

## Economic Evaluation of an Advanced Bioethanol Manufacturing Technology Using Maize as a Feedstock in South Africa

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**Abstract :** Industrial prosperity and rapid expansion of human population in South Africa over the past two decades, have increased the use of conventional fossil fuels such as crude oil, coal and natural gas to meet the country's energy demands. However, the inevitable depletion of fossil fuel reserves, global volatile oil price and large carbon footprint are some of the crucial reasons the South African Government needs to make a considerable investment in the development of the biofuel industry. In South Africa, this industry is still at the introductory stage with no large scale manufacturing plant that has been commissioned yet. Bioethanol is a potential replacement of gasoline which is a fossil fuel that is used in motor vehicles. Using bioethanol for the transport sector as a source of fuel will help Government to save heavy foreign exchange incurred during importation of oil and create many job opportunities in rural farming. In 2007, the South African Government developed the National Biofuels Industrial Strategy in an effort to make provision for support and attract investment in bioethanol production. However, capital investment in the production of bioethanol on a large scale, depends on the sound economic assessment of the available manufacturing technologies. The aim of this study is to evaluate the profitability of an advanced bioethanol manufacturing technology which uses maize as a feedstock in South Africa. The impact of fiber or bran fractionation in this technology causes it to possess a number of merits such as energy efficiency, low capital expenditure, and profitability compared to a conventional dry-mill bioethanol technology. Quantitative techniques will be used to collect and analyze numerical data from suitable organisations in South Africa. The dependence of three profitability indicators such as the Discounted Payback Period (DPP), Net Present Value (NPV) and Return On Investment (ROI) on plant capacity will be evaluated. Profitability analysis will be done on the following plant capacities: 100 000 ton/year, 150 000 ton/year and 200 000 ton/year. The plant capacity with the shortest Discounted Payback Period, positive Net Present Value and highest Return On Investment implies that a further consideration in terms of capital investment is warranted.

**Keywords :** bioethanol, economic evaluation, maize, profitability indicators

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