

# EFFICIENCY ASSESSMENT REPORT

## FILL-4-LIFE

Innovative Fill for Life (F4L in short) solution for turbine oils, resulting in cost savings and CO2 emission reductions.

**Solution ID:** 10491

**Company:** Fluitec

**Country:** Netherlands

**Export Date:** 25.10.2019

## 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 ID10491 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.

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## FEASIBILITY

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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.

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## EXPERTS REVIEWS

### CREDIBILITY OF DESIGN

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

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YES

**Expert justification -** This solution is already operational as formulated (Infinity TO and Boost AO). During the formulation and product development, they have considered the technical oxidative stresses on fluids requirements of turbine oil for the different types of industrial players (Power-Gen, Oil & Gas, Chemicals, etc. using steam/gas turbines, compressors and reducers (cooling tower, wind turbine)). Key additives (secret formulation) and antioxidants packages made the key technical features for developing a long-lasting lubricant. It saves oil consumption/oil replacement, reduces CO2 emissions and lows the need for rinsing/cleaning due to the formation of deposits, as no by-products of varnish production are generated. Thus, it offers key values such as sustainability, costs reduction, a cleaner and safer solution. Having verified a total compatibility with their customer's lubricant sample through tests in specialized laboratories and the possibility of participating in their Lubricant Academy, they provide real support to meet the customer's requirements. Indeed, they understand and make their customers understand the performance of their industrial installations. Continuous improvement with a sustainable solution.

YES

**Expert justification -** Lubricating oils oxidize with operating time and become unusable due to a generated by-product called lacquer or varnish, which contaminates the oil and makes it unusable for its purpose. The oil must be changed and the old oil is burned. Combustion will then release a significant amount of CO2. The solution proposed by "Fluitec" with Fill-4-Life is based on two products, one by a high-performance oil: "Infinity Turbine Oil" (ITO) and an additive "Boost AO" capable of increasing oxidation resistance and thus extending the service life. As a result, less oil to burn and less CO2 released into the atmosphere. The additive "Boost AO" can also be added to competitive oils.

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### SCALABILITY

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

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YES

**Expert justification -** Manufacturing and distribution are already possible. They already have about thirty different sites using our Fill-4-Life solution (Infinity TO and Boost AO). Sales are made worldwide either by their sales team or by local partners (about 30 of them in the EU, MEA, AMER and APAC). The very good point is, as they mentioned, a full compatibility test is required to meet the customer's requirements before the change is made. It means that they contribute continuously to improve their performance by monitoring the results and collecting customer data . In addition, to meet OEM's requirements, as being endorsed by Siemens and MAN Turbo. Customers can purchase drums of turbine oil solution (Infinity TO) to be added to their oil tank system. Thereafter, smaller amounts of fresh antioxidants (Boost Ao) will be needed to supplement. At its R&D site (based in NJ, USA), its operational team is responsible for the formulation of the Fill-4-Life solution [a mixture of trade secrets and patent-pending technology]. In addition, they supervise their manufacturing partner in Kansas, USA. They are looking for a second partner in Southeast Asia. The main technical constraint for them is the difficulty of getting customers to change their current solution. Usually, customers do not change as long as their current solution is efficient and they do not need to reduce their costs.

YES

**Expert justification -** Both Infinity Turbine Oil and Boost AO products are already in production by Fluitec and worldwide distribution is already in place. Some companies that successfully use these products also recommend them to their customers. The products are scalable and studies are already underway to increase the operating life to 200% (currently 150%). The distribution network will also grow according to the success of these products, which make a significant contribution to CO2 reduction.

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**Additional feedback / advice for the member**

Usually, customers do not change as long as their current solution is efficient and they do not need to reduce their costs. Nevertheless, innovators can continue to reach the Power-Gen, Oil & Gas, Chemicals market segment recommended by their customers and demonstrate their sustainable and efficient solution. The results speak louder than words.

**Additional feedback / advice for the member**

Large structures, steam turbines, gas turbines, pumping systems etc. use huge quantities of lubricating oils. Fill-4-Life makes a very positive contribution to the fight against CO2 emissions, with its products that considerably increase the life of oils between replacement services. There is a wave of demonstrations around the world to raise awareness about global warming. Pushing the promotion of Fill-4-Life is perhaps an opportunity. Doing without petroleum-based products is not for tomorrow, but some technologies, including Fill-4-Life, are making a significant contribution to reducing CO2 emission.

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## ENVIRONMENT

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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.

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## 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?**

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✔ YES

**Expert justification -** The innovators offer a solution with a 10-year oil life guarantee, which means a reduction of up to 50% in oil, drain and maintenance costs. The average oil change in the industry is about 5 to 7 years. With Fill-4-life, it can go up to 10 years. They calculated that in more than 10 years, 58,000 tonnes of CO2 emissions and 22 million litres of turbine oil would be saved. From my point of view, it was very interesting to consider the amount of waste reduced by using their solution because it has a financial and environmental impact. The innovators provided me with this data and they can reduce waste by up to 20 million kilograms.

✔ YES

**Expert justification -** Customers targeted for the use of Fill-4-Life use 2500 to 60,000 liters in their tanks. They are therefore important consumers and when the service life of the oils is reached, significant quantities of CO2 are released into the atmosphere during combustion. A life extension of several years therefore contributes to reducing the carbon impact. One obvious obstacle is the conservative attitude of large companies and convincing them to use an additive in service to extend the life of the oils used.

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### Additional feedback / advice for the member

It is important to mention or emphasize to their customers that this solution not only saves them costs, reduces material extraction or oil consumption, but also reduces waste production. Thus this intelligent solution allows to reduce the environmental impact and to provide a sustainable solution for turbine oil in industrial installations. It is an important point to be considered for future pitches or product presentations.

### Additional feedback / advice for the member

Customers targeted for the use of Fill-4-Life use 2500 to 60,000 litres in their tanks. So they are important consumers, but an obvious obstacle is the conservative attitude of large companies and convincing them to use an additive in service to extend the life of the oils used. The main impact of the Fill-4-Life solution occurs at the end of life period. Infinity Turbine Oil has a service life that is approximately 50% longer than traditional turbine oil. Boost AO extends the service life and the consequences are a reduction in CO2 emissions as oil changes are made over longer periods of time.

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## PROFITABILITY

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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.

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## 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 - 2** - The solution has a higher purchasing price but creates a return on investment to the client over its lifetime.

**Expert justification** - According to the financial impact file provided by the Innovators, their solution has a higher cost when purchasing new oil than competitive reference (IOT \$3.75/l vs. Reference \$3.3/l). However, after 10 years of solution life, the customer will save about 39% of the costs. In the middle of product life time, about 5 years after the purchase of the new oil, Boost AO is necessary. In competitors, after 7 years, it is a new purchase of oil is necessary meaning a change maintenance shutdown . Thus the costs of this non-production must be considered. With the Fill-for-life solution, it is designed to operate continuously.

✓ YES

**Selected option - 2** - The solution has a higher purchasing price but creates a return on investment to the client over its lifetime.

**Expert justification** - The price per litre of Infinity Turbine Oil is U\$ 3.75 and the price of a standard oil is U\$ 3.30, but because the ITO has a life span of at least 50% longer, the return on investment will be after a few years, but for a significant amount. In the long term, customers consume less lubricants, which contributes to lower CO2 emissions and lower demand for raw material extraction.

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### 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 Solution Provider has indicated that their solution's commercialization stage has already reached the breakeven point and is profitable. As such, they are not requested to provide further information on their forecasted business case. The solution has already been profitable since 2018 according to Innovators. Their current addressed market share is approximately USD 50 million. Their current market share in this market is about 2%. They sold approximately US\$1 million worth of Fill-4-Life products in 2018. Their business model and sales solution provide them with the key to selling worldwide for the Power-Gen, Oil and Gas, Chemicals and Industrial Gases business sectors mentioned above. The sale of these 2 products associated with the solution allows them a gross margin of 35% and 65%.

✓ YES

**Expert justification** - The business model is carried out through 3 different channels: direct,

partner and OEM references. The objectives are Power-Gen, Oil and Gas, Chemical, the margin is comfortable and the company is profitable since 2018 and the Fill-4-Life solution is growing. Based on a real case study, for an average power plant (4 to 5 turbines) in Arizona, a calculation was made that the return on investment represents approximately U\$ 500k over a period of 10 years

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#### **Additional feedback / advice for the member**

Today, a lot of research is being done to find an ecological alternative to fossil energies. But several other by-products are derived from fossil sources, such as lubricating oils. All machines in our world use lubricants and it is not possible to remove them. Waste oils are burned and thus contribute to an increase in CO<sub>2</sub> in the atmosphere. The Fill-4-Life solution provides a considerable increase in the service life of lubricants and as a result, CO<sub>2</sub> emissions are reduced by an important factor. The search for solutions to save fossil fuel derivatives must continue. If solutions become possible for locomotion energy using hydrogen or batteries for electric propulsion, for some petroleum-based products, replacement is not so obvious, which is why the Fill-4-Life solution is interesting and research must continue in this direction.

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