

THE MINERAL INDUSTRY OF SINGAPORE

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Singapore is a city state with limited natural resources. The country's strategy is to market itself as a regional service hub focusing on advanced electronics, aerospace, and other high technology industries. The Singapore economy has continuously done well in the past 2 years. In 1996, the gross domestic product (GDP) slowed down to 7.0% compared with 8.9% in 1995. Unit labor costs in manufacturing sector rose 3% and inflation remained negligible at 1.4% in 1996. Electronics output accounts for more than 50% of the country's manufacturing sector and employs about 35% of the country's workforce. The global slowdown in the demand for electronics held Singapore back slightly in 1996.

The Singaporean Government appointed two commissions to study on the country's manufacturing and trading competitiveness in the Asia and the Pacific region. The Government planned to maintain its manufacturing base at its current level of 25% of GDP. Government officials fear that if the manufacturing sector diminishes, then people will forfeit familiarity with new technologies and will start to fall behind. The Government hopes to become a leading center for the innovation and conceptualization of new technologies and production in the Asia and the Pacific region.

Petroleum products are Singapore's second most important manufacturing output behind electronics. Because of its geographical location, at the center of the supply chain from the Middle East to Asia and its four season deep water port, Singapore is the world's third largest refining center after Rotterdam and Houston. Refineries in Singapore have the capacity to process 1.2 million barrels of crude oil daily for the Asia and the Pacific market. These refineries have the capability to process more than 40 different kinds of crude oil, ranging from Middle East countries to Asian countries such as China, Malaysia, and Indonesia.

The downstream integration from petroleum to petrochemicals began in the 1970's. The country's first naphtha cracker started up in 1984. The second naphtha cracker was put into operation in 1996 and is operated by Petrochemical Corp. of Singapore, a 50-50 joint venture between the Netherlands-based Shell Overseas Investment and a consortium of 37 Japanese firms led by Sumitomo Chemical. Full integration of the second naphtha cracker with several downstream projects will be completed in mid-1997. Currently, the country has an annual ethylene output capacity of 1 million metric tons. With the second naphtha cracker is under implementation, the Government has initiated a third naphtha cracker. With approval by the Economic Development Board (EDB), Exxon Chemical Singapore Pte. Ltd., a subsidiary of Exxon Corp. of

the United States, will build an 800,000-metric-ton-per-year (t/yr) naphtha cracker on Jurong Island. The plant is scheduled to come onstream in 2000. Exxon plans to build three plants in the complex that will further refine the cracker's output, including a 450,000-t/yr polyethylene unit, a 275,000-t/yr polypropylene unit and a 150,000-t/yr oxo-alcohol unit. Exxon has chosen M.W. Kellogg Co. of the United States and Chiyoda Corp. of Japan to build the cracker (Chemical Week, 1997).

The chemical sector is important to Singapore. The output value of chemical sector was at \$15.5 billion in 1996, up 10% from 1995, and is expected to continue growing at about the same rate until 2000. The chemical sector accounted for about 37% of total manufacturing investments in 1996. EDB plans to develop a cluster industry in which petrochemical producers act as each other's suppliers at the same location. EDB initiated a land reclamation program to create Jurong Island, as a base for industrial development. The Jurong Island project is an amalgamation of seven islands into a homogenous land mass. The \$4.2-billion project entails reclamation and will increase land area from 1,000 to 2,800 hectares by 2003. A causeway linking the island to the mainland will cost an additional \$280 million. In 1995, EDB set up a \$710-million Cluster Development Fund to enable EDB to share the risks and costs of strategic investment in Singapore. EDB decision on investment on strategic projects is not designed to make profit for the Government, but rather to jump-start strategic projects that investors may not find attractive initially. EDB will eventually sell back its share to the main investors at cost when the project is running profitably (Chemical Week, 1997).

Meanwhile, Singapore Aromatics, the joint venture of Exxon and Amoco of the United States and China American Petrochemical Co. of Taiwan, started up an aromatic complex on Ayer Chawan Island, as part of Jurong Island project. The plant has capacity for 350,000 t/yr of para-xylene and 96,000 t/yr of benzene. On Sakra Island, another component of the Jurong Island project, Hoechst will commission a vinylacetate monomer unit, and Eastman will complete an oxo chemical complex in 1997. Sumitomo is scheduled to complete its acrylics complex in 1998. Numerous feasibility studies are under way for projects that will determine the future structure of the petrochemical sector in Singapore (Chemical Week, 1997).

In addition to establishing manufacturing facilities in Singapore, multinational companies have been setting up Asian regional headquarters and technical centers. BASF of Germany moved its world headquarters for its textile, leather chemicals, and dyes to Singapore.

The Government encourages Singaporean firms to invest abroad to increase the country's external income. The United States continued to be Singapore's major trading partner. The Government has been very active in promoting investment and in setting up industrial parks in China, India, and Vietnam. It provides Singapore-based companies to access to wider markets

and cheaper labor forces.

Reference Cited

Chemical Week, 1997, Singapore approaches next development phase:
Chemical Week, February 19, p. s2.