

# Feasibility Study for In-situ Oxygen Separation for Hospitals: Technical Report and Market Analysis

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## **Executive Summary**

The purpose of this study is to consider the profitability of an onsite oxygen production system for a medical facility. This system is designed to meet the needs of hospitals that are currently on average using 3,000 gallons of liquid oxygen per month, paying average yearly costs of \$19,000. The designed system incorporates a pressure swing adsorption system. Prior to the pressure swing adsorbers, there is a silica gel drying column that removes moisture and trace impurities from the stream. This feeds into the first pressure swing adsorption system, which removes nitrogen from the entering air stream. This stream is stored in a low-pressure storage vessel before it enters the next pressure swing adsorption system, which removes argon from the stream. The yearly energy cost for this system was determined to be \$8,500. The selling price of this system to optimize demand and net present value of the business plan for this system was determined to be \$66,500. The net present value for the seven-year estimated life of this business is \$5,300,000. The amount of profit that could be obtained varied from approximately \$8,500,000 to \$1,600,000 as calculated by the net present value method. The study also revealed that there was a 0% risk of losing money with the proposed design.

Regarding the possibility of using an onsite cryogenic process to meet hospital needs, this project concluded that this was economically unfeasible. Although a process that provides the needed product at the needed flowrate was successfully designed within operating cost requirements, the capital costs of this system inhibited typical hospitals from being able to invest in such a system.