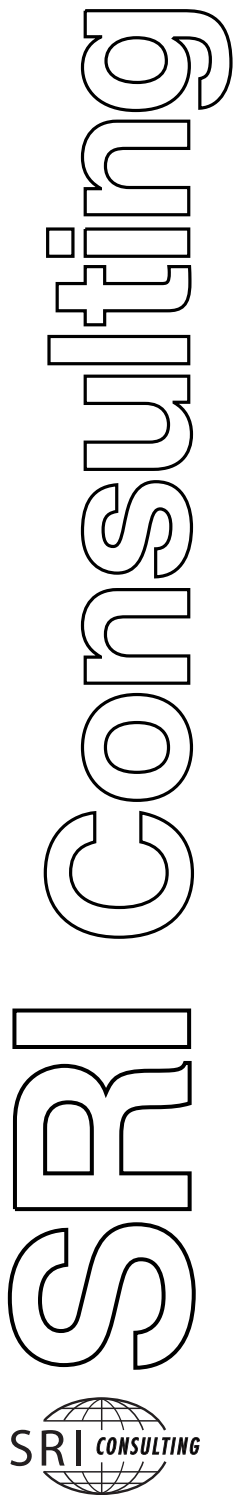


Abstract
Process Economics Program Report 181A
COGENERATION
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Cogeneration refers to processes that produce electricity and steam from the same energy source. These processes can reduce fuel consumption by 25-35% in comparison with producing steam and electricity in separate facilities. Cogeneration is not a new concept; it began industrial applications over a century ago. Its popularity, however, fluctuated greatly from time to time. We are now in a period of surging interest in cogeneration because fuel prices are rapidly moving upward. At the beginning of this report, we review briefly the historic perspectives of cogeneration in the United States and abroad, government regulations and incentives, the growth trend of cogeneration in the U.S. chemical and petroleum refining industries, and the potential impact of recent U.S. electricity industry deregulation and restructuring on cogeneration. The commercial review is followed by a technical review and analyses of cogeneration technologies and the equipment to fulfill energy saving goals. Capital investments and production costs are estimated for the following production systems:

- A methodology for data collection and preliminary process screening including a cost estimating sample case.
- The economics of four cogeneration configurations to supply a fixed amount of steam but varying the quantity of electricity for four different cogeneration cycles.
- The economics of cogeneration by four process routes are compared for petroleum refinery applications.
- The economics of producing hydrogen by the steam reforming process is compared with the economics of trigeneration of electricity, steam and hydrogen by gasification of petroleum coke and combined-cycle power production.
- Economics of cogeneration by an integrated advanced coal gasification and combined-cycle system.

The report is a valuable source of information that would be of interest to project planners, researchers, refinery operators, technology licensors, equipment vendors, government regulators, process developers, engineering contractors, and all those who are interested in reducing energy costs and protecting the environment.



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