

## **Integrated Resource Planning (92S14)**

"Integrated Resource Planning" differs from most PERP reports which cover specific processes and products. This report describes planning procedures which are applicable to the chemical process industries.

Integrated resource planning (IRP) was originally developed and applied in the U.S. electric utility industry as a planning tool to cope with changing times. The parallels between the utility industry and the chemical process industries (CPIs) allow the principles of IRP to be adapted and applied in the CPIs.

The traditional planning process is intended to match the supply and demand of a product (or service) at a competitive cost. The supply cost must be competitive with those of alternatives in order to reduce the possibility of a customer seeking other vendors of the same product or substituting other products. Further, the planning process must account for achievement of corporate goals such as profitability or business position.

The traditional planning process and IRP both use well-defined sets of basic parameters, variables, assumptions and objectives to formulate a means to achieve overall goals. However, the application of IRP accounts for a broader range of issues and concerns, includes a wider range of goals, and results in the development of a more complete set of demand and supply options.

Capacity expansion planning in the CPI is driven by the cyclical nature of product demand. The principles of IRP can be employed to develop models to help predict the best options based on a variety of inputs.

Environmental concerns have become more stringent over the years. The concerns of a producer are no longer limited to the environmental impact during the product's manufacture, but have been extended upstream to raw materials and other input used in product manufacture and downstream to the end use and ultimate product disposal. The manufacturer must also consider current, proposed, and even possible legislative issues. Finally, the public's perception of a manufacturer and its products and their environmental impact must be considered. Even if the public's perception is not based on fact, these perceptions drive legislative activities and market dynamics. Thus, a part of IRP of particular importance to the CPI is environmental issues, which are considered in detail in a life cycle analysis.

One tool to determine the environmental impact of a specific product, which is based on quantitative assessment, is the life cycle assessment (LCA), an approach that quantifies

the total environmental and other burdens of specific products and alternatives. It looks at the impact of a product from "cradle to grave," from extraction and/or manufacture of the product's raw materials and energy input, through its production and end use to its final disposal.

The report discusses the goals and procedures of LCA in some detail, with sections on life cycle inventory, valuation and modeling methodology.

