Economic Surveys of Gas to Polypropylene Complex (Lurgi and Basell techologies) in Industrial Scale

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ABSTRACT

Iran has a lot of natural gas sources that can be used as raw material to produce value added petrochemical products. In this study, we survey economic indicators for investment of GTPP complex which it converts natural gas to polypropylene according to Lurgi Technology. Financial analysis has been done by COMFAR III Expert software. Total fixed investment costs for this industrial scale plant is MMUSD 970 and the annual operating costs are MMUSD 164. Internal Rate of Return of the project was 24.79% and net present value 895MM$. Also Normal Payback and Dynamic payback periods were 6 and 8 years, respectively. IRR sensitivity analysis has done and results showed increasing in sales revenue has the most effect on IRR.

Keywords: Natural Gas, Polypropylene, **Net Present Value, Internal Rate of Return, Payback period**

1. INTRODUCTION

Polypropylene (PP) is a member of the polyolefin class of polymers and it is a versatile thermoplastic resin available in a wide range of formulations for engineering applications. The chemical designation is $(-C_3H_6-)_n$ and the melting point of polypropylene (160 ºC) is very high compared to many other plastics.

Polypropylene is used both in industry and in consumer goods and also can be used both as a structural plastic and as a fiber as well [1]. Polypropylene plastics began to find commercial applications in the 1950s. Karl Ziegler and Giulio Natta independently developed a family of stereospecific transition-metal catalysts that made possible the commercialization of polypropylene as a major commodity plastic. The structural plastic is often used for food containers, particularly those that need to be microwave safe and dishwasher safe. Also, this polymer is used worldwide in automotive parts, appliances, consumer products, packaging and nonwovens [2].

Demand growth of propylene is projected at higher than 5% worldwide with marked regional spikes as e.g. for Iran, India, PR China. Polypropylene is by far the largest and fastest growing of the propylene derivatives, and requires the major fraction of about 60 % of the total propylene. Moreover, the increasing substitution of other basic materials such as paper, steel and wood by PP will induce a further growth in the demand for PP and hence propylene [3].

The total proven gas reserves amount to approx. 180 trillion cubic meters world-wide which translates into a gas reserve-to-production ratio, i.e. a gas reserve lifetime of 70 years. Furthermore, estimated additional gas reserves will cover a lifetime of 65 years more [4]. Natural gas reserves provides low cost feedstock for polypropylene production and aiming at better use of natural resources especially in the case of associated gases being flared .

There are three important methods for producing of Polypropylene as shown in figure 1. Among the mentioned methods, Methanol-to-Propylene (MTP) is the most popular technology for producing polypropylene which it is used by Lurgi Co [3]. Lurgi is leading international company operating in the field of Gas To propylene (GTP) Technology**.**