

The steam cracking process in the production of propylene

[Literature](#), [Russian Literature](#)



The paper "The Steam Cracking Process in the Production of Propylene" is an excellent example of an assignment on macro and microeconomics.

Propylene manufacture: There are two production processes used in the production of propylene, one of the widely used method is the steam cracking process which involves the production of propylene as the by-product of in the production of ethylene, the other production process is propylene as a by-product in the oil refinery process. This paper focuses on the costs associated with the steam cracking process that aids in the production of propylene.

The steam cracking process: The steam cracking process entails the breaking down of saturated hydrocarbons into smaller and unsaturated hydrocarbons. In this process the hydrocarbon is usually diluted with steam and then heated in a furnace for a short period of time at 850 degrees centigrade temperature, the gas is then transferred to the heat exchanger unit to stop the reaction. In the production of propylene there are various costs associated and these costs are subdivided into two and they include the variable costs and the fixed costs, however, when starting up a plant there is need to consider the capital expenditure of the plant and other inputs required in order for the firm to economically utilize its opportunity.

Production costs of propylene manufacture: Capital costs: First, we consider the capital expenditure to start up the Plant, these costs include land in which the plant will be established, the plant fixtures which include the furnace pipes and the demethenizer tower. These costs are the costs that are associated with the establishment of this plant and in most cases the capital required is high. When the plant is set up there are other production costs that are associated with the plant. Capital costs can be financed

through loans from banks or other lenders, the firm could also intend to sell shares to the public in order to meet its capital requirements if the firm chooses to fund through loans than the firm will be required to pay installments and at the same time repay the loan with interest. This type of loan, however, should be long term, if the firm considers financed through equity through the sale of shares then the firm will be required to share its profits with shareholders. When starting the firm there must be a consideration of the capacity of the plant in most cases the higher the capacity of a plant then the higher will be its cost and for this reason, this will help us to determine the capital cost required. Working capital: Working capital is a cost that the firm incurs in order to start its production process, this cost includes start-up cost of hydrocarbon which is ethylene, this cost will depend on the quantity the firm intends to produce and therefore the working capital will be the cost of the quantity requirement of inputs which include the cost of start-up raw materials. Maintenance costs: This is an operating cost that the firm has to incur, one of the maintenance cost is the cost associated with the removal of particle accumulation in the furnace, the other maintenance costs incurred include those costs to repair the tear and wear in the firm. We expect that the plant will require frequent repairs and for this reason, there has to be the consideration of these costs.

Operating labour: A firm has to employ labour in its production process, the labour costs will depend on the number of employees the firm requires and also the cost per unit labour. The firm will require to have administrators and also manual labourers employed, in this case, the number of labourers

required depend on the quantity and size of the firm and also the number of shifts the firm intends to implement, example if the firm will have day and night shifts then the firm will employ double the number of labourers the firm would have employed if it only considered one shift a day. The number of labourers should not be too high nor too low and the optimal number of labourers should be determined to take into consideration scale economies, a 24-hour operation of the firm should be the best in order to utilise the costs advantage of more working hours, this will enable the firm to reduce the unit fixed cost of a single product and therefore reduce the cost of production, the 24-hour operation will also increase the quantity of gas produced and therefore make the firm more profitable, however, the quantity produced must take into consideration the demand and the production capacity of the firm.

Supervision costs: There is need for a firm to employ supervisors in the firm and for this reason, therefore, supervision costs will be incurred in the process, these supervisors are to aid in the proper and smooth running of the firm's labourers and operations

Local taxes: A firm must pay local taxes to the local authorities, tax is paid to the local government and it is charged on at a certain percentage charged on the income, this is a mandatory cost that the firm must pay.

Interest on borrowings: The firm will also be required to incur costs if it finances through debts, due to the high start-up cost and high operating cost the firm can borrow funds from banks or other lenders and this will require the firm to pay interest rates incurred by the amount.

Insurance costs: It is a requirement that a firm ensures its firm and also its business undertaking, insurance costs are paid by the firm and therefore this is a cost that will be incurred depending on the value of the property

insured. License fees: Every firm and business is required to have a licence to undertake its processes, for this reason, therefore, a licence fee is incurred whose charges depend on the nature of the business. Raw materials: Raw materials are required for the production of propylene, the raw material required here include the hydrocarbon which will be used to produce ethylene and propylene. Water will also be required in the production cost and its cost will depend on the quantity produced. Shipping and packaging: When the firm has produced its products it will have to package its produce, this requires the firm to have containers that will transport the gas, There will also be a requirement where transportation vehicles will be used to offer after-sale services and for this reason, the number of transport vehicles will also require capital and the number of these vehicles will depend on the quantity produced and the demand for the products. Laboratory costs: These costs are associated with quality control, these costs are required in order to check the quality and smooth running of the processes and they are important to avoid poor quality production. Utilities: These are costs that are incurred during the firm operations, example there has to be electricity cost associated with lighting and the heating process and these costs are variable and therefore have to be considered because they depend on the quantity used. General administration costs: The firm will have different departments which will require employees from different disciplines example the manager, the accountant, auditors and supervisors. These costs will be incurred and they do not depend on the quantity produced. Bank charges costs: Most banks will charge a monthly fee for the services it offers to the firm, for this reason,

therefore, these costs must be accounted for during the preparation of budgets and accounting reports of the company which must reflect the financial position of the firm. Depreciation Costs: Depreciation is that cost incurred as a result of wear and tear of assets, these costs are important in that they will help in the maintenance and purchase of already depreciated assets, depreciation costs will include plant depreciation costs, vehicle depreciation costs and equipment depreciation costs, these costs must be charged on profits which will aid in replacement and maintenance of assets.

The following is an example of propylene production costs: The following costs are an estimate of the Lurgi mtp company

LURGI MTP COMPANY
PROCESS PROPYLENE CAPACITY 520, 000 TONNES PER YEAR
INVESTMENT COSTS 565 MILLION DOLLARS
RAW MATERIALS COST 228 MILLION DOLLARS
UTILITIES 10. 8 MILLION DOLLARS
OPERATION AND MAINTENANCE COST 29. 6 MILLION DOLLARS
PLANT OVERHEADS AND INSURANCE 31. 6 MILLION DOLLARS
INTEREST ON CAPITAL 113 MILLION DOLLARS
CREDIT FOR GASOLINE 107 MILLION DOLLARS
COST OF PRODUCTION 274 MILLION DOLLARS