Practice 4: Collaboration among stakeholders for real-time data sharing

Description: Improving operational efficiency through real-time information sharing between different actors, such as port authorities, shipping companies, and terminals, to reduce delays and optimize the supply chain, thus reducing emissions.

5. Practice 5: Collaboration with other ports to exchange information and green solutions

Description: Create networks of collaboration between ports to share best practices, technologies, and innovative strategies aimed at reducing emissions and promoting environmental sustainability in port operations.

6. Practice 6: Continuous monitoring of emissions during operations

Description: Implement monitoring systems to track emissions of CO₂, SO₂, and other pollutants, using advanced technologies to collect accurate data.

7. Practice 7: Continuous training and updates for pilots

Description: Regularly organize training sessions for Tug Masters and engineers on sustainability and ecological practices, emphasizing the importance of reducing emissions.

8. Practice 8: Implementation of eco-friendly propulsion systems

Description: Invest in green technologies such as hybrid propulsion systems, electric engines, and other innovations to reduce environmental impact.

9. Practice 9: Supply chain optimization

Description: It is essential for achieving operational efficiency and the sustainable use of resources. A key element of this optimization is logistical coordination between the various stakeholders (transporters, shipping companies) to ensure that operations are carried out within the required timeframes. This ensures, for example, that waiting times for ships or goods to be loaded (export cycle) are reduced, thereby improving the efficiency of pilots and tugboats while preventing congestion and operational overloads

10. Practice 10: Minimization of engine running time

Description: Minimize engine idle times when not necessary by turning off engines or using alternative power systems when possible.

11. Practice 11: Optimization of operation speed

Description: Implement eco-speed practices during transit, adjusting vessel speed to minimize fuel consumption without compromising operations.

12. Practice 12: Periodic publication of reports on environmental performance

Description: Regularly publish reports on environmental performance, including data on emissions and sustainability efforts, to promote transparency and improve corporate reputation.

13. Practice 13: Accurate route planning

Description: This practice involves the development of optimized routes for tugboats, aiming to minimize both the distance travelled and the time required to complete operations. It is based on the analysis and definition of optimal routes before the commencement of activities, a crucial phase that significantly impacts the overall efficiency of the mission, laying the groundwork for operational success

14. Practice 14: Real-time navigation route optimization

Description: Plan efficient routes to reduce fuel consumption and emissions, using advanced navigation software.

15. Practice 15: Regular maintenance of tugboat engines

Description: Regularly perform maintenance and calibration of engines to ensure they operate efficiently, reducing emissions and fuel consumption.

16. Practice 16: Use of biofuels for tugboats

Description: Use biofuels or low-emission fuels to reduce environmental impact compared to traditional fossil fuels.

17. Practice 17: Use of simulation tools to optimize maneuvers.

Description: Implement simulation software to test and optimize tugboat maneuvers, reducing fuel consumption and improving the efficiency of maritime operations.

C. Specific goals

Svitzer has set a target of reducing the CO2 intensity of its global fleet by 50% by 2030. Moreover, by 2040 the company's global operations should be climate neutral. This switch to biofuels is one of the main measures implemented by the company in order to achieve them.

D. Direct impact of the practice

Certified emissions reductions of the towage operations that are provided to Svitzer's customers.

E. Place of implementation

Some United Kingdom's terminals like London, Southampton, Medway, Felixstowe, etc. and at the moment it is expanding to the European continent like the ports of Esbjerg, Gothenburg and Malmö.

F. Start and end date or duration of the pilot project

The pilot project took place in the second semester of 2021. Since then, a growing number of tugboats in the United Kingdom and in the European continent have switched to biofuel.

2. CONTEXT AND DESCRIPTION

A. Description of the practice

Replacing Marine Gas Oil with carbon neutral second generation biofuel, after securing the supply, conducting a pilot trial, adapting the engines and converting the fleet to operate with biofuels.

B. Driving factor behind the adoption of the green practice

At the moment, port towage is not covered by specific environmental regulations that aim to decarbonise the sector, but ports and the company are implementing plans to reduce their carbon footprint, there are funding programmes that foster the production, deployment and use of biofuels and there is a growing demand for cleaner port towage services by customers.

c. Stakeholders involved

Svitzer which is the port operator and its technicians, crews and tug masters that had to adapt to operate with biofuels, to learn to manage the software that helps the company collect and analyse data on fuel consumption and maintaining the engines. CAT an engineering equipment manufacturer, which developed new engines adapted to use biofuels and constantly monitor the performance of the tug and these engines. Biofuels producers expanding the production of standardised HVO and FAME biofuels. Port and governmental authorities supporting the deployment of biofuels in terminals. Tugmasters, crews and technicians play an essential role, adapting the way they operate the tugboat and implementing the recommendations on monitoring and maintenance.

3. IMPLEMENTATION

A. Description of the adopted practice

Svitzer published in May 2022 its decarbonization strategy and as part of it, it has been gradually adapting its fleets to run with biofuels.

Once the London terminal had the capacity of bunkering and deploying a large amount of biofuel, the company run in 2021 a successful biofuel trial. This, was completed in collaboration with CAT which adapted the engines and together with Svitzer crews and technicians developed maintenance guidelines and have been constantly monitoring fuel quality, fuel cleanliness, load response and overall engine health

This successful pilot exercise led to the conversion of an increasing number of tugs to biofuels in different British and EU ports.

B. Technologies used (if applicable)

The production, bunkering, certification and standardization of hydrotreated vegetable oil (HVO) and fatty acid methyl ester (FAME) biofuels, the adaptation of tugs to running on 100% biofuel with Cat® 3516C main engines plus two C4.4 auxiliary engines. Monitorisation of tug and engine performance via Caterpillar's connectivity technology to help improve vessel efficiency and optimise fuel use.

c. Competencies required

Tugmasters and crews had to adjust their tugboat operations to operate with biofuels. CAT established maintenance recommendations and guidelines for crews and technicians, helping them identify and address abnormalities, component wear and enhance engine maintenance.

4. COLLECTED DATA

A. Before implementation

B. After implementation:

The use of these biofuels reduce carbon emissions by 100% on a tank-to-wake basis and about 90% on a well-to-wake basis compared to Marine Gas Oil. The switch to biofuels saw CO₂ emissions reductions of more than 21,000 mt/year in 2022.

5. ECONOMIC AND ENVIRONMENTAL ANALYSIS (*IF THE INFORMATION IS ACCESSIBLE*)

A. Initial investment required

B. Key savings or economic impact

The use of these biofuels reduces carbon emissions by 100% on a tank-to-wake basis and about 90% on a well-to-wake basis compared to Marine Gas Oil. This enables Svitzer to offer its customers an opportunity to reduce their Scope 3 emissions and their environmental footprint, either by procuring towage services delivered by tugs fuelled with biofuel, or by 'insetting' carbon emissions from tug jobs elsewhere against savings generated in the British ports where they operate. Additionally, customers utilizing Svitzer's towing services will be subject to the Ecofriendly Bunker Adjustment Factor, which accounts for the cost differences associated with the shift to biofuels. Thus, Svitzer can now offer its costumers the same service with an extra value that can contribute to lower their carbon footprint.

C. Contribution to environmental goals

The use of these biofuels reduces carbon emissions by 100% on a tank-to-wake basis and about 90% on a well-to-wake basis compared to Marine Gas Oil. The switch to biofuels saw CO₂ emissions reductions of more than 21,000 mt/year in 2022. Furthermore, the use of biofuels for port towage has fostered the case for their mass scale production, bunkering and deployment in British ports, creating the necessary demand that is necessary to upscale the production of these green fuels. Moreover, the use of biofuels in port towage operations is helping ports like London to reach its decarbonisation plans.

6. CONCLUSIONS

A. Success of the green practices

The outcomes have achieved the objectives; offering a quality service while reducing the tugboats emissions without major incidences. The expansion of this programme to other ports in the United Kingdom and the EU are a proof of it. The use of 2nd generation biofuels has helped Svitzer save millions of metric tons of CO2 emissions.

These savings are the basis of EcoTow which provides Svitzer customers with audited and verified emission reductions and marginal abatement costs per ton of CO2 saved. These can be embedded into the company's ESG reporting. Thus, Svitzer has been able to translate the decision of using biofuels into a business model that has the necessary demand to make it sustainable.

B. Lessons learned:

This solution can be adopted where there is a constant supply of biofuels at reasonable prices and in sufficient quantities and the demand for greener port towage operations.

It is essential to select the right type of engines to run on biofuels. Constant monitoring through digital means of fuel quality, fuel cleanliness, load response and overall engine health is key.

Crews and tugmasters have had to adjust and modify their operations to transition from Marine Gas Oil-fueled tugboats to biofuel-fueled ones.

Crews, along with technical marine engineers and technicians, collaborated with CAT personnel to assess the engines' maintenance and repair needs, and establish a set of guidelines to address these requirements.

Collaboration between the towage company, engine manufacturer, technicians, and crews has been crucial in optimizing the use of biofuels in tugboats.

C. Next steps

The company has been progressively adapting, and will continue to adapt additional tugboats to operate on biofuels wherever available, as well as in terminals with a demand for green towage operations. This expansion is driven not only by customer demand but also by public policies that support the adoption of biofuels in terminals and the ports' decarbonization initiatives. Future implementations could include enhancing partnerships with port authorities to streamline 2nd and 3rd generation biofuel availability, expanding research into alternative sustainable fuels and exploring innovative technologies to further reduce emissions in towage operations.

7. ANNEXES

D. Include relevant supporting materials

[Svitzer first biofuel pilot project press release](#)

[Svitzer achieves UK green scheme accolade](#)

[Svitzer, Caterpillar collaborate on biofuel pilots](#)

[Svitzer press release on its new strategy to become fully carbon neutral by 2040](#)

[Svitzer and Caterpillar team up to test 100% biofuel operation press release](#)

[UECC teams up with Svitzer on biofuels in tug operations](#)