

TSE haalbaarheidsstudie: Renewable Alkylate Feasibility study (TESN118115)

Periode: 1-10-2018 tot 30-9-2019

Project title: "Ontwikkeling van een biobased alkylaatbrandstof (BAB) voor motoren in groenonderhoud en racesport."

The Project Consortium consisting of Sunchem B.V, Cleantech Innovations B.V. and Gutts B.V., have researched the feasibility of the production and sales of renewable alkylate fuel for motor race sports and small engines in green work applications, based on Sunchems proprietary sustainable Solaris tobacco oil as feedstock. The production of a renewable alkylate fuel is beneficial in order to replace fossil-based components used in these applications since there are currently no renewable alternatives on the market. The feasibility study includes research on the alkylate market, technical feasibility, sustainability evaluation, and a final economic evaluation.

Using the standard values provided by the *Directive of the European Parliament and of The Council on the promotion of the use of energy from renewable sources* an estimate GHG reduction of 73.6% can be achieved with the conversion process. Solaris biofuel products have such exceptional GHG savings due to sustainable farming practices, high oil yield per hectare of land and geographical advantages when compared to the standard cultivation values for crops like rapeseed, palm or soybean.

The Dutch small engine alkylate market has been estimated to grow significantly the coming years and makes up to 25% of the European speciality alkylate fuel market. This is driven by strict regulations for workplace safety, which mandates the use of alkylate fuel to protect operators from the carcinogenic benzene fumes found in fossil-petrol. Next to this, alkylate fuels also improve the air quality since they burn with less particulate matter, and sulphur emissions. A secondary market focuses on racing fuel, which is of interest especially at smaller scales since racing fuel is more price inelastic and teams or sponsors are willing to pay a premium for green marketing opportunities.

Various production and conversion schemes were modelled and compared in order to assess the technical feasibility. A conversion route has been engineered that produces a renewable alkylate which is the chemical equivalent of fossil alkylate. It was determined that small-scale production of alkylate from Solaris oil would result in too high OPEX to be economically feasible. Instead, large-scale production with higher volume throughput and optimized energy recovery would be more economically favourable. Large-scale production also lowers the cost of consumables and could decrease OPEX per litre by almost 4 times.

Preferably fossil parity (€/L) is desired, however using certified renewable feedstocks this is not possible. Target customers in the green works industry are approached to find out their price elasticity for alkylate fuel and gauge interest in switching to a renewable alternative. It has shown that the consumer behaviour in this industry is inconsistent, but the majority of consumers would only pay a small premium for a renewable fuel (<€0.50/l). Some respondents also stated that they would be willing to pay a larger premium for the fuel since fuel is a relatively small cost for them compared to labour costs. From this study it was determined that clients which have environmental responsibility requirements would be the primary customer base for the alkylate fuel.

Carrying out this project is a means to contribute to the goals of sustainable energy management and strengthening of the knowledge position of the Topsector Energy. These goals are achieved by developing alternative fuels that reduce the CO₂ impact of industries, which currently have no renewable fuel alternatives. Moreover, this technology offers potential for other fuel applications as an alternative renewable blend stock with high stability and performance. Regular petrol often contains up to 20% alkylate to improve the properties of the fuel. To continue to increase bio-blending mandates beyond the maximum inclusion level of bio-ethanol, more high-performance renewables will be needed in the future in order to comply with EU RED II regulations.

For more information or a free copy of the Public Final Report, please contact Boudewijn Brandt: boudewijn@sunchem.it

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