

EFFICIENCY ASSESSMENT REPORT

ADMIRAL FLUIDICS CORP./SOLIDWATER™ SHIP PROPELLER

We have built a ship propeller that is five times as efficient as traditional propellers reducing fuel use and pollution.

Solution ID: 10433
Company: Admiral Fluidics

Country: United States
Export Date: 10.01.2020

ASSESSMENT RESULTS



APPROVED

FEASIBILITY

- Credibility of concept | YES
- Scalability | YES

ENVIRONMENT

- Environmental benefits | YES

PROFITABILITY

- Client's economic incentive | YES
- Seller's profitability | YES

GENERAL COMMENTS FROM THE SOLAR IMPULSE FOUNDATION

The solution ID10433 is declared by the Solar Impulse Foundation as labelled Solar Impulse Efficient Solution after going through the following selection steps :

- It is falling into the eligibility scope in terms of (1) Minimum Maturity and (2) Type of solution. Moreover, the solution is owned and developed by an entity Member of the World Alliance that is operating in accordance with the Solar Impulse Foundation's ethical position.
- The Solution Submission Form was assessed by 2 independent Experts with at least 5 years of Experience in one of the sectors of application of the Solution and valid and coherent answers with justifications were collected enabling the deliberation of a majority opinion on each of the 5 criteria.
- Based on Experts deliverables, the Solutions Team concluded that the solution's assessments had been satisfactory and that the five criteria obtained a majority of "YES".
- After a final verification performed by both the Experts and Solutions team representatives, the validity of the assessment performed and the requirements for the five criteria were confirmed, resulting in the solution being awarded the Solar Impulse Efficient Solution Label.

FEASIBILITY

This section captures the ability of the solution to be credible (based on a resilient technology or concept) and captures if the solution is already or has the potential to be scaled up and deployed concretely in the real world (vs. in lab). The Experts were required to answer two questions on (1) credibility of design and (2) scalability of the solution.

EXPERTS REVIEWS

CREDIBILITY OF DESIGN

Can the technology behind the solution be constructed and operated as designed?

✓ YES

Expert justification - The patented technology represents a ship propeller that is five times as efficient as traditional propellers reducing fuel use and pollution. As shown in the provided documents, material, and videos, the propeller is already prototyped and the concept is working.

✓ YES

Expert justification - The solution can be constructed and operated as designed. The company has already built several prototype and is building a new version at a scale 1:1 and has client to test it. The concept is more than credible and is proven but at prototype scale. The market targeted is several type of vessels and without testing it in big vessels it is difficult to guarantee if it is feasible for the target (80% of future fleet).

SCALABILITY

Is the manufacturing (if a product) or distribution (if a service) of the solution at scale technically feasible?

✓ YES

Expert justification - The technology is scalable and does not require rare or costly material to be produced. The inventors even suggest to manufacture the propeller using high temp 3D printing using PEEK polymer with characteristics similar to titanium. Next to the 3D printing technology, the suppliers for the other parts of the solution are also already identified, i.e., a supplier of support/steering disk assembly (in Sweden) and a motor, battery, power supply, software, and controllers supplier in California.

✓ YES

Expert justification - It is totally scalable with interested clients and partners. There is no big issue at that stage to say it is not scalable. There will certainly be several other prototype to make the system reliable, especially on bi vessels but as long as the company will find the good mix in terms of technology, materials, durability, it will be possible to scale up the product and to commercialize it at a larger scale. In terms of distribution, they have a good view on the market and what to do to address it.

ENVIRONMENT

This section captures the ability of the solution to have a direct positive impact on the environment over its entire lifecycle compared to a reference without any significant negative impact transferred. The Experts were required to answer one question on the environmental benefit of the solution.

EXPERTS REVIEWS

ENVIRONMENTAL BENEFITS

Can the solution deliver an incremental environmental benefit versus a reference case, considering the lifecycle (production, use and disposal stages) of its value chain?

✓ YES

Expert justification - Nowadays, 16 VLCC tankers create as much pollution as all the cars in the world. The proposed propeller solution is five times as efficient as traditional propellers reducing fuel usage and pollution. Using the proposed technology, the pollution and fuel usage of ships and tankers around the globe can be reduced by 80%.

✓ YES

Expert justification - There is no LCA for the moment but the lifecycle of the product is certainly low compared to the potential benefits of the solution on the fuel consumption of the vessels and their CO2 emissions. The solutions could considerably reduce by -80% the marine logistic direct emissions which is on paper (prototype for bi vessel not done yet) a game changer in the maritime operation and their carbon impact. The company proposed to find the more sustainable materials to reduce their carbon footprint but at that stage there is nothing concrete. Nevertheless, even if the LCA of the solution itself could not be perfect the benefits of the solution on the CO2 emissions will be unlimited higher.

PROFITABILITY

This section captures the capacity of a solution to deliver an economic incentive for the client and to generate profits for the seller in a 5-year timeframe, regardless of its marketing strategy, its positioning towards competitors, the novelty of the idea and the resources and experience of the team. The Experts were required to answer 2 questions on (1) Client's economic incentives and (2) Seller's profitability of the solution.

EXPERTS REVIEWS

CLIENT'S ECONOMIC INCENTIVE

Can the solution: 1) have the same or lower purchasing price than a reference case? OR 2) create return on investment over the lifetime of the solution despite a higher purchasing price? OR 3) create an economic incentive (value for money) for the client which is not directly related to savings? OR 4) become cheaper than the reference after a change in regulation that is reasonably foreseeable in the next five years in the targeted region(s) and sector(s) of implementation?

✔ YES

Selected option - 1 - Yes, The Solution creates **direct savings** for the client (e.g. cheaper purchase price).

Expert justification - The clients can save directly 80% of fuel costs in tankers and ships using the proposed propeller solution. It is a huge saving in costs since a tanker needs \$25,000,000 /yr in fuel and about \$20,000,000 /yr in fuel can be directly saved every year. Also the costs of manufacturing are lower than for traditional propellers. If clients pay \$850,000 for one propeller they will get full ROI in 1.6 months.

✔ YES

Selected option - 1 - Yes, The Solution creates **direct savings** for the client (e.g. cheaper purchase price).

Expert justification - The solution, by considerably reducing the fuel consumption, create direct saving for the client. It will make the solution attractive for the costs savings and to limit the impact of the evolution of the fuel prices on the market for the maritime transport.

SELLER'S PROFITABILITY

Could the solution itself be profitable for the seller within 5 years, with a sale's price at which clients would buy it? Please evaluate this regardless of the marketing strategy, the people behind it, the competitors and the novelty of the product.

✔ YES

Expert justification - The current international market for ship propulsion sales is \$22Bn/yr growing at 22%/yr. The seller expects to have 80% of this market within 8 years. The clients' expected profitability is high and the market demands for efficient solutions. The breakeven in volume is 60 propeller units sold or leased. Since the product will be introduced soon to the global markets, it is expected to achieve a breakeven within 1 year.

✔ YES

Expert justification - The solution will be profitable for the company in a short term basis. The expected selling price is competitive and attractive for a client. The market is huge and worldwide (potentially all the maritim transport in the world). The solution will be realy attractive as the selling price is competitive and the solutions provide savings for the clients. Considering the size of the market that make the solution profitable. As the solution is already at a high level of TRL and as they already have client ot test it, the solution will be profitable soon and realistically in less than 5 years.

The information set out above, is solely for the purposes of information and the Solar Impulse Foundation does not provide any guarantee as to its authenticity, completeness or accuracy. This information is the direct outcome of the assessment performed by external non-remunerated experts that volunteered to review your solution submission form following the application of the Efficiency Assessment Process of the Solar Impulse Efficient Solution Label Standards. This information is shared to you as it might be of value for you to get the feedback provided on your application – regardless of the outcome of the general selection process.

Copyright © 2020 **Solar Impulse**. All rights reserved.